

WELLHEAD PROTECTION PLAN PART II AMENDMENT

CITY OF BOVEY



“Home of the Picture Grace”

POTENTIAL CONTAMINANT SOURCE MANAGEMENT STRATEGY

This Plan is
in effect from
January 2023
through
January 2033



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& MENK**

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DEPARTMENT
OF HEALTH



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DOCUMENTATION LIST

<u>STEP</u>	<u>DATE PERFORMED</u>
Scoping Meeting 2 Held (4720.5340, subp. 1)	April 22, 2021
Scoping 2 Letter Received (4720.5340, subp. 2)	May 16, 2021
Remaining Portion of Plan Submitted to Local Units of Government (LGUs) (4720.5350)	June 20, 2022
Review Received from Local Units of Government (4720.5350, subp. 2)	August 25, 2022
Review Comments Considered (4720.5350, subp. 3)	August 29, 2022
Public Hearing Conducted (4720.5350, subp.4)	September 21, 2022
Remaining Portion WHP Plan Submitted (4720.5360, subp. 1)	October 1, 2022
Final WHP Plan Review Received (4720.5360, subp. 4)	January 2023

PUBLIC WATER SUPPLY PROFILE

PUBLIC WATER SUPPLY

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GENERAL INFORMATION

UNIQUE WELL NUMBER(S) 228834 – City Well #1
POPULATION SERVED: 802
CONNECTIONS: 334
COUNTY: Itasca County

Members of the Wellhead Protection Team

NAME	REPRESENTING
Kevin Odden	Public Works Supervisor, City of Bovey
Joseph Pelawa	City Engineer, Bolton and Menk, Inc.
Chris Parthun	Principal Planner, MDH
Marilyn Bayerl	Bayerl Water Resources

ABBREVIATIONS

BMP	Best Management Practices	MNDOT	MN Department of Transportation
BWSR	Board of Water and Soil Resources	MPCA	MN Pollution Control Agency
CSAH	County State Aid Highway	MRWA	MN Rural Water Association
CRP	Conservation Reserve Program	NRCS	Natural Resources Conservation Services
DNR	MN Department of Natural Resources	PCSI	Potential Contaminant Source Inventory
DWSMA	Drinking Water Supply Management Area	ppb	Parts per Billion
EQIP	Environmental Quality Incentive Program	PWS	Public Water Supply
GPS	Global Positioning Systems	ROW	Right-of-way
IWMZ	Inner Wellhead Management Zone	SWCD	Soil & Water Conservation District
MDA	MN Department of Agriculture	TBD	To be determined
MDH	MN Department of Health	TOT	Time-of-travel
mg/L	Milligrams per Liter	WHP	Wellhead Protection
MGS	Minnesota Geological Survey	WHPA	Wellhead Protection Area

EXECUTIVE SUMMARY

Part Two of The City of Bovey's Wellhead Protection Plan Amendment speaks to sections 4720.5220 through 4720.5290 of MN Rules. This portion of the plan is based on the requirements outlined in the scoping document found in [Appendix II](#) of this plan. It addresses:

- Data elements and their assessments
- Impact(s) of changes on the Public Water Supply Well
- Issues, problems and opportunities
- Wellhead protection goals
- Objectives and action plans
- Program evaluation
- Alternative water supply / contingency strategy

In the Part One of the City's WHPP, the delineation of the Wellhead Protection Area (WHPA), the Drinking Water Supply Management Area (DWSMA), vulnerability of the well, and vulnerability status of the aquifer in which the City's wells are located were completed and approved by the Minnesota Department of Health. This information was utilized in the completion of this document and can be found in [Appendix I](#).

The City of Bovey is in Itasca County. It is mainly comprised of developed properties. The amended DWSMA is shown in [Figure One](#). [Figure Two](#) depicts the original and current DWSMA. The DWSMA has decreased in size from 6,208.5 acres to 351.8 acres. With the removal of the surface water contributions to the drinking water supply aquifer, the mine pit drainage area was no longer a consideration and the 10-year time-of-travel was utilized to delineate the DWSMA.

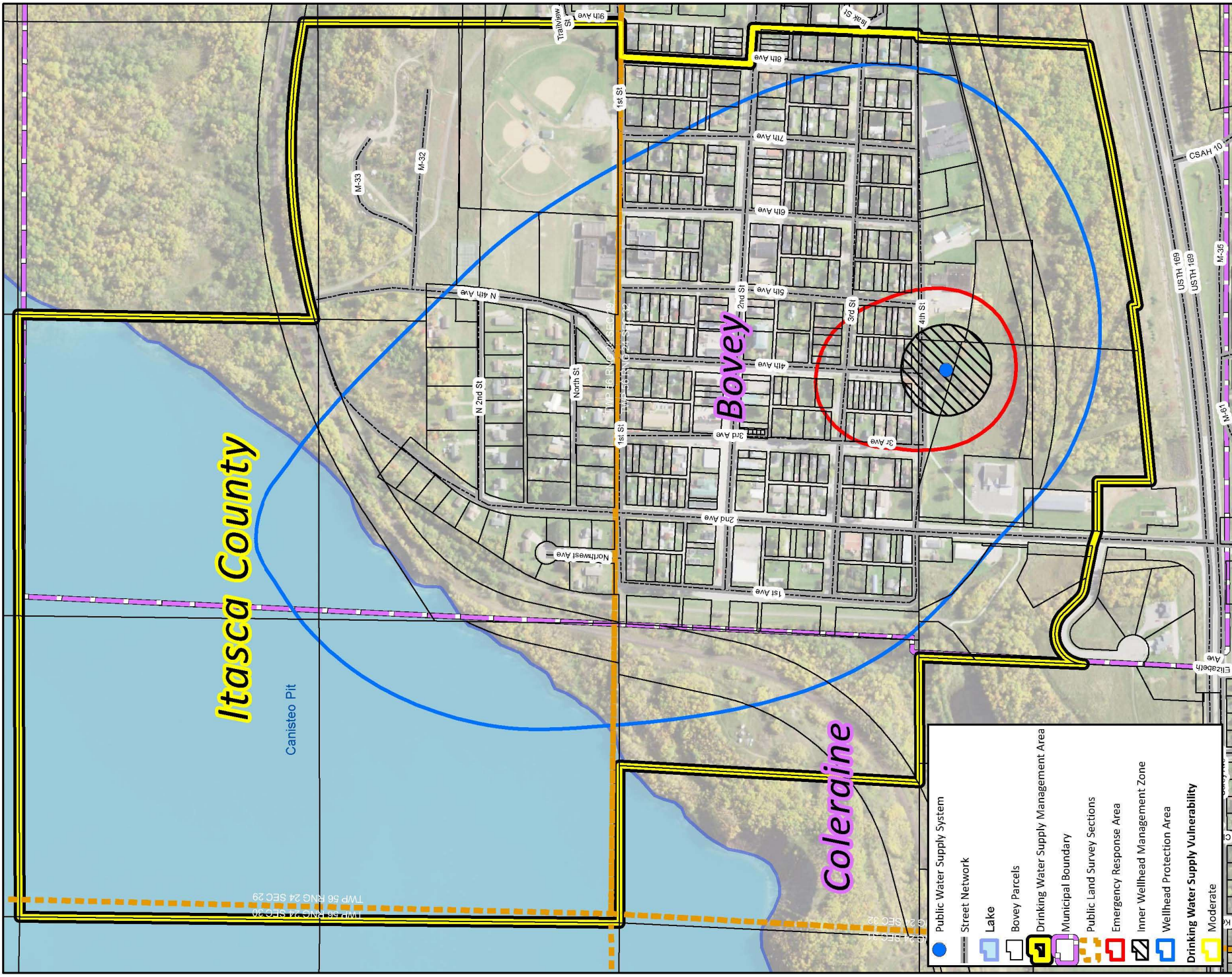
Geologic conditions at the wells include a potentially non-contiguous cover of clay-rich geologic materials over the aquifer. This, along with Tritium in the city well aquifer, determined the vulnerability status as moderately vulnerable.

The moderately vulnerable status calls for inventory of most potential contaminant sources located within the DWSMA. Management strategies identified in Chapter Five identify actions the city and the WHP team can focus on for the next ten years. These strategies focus on the following areas of concern: inner wellhead management zone, tanks, wells (unsealed - unused, high capacity, class V and residential), leaks sites, and education. Sealing existing wells that can be connected to the utility and public education are the highest priorities in this plan.

The City of Bovey and the WHP team intend to work with Itasca County Soil and Water Conservation District (SWCD) and State and local agencies to promote the completion of a geological survey and the process of completion of the One Watershed, One Plan (1W1P) project for the Mississippi River Grand Rapids watershed.

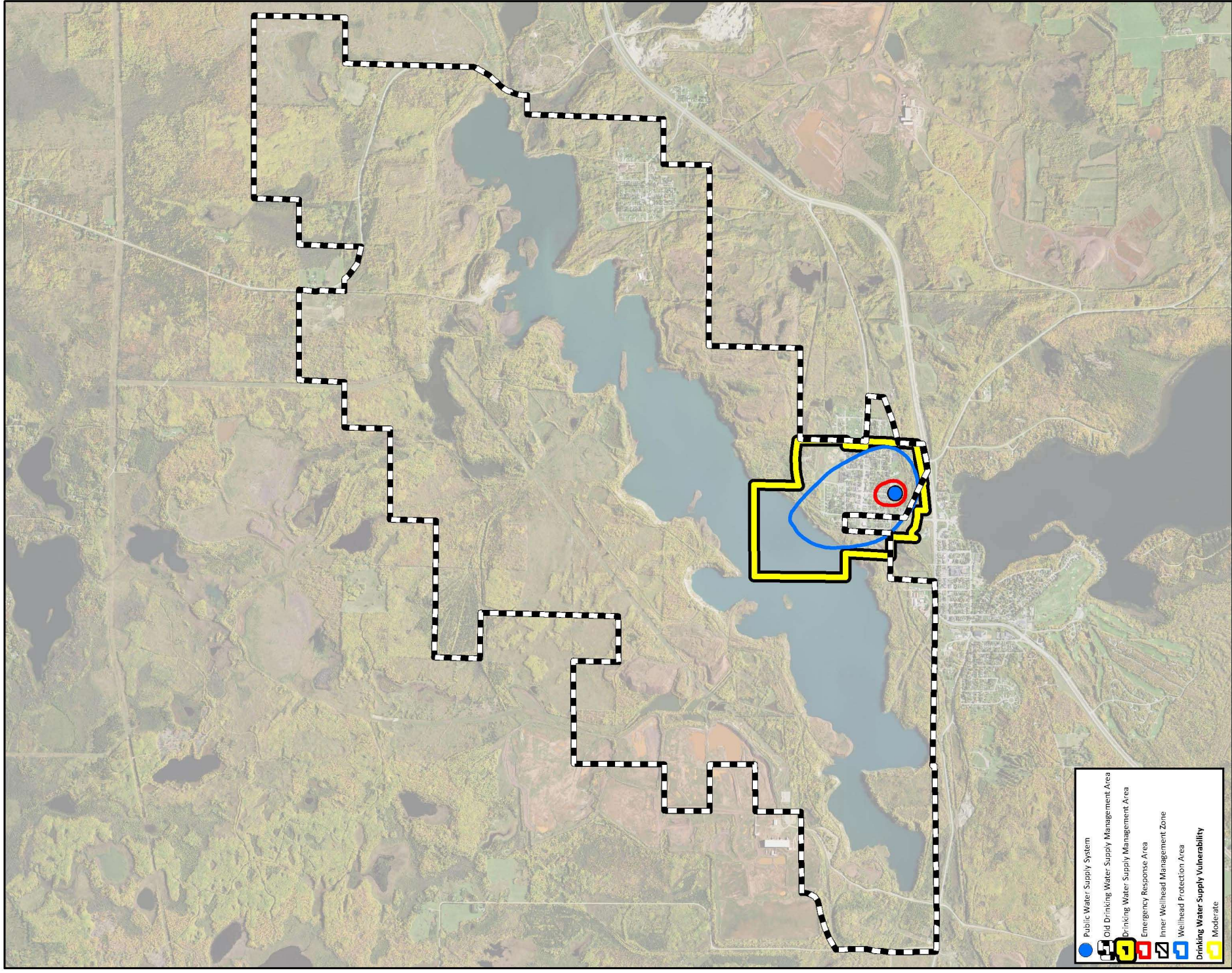
The majority of the area is fully developed and the City of Bovey DWSMA lies within the City of Coleraine's DWSMA. A cross-connection exists with the Coleraine city wells. The City is willing to work with Coleraine on completion and implementation of their plan.

It is the hope of the WHP team that through increased public awareness, habits will be established that will decrease the potential for future water problems and the community can continue to enjoy the current quality of water they have come to expect.



BOVEY - DWSMA
 Old and New Drinking Water Supply Management Areas (DWSMA)

Figure Two
 0 415 830 1680 Feet
 High resolution by Esri, Microsoft, DeLorme, CNES



- Public Water Supply System
- Old Drinking Water Supply Management Area
- New Drinking Water Supply Management Area
- Emergency Response Area
- Inner Wellhead Management Zone
- Wellhead Protection Area
- Drinking Water Supply Vulnerability
- Moderate

CHAPTER ONE
DATA ELEMENTS/ASSESSMENT
Minnesota Rules 4720.5200

I. REQUIRED DATA ELEMENTS

A. PHYSICAL ENVIRONMENT DATA ELEMENTS

1. Precipitation

Precipitation is measured at multiple sites within Itasca County through the Soil and Water Conservation District volunteer and other programs. Data from the sites are compiled and made available on the State Climatology Website at: <http://climate.umn.edu/hidenannual/>. Precipitation is not considered to be an issue in this plan due to the determined moderate vulnerability.

2. Geology

Geologic data elements pertinent to the Wellhead Protection Area (WHPA) delineation and vulnerability status are included in Part One of this Wellhead Protection Plan (WHP) and were utilized in the delineation. Part One can be found in [Appendix I](#) and is on file with the Minnesota Department of Health (MDH) and the City of Bovey.

There is currently no existing geologic atlas for Itasca County. The Itasca SWCD is investigating the feasibility of completing this important survey for the county. This would be helpful in future wellhead plan groundwater studies. The city will support the completion of this project as is feasible.

The city of Bovey's well is 92-feet and lies in the Quaternary Buried Artesian aquifer. The well was drilled in 1953. Due to the detection of Tritium in the city well, the DWSMA has moderate vulnerability rating.

3. Soils

Due to the moderate vulnerability of the aquifer, soils are not a required data element when determining potential contaminant sources.

4. Water Resources

The city of Bovey DWSMA includes a portion of the Canisteo Mine Pit Lake (DNR Lake number 31132504) within its boundary. It encompasses 1,458 acres and has a maximum depth of 311-feet. An unnamed waterway flows in a southwesterly direction from the outlet of the Canisteo Mine Pit and eventually ends up in Trout Lake as shown in [Figure Three](#). This outlet was used in the past when mining occurred to prevent flooding, but is no longer in use/flowing. This is part of the Mississippi River Grand Rapids Watershed (HUC8 - 07010103). The watershed is located in the Upper Mississippi River Basin in central Minnesota. The watershed within the DWSMA is the Trout Lake Watershed (HUC12 - 070101030404).

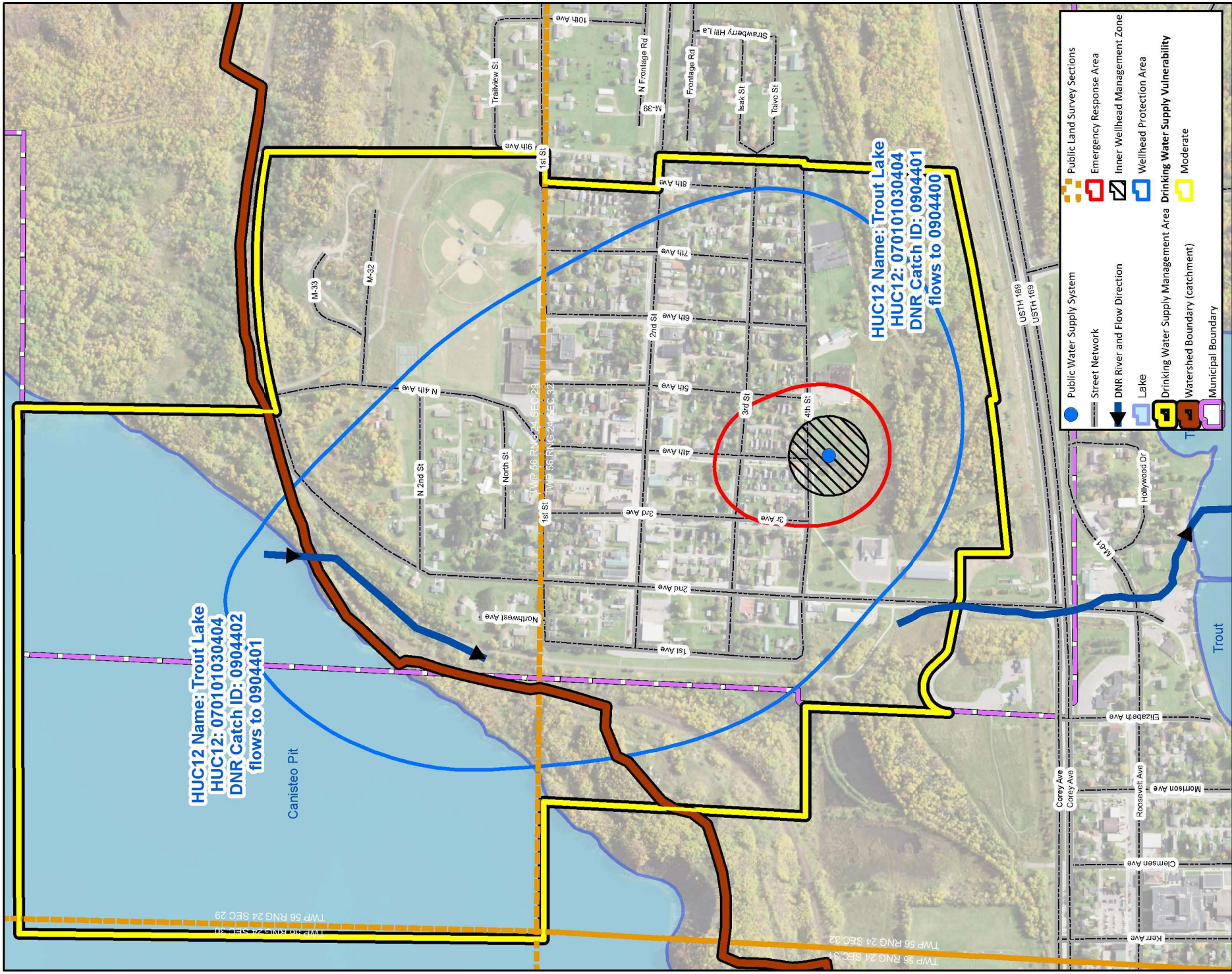
The Itasca SWCD is leading a One Watershed One Plan (1W1P) process for the Mississippi River Grand Rapids Watershed. This focuses on planning within the watershed boundaries and involves multiple units of government. The city will participate in the 1W1P process as feasible. A "Watershed Monitoring and Assessment Report" was completed in 2018 and can be found at:

<https://www.pca.state.mn.us/sites/default/files/wq-ws3-07010103b.pdf> .

There are about 120 acres of wetland and no floodplain or ditches within the city of Bovey DWSMA. Due to the moderate vulnerability of the aquifer, surface water is not a required data element when determining potential contaminant sources.

Figure Three

BOVEY - DWSMA
Water Layer



HUC12 Name: Trout Lake
HUC12: 070101030404
DNR Catch ID: 0904402
flows to 0904401

HUC12 Name: Trout Lake
HUC12: 070101030404
DNR Catch ID: 0904401
flows to 0904400

	Public Water Supply System
	Street Network
	DNR River and Flow Direction
	Lake
	Drinking Water Supply Management Area
	Watershed Boundary (catchment)
	Municipal Boundary
	Public Land Survey Sections
	Emergency Response Area
	Inner Wellhead Management Zone
	Wellhead Protection Area
	Drinking Water Supply Vulnerability
	Moderate

B. LAND USE DATA ELEMENTS

1. Land Use

Land use/cover for the city of Bovey's DWSMA is as shown in [Figure Four](#) and [Table A](#). This information is based on the 2020 National Agricultural Statistics Service from the United States Department of Agriculture, along with edits from local knowledge. The predominant land cover within the DWSMA is developed at thirty-seven percent. Open water makes up the other high use at near thirty-four percent. Tree cover and wetlands comprise most of the remainder. Land use does not have a known effect on the drinking water supply wells.

CITY OF BOVEY DWSMA		Table A	
CURRENT LANDUSE / LAND COVER	ACRES	% of DWSMA	
Barren	1.3	0.4	
Agricultural	0.4	0.1	
Developed	128.9	36.6	
Grass/Pasture	7.9	2.3	
Open Water	117.8	33.5	
Shrubland	9.0	2.6	
Tree Cover	49.3	14.0	
Wetlands	37.1	10.5	
Total	351.7	100.0	

2. Zoning

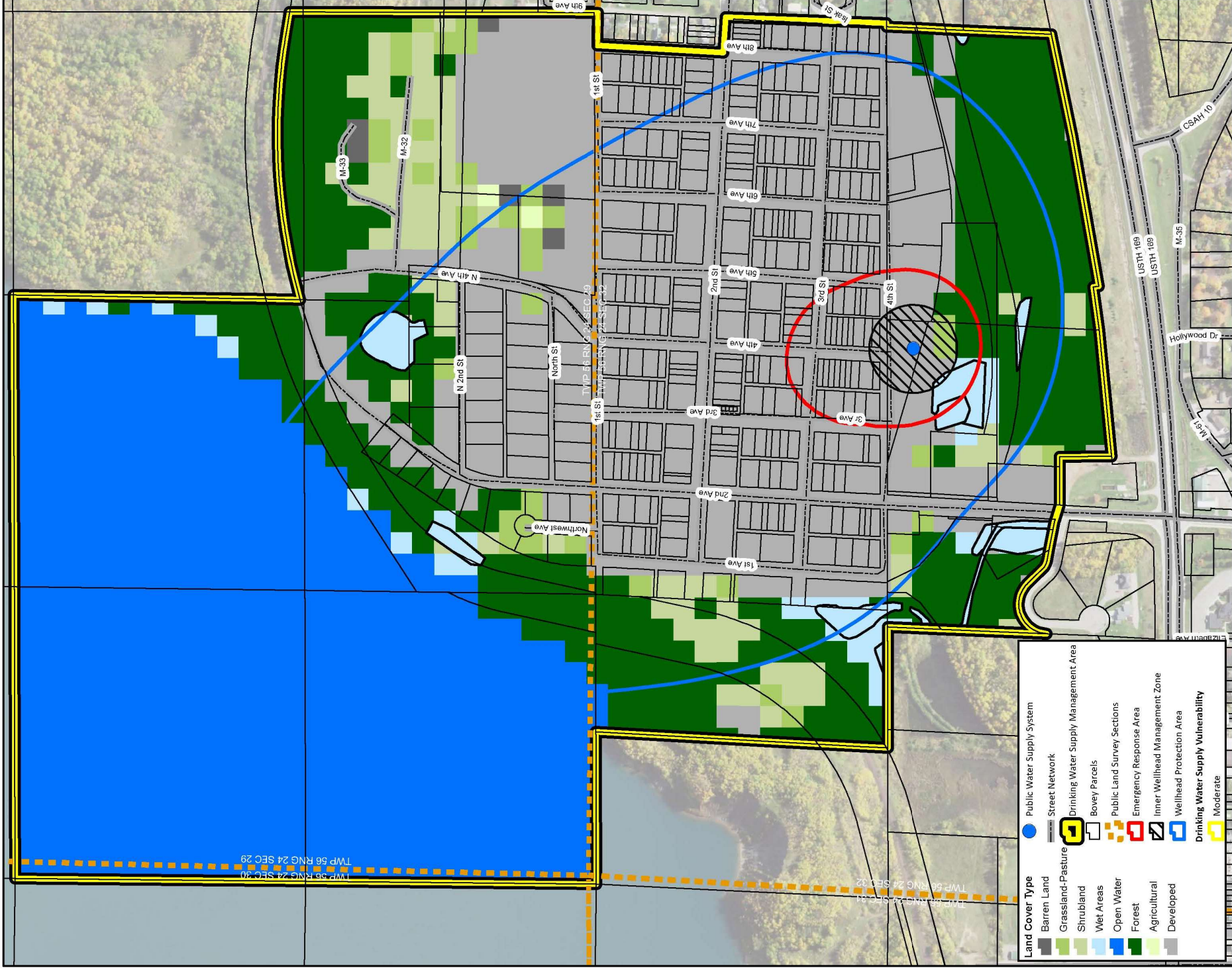
Zoning is shown in [Figure Five](#) and [Table B](#). The DWSMA is located within the City of Bovey and the City of Coleraine. Just over seventy-two percent of the DWSMA area is located within the city limits of Bovey. Approximately twenty-eight percent in Coleraine. Zoning in Coleraine is Tourism Recreational on the upland portion and Mining within the Canisteo Mine Pit.

Over forty percent of the DWSMA is zoned residential. Mining is the next highest zoning and the rest is a mix of business and tourism. A complete listing of parcels within the DWSMA is available in [Appendix III](#).

CITY OF BOVEY DWSMA		Table B		
CURRENT ZONING	City of Bovey Acres	City of Coleraine Acres	% of DWSMA	
Business	32.2		9.2	
Business – Industrial (Proposed)	19.5		5.5	
Business Residential	8.8		2.5	
Mining	52.8	75.9	36.6	
Mobile Business Residential	5.3		1.5	
Public	25.3		7.2	
Residential	107.4		30.5	
Residential – Mobile	2.1		0.6	
Tourism		22.4	6.4	
Total	253.5	98.3	100.0	

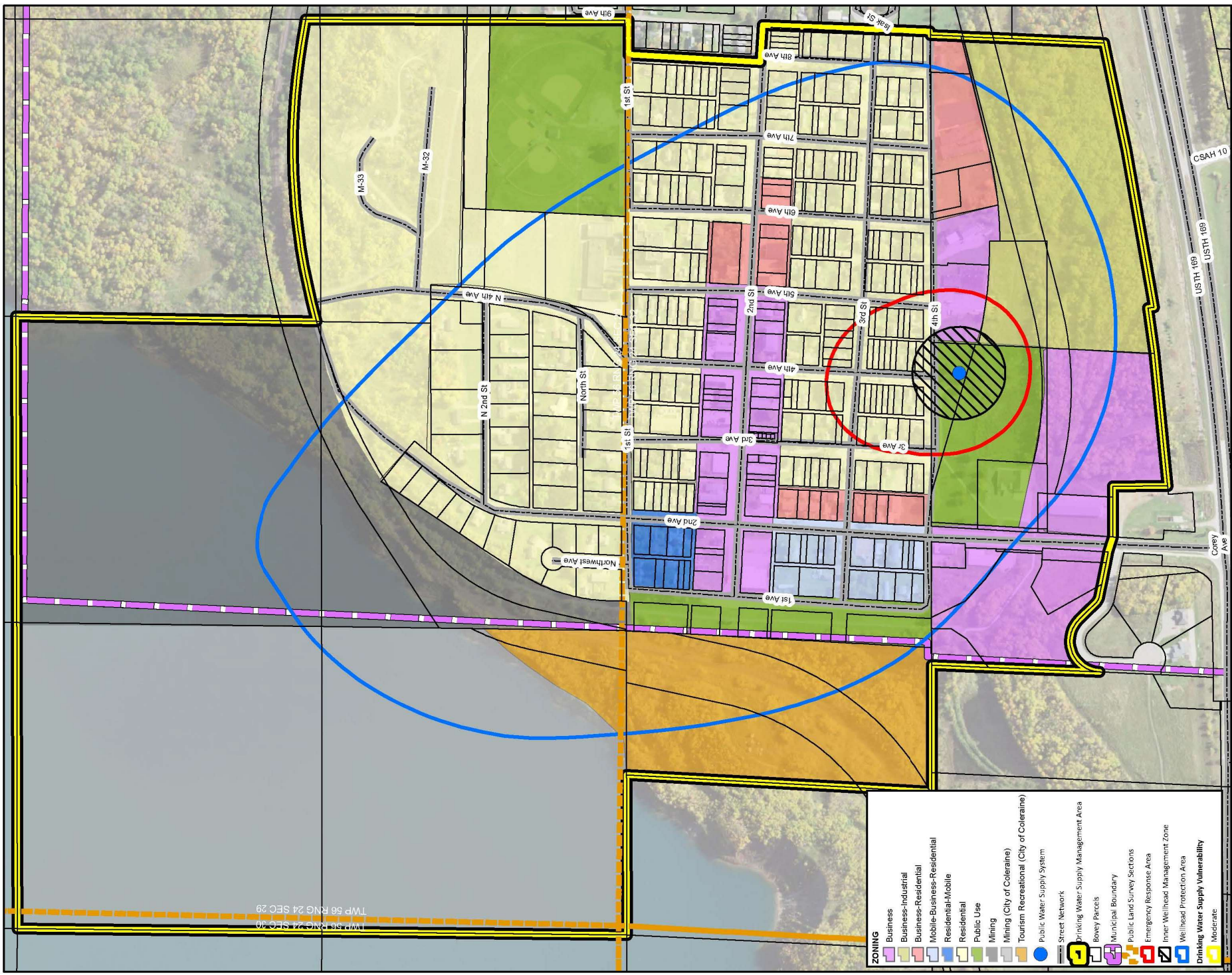
BOVEY - DWSMA
Land Cover

Figure Four
0 70 140 210 Feet
Data provided by Esri, Phoenix, Illinois, GIS
Map produced by Esri, Phoenix, Illinois, GIS





TWP 55S R10E S21, S10, Q 30
TWP 56 R10E S21, S10, Q 30



ZONING

- Business
- Business-Industrial
- Business-Residential
- Mobile-Business-Residential
- Residential-Mobile
- Residential
- Public Use
- Mining
- Mining (City of Coleraine)
- Tourism Recreational (City of Coleraine)
- Public Water Supply System
- Street Network
- Drinking Water Supply Management Area
- Bovey Parcels
- Municipal Boundary
- Public Land Survey Sections
- Emergency Response Area
- Inner Wellhead Management Zone
- Wellhead Protection Area
- Drinking Water Supply Vulnerability
- Moderate

3. Future Land Use

The City of Bovey has a Comprehensive Plan completed in 2009 with a 2014 update with future planning for zoning revisions that are updated on a regular basis. The proposed zoning map shown in **Figure Six** shows proposed changes within the DWSMA. A summary of the changes can be seen in **Table C**. These changes are proposed for thirty percent of the DWSMA and would better define the existing residential properties. It would also combine the business, commercial, and industrial use areas and define a business park area.

CITY OF BOVEY DWSMA		<i>Table C</i>	
PROPOSED FUTURE LANDUSE/ZONING	ACRES	% of DWSMA	
Business Park	17.8	4.7	
BCI -	23.7	6.3	
R1 -	48.6	12.9	
Proposed Public Use	24.0	6.4	
Total	114.1	30.4	

The City of Coleraine has a Comprehensive Plan completed in 2015. It addresses land use/zoning changes in both Coleraine and Bovey.

This document can be found at: <https://www.cityofcoleraine.com/wp-content/uploads/2019/01/COLERAINECOMPPLANfinalPrint-2015.pdf>

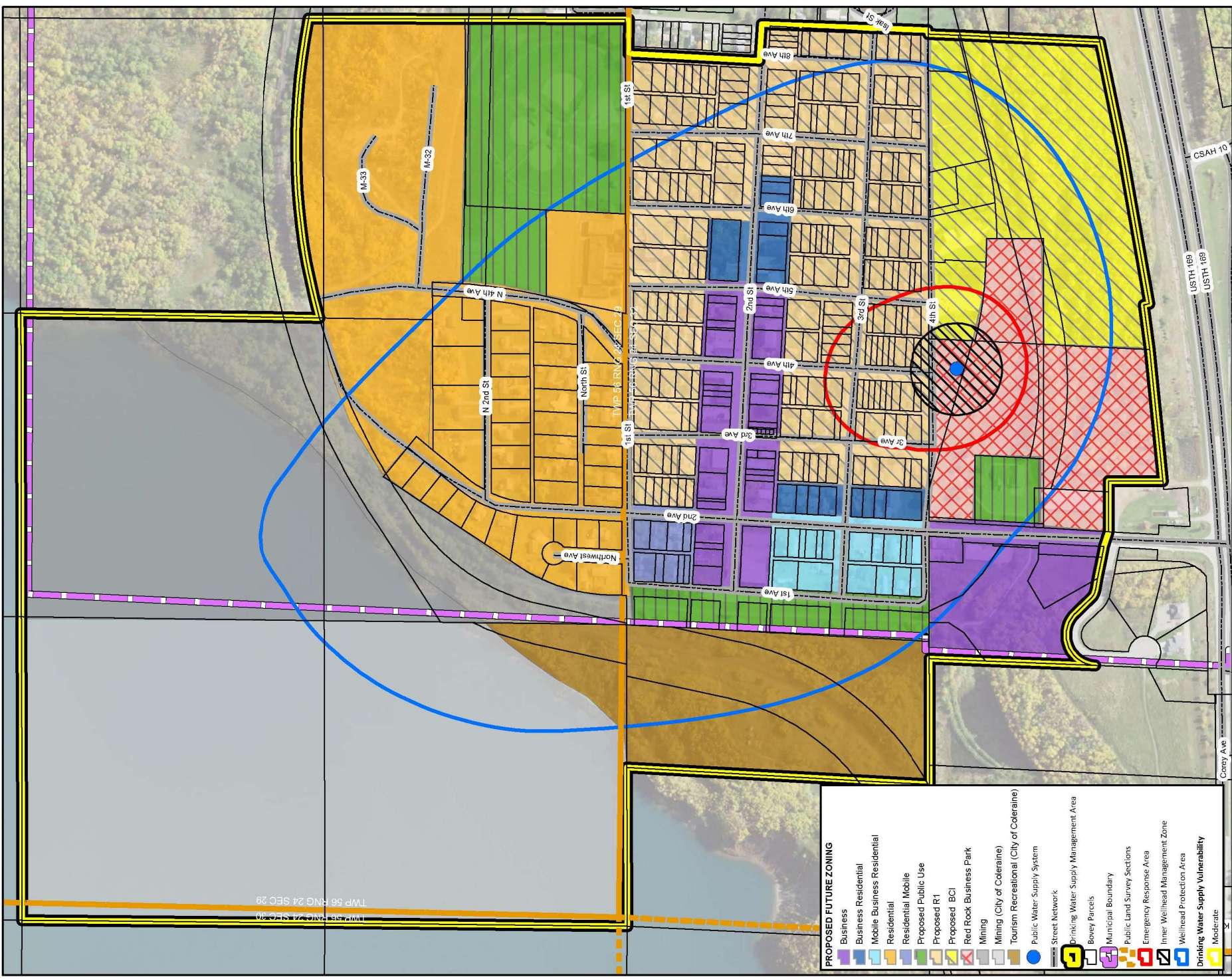
Annexation is petition driven and no annexation is expected within the DWSMA of the City of Bovey.

Itasca County future land use planning was completed in 2000 and amended in 2013. This plan addresses mining and supports wellhead protection planning. None of the DWSMA area lies outside the city limits of either Bovey or Coleraine. A copy of the plan can be found at:

<https://www.co.itasca.mn.us/DocumentCenter/View/632/Comprehensive-Land-Use-Plan>

BOVEY - DWWSMA
Proposed Future Zoning

Figure Six
Scale: 0 65 130 260 Feet
Map Produced by Rock, Wood, & Stone, GIS



4. PCSI

A Potential Contaminant Source Inventory (PCSI) was conducted by the city with the assistance of the MDH, MPCA and Itasca County as well as local well drillers. Some of the contaminant sources were identified based upon databases and information supplied by various State and Federal Agencies. These items include located, unlocated and sealed wells, Class V wells, tanks, leak sites and potential contaminants of concern. This information was verified by the WHP Team and endorsed by the MDH. Further verification and mapping of the data will be included in the management strategies found in Chapter Five.

The following **Table D** and **Figure Seven** contains the potential sources of contamination along with the level of risk they were assigned by the wellhead team. All are considered priority #1 by the wellhead team. A listing of properties with a potential contaminant source - including wells, along with parcel identification is included in **Appendix III**. The maps and list of these contaminant sources will be used by the City to educate and contact landowners that they are located within the DWSMA and about the impact these items may have on the city of Bovey's PWS wells.

Table D – Potential Contaminant Source Inventory

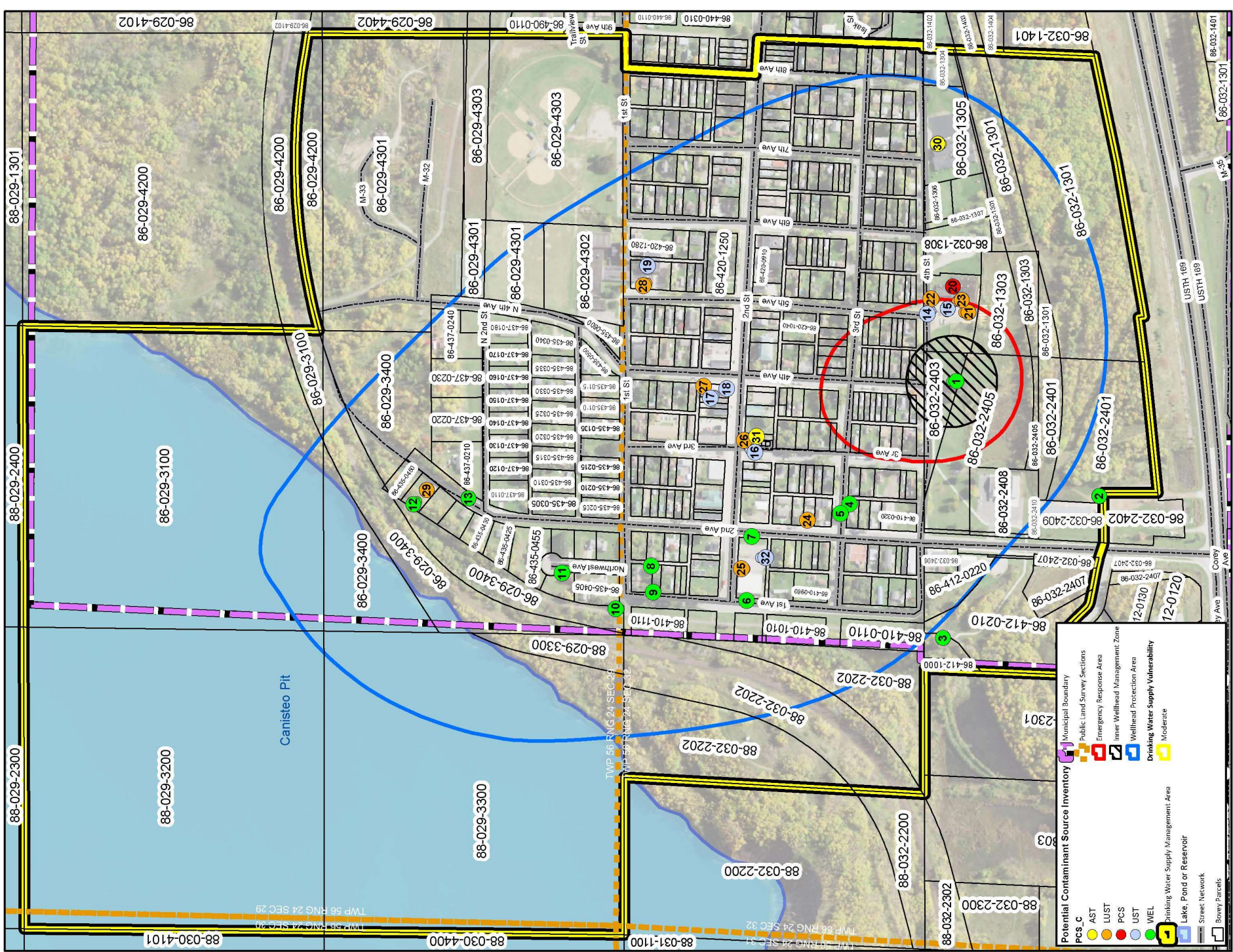
Potential Source Type *A=Active, I=Inactive, R=Removed, C=Closed, U=Unknown L=Level of Risk (H=High, M=Medium, L=Low)	Total No.	City of Bovey DWSMA Potential Contaminants						Level of Risk
		A	I	R	C	U		
AST - Above Ground Storage Tank	3			3				L
LUST - Leak Site	9	1			8			H/L
PCS – Potential Contaminant Site	1				1			L
UST – Underground Storage Tank	19	3	1	15				M/L
WEL – Public Water Supply Well	1	1						L
WEL – Observation Well	12	11					1	L
TOTAL	45	16	1	18	9	1	1	

All known wells have been identified and located. Unlocated wells utilized for this PCSI have been either located within the DWSMA or determined to be outside the DWSMA. Those located outside the DWSMA have not been included in the PCSI. There are thirteen wells within the DWSMA. One is the public supply well, the rest are monitoring/observation wells. Inactive wells and any new wells found will be assessed for sealing potential. If any are found, education will be provided to property owners about the risks of unused/unsealed wells and incentives to seal them will be pursued. There is one unknown well (PCSI ID#3) that is 362-foot deep. The city will work with MDH and the property owner to locate and seal the well if possible.

There is one active and eight closed leak sites, along with a closed potential contaminant site. The active site is a high level of risk, and the closed sites are low. The city will stay in connection with the MPCA regarding the status of the active site. It is important for the city to understand the location in the event the chemicals show up in the drinking water supply wells. The MPCA is the regulatory authority for these sites.

BOVEY - DWWSMA
Potential Contaminant Source Inventory

Figure Seven
0 62.5125 250 Feet
This source is located in the City of Bovey.
Map prepared by: Planning Department



Potential Contaminant Source Inventory

- PCS, C**
 - AST
 - LUST
 - PCS
 - LUST
 - MEL
- Drinking Water Supply Management Area
- Lake, Pond or Reservoir
- Street Network
- Bovey Parcels
- Municipal Boundary
- Public Land Survey Sections
- Emergency Response Area
- Inner Wellhead Management Zone
- Inner Wellhead Management Area
- Wellhead Protection Area
- Drinking Water Supply Vulnerability
 - Moderate

Underground storage tanks provide a potential threat as they can become leak sites. There are three active UST on two different parcels. These provide a moderate threat to the drinking water supply aquifer. Information will be provided to these properties. There is an inactive underground tank (PCSI ID#19) that is unknown. The city will determine the location and work with the property owner to remove if feasible. The fifteen removed UST and three removed AST provide no threat unless also designated as a leak site.

There are no pipelines located within the DWSMA.

Class V injection 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 commercial and industrial septic systems. Class V wells are a concern because, in some situations, they may pose a risk to underground sources of drinking water. The risk a Class V well may present depends on factors such as: the type of fluid(s) it receives, its location in relation to water supply sources, its construction, maintenance and local geology. There are no known Class V well in the DWSMA. Existing land uses, management and local land use controls within the Inner Well Management Zone (IWMZ or 200' radius around the public water supply wells) and the immediate one-year time of travel area is shown in [Table E](#) and was reviewed and considered by the WHP team during the development of this plan. This is done to identify land use issues and related potential contaminants which may have the most immediate impact upon the public water supply wells.

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

Source Type	Well 1	Risk
SB2 – Sewer, buried, collector, municipal, serving a facility handling infectious or pathological wastes, open-jointed or unapproved materials.	1	H
PT3 – Petroleum tank or container, buried, between 56 and 1100 gal.	1	L
WT2 – Water treatment backwash disposal area.	1	L

The WHP team discussed the importance of on-going monitoring for land use changes and potential contaminants near the public water supply wells, awareness of the State Well Code isolation distances and the need to maintain these setback requirements. The area around the wells consists mainly of public land and is city owned. A copy of the IWMZ form and measures that have been identified are included in [Appendix IV](#). Management Strategies to address recommendations in the inventory and protect this area will be considered in Chapter Five of this plan.

5. Public Utility Services

Public utilities and infrastructure that may impact groundwater quality in the DWSMA were considered in the development of this plan. Public utility maps are not included in this plan as they are not available in a digital format, but are available at the city offices and public works. Digital copies would be a useful tool for planning within the DWSMA. A transportation map is shown in [Figure One](#). There are no major roadways located within the DWSMA.

Spill response is managed by contacting the MN State Duty Officer for state highways and the Itasca County Emergency Management office for county roads.

The Alternate Water Supply / Contingency Strategy prepared by the city addresses options for back up water supplies and emergency preparedness in the event of a disruption in services such as a watermain break or catastrophic event such as a hazardous release that may impact the public water supply. It can be found in [Appendix VI](#) of this Plan and at city hall.

The Old Municipal Well Inventory is found in [Appendix V](#). The city will review the inventory and verify locations and/or sealing records. The city will work with MDH to identify and seal any unused municipal or cross-connected wells.

C. WATER QUANTITY DATA ELEMENTS

1. Surface Water Quantity

Surface water quantity is not a consideration in this moderately vulnerable DWSMA.

2. Groundwater Quantity

The aquifers appear to have adequate recharge to meet city needs and there are no indications of impact from other high-capacity wells in the area. Well interferences are addressed in the Part One Plan.

D. WATER QUALITY DATA ELEMENTS

1. Surface Water Quality

Surface water quality is not a consideration in this moderately vulnerable DWSMA.

2. Groundwater Quality

No exceedance was found in any of the other MDH tested parameters over the past ten years. Tritium is a radioactive isotope of hydrogen that was released into the atmosphere during testing of hydrogen bombs. When Tritium is found in groundwater in amounts greater than one tritium unit, it is an indicator that recharge due to rainfall has occurred in the United States since 1953. Tritium analysis was conducted on the city well with a level of 6.5 tritium units detected. The moderate vulnerability of the drinking water aquifer was determined based on this information and the chloride/bromide ratios discussed in the Part One Plan.

According to the Part One Plan, chloride/bromide ratios indicate influences from land use activities such as road de-icing.

II. ASSESSMENT OF DATA ELEMENTS

A. USE OF THE WELL

The City of Bovey utilizes one well at 92-feet deep. They have one elevated storage tower containing a 125,000-gallon capacity. The city well pumps an annual average of 90,000 gallons per day. They have an emergency interconnect with Coleraine Well #4 (ID# 110457), which is co-owned with the City of Coleraine and is connected to the distribution system. It is an active primary well designated for emergency use. Treatment includes fluoridation and filtration.

The city provides service to 334 non-metered connections through appurtenant distribution mains, lines, and services. The volume of water pumped from 2017 through 2021 is shown in [Table F](#) has ranged from a low of 21.4 million-gallons in 2017 to a high of 34.6 million-gallons in 2021. Water use is expected to remain stable.

ANNUAL WELL PUMPING AMOUNTS (IN MILLIONS OF GALLONS) FOR WELL #1 (228834)					
	2017	2018	2019	2020	2021
	21.4	24.9	30.9	29.4	34.6

Table F

The installation of other high-capacity wells or increases in water use beyond permitted appropriation levels may affect the delineated WHPA and DWSMA and subsequently require a revision of this WHPP.

B. WELLHEAD PROTECTION AREA DELINEATION CRITERIA

The following data inputs were used in determination of the boundaries of the wellhead protection area.

1. Time of Travel
2. Flow Boundaries
3. Daily Volume
4. Ground Water Flow Field
5. Aquifer Transmissivity

A detailed discussion of the delineation is found in Part One of the plan, supplied in [Appendix I](#) of this document.

C. QUALITY AND QUANTITY OF WATER SUPPLYING THE PUBLIC WATER SUPPLY WELL

The city has an adequate supply of groundwater to provide services to its customers. Well interferences are addressed in the Part One Plan. The City of Coleraine’s two wells were considered in the delineation of the capture area. There are no known well interferences within the DWSMA.

Results of routine sampling conducted by the MDH has shown no violations of any parameters monitored under the Safe Drinking Water Act.

D. THE LAND AND GROUNDWATER USES IN THE DRINKING WATER SUPPLY MANAGEMENT AREA

The land use within the DWSMA is mainly developed residential. Proactive management of existing wells, unsealed, unused wells, tanks, leak sites, and potential class V wells are of concern due to the moderately vulnerable rating of the aquifer. Potential Contaminant Sources are discussed and addressed in the Management Strategies of this plan.

CHAPTER TWO

IMPACT OF CHANGES ON PUBLIC WATER SUPPLY WELL

Minnesota Rules 4720.5220

I. CHANGES IDENTIFIED IN:

A. PHYSICAL ENVIRONMENT

There are no expected changes to the physical environment within the DWSMA.

B. LAND USE

No expected changes in land use within the DWSMA.

C. SURFACE WATER

No expected changes in surface water within the DWSMA.

D. GROUNDWATER

No expected changes in groundwater within the DWSMA.

II. IMPACT OF CHANGES

A. EXPECTED CHANGES IN WATER USE

There are no expected changes to water use.

B. INFLUENCE OF EXISTING WATER AND LAND GOVERNMENT PROGRAMS AND REGULATION

The City of Bovey has regulatory jurisdiction over the DWSMA within the city limits. They have ordinances in place to require hook-up to the public water supply if water is available to the property.

Ordinances to ensure prevention of cross-connection into the city system from local residents are also in place. The city has an existing cross-connection with the City of Coleraine.

The City of Coleraine has regulatory jurisdiction within the areas outside the Bovey city limits.

Itasca County updated their Comprehensive Local Water Management Plan (CLWMP) in 2019. This plan identifies priorities within the County. Priorities from the CLWMP currently include protection of the groundwater resources, participation in wellhead protection planning, assistance in education, and assistance with mitigation of potential contaminants.

C. ADMINISTRATIVE, TECHNICAL, AND FINANCIAL CONSIDERATIONS

The City of Bovey has been supportive of Wellhead Protection efforts. A Wellhead Team has been formed and has been actively involved in the planning process.

The City of Bovey will be responsible for implementation of this plan. The Wellhead Protection Team will continue to meet periodically to review and discuss implementation programs.

Itasca County Planning and Zoning and Local Water Planning have provided technical assistance for this plan, along with local experts such as the Itasca SWCD.

CHAPTER THREE
ISSUES, PROBLEMS, AND OPPORTUNITIES
 Minnesota Rules 4720.5230

Issue Identified	Impacted Feature	Problem Associated with the Identified Issue	Opportunity Associated with the Identified Issue	Adequacy of Existing Controls to Address the Issue
Limited information for next delineation	Aquifer Well water quality DWSMA	The MDH has limited information regarding wells and monitoring.	The city will consider recommendations from MDH on data gathering and monitoring.	N/A
High chloride bromide ratios	Aquifer Well water quality	Higher chloride bromide ratios indicate potential influence from land use.	The city will investigate mitigation opportunities for road salt storage and use.	The city has regulatory authority over road salt on city streets only.
Wells in DWSMA – monitoring, unknown, OB Well	Aquifer Well water quality DWSMA	A deep observation well (PCSI ID#3) with large casing exists within the DWSMA – status unknown.	The city can attempt to work with MDH to locate the well and determine sealing status – they can offer well sealing to property owner if appropriate.	The city does not have regulatory authority over wells and cannot require sealing. MDH has well authority
Leak sites are located within the DWSMA.	Aquifer Well water quality DWSMA	Leak sites may pose a threat to the public water supply aquifer.	The city will notify MPCA if monitoring in public water supply wells show indication of potential contamination.	The city does not have authority to regulate tanks. The MPCA has authority to regulate tanks.
Website	Well water quality Well water quantity	The city website does not currently have information for water conservation and wellhead protection education.	The city can apply for MDH SWP funding to create the water conservation and wellhead protection portion of the website.	The city currently manages their website.
The city may have inadequate protection ordinances.	Aquifer Well water quality DWSMA	The city needs to protect the drinking water aquifer.	The city can apply for MDH grant funding to assess and update ordinances if needed.	The city has regulatory authority over the utilities.
The city does not have alternate power for wells in the event of an outage	Well water quantity	The city does not have the ability to provide power in the event of power outage.	The city can apply for MDH SWP grant funds to assist in the purchase and installation of a generator, wiring and automatic transfer switch.	The city owns the property surrounding the PWS wells.
Well Security	Aquifer Well water quality	The city may have inadequate protection of the wellfield.	The city can assess security needs and apply for MDH SWP funding if needed.	N/A
Itasca County is leading the 1W1P for Mississippi River-Grand Rapids and the City of Coleraine is also amending their WHPP.	Aquifer Well water quality	The 1W1P has the potential to add groundwater protection strategies and funding. The city shares a cross-connection and lies within the City of Coleraine DWSMA.	The city can participate in the planning efforts of these two projects to the extent feasible to advocate for groundwater protections.	The city does not have regulatory authority for either of these projects.

Issue Identified	Impacted Feature	Problem Associated with the Identified Issue	Opportunity Associated with the Identified Issue	Adequacy of Table G Existing Controls to Address the Issue
Geologic Atlas	Aquifer	Itasca County is working on establishing funding to complete a geologic atlas to provide updated groundwater information.	The city can support this project as is feasible, minimally with a letter of support.	N/A
Tanks within DWSMA	Aquifer Well water quality	There is an inactive underground tank (PCSI ID#19) that is unknown.	The city will determine the location and work with the property owner to remove if feasible.	The city does not have regulatory authority over tanks. MPCA is the regulatory authority for underground and above ground tanks.
Old Municipal Well Inventory – uncertainty of unused/unsealed city wells	Aquifer Well water quality DWSMA	It is unknown if wells presented in the inventory exist and/or if they are sealed.	The city can utilize the information provided by MDH and MDH Well Management to assist in location and determination of status.	The city can seal wells on city property but does not have authority to require sealing on private property. MDH has well regulatory.
There may be unknown Class V Wells located in the DWSMA.	Aquifer Well water quality DWSMA	The city needs to inform property owners of what a Class V Well is and how to report.	The city can apply for MDH grant funding to inform the property owners within the DWSMA.	The EPA has authority over Class V Wells in Minnesota.

Table G outlines the issues, problems and opportunities determined by the wellhead team to be priorities during the 10-year implementation phase of this plan. It is difficult to foresee or plan for the future. The City of Bovey will use its planning and management capabilities within this plan to respond to any new/unknown source water protection issues that may impact the quality or quantity of its drinking water in the future.

I. IDENTIFICATION OF:

A. PROBLEMS AND OPPORTUNITIES DISCLOSED AT PUBLIC MEETING AND IN WRITTEN COMMENT

No public comments were presented at any of the public meetings held in conjunction with this plan.

B. DATA ELEMENTS

The State's Wellhead Protection Rule requires that existing information be utilized in developing the Wellhead Protection Plan. Much of the data collected and utilized to delineate the City's WHPA and DWSMA and to determine vulnerability of the aquifer to possible contamination comes from regional sources on a large scale. While much regional information and data is being used, Bovey has initiated ground truthing of many of the contaminant sites and sources within the community to further protect public drinking water supplies.

The City of Bovey has located and mapped the PCSI elements to determine potential areas of concern and will update as necessary.

C. STATUS AND ADEQUACY OF OFFICIAL CONTROLS, PLANS, AND OTHER LOCAL, STATE, AND FEDERAL PROGRAMS ON WATER AND LAND USE

The WHP team feels adequate protection of the DWSMA is available through existing land use ordinances in the city, Itasca County, and state well and groundwater appropriations permits. Existing education programs, promoting Best Management Practices (BMPs) and working with local landowners on issues is the approach proposed by the City.

The County Local Water Management Plan, administered by Itasca Soil and Water Conservation District, address ground and surface water protection. Potential funding for well sealing or other BMPs may be available through Local Water Planning, the SWCD, or through MDH Source Water Protection Implementation Grants (available as part of the Clean Water Legacy). Other agencies within the state have programs that may be helpful in implementation of this plan. They include MRWA, MDH Well Management, MPCA tanks section, DNR and MDA.

CHAPTER FOUR

WELLHEAD PROTECTION GOALS

Minnesota Rules 4720.5240

III. GOALS

A. PRESENT AND FUTURE WATER AND LAND USE

The overall Goals of the City of Bovey Wellhead Protection Plan are:

- 1. Protect the public water supply from contamination due to safety and land use activities.**
The Potential Contaminant Source Inventory for Bovey identified sources as potential threats to the drinking water. These include tanks, leaks, potential class V wells, active wells, and unused/unsealed wells. These uses will require management strategies for protection of drinking water, including, but not limited to land use. All landowners with contaminant sources share in the responsibility for accomplishment of this goal with the City of Bovey's WHP team, in partnership with the Local Governmental Units, playing a lead role.
- 2. Establish and maintain a WHP continuing public education program as an ongoing process.**
The City of Bovey has participated in public education programs pertaining to wellhead protection and intends to continue to work towards improving public perception pertaining to protection of the public drinking water supply. They intend to upgrade the city website with wellhead information and opportunities to the property owners within the DWSMA, including but not limited to well sealing cost-share or full funding as grants are available.
The City currently enjoys a safe and sufficient water supply. Through the implementation of this WHP Plan, they propose to further safeguard the public water supply of the citizens of the City of Bovey.

CHAPTER FIVE

OBJECTIVES AND PLANS OF ACTION

Minnesota Rules 4720.5252

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

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

OBJECTIVES

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

- A.** Provide land owners with educational materials and other resources to assist them with drinking water protection issues such as private well use, maintenance and sealing assistance and Class V wells.
- B.** Gather new information on potential contaminants.
- C.** Manage potential contaminants.
- D.** Ensure emergency preparedness of local agencies.
- E.** Create awareness among LGUs about the importance of protection of the drinking water supply aquifer.
- F.** Maintain communications with the MDH and other agencies able to assist with implementation of this plan.
- G.** Collect additional data to substantiate information contained within this Plan, and to provide more detail for future Plan amendments. Include water quantity information to maintain adequate drinking water supply.
- H.** Conduct regular evaluations of Plan implementation and effectiveness.

WHP MEASURES AND ACTION PLAN

Based upon this information, 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 lead party and any cooperators and the year or years in which it will be implemented.

The following categories are used to further clarify the focus that each WHP measure provides, in addition to helping organize the measures listed in the action plan:

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

ESTABLISHING PRIORITIES

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

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

The City of Bovey defines a priority for implementing a WHP measure as maintaining the quantity and high-quality drinking water they have come to expect. The following **Table H** lists each measure that will be implemented over the 10-year period that the city's WHP plan is in effect, including the priority assigned to each measure. The city is the responsible party for all measures.

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

MONITORING, DATA COLLECTION, AND ASSESSMENT:

Table H - WHP Plan of Action

Description	Objective	Priority	Responsible Party & Cooperators	Cost	Implementation Time Frame										
					2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	
<p><u>Water Quality Monitoring:</u> WHP Measure #1: Contact MDH Hydrologist to set up the sampling of well #1 (or primary well) along with stable isotope sample from the well and the Canisteo Mine Pit. 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.</p>	G	H	MDH Bovey	Staff Time					X						
<p>WHP Measure #2: Coordinating with well maintenance, contact MDH Hydrologist to set up an aquifer test on well #1. Apply for MDH SWP funding.</p>	G	H	Bovey MDH Consultant	Staff Time TBD	X										
<p>WHP Measure #3: Discuss feasibility of construction of an observation well for use with aquifer testing and to help confirm aquifer vulnerability. Apply for MDH SWP funding.</p>	G	H	Bovey MDH Consultant	Staff Time TBD		X									
<p>WHP Measure #4: Purchase and install transducers and temperature probes in the city wells and Trout Lake if funding available.</p>	B/G	H	Bovey MDH	Staff Time TBD		X	X								
<p>WHP Measure #5: Support Itasca County's efforts to have the Minnesota Geologic Survey (MGS) and Department of Natural Resources (DNR) complete a geologic atlas to provide updated groundwater information including seeking outside funding if feasible.</p>	G	M	Bovey Itasca County DNR MGS	TBD			X								
<p><u>Well Inventory and Prioritization</u> WHP Measure #6: Update the PCSI as needed with an assessment in year 5 and complete update during plan amendment. Review status of existing potential contaminants and add any new ones identified within the DWSMA.</p>	B/G	H	Bovey MDH Consultant	Staff Time TBD						X					X

MONITORING, DATA COLLECTION, AND ASSESSMENT (cont.):

Description	Objective	Priority	Responsible Party & Cooperators	Cost	Implementation Time Frame											
					2023	2024	2025	2026	2027	2028	2029	2030	2031	2032		
WHP Measure #7: Contact MDH to update the IWMZ survey form for all wells in the system every 7 years working in coordination with the MDH.	F	H	Bovey MDH MRWA	Staff Time					X							
WHP Measure #8: Request listing from MDH of new wells drilled within 1-mile of the DWSMA prior to plan amendment process. Verify wells and send information to MDH Hydro.	F/G	L	Bovey MDH	Staff Time						X						

WELL AND CONTAMINANT SOURCE MANAGEMENT

Description	Objective	Priority	Responsible Party & Cooperators	Cost	Implementation Time Frame												
					2023	2024	2025	2026	2027	2028	2029	2030	2031	2032			
<u>Municipal Well Management Practices</u> WHP Measure #9: Monitor setbacks for all new potential contaminant sources within the IWMZ.	C	H	Bovey MDH	Staff Time													←-----On-Going-----→
Measure #10: Implement recommended wellhead protection measures identified in the IWMZ PCSI.	C	H	Bovey MDH	TBD													←-----As Feasible-----→
WHP Measure #11: The city shall implement activities directed in the MDH Sanitary Survey inspection. The city will apply for grants as necessary to implement.	C	H	Bovey MDH Consultant	Staff Time TBD													←-----As Needed-----→
<u>Municipal Well Security Issues</u> WHP Measure #12: Evaluate need for acquisition of a back-up generator. If need is determined, purchase back-up generator for continuous water supply during loss of power.	D	H	Bovey Contractor	Minimum \$10,000													←-----As Feasible-----→
WHP Measure #13: Pursue MDH grant funds to construct a salt shed to store sand/salt mixture to prevent chlorides from infiltrating into the aquifer.	C	H	Bovey	Staff Time TBD		X											

WELL AND CONTAMINANT SOURCE MANAGEMENT (Cont.):

Description	Objective	Priority	Responsible Party & Cooperators	Cost	Implementation Time Frame									
					2023	2024	2025	2026	2027	2028	2029	2030	2031	2032
WHP Measure #14: Purchase and install generator wiring and controls to accommodate generator needs if generator is purchased.	D	H	Bovey Contractor	Minimum \$10,000	←-----As Feasible-----→									
WHP Measure #15: Assess security needs and apply for funding if identified. Purchase and install equipment needed to secure the wellheads if feasible.	D	H	Bovey Contractor	Staff Time TBD	←-----If need is determined -----→									
<u>Class V Wells</u> WHP Measure #16: Update and identify any new known potential Class V Wells in the DWSMA. Contact MDH for assistance with a suspected owner of a Class V well.	B	M	Bovey MDH EPA	Staff Time	←-----On-Going-----→									
<u>Private Well Management</u> WHP Measure #17: Work with property owners to determine status OB well in DWSMA.	B/C	H	Bovey DNR MDH	Staff Time TBD	X									
WHP Measure #18: Apply for SWP or SWCD funding to seal any wells located within the DWSMA with owner consent.	C	H	Bovey MDH SWCD	Staff Time	←-----On-Going-----→									
<u>Old Municipal Well Management</u> WHP Measure #19: Work with MDH to verify status and location of any unknown municipal well from Old Municipal Well inventory and apply for MDH Grant funds to seal if unused/unsealed.	C/F	M	Bovey MDH	Staff Time	X	X								
<u>Tanks, Leaks, Contaminants of Concern</u> WHP Measure #20: If Public Water Supply Wells show contaminants, work with MPCA to determine if closed leak sites need to be re-activated.	C/F	M	Bovey MPCA	Staff Time	←-----If Needed-----→									
WHP Measure #21: The city will work with the property owner and the MPCA to determine the status of inactive tank(PCSI ID#19) and assist in removal if feasible.	C/F	M	Bovey MPCA	Staff Time			X	X						

EDUCATION AND OUTREACH:

Description	Objective	Priority	Responsible Party & Cooperators	Cost	Implementation Time Frame											
					2023	2024	2025	2026	2027	2028	2029	2030	2031	2032		
<u>Education and Outreach</u> WHP Measure #22: Provide information on the city website including but not limited to the DWSMA map and wellhead plan, wells, unused/unsealed wells, conservation and sealing opportunities.	A/D	M	Bovey MPCA MDH MRWA	Staff Time TBD	X											
WHP Measure #23: The City will participate in the One Watershed, One Plan as feasible when it is developed.	F	M	Bovey Itasca County	Staff Time												←-----On-Going-----→

LAND USE AND PLANNING:

Description	Objective	Priority	Responsible Party & Cooperators	Cost	Implementation Time Frame											
					2023	2024	2025	2026	2027	2028	2029	2030	2031	2032		
<u>Ordinance Controls</u> WHP Measure #24: Research need for Ordinance update to address water protection issues within the PWS area and apply for funding if need identified.	D	M	Bovey Consultant	Staff Time TBD												←-----If Needed-----→

WHP COORDINATION, REPORTING, AND EVALUATION:

Description	Objective	Priority	Responsible Party & Cooperators	Cost	Implementation Time Frame											
					2023	2024	2025	2026	2027	2028	2029	2030	2031	2032		
<p><u>WHP Coordination</u></p> <p>WHP Measure #25: Coordinate an internal meeting with the public utility, city administrator, technical assistance provider, or appropriate staff to discuss WHP Plan implementation and coordination every 2.5 years. Discuss funding needs and pursuit of SWP Grant funds to help implement activities identified in the WHP Plan.</p>	I	H	Bovey MDH WHP Team	Staff Time	X		X		X		X					
<p><u>Implementation Tracking and Reporting Activities</u></p> <p>WHP Measure #26: Maintain a “WHP folder” that contains documentation of WHP activities you have completed and a date that it was done. Identify each activity with the number of the measure contained in this table.</p>	H/I	H	Bovey	Staff Time	X	X	X	X	X	X	X	X				X
<p>WHP Measure #27: Develop a spreadsheet that coincides with measures found in your plan to track and monitor plan implementation activities and completion dates.</p>	H/I	H	Bovey	City Staff Time	X											
<p><u>WHP Program Evaluation Plan Reporting</u></p> <p>WHP Measure #28: Complete an Evaluation Report every 2.5 years that evaluates the “progress of plan of action and the impact of any contaminant release on the aquifer supplying the public water supply well” MN WHP Rule 4720.5270</p>	G/I	H	Bovey MDH MRWA	Staff Time						X						X
<p>WHP Measure # 29: Summarize WHP Plan implementation efforts in a report to MDH at the beginning of the amendment process, usually in the 8th year.</p>	G/I	M	Bovey MDH MRWA	Staff Time												X

CHAPTER SIX

EVALUATION PROGRAM

Minnesota Rules 4720.5270

The success of the Potential Contaminant Source Management Strategy must be measured regularly to ensure the Plan is meeting the community needs on Wellhead understanding and compliance.

The City of Bovey's WHPA has been designated as having moderate vulnerability to contamination. The designation of moderate vulnerability requires monitoring of the following potential contaminant sources within the DWSMAs:

- a. Above Ground Storage Tanks greater than 1,100 gallons
- b. Potential Class V Wells
- c. Leaking Underground Storage Tanks
- d. Potential Contamination Sites
- e. Solid Waste Management Sites
- f. Spills
- g. Storage or Preparation Areas (Chemicals, Fertilizers, Fuels, Gasses, Oils, Hazardous substances, Solvents and Coatings and Waste
- h. Suspected Contaminants of Concern
- i. Underground Storage Tanks
- j. Wells

A program to ensure this is completed has been documented in Chapters One through Five. In addition to this, to ensure compliance, the City will:

- o Track the implementation efforts completed;
- o determine the effectiveness of these efforts; and
- o identify any implementation changes needed to accomplish the goal of the plan.

To accomplish the above, the following activities will be completed:

1. Changes in land use and other development within the DWSMA will be monitored.
2. It is recommended that the WHP team meets annually, although at a minimum they will meet every two-and-one-half years and develop a report which assesses the status of plan implementation and to identify issues that impact the implementation of action steps throughout the DWSMA.

CHAPTER SEVEN

ALTERNATIVE WATER SUPPLY / CONTINGENCY STRATEGY

Minnesota Rules 4720.5280

PURPOSE

The Water Supply / Contingency Strategy Plan can be found in [Appendix VI](#) of this Plan. The purpose of this plan is to establish, provide and keep updated, certain emergency response procedures and information for the City of Bovey, which may become vital in the event of a partial or total loss of public water supply services as a result of natural disaster, chemical contamination, or civil disorder of human-caused disruptions.

Appendix

**I – WHPA and DWSMA Delineations and Vulnerability Assessments
(Part 1)**

II – Part One and Part Two WHPP Scoping Documents

III – DWSMA and PCSI parcel list

IV – Inner Wellhead Management Zone Potential Contaminant Sources

V – Old Municipal Well Inventory

VI – Alternative Water Supply – Contingency Strategy

VII – Glossary of Terms and Acronyms

VIII – Implementation Schedule

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

DELINEATIONS – WELLHEAD PROTECTION AREA AND DRINKING WATER
SUPPLY MANAGEMENT AREA

VULNERABILITY ASSESSMENTS – WELLS AND DRINKING WATER SUPPLY
MANAGEMENT AREA

October 10, 2019

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

Public Water Supply ID: 1310003

City of Bovey
P. O. Box 399
Bovey, Minnesota 55709-0399
218-245-1633

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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.

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Glossary of Terms

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

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

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

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

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

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

Wellhead Protection Area (WHPA). The surface and subsurface area surrounding a well or well field that supplies a public water system, through which contaminants are likely to move toward and reach the well or well field (Minnesota Statutes, section 1031.005, 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 Bovey has one primary well screened in a sand and gravel aquifer that is buried beneath a layer of clay-rich sediment. Such aquifers are known generically as Quaternary Buried Artesian Aquifers (QBAA). The city's aquifer is between approximately 39 and 91 feet below the ground surface (Table 1). Regionally, groundwater flow is to the south.

Table 1 - Water 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 #1	228834	Primary	16	50	92	1953	QBAA	Vulnerable

Well Vulnerability - The vulnerability of the 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. Well #1 does not meet construction standards because grouting information is unknown. If the well was not grouted, it has the potential for acting as a conduit for flow of surface water and contaminants into the aquifer. To date, no evidence of this has been identified. The city's well 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.

Table 2 - Isotope and Water Quality Results

Unique Number (Well Name)	Tritium	Nitrate (mg/L)	Chloride/Bromide Ratio	Chloride (mg/L)	Bromide (mg/L)	Arsenic (µg/L)
228834 (Well #1)	6.5 (12/4/2017)	0.38 (12/4/2017)	6296	40.3 (12/4/2017)	0.0064 (12/4/2017)	<1.0 (11/2/2017)

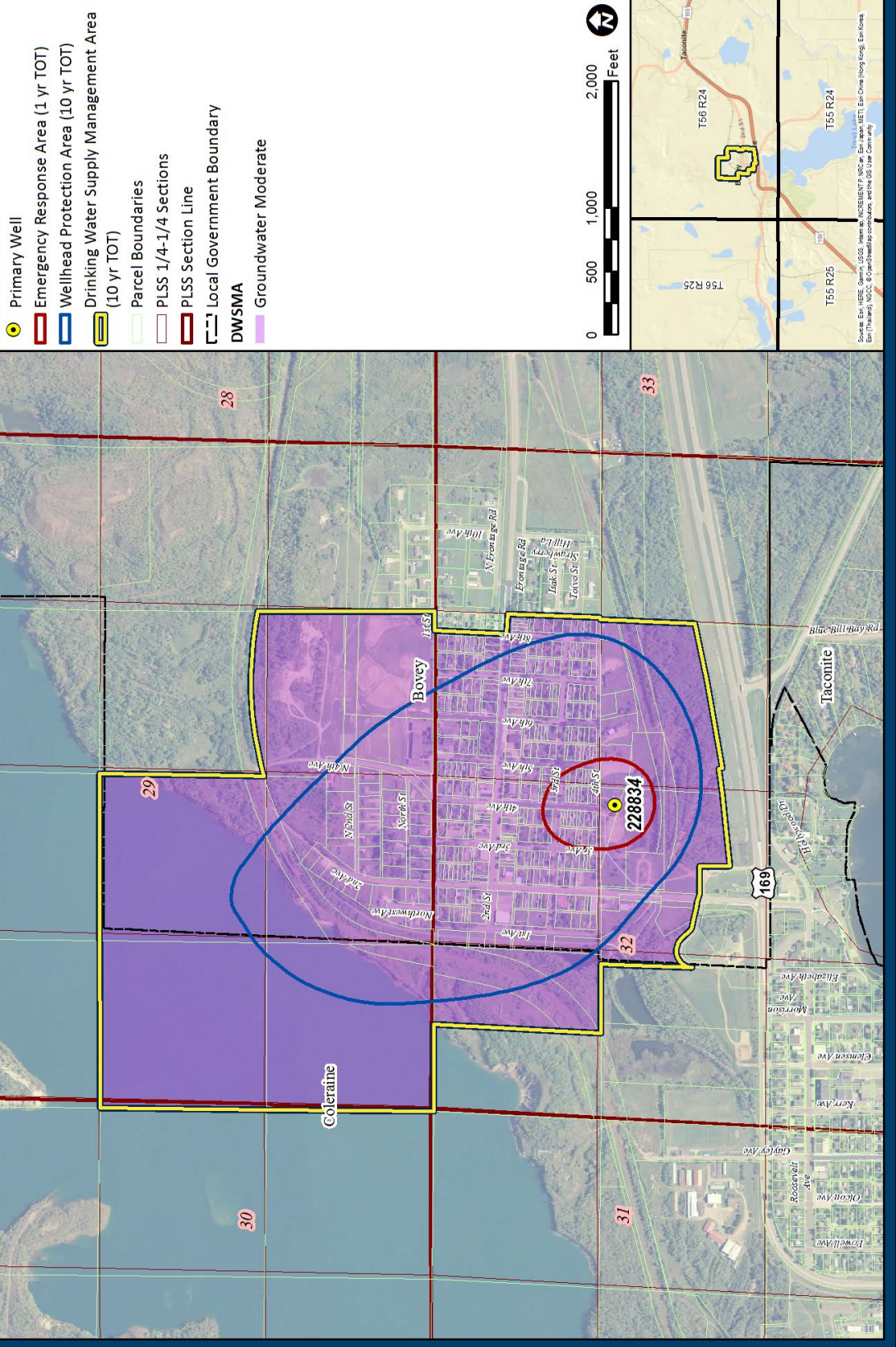
DWSMA Vulnerability - The vulnerability of the city's aquifer throughout the DWSMA is based on the geologic sensitivity ratings of wells and their monitoring data (Table 2). Based on this information MDH has assigned a moderate groundwater vulnerability to the DWSMA. This suggests that water and contaminants 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 #1. 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 are 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 are found above maximum allowable levels in the city's water supply, nor are any present at one-half of those levels.

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, water quality monitoring, and an aquifer test. Further details can be found in the Recommendations section of this report.

Itasca County
Minnesota

Figure 1
Drinking Water Supply Management Area
City of Bovey



Technical Report

Discussion

This document describes the amendments to Part 1 of the wellhead protection (WHP) plan for the city of Bovey (PWSID 1310003). 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 location of the city's well was adjusted for greater accuracy. The amended areas are smaller (Figure 7) because a draft MDH policy change for surface water contribution areas is in the process of being updated which allowed the Canisteo Mine Pit to be removed from the wellhead protection area. 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. 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 Bovey on July 13, 2018, 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 Bovey obtains its drinking water supply from one primary well. Table 1 summarizes general construction information and vulnerability status.

Description of the Hydrogeologic Setting

The city of Bovey is located in Itasca County on the Mesabi Iron Range. Major water features around the city of Bovey are the glacially formed Trout Lake and the abandoned iron ore mines that now form the Canisteo Mine Pit Lake. The Canisteo Mine Pit Lake was formed when water levels rose following the cessation of mining (Walsh, 2007). Bedrock beneath the city of Bovey consists of the Virginia Formation, a Paleoproterozoic package of argillites, siltstones, and greywackes (Jones, 2002). This unit thins to the north so that the uppermost bedrock present within the Canisteo mine Pit is the Biwabik Iron Formation (Jirsa et al, 2005). The city of Bovey operates one well in the glacial outwash that overlies this bedrock.

For a more detailed discussion on the geology and hydrogeology of the area around Bovey, see Wellhead Protection Plan for the city of Bovey, Minnesota, Part 1 (Walsh, 2007).

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 and Gravel	Well Records and the CWI Database
Porosity Type and Value	25 percent	Fetter, 2001
Aquifer Thickness	52 feet	Well Records and the CWI Database
Stratigraphic Top Elevation	1269 ft. AMSL	Well Records and the CWI Database
Stratigraphic Bottom Elevation	1217 ft. AMSL	Well Records and the CWI Database
Hydraulic Confinement	Confined	Well Records and the CWI Database

Attribute	Descriptor	Data Source
Transmissivity	Range of Values: 27 - 6,800 ft ² /day 1,480 ft ² /day at Well #1	A range of transmissivity values was used to reflect changes in aquifer composition and thickness as well as uncertainties related to the quality of existing aquifer test data. See Table 4 for the reference value.
Hydraulic Conductivity	Range of Values: 6 - 103 ft/day 28.5 ft/day at Well #1	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 flow is southerly, with an approximate compass direction of 180° and gradient of 0.005 to 0.011 (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 Bovey 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	Hydrologic Boundary	Prairie River, Swan River, Trout Creek, Trout Lake, the Canisteo Mine Pit and a few unnamed streams and lakes were added as head boundaries in the flow model.
Flow Boundary	Geologic Boundary	Analysis of specific capacity data suggests the transmissivity of the aquifer system varies with proximity to the city wells. This was simulated in the model by varying the hydraulic conductivity spatially.
Flow Boundary	Other High Capacity Wells	The city of Coleraine's high-capacity wells were added and simulated at the rate specified in Table 6.
Recharge	Modeled Value	During the calibration process it was estimated that approximately two inches of recharge occurs annually to the buried aquifer used by the city of Bovey. Delin (2007) estimates approximately seven inches for surficial aquifers in this area.
Daily Volume of Water Pumped	See Table 5	Pumping information was obtained from the DNR, Appropriations Permit Number 1984-2085, and was converted to a daily volume pumped by a well.

Criterion	Descriptor	How the Criterion was Addressed
Groundwater Flow Field	Groundwater flow is southerly, with an approximate compass direction of 180° and gradient of 0.005 to 0.011 (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.
Aquifer Transmissivity	Reference Value: 1,480 ft ² /day	The aquifer test plan was approved on October 1, 2019, and T was determined from specific capacity information. 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 Appropriations Permit Number 1984-2085. 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 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 Number	2014	2015	2016	2017	2018	5-Year Projection	Pumping Amount Used in Previous Delineation
Well #1	228834	35.770	30.243	26.898	21.389	24.949	35.770	35.391

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

In addition to the wells used by the public water supplier, Table 6 shows other high-capacity wells included in the delineation to account for their pumping impacts on the capture areas for the public water supply wells. Pumping data was obtained from the DNR MPARS database.

Table 6 - Other Permitted High-Capacity Wells

Unique Number	Well Name	DNR Permit Number	Use	Maximum Annual Volume of Water Pumped (million gallons) Last 5 Years
241430	City of Coleraine	1979-2186	Municipal/Public Water Supply	27.369
110457	City of Coleraine	1979-2186	Municipal/Public Water Supply	26.576

Method Used to Delineate the Wellhead Protection Area

The WHPA for the city of Bovey's wells was determined using the software code MODFLOW (McDonald and Harbaugh, 1988). The resulting WHPA boundaries are a composite of the capture zones calculated from several different model scenarios (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-NWT (Niswonger, 2011). 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 289 rows, 273 columns, and two layers. The model incorporates a variable areal grid spacing ranging from five 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. The Canisteo Mine Pit and Trout Lake also extended into Layer 2 as they are extremely deep and in direct connection with the aquifer. As such the conductance values used were very high to help simulate water freely moving into and out of those river model cells. The Canisteo Mine Pit was altered for different scenarios as the head value for this river feature is currently transient and not incongruous with a steady state simulation. Further details on how this was handled can be found in the Sensitivity Analysis section. Vertical recharge was applied to Layer 1 of the model using modified values published by the U.S Geological Survey (Delin et al., 2007). These values

for recharge were obtained through the calibration process for the entire model domain. Layer 1 hydraulic conductivity was set at a consistent value to represent a sandy-clayey till and was not altered (Fetter, 2001). In Layer 2 hydraulic conductivity was refined with specific capacity data.

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 do the most good. 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.

In order to retain the potential for the channel aquifer feature simulated in the 2007 delineation, an additional model was created that used the above PEST calibrated hydraulic conductivity for the model domain and then replaced the area proximal to the city wells with the channel aquifer hydraulic conductivity values. This allowed the upper transmissivity value of 6,800 ft²/day to be simulated locally without affecting the lower bulk transmissivity associated with the sand and gravel aquifer.

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 25 percent was used and a reverse time of travel was calculated at 10 years.

Representative aquifer parameters were used in the base case model scenario. Additional modeling scenarios using MODFLOW were then simulated using reasonable estimations of parameters to demonstrate model sensitivity and to reflect uncertainty conditions, which are addressed in the next section. The model parameters for all model runs are listed in Table 7.

The combined output of all model results were composited to create the final WHPA (Figure 1).

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 can help 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 regards 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 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 wells in a similar geologic setting in an approximate seven mile radius of the city's wells. The residual root mean square (RMS) error of the calibration well set was approximately 1.05 meters with a normalized RMSE of 6.1 percent. It is noted that this error is less 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 well.

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 particular MODFLOW model, 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 largest annual pumping during the last five years of record, as shown in Table 5, and therefore the sensitivity of the delineation to this parameter is assumed to be minimal when compared with the other parameters discussed below.

- 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 sensitivity to the elevation of the Canisteo Mine Pit water level greatly affects the hydraulic gradient. Therefore, four different mine pit lake elevations were simulated.

- Current elevation: 1303.35 ft AMSL
- Proposed low elevation of DNR outfall: 1305 ft AMSL
- Proposed high elevation of DNR outfall: 1311 ft AMSL
- Maximum elevation before flooding of city of Bovey occurs: 1324 ft AMSL

- 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 tests conducted throughout the region and geostatistically smoothed across the model domain, with values near the well field reflecting those obtained from the city's wells. Two additional model runs were performed wherein the hydraulic conductivity was decreased/increased by 50 percent to account for the reduced values generally observed for this parameter away from the city's well field and the uncertainty in the specific capacity calculation.
- 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. A literature value of 25 percent was used for the delineation and this value was not varied (Fetter, 2001).

- 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 of Bovey’s well, Layer 2 is approximately 50 feet thick, reflecting the sand and gravel aquifer the city is screened in. The thicknesses vary greatly throughout the model domain but are consistent with CWI records.

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, a maximum historical (five-year) pumping rate or an engineering estimate of future pumping, whichever is greater (Minnesota Rules, part 4720.5510, subpart 4).
2. Aquifer Hydraulic Conductivity – Hydraulic conductivity was adjusted plus and minus 50 percent.
3. Canisteo Mine Pit – Four elevations were simulated to capture how the hydraulic gradient is affected by the Mine Pit water level.

Capture areas were developed for a range of hydraulic conductivities and times of travel of one and 10 years (Figure 6). As the model code uses constant input values for each run, several runs were required to include all variations in input parameters. Table 7 documents the variables used to address MODFLOW uncertainty.

Table 7 - Model Parameters Used in MODFLOW Base Case and Uncertainty Runs

File Name	City Well Discharge (m ³ /day)	Model Domain Hydraulic Conductivity (m/day)	Area Proximal to City Wells Hydraulic Conductivity (m/day)	Canisteo Mine Pit Elevation (ft AMSL)	Hydraulic Gradient	Remarks
Calibrated Steady State	371	Spatially variable: 2-30	9	1303.35	0.005	Calibrated Steady State Model used as base scenario
Conductivity-50 Percent	371	Spatially variable: 1-15	4.5	1303.35	0.005	Calibrated Steady State Model with Kx, Ky and Kz multiplied by 0.5
Conductivity+50 Percent	371	Spatially variable: 3-45	13.5	1303.35	0.005	Calibrated Steady State Model with Kx, Ky and Kz multiplied by 1.5
Calibrated Steady State	371	Spatially variable: 2-30	9	1305	0.0055	Calibrated Steady State Model used as base scenario
Conductivity-50 Percent	371	Spatially variable: 1-15	4.5	1305	0.0055	Calibrated Steady State Model with Kx, Ky and Kz multiplied by 0.5
Conductivity+50 Percent	371	Spatially variable: 3-45	13.5	1305	0.0055	Calibrated Steady State Model with Kx, Ky and Kz multiplied by 1.5
Calibrated Steady State	371	Spatially variable: 2-30	9	1311	0.0075	Calibrated Steady State Model used as base scenario
Conductivity-50 Percent	371	Spatially variable: 1-15	4.5	1311	0.0075	Calibrated Steady State Model with Kx, Ky and Kz multiplied by 0.5
Conductivity+50 Percent	371	Spatially variable: 3-45	13.5	1311	0.0075	Calibrated Steady State Model with Kx, Ky and Kz multiplied by 1.5
Calibrated Steady State	371	Spatially variable: 2-30	9	1324	0.011	Calibrated Steady State Model used as base scenario
Conductivity-50 Percent	371	Spatially variable: 1-15	4.5	1324	0.011	Calibrated Steady State Model with Kx, Ky and Kz multiplied by 0.5
Conductivity+50 Percent	371	Spatially variable: 3-45	13.5	1324	0.011	Calibrated Steady State Model with Kx, Ky and Kz multiplied by 1.5

Conjunctive Delineation

MDH is currently revising the ‘Guidance for Preparing a Conjunctive Delineation’. The draft guidance states that the assessment on whether to include a surface water feature in a conjunctive delineation shall focus on the ERA instead of the WHPA as pathogens are the primary focus for inclusion. Chemical and isotopic data from the city’s primary well, Trout Lake, and the Canisteo Mine Pit indicate that water from the Canisteo Mine Pit has likely constituted a small component of recharge to the city’s well (Appendix B). This component will likely change through time as the groundwater system adapts to the rising stage of the pit lake water. All model runs were in agreement with the chemistry data as well, with a portion of the particle tracks terminating at the Canisteo Mine Pit within the WHPA. However, as these portions are outside of the ERA and the vulnerability of the DWSMA is moderate and not high, therefore, unlike the 2007 delineation, a conjunctive delineation was proven not necessary for the Canisteo Mine Pit.

Delineation of the Drinking Water Supply Management Area

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

- Center-lines of highways, streets, roads, or railroad rights-of-ways.
- Property or fence lines.

Comparison of Previous and Current WHPA and DWSMA Delineations

The updated WHPA and DWSMA for the city of Bovey are much smaller than those generated in 2007 (Figure 7). This reduction stems primarily from a change in MDH’s conjunctive delineation policy, which resulted in the Canisteo Mine Pit and its watershed being excluded from the WHPA.

The following is a brief synopsis of additional technical considerations that changed since the previous plan:

- The previous model used four different recharge rates, varying from 0.02 inches per year to five inches per year. Recharge was altered to a consistent two inches per year to reflect the aquifer infiltration rate.
- Additional well construction in the area has provided increased knowledge of local geology.

Vulnerability Assessments

The Part I wellhead protection plan includes the vulnerability assessments for the city of Bovey’s well 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 Bovey are listed in Table 1 and are based upon the following conditions:

1. Well #1 does not meet construction standards because information about grouting is unknown. If the well was not grouted, it has the potential for acting as a conduit for flow of surface water and contaminants into the aquifer. To date, no evidence of this has been identified.
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; and
4. Water samples were collected and were analyzed for tritium, nitrate, chloride and bromide. Tritium was detected in the sample for Well #1, confirming the vulnerable nature of the wells (Alexander and Alexander, 1989). In addition, the chloride and bromide results confirm that those wells have been impacted by land-use activities such as road de-icing (Table 2). Extremely low nitrate was detected but is believed to be from nitrification.

Assessment of Drinking Water Supply Management Area Vulnerability

The vulnerability of the DWSMA is shown in Figure 1 and is based upon the following information:

1. Isotopic and water chemistry data from wells located within the DWSMA indicate the aquifer contains water that has detectable levels of tritium and has been impacted by land-use activities such as road de-icing, as evidenced by the chloride and bromide results from the city well. The sulfate levels in this well peaked in 2012 at 313 mg/l and are now well below the secondary drinking water standard of 250 mg/l, suggesting that whatever change in groundwater conditions that resulted in that spike has now passed.
2. Review of the geologic logs contained in the CWI database, geological maps, and reports indicate that the aquifer exhibits a low to high 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 Bovey's Wellhead Protection Plan.

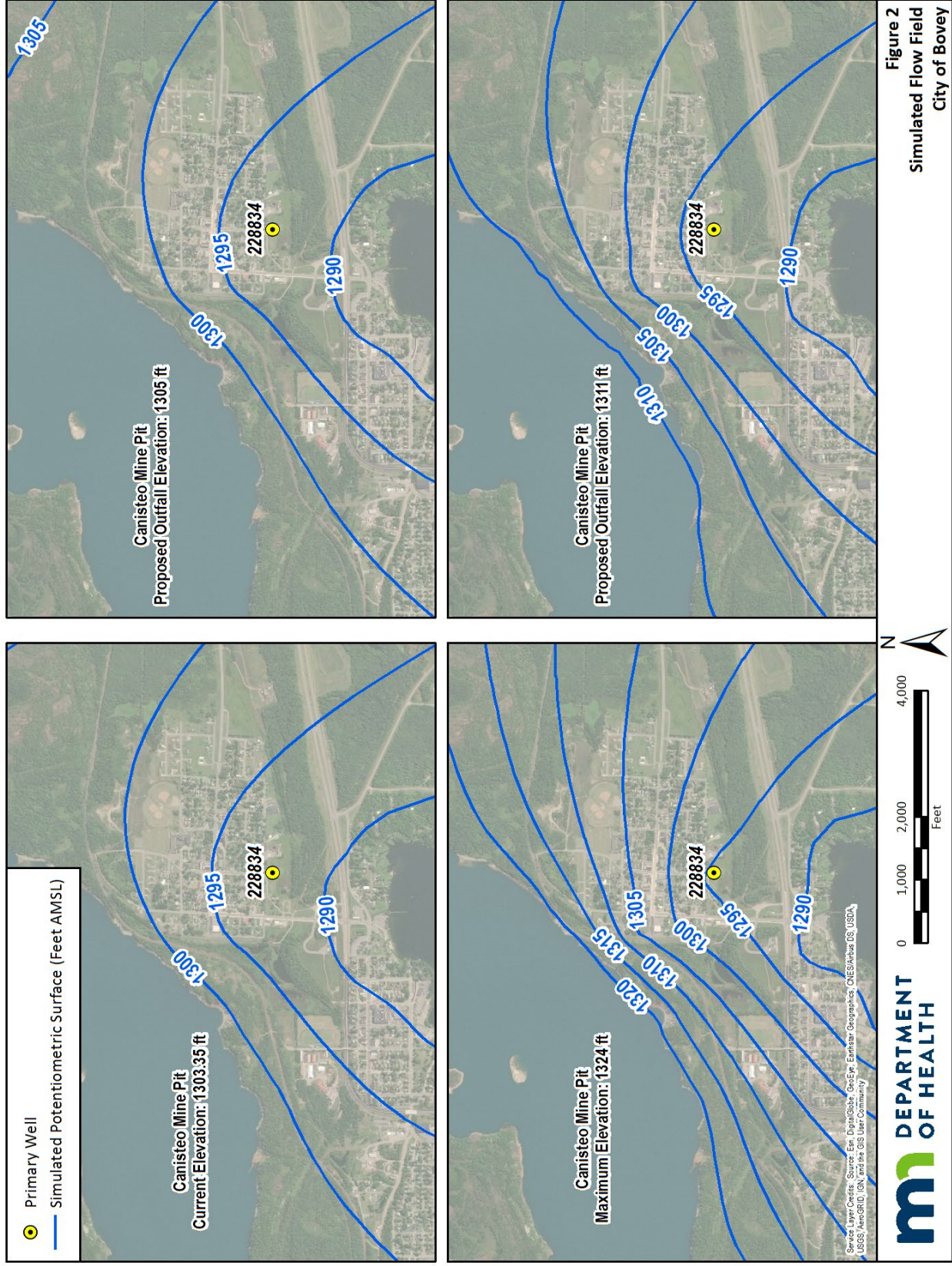
1. **Well Locating:** This delineation is based on very little well data. If wells are constructed within two miles of the city or one mile of the DWSMA, their locations should be verified. This information may allow a better understanding of the extent and thickness of the city's aquifers, and could result in a more refined WHPA in the future.
2. **Water Quality Monitoring:** Re-sample Well #1 (or whatever primary wells exist at that time) along with a stable isotope sample from the well and the Canisteo Mine Pit. This should be completed during year six of plan implementation for vulnerability parameters determined in consultation with MDH (likely tritium, chloride, bromide, nitrate and ammonia); contingent on funding assistance from MDH for sampling and analysis. The city may need to collect the samples and ship them to MDH. This information will be used to update our understanding of the vulnerability of the city's well and aquifer to contamination risk.
3. **Aquifer Test:** Performing an aquifer test at Well #1 might help to refine the hydraulic conductivity of the aquifer near the well and confirm any potential geologic barriers for the next amendment. Another benefit would be to help establish the leakage rates for the overlying confining unit. The city should contact MDH prior to pursuing this option to discuss what would be entailed in conducting such a test.
4. **Observation Well:** If an aquifer test were to be conducted, additional information could be gained by measuring water levels at an observation well rather than just the city well. The observation well could also help confirm our assessment of aquifer vulnerability near the city well. Construction of an observation well could be a grant-eligible activity, and should be discussed with the MDH hydrologist before pursuing.

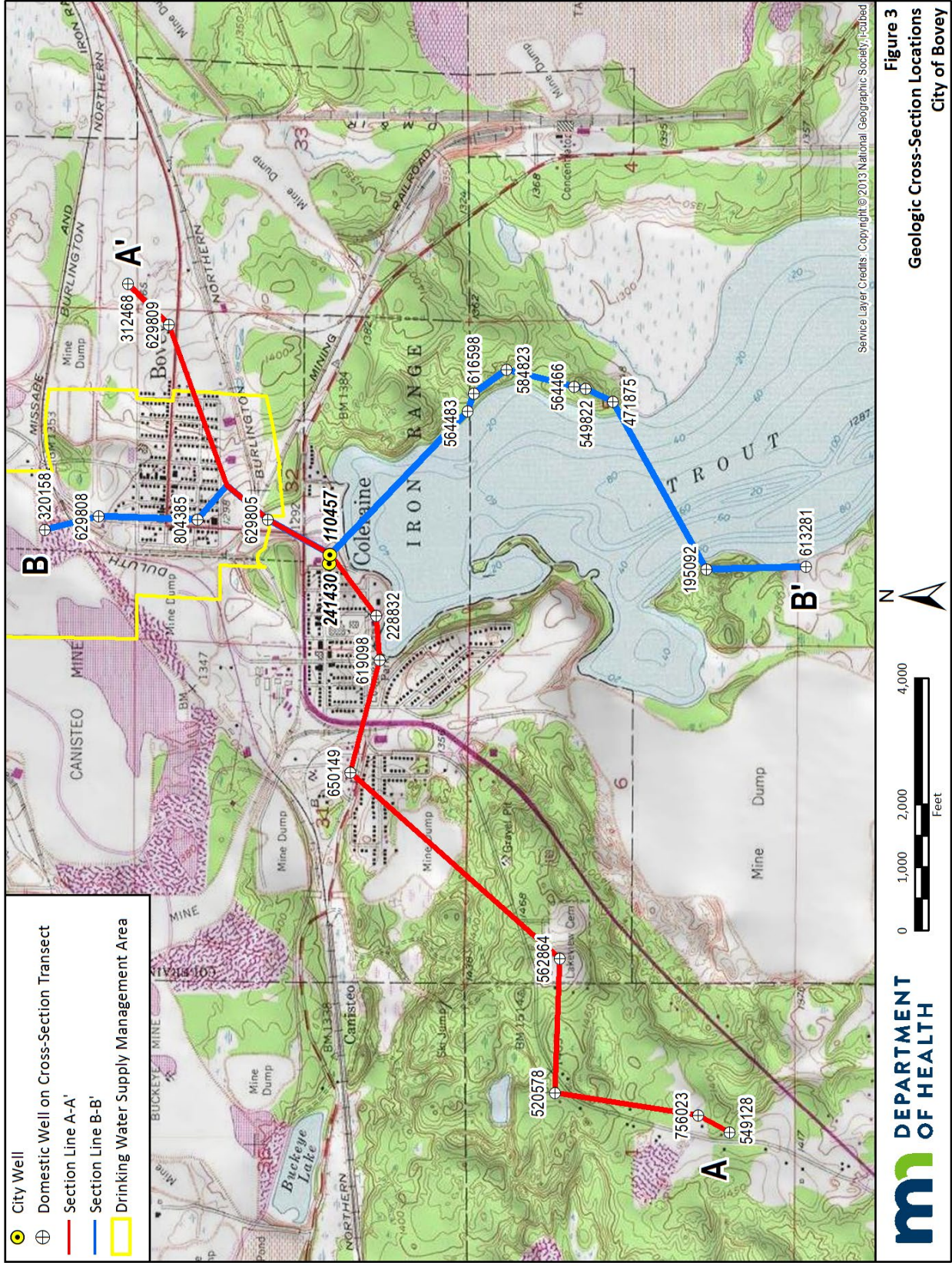
Selected References

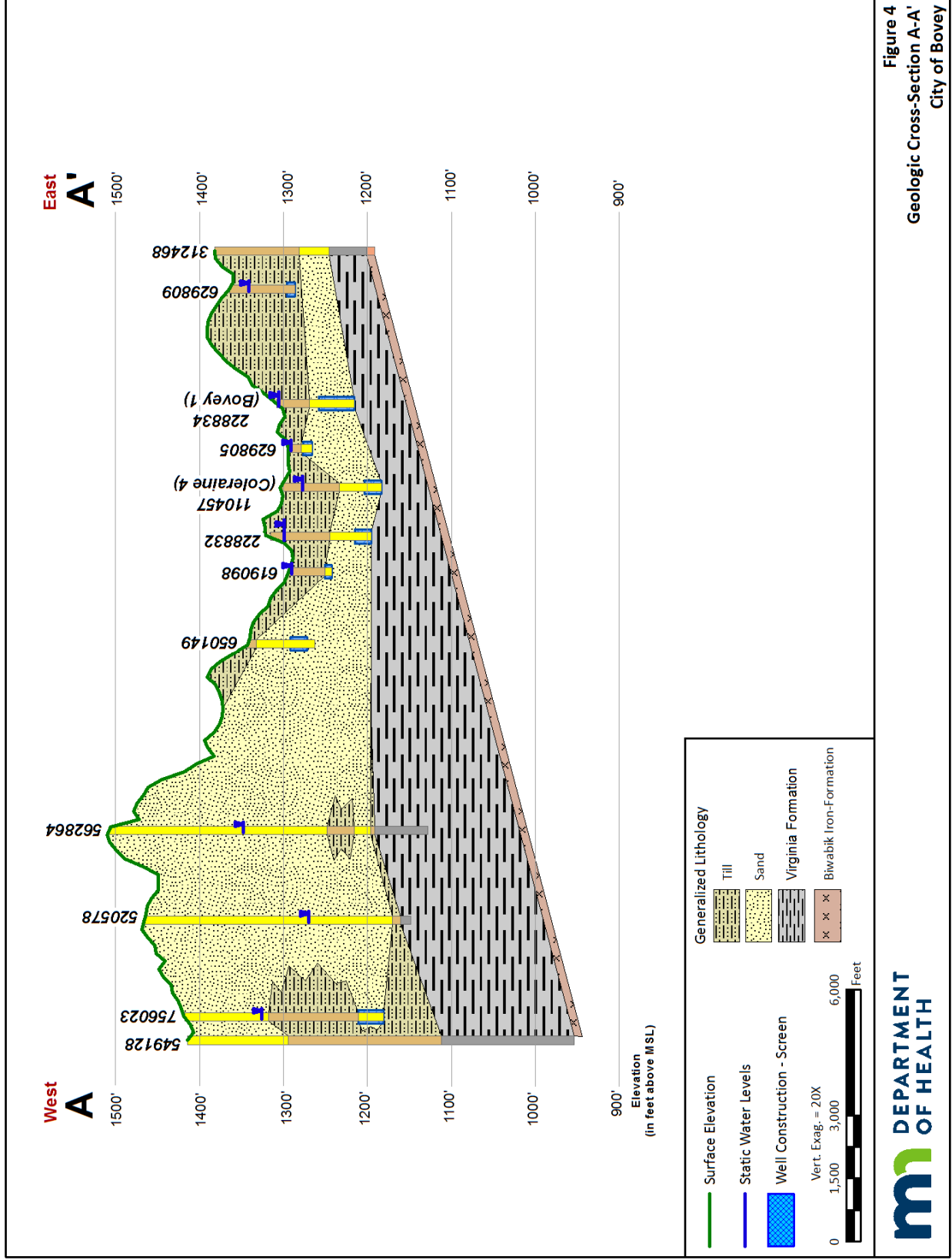
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- Walsh, J.F. (2007), *Wellhead protection plan for the city of Bovey, Minnesota--Part 1*, Minnesota Department of Health, St. Paul, Minn., 39 p.

Figures







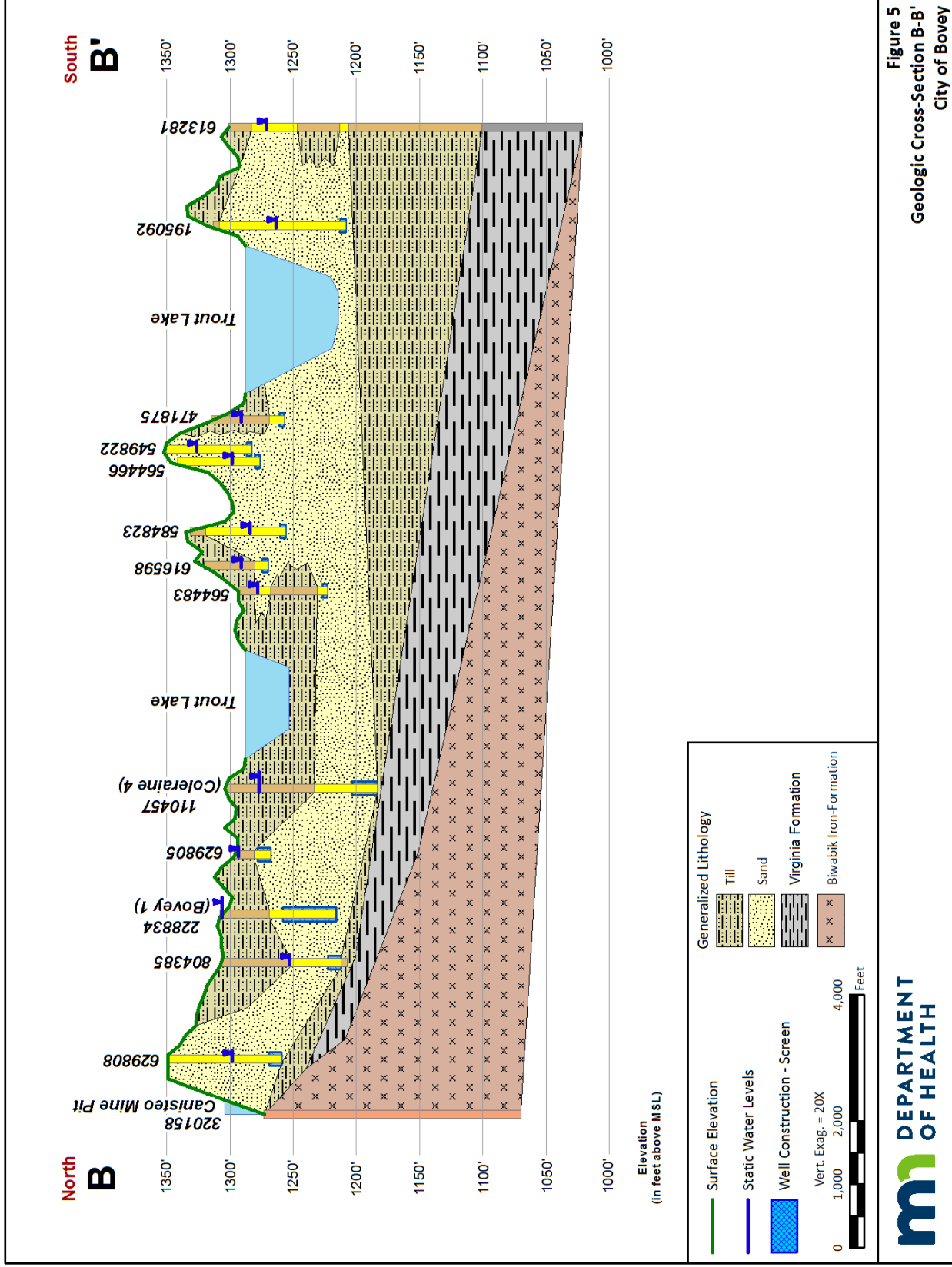


Figure 5
Geologic Cross-Section B-B'
City of Bovey

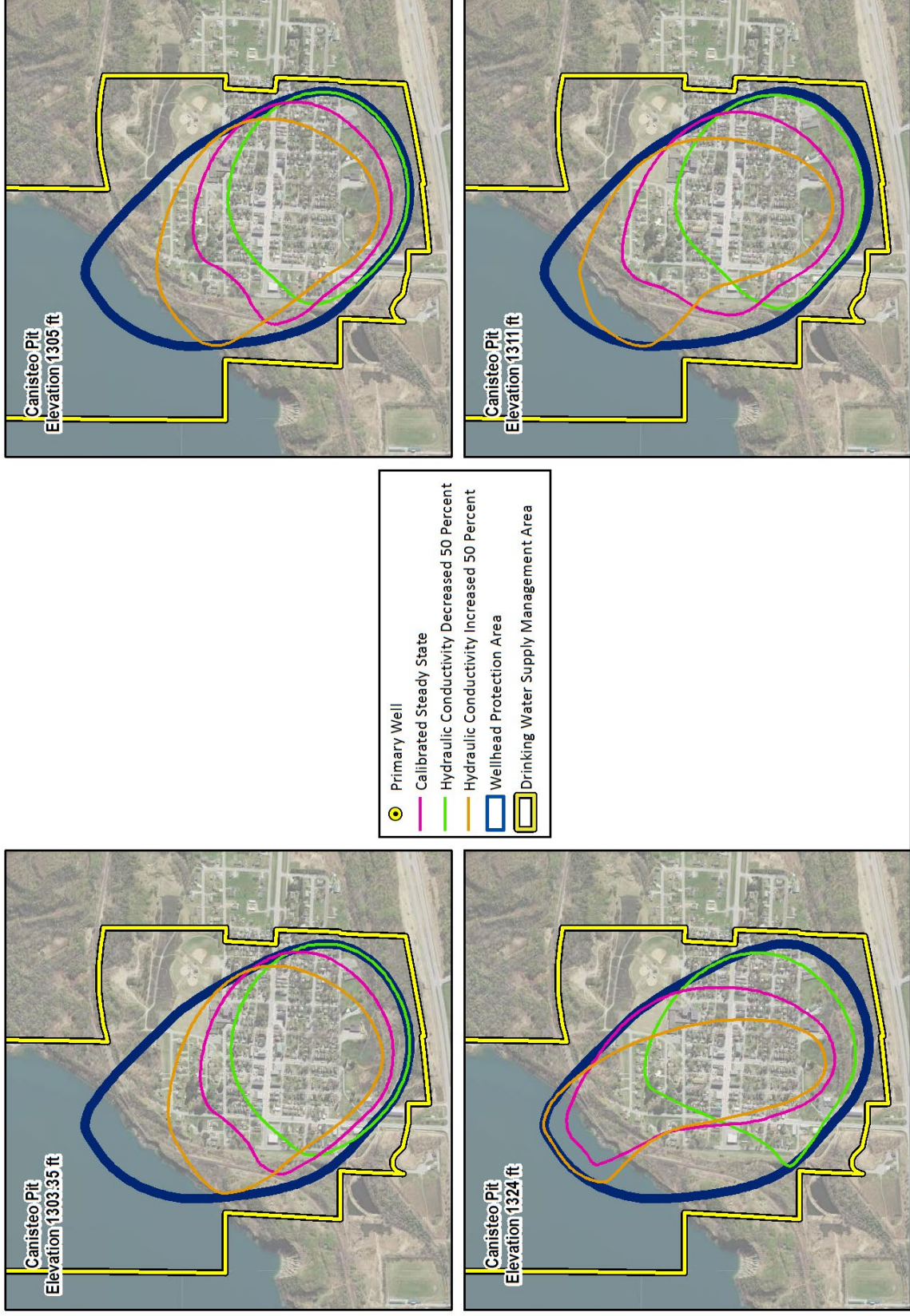


Figure 6
Model Uncertainty Analysis: 10 Year Capture Zones
City of Bovey

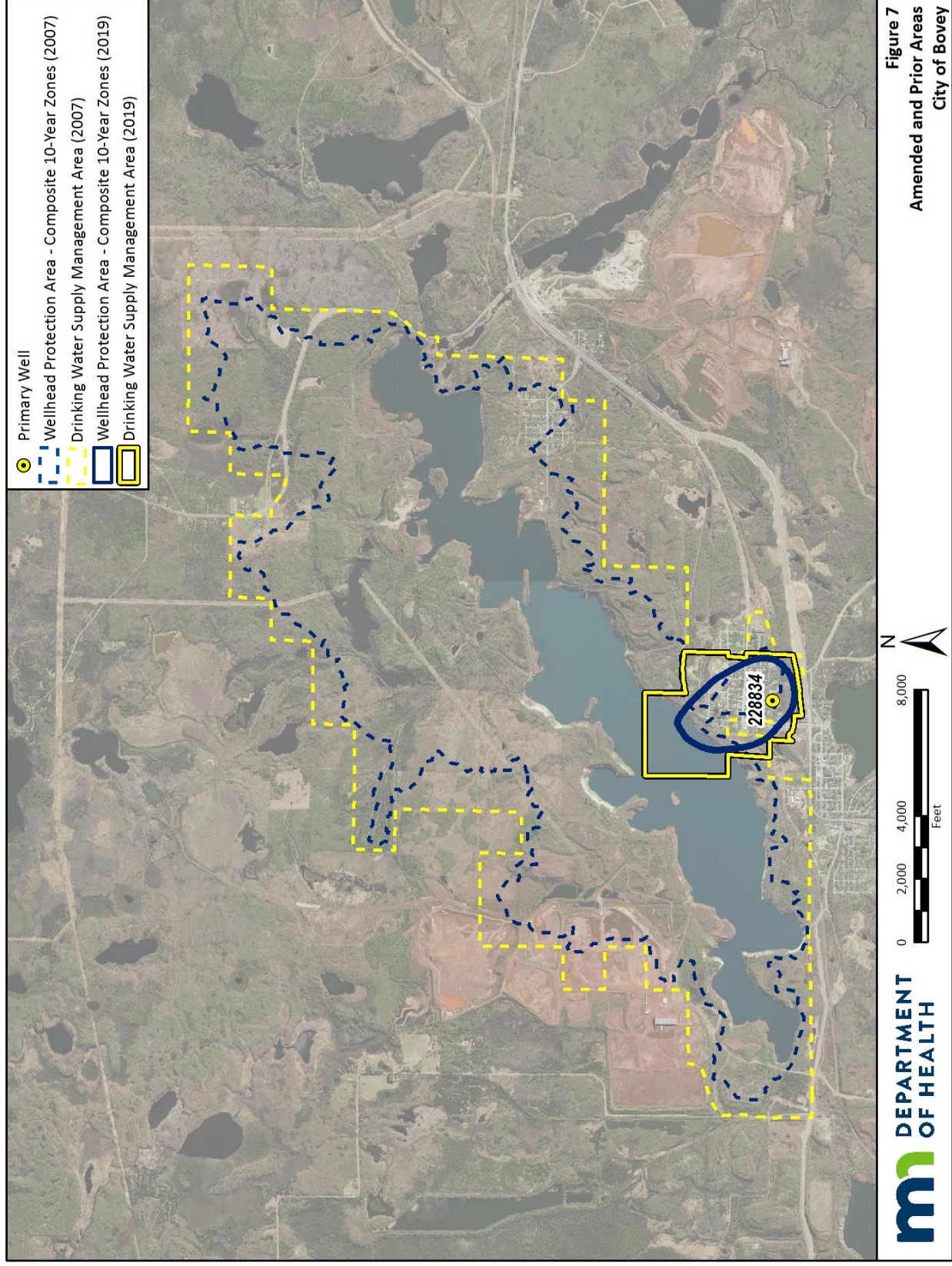


Figure 7
Amended and Prior Areas
City of Bovey

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	NOAA, USGS
Geology	Maps and geologic descriptions	M	H	H	H	MGS, DNR
Geology	Subsurface data	M	H	H	H	MGS, MDH, DNR
Geology	Borehole geophysics	M	H	H	H	None Available
Geology	Surface geophysics	L	L	L	L	None Available
Soils	Maps and soil descriptions	L	H	M	L	NRCS
Soils	Eroding lands					
Water Resources	Watershed units	L	H	L	L	MnGEO, DNR
Water Resources	List of public waters	L	H	L	L	MnGEO, DNR
Water Resources	Shoreland classifications					
Water Resources	Wetlands map	L	H	L	L	USGS
Water Resources	Floodplain map					
Land Use	Parcel boundaries map	L	H	L	L	Itasca County
Land Use	Political boundaries map	L	H	L	L	MnGEO, City
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	City
Public Utility Services	Oil and gas pipelines map					
Public Utility Services	Public drainage systems map or list	L	H	L	L	MnGEO, DNR
Public Utility Services	Records of well construction, maintenance, and use	H	H	H	H	City, CWI, MDH
Surface Water Quantity	Stream flow data	L	H	H	H	USGS
Surface Water Quantity	Ordinary high water mark data	L	H	L	L	DNR
Surface Water Quantity	Permitted withdrawals	L	H	L	L	DNR
Surface Water Quantity	Protected levels/flows	L	H	L	L	DNR

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	Water use conflicts	L	H	L	L	DNR (no relevant data found)
Groundwater Quantity	Permitted withdrawals	H	H	H	H	DNR
Groundwater Quantity	Groundwater use conflicts	H	H	H	H	DNR (no relevant data found)
Groundwater Quantity	Water Levels	H	H	H	H	DNR (no relevant data found)
Surface Water Quality	Stream and lake water quality management classifications					
Surface Water Quality	Monitoring data summary	L	H	L	L	MPCA (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	None Available
Groundwater Quality	Contamination site data	M	M	M	M	MPCA (no relevant data found)
Groundwater Quality	Property audit data from contamination sites					
Groundwater Quality	MPCA and MDA spills/release reports	M	M	M	M	MPCA, MDA (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 B:

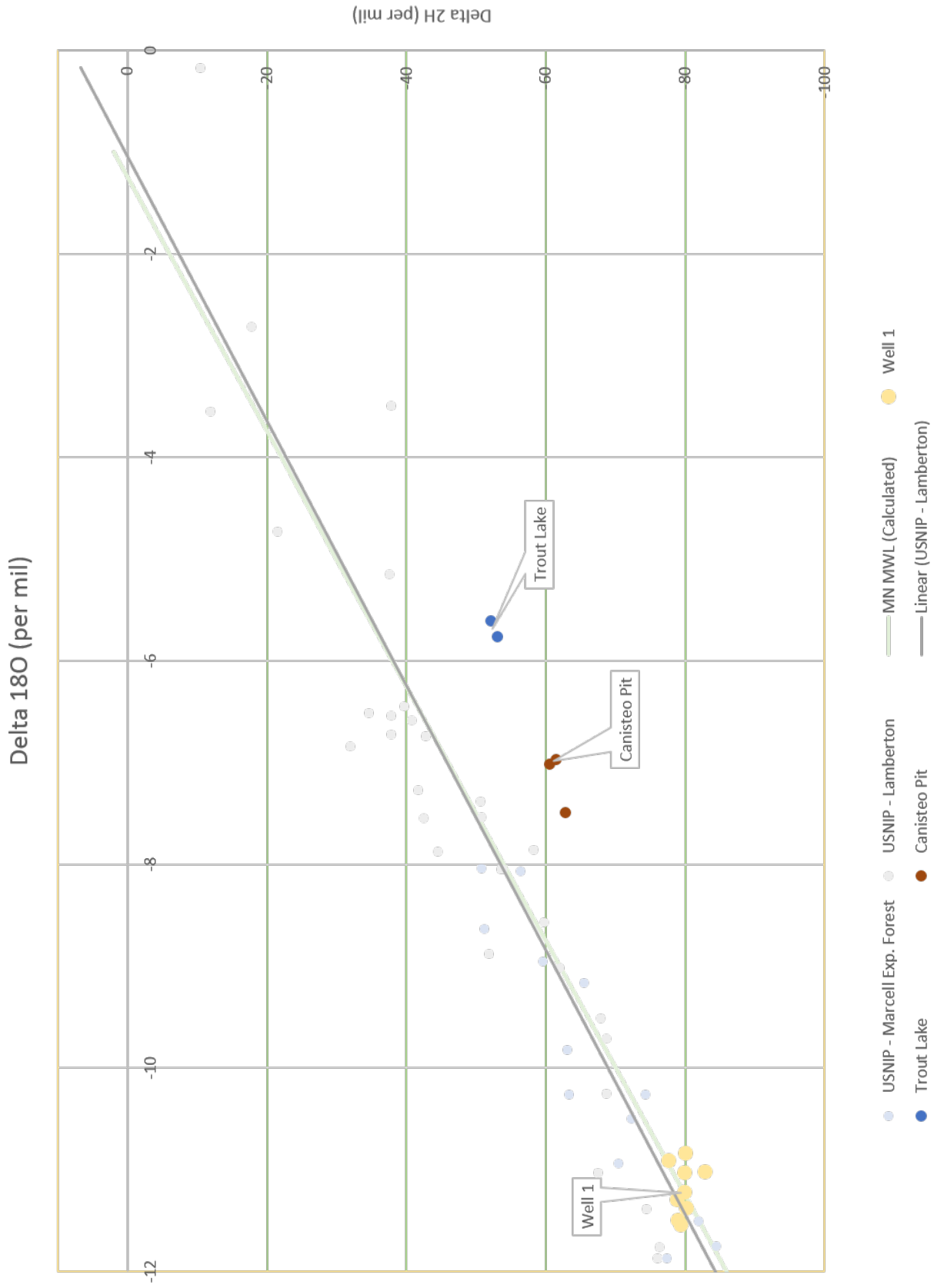


Table 1: ¹⁸O Summary Information

ID (link to Table 2)	Number of Samples	² H	Minimum Value	Maximum Value	Mean Value	Coefficient of variation (CV) ¹	Do 1 or more samples show evidence for evaporated surface water? (#)	% of samples showing evidence for evaporated surface water	% evap SW times the mean LC Excess*	% rank of the % evap SW times the mean LC Excess* (includes Virus Study wells: 86 wells total)	Open water 1 year Capture Zone	Open water 10 year Capture Zone	Primary Groundwater Classification	Most conservative Geologic Sensitivity	Most recent Tritium result	Temporal Variability	Vertical Hydraulic Gradient Mean	Surface Water Impact Assessment
0000228834 (1310003S01)	9	-11.5431507322	-10.836	-11.1922087480222	2%	Yes (3 of 9)	33%	-0.701914160737058	13%	n/a	n/a	n/a	M	6.4901995571				possibly impacted by long-residence time surface water at long time of travel
SWS0000170	2	-5.76	-5.61	-5.685	Not calculated	No (0 of 2)	0%	n/a	n/a	n/a	n/a	n/a		10.9				
SWS0000171	3	-7.49	-6.97	-7.15666666666667	4%	No (0 of 3)	0%	n/a	n/a	n/a	n/a	n/a		13.9				

(1) - A highlighted CV indicates it meets or exceeds the threshold value for high variability of 3% and may indicate rapid or seasonal recharge (https://dwpreports.web.health.state.mn.us/DWP_Reports/gv_categories_11.pdf).

Table 2: Isotope Analysis

¹⁸ O	² H	ID (link to Table 1)	Collection Date	LC Excess* (1)	Does the LC Excess* show that the sample is significantly different than the MWL? (2)	Evidence for evaporated surface water? (3)	Estimated Annual Precipitation (Bowen grid for North America for ¹⁸ O values) (4)	Is the sample ¹⁸ O value significantly different than the Estimated Annual Precipitation value (Bowen, 2003)? (5)	Precipitation month most closely matching ¹⁸ O	Precipitation month most closely matching ¹⁸ O	Precipitation for month most closely matching ¹⁸ O	Precipitation difference for month most closely matching ¹⁸ O
-10.91	-77.67	0000228834 (1310003S01)	2/10/2004	-0.49249397	No	No	-11.2200	No	April	April	-11.1125	0.2025
-11.03	-79.91	0000228834 (1310003S01)	6/2/2004	-1.21474393	Yes	Yes	-11.2200	No	April	April	-11.1125	0.0825
-11.02	-82.88	0000228834 (1310003S01)	10/14/2004	-2.91918674	Yes	Yes	-11.2200	No	April	April	-11.1125	0.0925
-10.836	-80.11	0000228834 (1310003S01)	2/24/2009	-2.18329677	Yes	Yes	-11.2200	No	April	April	-11.1125	0.2765
-11.5	-79.01	0000228834 (1310003S01)	8/26/2010	1.36400147	Yes	No	-11.2200	No	April	April	-11.1125	0.3875
-11.5431507322	-79.4247657292	0000228834 (1310003S01)	3/30/2015	1.32270412	Yes	No	-11.2200	No	April	April	-11.1125	0.4306
-11.217666	-79.929353	0000228834 (1310003S01)	3/9/2016	-0.39678557	No	No	-11.2200	No	April	April	-11.1125	0.1051
-11.29199	-78.901901	0000228834 (1310003S01)	11/2/2017	0.50580976	No	No	-11.2200	No	April	April	-11.1125	0.1795
-11.381072	-80.259781	0000228834 (1310003S01)	12/4/2017	0.14013874	No	No	-11.2200	No	April	April	-11.1125	0.2685
-5.76	-53.02	SWS0000170	6/2/2004	-9.45633148	Yes	No	0.0000	Yes	January	January	0.0000	5.7600
-5.61	-52.08	SWS0000170	7/15/2009	-9.59329064	Yes	No	0.0000	Yes	January	January	0.0000	5.6100
-7.49	-62.81	SWS0000171	6/2/2004	-7.28902259	Yes	No	0.0000	Yes	January	January	0.0000	7.4900
-6.97	-61.44	SWS0000171	10/14/2004	-8.81961112	Yes	No	0.0000	Yes	January	January	0.0000	6.9700
-7.01	-60.58	SWS0000171	7/15/2009	-8.16220713	Yes	No	0.0000	Yes	January	January	0.0000	7.0100

(1) - Bowen GJ, Revenaugh J (2003) Interpolating the isotopic composition of modern meteoric precipitation. Water Resources Research 39, 1299. doi:10.129/2003WR020286
 (2) - Absolute values of LC Excess* that are greater than 1 are considered significant deviations from the Minnesota MWL.

(3) - Evidence of evaporated surface water is set to 'Yes' only for those samples where the LC Excess* was both negative and significant, and ¹⁸O is heavier than the Estimated Annual Precipitation.

(4) - Landwehr, J.M. and Coplen, T.B. (2004) Line-conditioned excess: A new method for characterizing stable hydrogen and oxygen isotope ratios in hydrologic systems. In Isotopes in Environmental Studies, Edition: 1, Chapter: IAEA-CN-118/56, Publisher: IAEA, pp.132-135. See pp.99-100 in: <http://www.iaea.org/miss/collection/NCLCollectionStore/Public/36.003.36003223.pdf>

(5) - Differences between ¹⁸O and Estimated Annual Precipitation that are greater than 0.4 are considered significantly different.

July 19, 2018

Mr. Kevin Odden, Public Works Supervisor
City of Bovey
P.O. Box 399
Bovey, Minnesota 55709-0399

Dear Mr. Odden:

Subject: Scoping Decision Notice No. 1 for the City of Bovey, PWSID 1310003, for Wellhead Protection Plan

This letter provides notice of the results of the Scoping 1 meeting that Chris Parthun (Minnesota Rural Water) and Jane de Lambert (Minnesota Department of Health) held with you on July 13, 2018, regarding your wellhead protection (WHP) plan. During the meeting, we discussed the preparation of Part I of a WHP plan that will document the 1) delineation of a WHP area, 2) delineation of a drinking water supply management area, and 3) assessments of well and aquifer vulnerability related to these areas for the primary water supply wells that are used by the city of Bovey. As you may remember, the WHP area is the surface and subsurface area surrounding your public water supply wells through which contaminants are likely to move and affect your drinking water supply. The drinking water supply management area is the area delineated using identifiable landmarks that reflect the WHP area boundaries as closely as possible.

The city of Bovey will have until April 28, 2021, to complete the entire WHP plan, Part I and Part II. The Minnesota Department of Health (MDH) strongly recommends that half of the time allotted be dedicated to completing Part II of the plan. The city may be granted an extension under certain circumstances.

MDH will assist the city with its Part I report. There will be no cost to the city for any involvement by MDH staff with this work. However, it will be the responsibility of the city of Bovey to assist with any requested data collection to aid in the delineation and vulnerability assessments.

At our meeting, we discussed rule requirements and the types of information needed to complete the Part I report. The WHP plan must be prepared in accordance with Minnesota Rules, parts 4720.5100 to 4720.5590. General wellhead protection requirements and criteria for delineating the wellhead protection area and data reporting are presented in Minnesota Rules, parts 4720.5500 to 4720.5510.

The enclosed Scoping Decision Notice No. 1 formally identifies the information that the city will provide to MDH to meet rule requirements for preparing Part I of the WHP plan. The wellhead rule refers to the existing information required for wellhead planning as data elements. Much of this information is available in the public domain, as described in the Scoping Decision Notice No. 1 form. You only need to provide the information that is not in the public domain and, therefore, not available to MDH. The Scoping Decision Notice No. 1 form also includes:

Mr. Kevin Odden
Page 2
July 19, 2018

- 1) Table 1, which lists the Minnesota unique well number and well construction for each well that will be included in the WHP plan.
- 2) Table 2, which lists the pumping volumes for each well.
- 3) Table 3, which lists other permitted high capacity wells within two miles of the PWS wells.
- 4) A map of the well locations.

A summary of the data being requested by MDH is included at the end of the Scoping Decision Notice No. 1 form.

After the delineation and Part 1 report has been completed, we will provide you with a draft for review prior to its submittal for formal approval. During this time, you will want to evaluate the boundaries of the drinking water supply management area. These are derived using roads, property boundaries, section lines, or other features that the public can easily understand for referencing the areas that will be included in the city's WHP plan. MDH will provide a proposed boundary that will require the city's consent.

Finally, it is our understanding that you will serve officially as the wellhead protection manager on behalf of the city. You are both responsible for providing written notice to local units of government of the city's intent to develop the WHP plan, as required by the WHP rule (part 4720.5300, subpart 3). A copy of this notice should be forwarded to MDH and must include a list of the city wells, their unique well numbers, and contact information for you as co-WHP managers. Chris Parthun can provide you with some examples of the notification of intent that other communities have used. Please contact Chris Parthun at 218-308-2109 for assistance.

In closing, we look forward to working with you on your Wellhead Protection Plan. If you have any questions regarding our comments, please contact me at 651-201-4692 or at jane.de.lambert@state.mn.us.

Sincerely,

Jane de Lambert, Hydrologist
Source Water Protection Unit
Environmental Health Division
P.O. Box 64975
St. Paul, Minnesota 55164-0975

Jd:ds-b

Enclosures: Scoping Decision Notice No. 1; Summary of Data Requested; Table 1 - Public Water Supply Well Information; Table 2 - Annual Volume of Water Pumped From PWS Wells, Well Location Map

cc: Chris Parthun, Planner, Source Water Protection Unit, Bemidji District Office
Mike Luhrsen, Engineer, Minnesota Department of Health, Fergus Falls District Office
Ron Struss, Minnesota Department of Agriculture

SCOPING DECISION NOTICE No. 1

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

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

Name of Public Water Supply		Date
City of Bovey (PWSID = 1310003)		July 19, 2018
Name of the Wellhead Protection Manager		
Mr. Kevin Odden, Public Works Supervisor		
Address		Zip
P.O. Box 399		55709-0399
Unique Well Numbers		Phone
228834 (Well #1)		218)-245-1633

Instructions for Completing the Scoping No. 1 Form

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

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

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

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

DATA ELEMENTS ABOUT THE PHYSICAL ENVIRONMENT

A. PRECIPITATION			
N	D	V	S
			A.1: An existing map or list of local precipitation gauging stations.
	X		
Technical Assistance Comments: Precipitation values can be used to determine the local recharge in the groundwater model. The locations of the gauging stations are available in the public domain.			
N	D	V	S
	X		A.2: An existing table showing the average monthly and annual precipitation, in inches, for the preceding five years.
Technical Assistance Comments: This information may be used for determining local recharge for the groundwater model. This information may be available in the public domain if there is a local gauging station.			
B. GEOLOGY			
N	D	V	S
	X	X	B.1: An existing geologic map and a description of the geology, including aquifers, confining layers, recharge areas, discharge areas, sensitive areas as defined in Minnesota Statutes, section 103H.005, subdivision 13, and groundwater flow characteristics.
Technical Assistance Comments: Information of this type is required to characterize the geologic and hydrogeologic setting of the PWS well field. This information is used to define aquifer geometry, location, and magnitude of the recharge and discharge areas, and groundwater flow information. Aquifer tests or alternatives listed in MN Rules, part 4720.5510, subpart 6, can be used to help characterize flow in the aquifer.			
N	D	V	S
	X	X	X
Technical Assistance Comments: Information of this type may be useful to refine the understanding of the geologic and hydrogeologic setting on a local basis. Submit only if the PWS or city has information of test drilling or site investigations conducted by the city that is not available in the public domain.			
N	D	V	S
	X	X	X
Technical Assistance Comments: Information from geophysical records may provide additional information about aquifer thickness, well construction, and water level information at a local scale. Submit only if the information is not available in the public domain.			
N	D	V	S
			B.4: Existing surface geophysical studies.
	X	X	X
Technical Assistance Comments: Information from geophysical studies may be useful to refine the understanding of the geology on a local basis. Submit only if the information is not available in the public domain.			
C. SOILS			
N	D	V	S
	X	X	C.1: Existing maps of the soils and a description of soil infiltration characteristics.
Technical Assistance Comments: This information is in the public domain and can be used to delineate the WHPA and assess the vulnerability of the DWSMA because it indicates the underlying geology.			
N	D	V	S
	X		C.2: A description or an existing map of known eroding lands that are causing sedimentation problems.
Technical Assistance Comments:			

D. WATER RESOURCES		
N	D	V S
	X	
<p>Technical Assistance Comments: These may be useful for delineating a surface water contribution area to the WHP area.</p>		
N	D	V S
	X	
<p>Technical Assistance Comments: These may be useful for delineating the WHP area or its surface water contribution area.</p>		
N	D	V S
X		
<p>Technical Assistance Comments:</p>		
N	D	V S
	X	
<p>Technical Assistance Comments: These may be useful for delineating the WHP area or its surface water contribution area.</p>		
N	D	V S
X		
<p>Technical Assistance Comments:</p>		

DATA ELEMENTS ABOUT THE LAND USE

E. LAND USE		
N	D	V S
	X	
<p>Technical Assistance Comments: This information may be helpful in delineating the DWSMA, if available. If this information is provided, identification numbers must be provided for each parcel. An electronic format for the map is preferable.</p>		
N	D	V S
	X	X
<p>Technical Assistance Comments: Please provide this information if the boundaries have been updated/changed. This information may help delineate the DWSMA. An electronic format for the map is preferable.</p>		
N	D	V S
	X	
<p>Technical Assistance Comments: This information is available in the public domain and may be used to delineate the DWSMA.</p>		
N	D	V S
X		
<p>Technical Assistance Comments:</p>		
N	D	V S
X		
<p>Technical Assistance Comments:</p>		

N	D	V	S	E.6: Existing zoning map.
X				
Technical Assistance Comments:				
F. PUBLIC UTILITY SERVICES				
N	D	V	S	F.1: An existing map of transportation routes or corridors.
	X			
Technical Assistance Comments: This information is available in the public domain and may be helpful in delineating the DWSMA.				
N	D	V	S	F.2: An existing map of storm sewers, sanitary sewers, and the public water supply systems.
	X			
Technical Assistance Comments: It is not necessary to submit a map of the storm sewers and sanitary sewers. It is important to know, however, whether there is any significant water loss occurring.				
N	D	V	S	F.3: An existing map of gas and oil pipelines used by gas and oil suppliers.
X				
Technical Assistance Comments:				
N	D	V	S	F.4: An existing map or list of public drainage systems.
	X	X		
Technical Assistance Comments: This information is available in the public domain and may be helpful in delineating the DWSMA.				
N	D	V	S	F.5: An existing record of construction, maintenance, and use of the public water supply wells and other wells within the DWSMA.
	X	X	X	
Technical Assistance Comments: If the information is different than that on-file with MDH, please provide 1) the pumping rates for the current and previous years, and the projected annual pumping rates for the next five years for each well in the PWS; and 2) well record(s) for the PWS well(s). Information about the PWS well(s) may affect the vulnerability assessment due to rehabilitation/reconstruction of a well or changes in pumping rates.				

DATA ELEMENTS ABOUT WATER QUANTITY

G. SURFACE WATER QUANTITY				
N	D	V	S	
	X	X		G.1: An existing description of high, mean, and low flows on streams.
Technical Assistance Comments: This information is available in the public domain and may be used to determine hydraulic connections between surface water bodies and the aquifer of concern.				
N	D	V	S	
	X			G.2: An existing list of lakes where the state has established ordinary high water marks.
Technical Assistance Comments: This information is available in the public domain. The information may be used to determine the WHPA.				
N	D	V	S	
X				G.3: An existing list of permitted withdrawals from lakes and streams, including source, use, and amounts withdrawn.
Technical Assistance Comments:				
N	D	V	S	
	X			G.4: An existing list of lakes and streams for which state protected levels or flows have been established.
Technical Assistance Comments: This information is available in the public domain and may be used to determine hydraulic connections between surface water bodies and the aquifer of concern.				
N	D	V	S	
	X		X	G.5: An existing description of known water-use conflicts, including those caused by groundwater pumping.
Technical Assistance Comments: Water use conflicts can indicate hydrologic boundaries that are important to simulate in the computer model used to generate the WHPAs.				
H. GROUNDWATER QUANTITY				
N	D	V	S	
	X	X	X	H.1: An existing list of wells covered by state appropriation permits, including amounts of water appropriated, type of use, and aquifer source.
Technical Assistance Comments: Please submit this information for wells that are not permitted by the DNR because this information may be useful in identifying the hydrologic boundary conditions that could affect the size and shape of the WHPA boundaries.				
N	D	V	S	
	X	X	X	H.2: An existing description of known well interference problems and water-use conflicts.
Technical Assistance Comments: Please notify MDH of well interference problems of which the PWS is aware. Interference problems with other wells, if present, likely indicate a hydrologic boundary that would need to be considered in making the WHPA delineation.				
N	D	V	S	
	X	X	X	H.3: An existing list of state environmental boreholes, including unique well number, aquifer measured, years of record, and average monthly levels.
Technical Assistance Comments: Only submit monthly water level measurements (with unique well numbers and dates) that are not in the public domain.				

DATA ELEMENTS ABOUT WATER QUALITY

I. SURFACE WATER QUALITY				
N	D	V	S	
X				I.1: An existing map or list of the state water quality management classification for each stream and lake.
Technical Assistance Comments:				
N	D	V	S	I.2: An existing summary of lake and stream water quality monitoring data, including: 1. bacteriological contamination indicators; 4. sedimentation; 2. inorganic chemicals; 5. dissolved oxygen; and 3. organic chemicals; 6. excessive growth or deficiency of aquatic plants.
	X	X		
Technical Assistance Comments: This information can be useful for assessing the degree of connection between any surface water features and the aquifer(s) used by the city wells.				
J. GROUNDWATER QUALITY				
N	D	V	S	
	X	X	X	J.1: An existing summary of water quality data, including: 1) bacteriological contamination indicators; 2) inorganic chemicals; and 3) organic chemicals.
Technical Assistance Comments: Submit if the PWS has information that is not available in the public domain, the information may help explain groundwater flow paths.				
N	D	V	S	J.2: An existing list of water chemistry and isotopic data from wells, springs, or other groundwater sampling points.
	X	X	X	
Technical Assistance Comments: Submit if the PWS has information that is not available in the public domain, the information may help explain groundwater flow paths.				
N	D	V	S	J.3: An existing report of groundwater tracer studies.
	X	X		
Technical Assistance Comments: Information may help explain groundwater flow paths.				
N	D	V	S	J.4: An existing site study and well water analysis of known areas of groundwater contamination.
		X	X	
Technical Assistance Comments: Submit if the PWS has information on contaminant sources not available in the public domain because these reports may contain additional geologic or hydrogeologic information.				
N	D	V	S	J.5: An existing property audit identifying contamination.
X				
Technical Assistance Comments:				
N	D	V	S	J.6: An existing report to the Minnesota Department of Agriculture and the Minnesota Pollution Control Agency of contaminant spills and releases.
	X	X		
Technical Assistance Comments: Notify MDH of reports on spills or contaminant releases that are on-file with the PWS or city but are not in the public domain. These reports do not need to be submitted but the MDH staff would like to review the reports.				

City of Bovey
Summary of Data Request
Specific Data to be Provided to MDH by PWS

As discussed during the first Scoping Meeting on July 13, 2018, the Bovey public water supply (PWS) will provide the following information for Part I of their Wellhead Protection Plan to the Minnesota Department of Health (MDH). The number of the data element that refers to the information needed to prepare the Part I Report is listed in the parenthesis at the end of each request.

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

Table 1 lists well use and construction for each of the PWS wells. Please review this table for accuracy. The enclosed map shows the locations of the public water supply wells. Let us know if you feel the wells are not correctly located. These locations must be used to delineate your wellhead protection area.

Table 2 shows the available pumping information that will be used to delineate the capture zone boundaries. Please review this table for accuracy.
- 2) If the city boundaries have recently changed, please provide the new boundaries. (E.2)
- 3) If there are private well records, soil boring reports, geophysical studies, or water level measurements in your files that MDH staff did not identify at the scoping meeting and that would be available for MDH staff to review and copy, please notify MDH. (B.2, B.3, B.4, and H.3)
- 4) Identify reports that you have on file relating to leaks/contamination sites that may be a concern to your drinking water supply that MDH may review and copy. (J.4)
- 5) If your files contain water chemistry data, such as bacteria, virus, inorganic, organic, or isotopic results from wells or other groundwater sampling points, that are not currently available to MDH that MDH may review and copy, please notify MDH. (J.1 and J.2)
- 6) With respect to Table 3, please provide information about other high-capacity wells in your area that may not be permitted by the Department of Natural Resources. (H.1)
- 7) Describe any conflicts over water use that the PWS has been involved with, such as 1) private wells that went dry (or well interference) or 2) springs or wetlands that were affected. Was the Department of Natural Resources involved in resolving the conflict? (G.5 and H.2)

**Table 1 - Public Water Supply Well Information
Bovey, Minnesota**

Local Well Name	Unique Number	Use/Status	Casing Diameter (inches)	Casing Depth (feet)	Well Depth (feet)	Date Constructed/Reconstructed	Well Vulnerability	Aquifer ¹
Well #1	228834	Primary	16	50	92	1953	Vulnerable	QBAA

Note: 1. QBAA = Quaternary Buried Artesian Aquifer

**Table 2 - Annual Volume of Water Pumped from PWS Wells
(Million Gallons)**

Well Name/ Number	2013	2014	2015	2016	2017	Amount Used in Previous Delineation
Well #1 (228834)	34.270	35.770	30.243	26.898	21.4	35.391

Note: **Bolding** indicates greatest annual pumping volume.

Source: DNR MN Permitting and Reporting System

Table 3 - Permitted High-Capacity Wells within 2 Miles

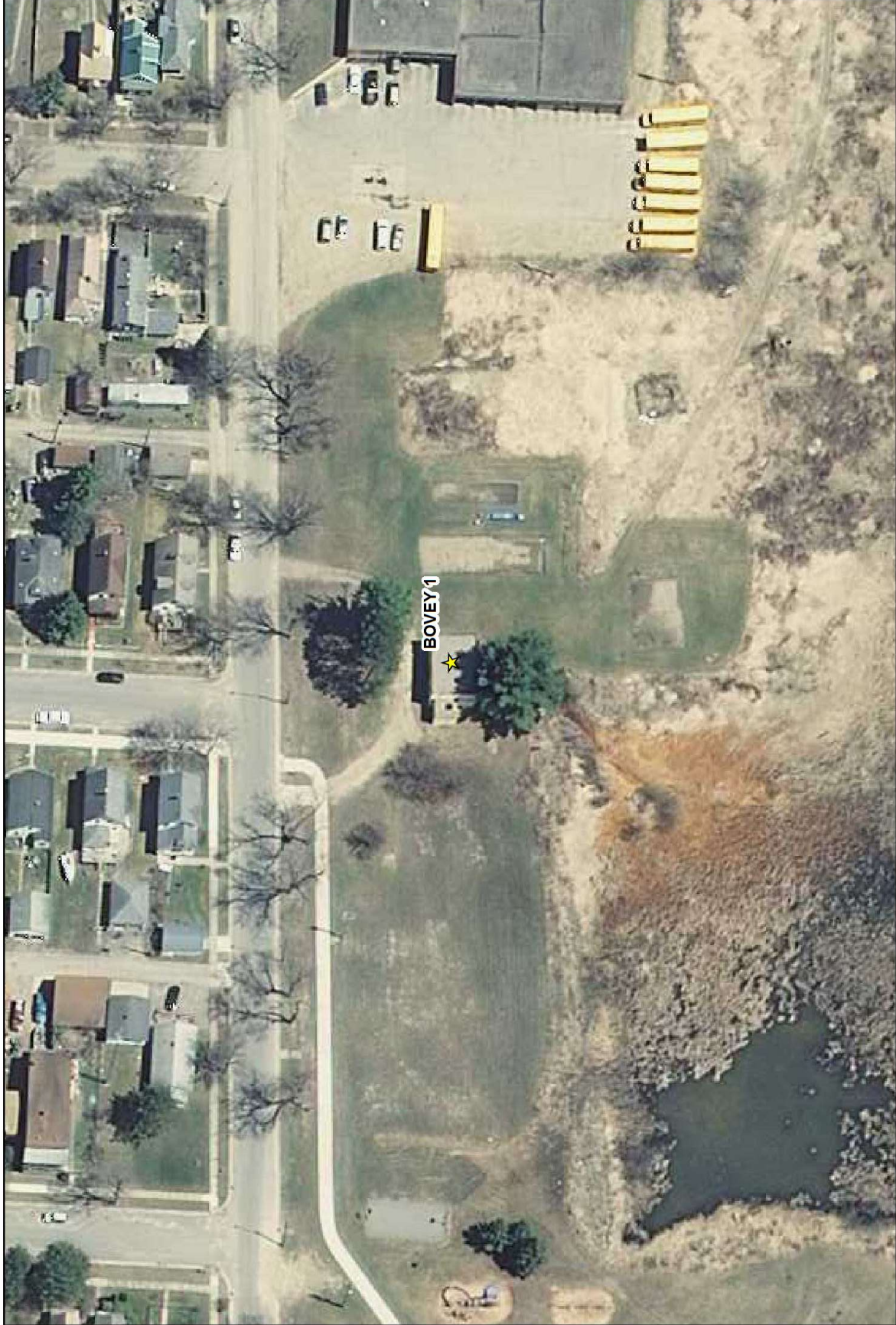
DNR MN Permitting and Reporting System

Local Well ID	Unique No.	Permit ID	Use	Max Last 5 Years Pumping*
Coleraine, City of	110457	1979-2186	Municipal/Public Water Supply	26.576
Coleraine, City of	241430	1979-2186	Municipal/Public Water Supply	27.369
Taconite, City of	241489	1979-2206	Municipal/Public Water Supply	8.146
Taconite, City of	495997	1979-2206	Municipal/Public Water Supply	7.613
Magnetation LLC	789582	2012-0688	Commercial/Institutional Water Supply	0.020

Source year = 2016

Source: MN DNR Permitting and Reporting System (MPARS)

*In million gallons per year





Protecting, Maintaining and Improving the Health of All Minnesotans

May 14, 2021

Mr. Kevin Odden, Public Works Supervisor
City of Bovey
P.O. Box 399
Bovey, Minnesota 55709-0399

Subject: Scoping 2 Decision Notice and Meeting Summary – City of Bovey – PWSID 1310003

Dear Mr. Odden,

This letter provides notice of the results of a combined second scoping meeting held via Virtual MS Teams meeting with both the city of Bovey and the city of Coleraine on April 22, 2021, regarding Part II of Bovey's and Coleraine's wellhead protect (WHP) plans. In attendance for the city of Bovey were Kevin Odden (Bovey) and Joe Pelawa (Bolten-Menk). In attendance for the city of Coleraine were Harry Bertram, Bob Beaver and Melanie Niday (SEH). Also in attendance was Marilyn Bayerl (Bayerl Water Resources, and Trent Farnum, Chad Anderson, and me (Minnesota Department of Health). 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 Bovey 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.

MIDH understands a consultant, to be determined, will be working with you 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 chris.parthun@state.mn.us or by phone at 218-308-2109.

Sincerely,

A handwritten signature in black ink that reads "Chris Parthun".

Chris Parthun, Planner
Environmental Health Division
705 Fifth Street NW, Suite A
Bemidji, Minnesota 56601-2933

CP:ds-b
Enclosures

cc: Mike Luhrsen, MDH Engineer, Duluth District Office
City Clerk, City of Bovey
Luke Stuewe, Minnesota Department of Agriculture

SCOPING 2 DECISION NOTICE – MODERATE VULNERABILITY DWSMA

Date: May 14, 2021
Name of Public Water Supply: City of Bovey
PWSID: 1310003
Name of the Wellhead Protection Manager: Mr. Kevin Odden, Public Works Supervisor
Address: P.O. Box 399
City: Bovey
Zip: 55709-0399
Phone: 218-245-1633
Primary Unique Well Numbers: 228834 (Well #1)
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.

SCOPING 2 DECISION NOTICE – MODERATE VULNERABILITY DWSMA

Submit –

The following information **MUST** be submitted in the Part 2 by including it in the plan narrative and/or appendix. **An asterisk* with red text** indicates information that **MUST** be contained in the Part 2.

- *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.

SCOPING 2 DECISION NOTICE – MODERATE VULNERABILITY 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 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.

SCOPING 2 DECISION NOTICE – MODERATE VULNERABILITY DWSMA

- *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.

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 Manager 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).

SCOPING 2 DECISION NOTICE – MODERATE VULNERABILITY DWSMA

Part 1 -

The following information was reviewed and assessed in 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. Or, if the Part 1 is included in the appendix that can be referenced.

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.



City of Bovey 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:

- The location of the city's well was adjusted for greater accuracy. The amended areas are smaller because a draft MDH policy change for surface water contribution areas is in the process of being updated which allowed the Canisteo Mine Pit to be removed from the wellhead protection area.

New management strategies to consider:

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 aquifers and could result in a more refined WHPA in the future.
2. Water Quality Monitoring: Re-sample Well #1 (or whatever primary wells exist at that time) along with a stable isotope sample from the well and the Canisteo Mine Pit. This should be completed during year six of plan implementation for vulnerability parameters determined in consultation with MDH (likely tritium, chloride, bromide, nitrate and ammonia); contingent on funding assistance from MDH for sampling and analysis. The city may need to collect the samples and ship them to MDH. This information will be used to update our understanding of the vulnerability of the city's well and aquifer to contamination risk.
3. Aquifer Test: Performing an aquifer test at Well #1 might help to refine the hydraulic conductivity of the aquifer near the well and confirm any potential geologic barriers for the next amendment. Another benefit would be to help establish the leakage rates for the overlying confining unit. The city should contact MDH prior to pursuing this option to discuss what would be entailed in conducting such a test.

4. Observation Well: If an aquifer test were to be conducted, additional information could be gained by measuring water levels at an observation well rather than just the city well. The observation well could also help confirm our assessment of aquifer vulnerability near the city well. Construction of an observation well could be a grant-eligible activity and should be discussed with the MDH hydrologist before pursuing.

Important partnerships to maintain or establish:

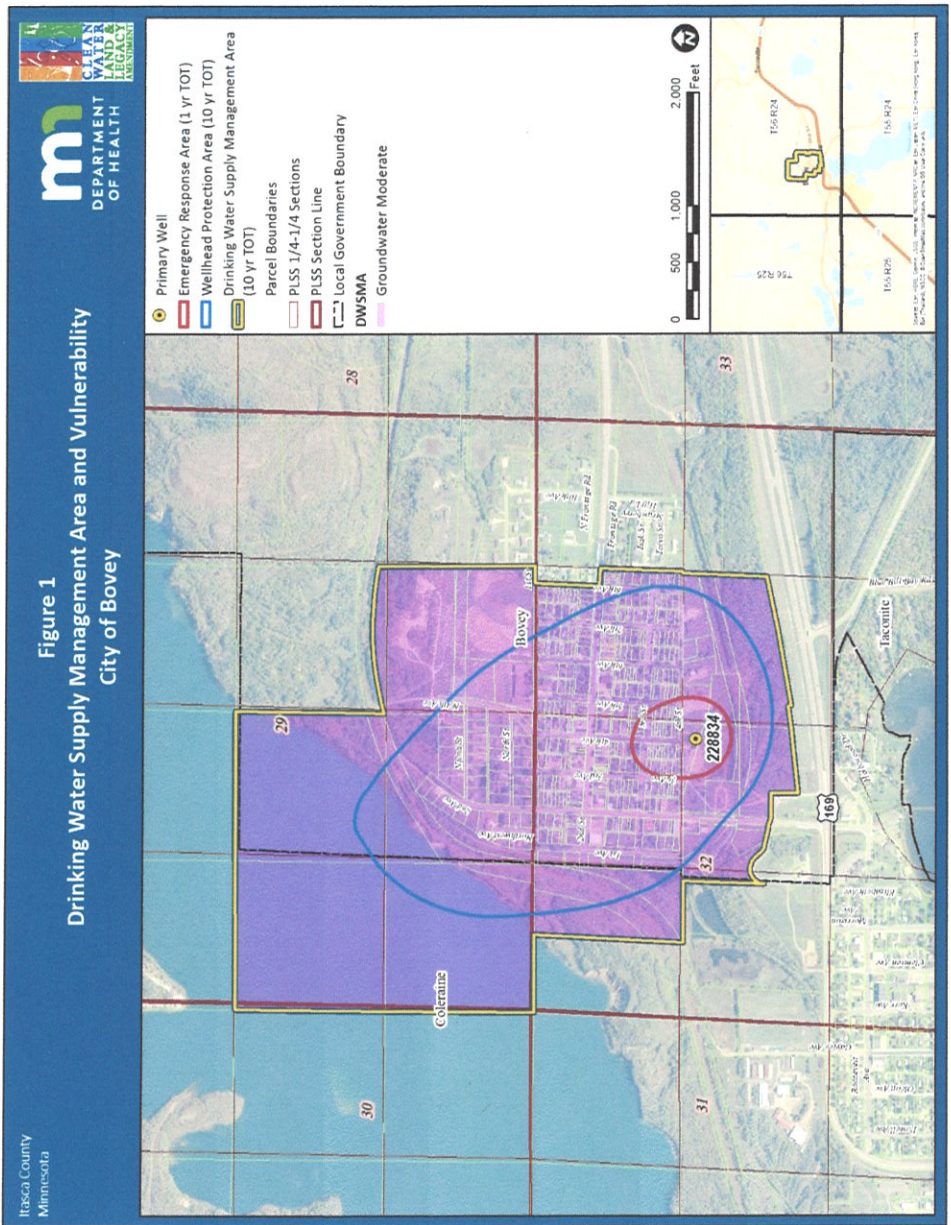
- DWSMA overlaps Coleraine’s jurisdictional municipal boundary.
- There is an emergency interconnect with the city of Coleraine.

Water quantity issues and implications:

- Major water features around the city of Bovey are the glacially formed Trout Lake and the abandoned iron ore mines that now form the Canisteo Mine Pit Lake. The Canisteo Mine Pit Lake was formed when water levels rose following the cessation of mining (Walsh, 2007).
- Inundation from the Canisteo Pit should be considered; water levels are projected to peak in 2023/2024.
- Plan should address drain tile on west side and south down First Avenue that was constructed in advance of the Canisteo Pit peak inundation.

Water quality issues and implications:

- Chemical and isotopic data from the city’s primary well, Trout Lake, and the Canisteo Mine Pit indicate that water from the Canisteo Mine Pit has likely constituted a small component of recharge to the city’s well.
- Plan should include well transducers and temperature probes in wells and Trout Lake.
- The well has been televised.



Scoping 2 Decision Notice Attachment Potential Contaminant Source Inventory Requirements

Moderately Vulnerable DWSMA

The following current and historical potential contaminant sources and related codes, materials and related codes, and activity status and related codes are required to be included in the potential contaminant source inventory. In cases where a materials identification is required, a materials designation and code must be assigned. All potential contaminant sources must be assigned an activity status and related code using state program descriptors or local knowledge.

Potential Contaminant Sources (PCS)

Material

Above-Ground Storage Tank - Greater than 1100 gallons

Chemicals

Fertilizers

Fuels, gases, and oils

Hazardous substances

Solvents and coatings

Waste

AST

C000

A050

F000

C001

S000

W000

Agricultural Drainage Well (potential Class V)

Disposal Well (potential Class V)

Industrial Drainage Well (potential Class V)

Large Capacity Cesspool (potential Class V)

Large Capacity Waste Water Disposal Site (potential Class V)

Leaking Underground Storage Tank

Misc. Injection Well (potential Class V)

Motor Vehicle Waste Disposal Well (potential Class V)

Pipeline Facility

Potential Contamination Site¹

Recharge Well (potential Class V)

Reinjection Well (potential Class V)

Solid Waste Management Site

Special Drainage Well (potential Class V)

Spills

Storage or Preparation Area

Chemicals (include RMP facilities here)

Fertilizers

Fuels, gases, and oils

Hazardous substances (include TRIS facilities here)

Solvents and coatings

Waste

ADW

DISWLL

INDW

CVLCC

CVWWD

LUST

INJWLL

CVMVW

PLFAC

PCS

RWLL

RIWLL

SWMS

SPDW

SPL

STOR

C000

A050

F000

C001

S000

W000

Potential Contaminant Sources (PCS)MaterialPCS CodesMaterial Codes

Stormwater Injection Well (potential Class V)	SWI	C000
Suspected Contaminant of Concern	SCC	A000
Chemical		F000
Food, agricultural, and consumer products		M000
Fuels, gases, and oils		P000
Materials and minerals		S000
Pathogens		W000
Solvents and coatings		
Waste		
Underground Storage Tank	UST	
Chemicals		C000
Fertilizers		A050
Fuels, gases, and oils		F000
Hazardous substances		C001
Solvents and coatings		S000
Waste		W000
Wells	WEL	

Footnotes:

¹Potential Contamination Sites (PCS) include the following:

Brownfields (BMS)

Delisted State Superfund Sites (DPLP)

Federal Superfund Sites (NPL)

Hazardous Waste Investigative/cleanup (HWIC)

No Further Remedial Action Planned (NFRAP)

State Superfund Sites (PLP)

Suspected Hazardous Waste Site (CERCL)

Voluntary Investigative Cleanup (VIC)

Activity Status; Codes; and Descriptions

Status	Code	Description
Active	A	PCS is operative or in use. Examples: Animal feedlot is active. Well is in use or has maintenance permit.
Closed	C	PCS is inactive and is not open from a regulatory viewpoint. Example: Leaking storage tank site or landfill is closed.
Inactive	I	PCS is present but not currently active. Examples: Gravel pit is inactive. Well is un-used.
Removed	R	PCS has been removed. Example: Underground storage tank has been removed.
Unknown	U	Activity status of the PCS is not known definitely or has not been evaluated. Examples: Class V site status unknown. Well is thought to be sealed, but no official sealing record has been identified.

DWS_GW_DWS_PCSL_ID	_VUL	ID	PIN	PERMIT_FAC_NAME	PROPERTY ADDRESS	CITY	ZIP-	STATU	MAT_	PROGRAM	TOTAL COMMENT
							CODE	PCS_C	S_C	C	
1189	MOD	1	86-032-2403	CITY OF BOVEY	402 4th St	BOVEY	55709	WEL	A	00228834	Public Water Supply Well - 92'
1189	MOD	2	86-032-2401	DNR MW CITY OF BOVEY	505 2nd Ave	BOVEY	55709	WEL	A	00629805	OBWEL 28'deep - 1999
1189	MOD	3	86-412-1000	OLIVER-COL 51(D.A. WHITE	No assigned address	BOVEY	55709	WEL	U	00304013	OBWEL 362'deep -
1189	MOD	4	R-O-W	DNR MW	R-O-W	BOVEY	55709	WEL	A	00804385	OBWEL 95'deep - 2015
1189	MOD	5	R-O-W	CANISTEO PIT PROJ. DNR OBWELL	R-O-W	BOVEY	55709	WEL	A	00689975	OBWEL 15'deep - 2008
1189	MOD	6	R-O-W	DNR MW	R-O-W	BOVEY	55709	WEL	A	00629811	OBWEL 30'deep - 1999
1189	MOD	7	R-O-W	DNR MW	R-O-W	BOVEY	55709	WEL	A	00689974	OBWEL 22'deep - 2008
1189	MOD	8	R-O-W	DNR MW	R-O-W	BOVEY	55709	WEL	A	00689973	OBWEL 19'deep - 2008
1189	MOD	9	R-O-W	DNR MW	R-O-W	BOVEY	55709	WEL	A	00689972	OBWEL 19'deep - 2008
1189	MOD	10	R-O-W	DNR MW	R-O-W	BOVEY	55709	WEL	A	00689967	OBWEL 29.5'deep - 2008
1189	MOD	11	R-O-W	DNR MW	R-O-W	BOVEY	55709	WEL	A	00689966	OBWEL 21.5'deep - 2008
1189	MOD	12	86-435-0445	DNR MW - CITY OF BOVEY	70 N 2nd Ave	BOVEY	55709	WEL	A	00629808	OBWEL 90'deep - 1999
1189	MOD	13	R-O-W	DNR MW	R-O-W	BOVEY	55709	WEL	A	00689965	OBWEL 52'deep - 2008
1189	MOD	14	86-032-1302	NK-G Transportation Inc	502 4th St	BOVEY	55709	UST	A	F000 TS0010564	Underground tanks active
1189	MOD	15	86-032-1302	NK-G Transportation Inc	502 4th St	BOVEY	55709	UST	R	F000 TS0010564	Underground tanks removed
1189	MOD	16	86-415-0110	Itasca Co Oil	300 2nd St	BOVEY	55709	UST	R	F000 TS0019259	Underground tanks removed
1189	MOD	17	86-410-1445	Bovey Spur	317 2nd St	BOVEY	55709	UST	A	F000 TS0011280	Underground active 550-gal tank
1189	MOD	18	86-410-1445	Bovey Spur	317 2nd St	BOVEY	55709	UST	R	F000 TS0011280	Underground tanks removed
1189	MOD	19	86-420-1210	Connor Jasper Middle School	101 5th Ave	BOVEY	55709	UST	I	F000 TS0010562	Underground tank inactive
1189	MOD	20	86-032-1302	ISD 316 Bus Garage (NK-G Transportation Inc)	502 4th St	BOVEY	55709	PCS	C	PB4071	Closed in 2012
1189	MOD	21	86-032-1302	NK-G Transportation Inc	502 4th St	BOVEY	55709	LUST	A	F000 LS0020233	Active SA0000748
1189	MOD	22	86-032-1302	ISD 316 Bus Garage (NK-G Transportation Inc)	502 4th St	BOVEY	55709	LUST	C	F000 LS0004940	Closed in 1996
1189	MOD	23	86-032-1302	ISD 316 Bus Garage (NK-G Transportation Inc)	502 4th St	BOVEY	55709	LUST	C	F000 LS0018480	Closed in 2012
1189	MOD	24	86-410-0875	2nd Ave and 3rd St Reconstruction	215 2nd Ave	BOVEY	55709	LUST	C	F000 LS0018464	Closed 2012 tanks removed (no permit)
1189	MOD	25	86-410-0910	Bob's Country Market	100 2nd St	BOVEY	55709	LUST	C	F000 LS0012701	Closed 2000
1189	MOD	26	86-415-0110	Itasca Co Oil	300 2nd St	BOVEY	55709	LUST	C	F000 LS0010309	Closed 2010
1189	MOD	27	86-410-1445	Bovey Spur (Holiday Station #570)	317 2nd St	BOVEY	55709	LUST	C	F000 LS0000071	Closed 2008
1189	MOD	28	86-420-1210	Connor Jasper Middle School	101 5th Ave	BOVEY	55709	LUST	C	F000 LS0015150	Closed 2012
1189	MOD	29	86-435-0445	Former Mining Site	70 N 2nd Ave	BOVEY	55709	LUST	C	F000 LS0004147	Closed 1991
1189	MOD	30	86-032-1305	Mount Olive Lutheran Church	700 4th St	BOVEY	55709	AST	R	F000 TS0010560	Above ground removed tank
1189	MOD	31	86-415-0110	Itasca Co Oil	300 2nd St	BOVEY	55709	AST	R	F000 TS0019259	Above ground removed tanks
1189	MOD	32	86-410-0910	Bob's Country Market	100 2nd St	BOVEY	55709	UST	R	F000 TS0007342	Underground tanks removed

CITY OF BOVEY POTENTIAL CONTAMINANT SOURCE INVENTORY

PARCELS LOCATED WITHIN THE CITY OF BOVEY DWSMA

PARCEL	OWNER NAME	MAILING ADDRESS	CITY_STATE_ZIP
86-415-0110	HIGGINS HOMES LLC	196 139TH AVE NW	ANDOVER MN 55304
86-415-0120	HIGGINS HOMES LLC	196 139TH AVE NW	ANDOVER MN 55304
86-415-0130	HIGGINS HOMES LLC	196 139TH AVE NW	ANDOVER MN 55304
86-415-0140	HIGGINS HOMES LLC	196 139TH AVE NW	ANDOVER MN 55304
86-415-0150	HIGGINS HOMES LLC	196 139TH AVE NW	ANDOVER MN 55304
86-415-0160	HIGGINS HOMES LLC	196 139TH AVE NW	ANDOVER MN 55304
86-415-0140	HIGGINS HOMES LLC	196 139TH AVE NW	ANDOVER MN 55304
86-415-0150	HIGGINS HOMES LLC	196 139TH AVE NW	ANDOVER MN 55304
86-415-0120	HIGGINS HOMES LLC	196 139TH AVE NW	ANDOVER MN 55304
86-415-0130	HIGGINS HOMES LLC	196 139TH AVE NW	ANDOVER MN 55304
86-415-0160	HIGGINS HOMES LLC	196 139TH AVE NW	ANDOVER MN 55304
86-415-0110	HIGGINS HOMES LLC	196 139TH AVE NW	ANDOVER MN 55304
86-420-1330	HECIMOVIICH, ADAM & JANELL	PO BOX 307	BOVEY MN 55709
86-410-0465	PELUSO, MARCA	PO BOX 76	COLERAINE MN 55722
86-410-0570	BOBICH, AMANDA L	PO BOX 210	BOVEY MN 55709
86-420-0345	TALLEY, C ARLIN & CAROLYN E	PO BOX 202	BOVEY MN 55709
86-420-1410	LEIFERMANN, THOMAS R	PO BOX 418	BOVEY MN 55709
86-410-0790	TRBOYEVICH, CORY A	211 3RD AVE	PO BOX 401
86-420-0430	SCHUSTER PROPERTIES LLC	27477 CO RD 60	GRAND RAPIDS MN 55744
86-435-0315	MIKULICH, GREGORY W	205 NORTH ST	BOVEY MN 55709
86-410-1520	VERTHEIN, TIMOTHY E & RONNA L	PO BOX 481	BOVEY MN 55709
86-410-0470	ECKSTROM, FLORA M	PO BOX 302	BOVEY MN 55709
86-420-0350	PITZEN, CLAY	302 7TH AVE	PO BOX 495
86-420-1425	BLAUERT, JAMES & LEONA	PO BOX 13	BOVEY MN 55709
86-410-0650	NYQUIST, DALE	PO BOX 222	BOVEY MN 55709
86-435-0460	JOHNSON, BRYAN D	101 NW AVE	PO BOX 117
86-420-0470	MEESE PROPERTIES LLC	36880 INGEBO TRL	COHASSET MN 55721
86-420-1345	ALLAIN, RUTHIE P	PO BOX 452	BOVEY MN 55709
86-410-1345	DIEN, LUAN & THACH, SOPHEA	52 DARLENE ST	ST PAUL MN 55119
86-410-0415	WALLACE, KRISTY	PO BOX 133	BOVEY MN 55709-2645
86-032-1303	CITY OF BOVEY	PO BOX 399	BOVEY MN 55709
86-032-1303	CITY OF BOVEY	PO BOX 399	BOVEY MN 55709
86-410-1110	COUNTY OF ITASCA	1177 LAPRAIRIE AVE	GRAND RAPIDS MN 55744
86-029-3100	RGGS LAND & MINERALS LTD LP	100 WAUGH DR STE 400	HOUSTON TX 77007
86-029-3100	RGGS LAND & MINERALS LTD LP	100 WAUGH DR STE 400	HOUSTON TX 77007
86-410-0875	HIGGINS HOMES LLC	196 139TH AVE NW	ANDOVER MN 55304
86-410-0875	HIGGINS HOMES LLC	196 139TH AVE NW	ANDOVER MN 55304
86-420-1320	COURNOYER, TYREL	PO BOX 145	BOVEY MN 55709
86-410-0310	HABITAT FOR HUMANITY	510 SE 11TH ST	GRAND RAPIDS MN 55744
86-420-0620	MCCARTNEY, LINDSAY M &	BRAINARD, KENT A	PO BOX 65
86-420-1445	TREBELHORN, GARY	711 2ND ST	BOVEY MN 55709
86-420-0225	FINCKBONE, BRANDON C	311 5TH AVE	PO BOX 62
86-420-0340	WITTSTRUCK, VIRGINIA & VICKIE	PO BOX 124	MARBLE MN 55764
86-032-2409	VELICH, DEREK J	PO BOX 509	BOVEY MN 55709
86-420-1335	WILLIAMS, GEORGE & ANNETTE	PO BOX 703	COLERAINE MN 55722
86-420-1130	WILLIAMS, COLTER L & WIRTH, AMBER C	PO BOX 537	BOVEY MN 55709
86-412-0210	KARNES, WADE J & TERESA R	21728 CO RD 71	GRAND RAPIDS MN 55744
86-412-0210	KARNES, WADE J & TERESA R	21728 CO RD 71	GRAND RAPIDS MN 55744
86-420-1325	HANSON, ROSALIE A	PO BOX 57	BOVEY MN 55709
86-420-1340	JOHANNSEN, LOUIE N & ROSEMARY L	PO BOX 193	BOVEY MN 55709
86-420-1190	SCHIRBER, JOHN D	PO BOX 543	COLERAINE MN 55722
86-435-0435	CARPENTER, SHIRLEY T	PO BOX 492	BOVEY MN 55709
86-420-1170	JASPER, MICHAEL	17823 BAYVIEW PL	GRAND RAPIDS MN 55744
86-435-0205	TODD, KEELEY J & DOUG	PO BOX 354	BOVEY MN 55709
86-410-1225	SHEIMAN, JASON B	415 NW 8TH AVE	GRAND RAPIDS MN 55744
86-420-0710	NORGORD, CHARLES H	PO BOX 285	BOVEY MN 55709
86-435-0415	JOHNSON, LEE R & CHELSIE M	104 NW AVE	BOVEY MN 55709
86-410-0815	DEGUISEPII, PAUL	PO BOX 287	COLERAINE MN 55722
86-437-0130	WROBEL, JOHN D & KATHRYN M	PO BOX 126	BOVEY MN 55709
86-410-0750	CITY OF BOVEY	PO BOX 399	BOVEY MN 55709
86-435-0445	CITY OF BOVEY	PO BOX 399	BOVEY MN 55709
86-410-0720	BLUE SKY PROPERTY LLC	6 NE 14TH ST	GRAND RAPIDS MN 55744
86-410-1235	LEIFERMANN, DENNIS & ANITA	20526 ASPEN DR	GRAND RAPIDS MN 55744
86-420-0260	TOBECK, BRANDI L	PO BOX 136	BOVEY MN 55709
86-420-1110	MOSTOLLER, KATHERINE K	PO BOX 82	BOVEY MN 55709-0082
86-420-0205	BLUE SKY PROPERTY LLC	6 NE 14TH ST	GRAND RAPIDS MN 55744

PARCELS LOCATED WITHIN THE CITY OF BOVEY DWSMA

PARCEL	OWNER NAME	MAILING ADDRESS	CITY_STATE_ZIP
86-420-0205	BLUE SKY PROPERTY LLC	6 NE 14TH ST	GRAND RAPIDS MN 55744
86-410-0960	BIBEAU, TERRY LEE & SHARON	PO BOX 732	COLERAINE MN 55722
86-420-1450	SMITH, SOSHANNA	PO BOX 165	BOVEY MN 55709
86-410-0765	CITY OF BOVEY	PO BOX 399	BOVEY MN 55709
86-410-0315	TRE PROPERTIES LLC	200 HAKALA LN	BOVEY MN 55709
86-420-0110	SHEIMAN, JASON B	415 NW 8TH AVE	GRAND RAPIDS MN 55744
86-410-1450	ABERNATHY, GUY & BERTA	PO BOX 253	BOVEY MN 55709
86-420-0885	NETTESTAD, GARRET W	PO BOX 162	BOVEY MN 55709
86-437-0230	DEGUISEPPI, PAUL L	PO BOX 287	COLERAINE MN 55722
86-420-1405	NEUMANN, KIMBERLY J	PO BOX 216	BOVEY MN 55709
86-420-0765	HUFFER, ROBERT J	431 E PINE ST	LEAD HILL AR 72644-9315
86-410-0340	DORN, DAVID	320 3RD AVE	BOVEY MN 55709
86-410-1325	HAYES, DANIEL I	PO BOX 87	BOVEY MN 55709
86-410-1260	PLANTE, BRIAN	PO BOX 74	BOVEY MN 55709
86-420-1220	VEKICH, JEFFREY & LISA	PO BOX 45	BOVEY MN 55709
86-410-1410	VICARO PROPERTY MANAGEMENT	C/O ITASCA COUNTY APARTMENTS	PO BOX 74 FORESTON MN 56330
86-420-0940	TINDELL, JESSE D & SHANNA R	212 6TH AVE	BOVEY MN 55709
86-410-0255	HOOPMAN, ETHAN W	PO BOX 248	BOVEY MN 55709
86-420-1460	NELSON, LAUREN & GOGGLEYE, ROCKY	PO BOX 208	BOVEY MN 55709
86-032-1308	SCHOOL DIST 316	PO BOX 227	COLERAINE MN 55722
86-420-0730	SCHUSTER PROPERTIES LLC	27477 CO RD 60	GRAND RAPIDS MN 55744
86-032-2401	CITY OF BOVEY	PO BOX 399	BOVEY MN 55709
86-032-2401	CITY OF BOVEY	PO BOX 399	BOVEY MN 55709
86-420-0955	GODBOUT, MICHAEL & METZER, DONNA	PO BOX 502	BOVEY MN 55709
86-420-0120	HABITAT FOR HUMANITY	510 SE 11TH ST	GRAND RAPIDS MN 55744
86-420-0880	WRIGHT, CONNIE	PO BOX 76	BOVEY MN 55709
86-420-1020	HANSON, JESSE R & FANTASIA A	PO BOX 6	BOVEY MN 55709
86-420-1355	DOYLE, TERRY L	PO BOX 237	BOVEY MN 55709
86-410-1245	MITCHELL, RUTH F & PATRICIA ANN	PO BOX 26	BOVEY MN 55709
86-410-1465	MOORE, KAYLA M	PO BOX 135	BOVEY MN 55709-0135
86-410-0810	DEGUISEPPI, PAUL	PO BOX 287	COLERAINE MN 55722
86-410-1340	DIEN, LUAN & THACH, SOPHEA	52 DARLENE ST	ST PAUL MN 55119
86-410-1210	SCHUSTER PROPERTIES LLC	27477 CO RD 60	GRAND RAPIDS MN 55744
86-420-0950	GORRON, LAWRENCE E & WENDY L	PO BOX 184	BOVEY MN 55709
86-420-1375	DEGUISEPPI, TARA & STANLEY, TRINA	28523 CO RD 69	BOVEY MN 55709
86-420-0945	MILLER, KATRINA D	PO BOX 353	BOVEY MN 55709-0353
86-420-1435	PIRITANO, GREGORY M	PO BOX 301	BOVEY MN 55709-0301
86-437-0160	WEITZEL, ADAM & JESSICA	PO BOX 505	BOVEY MN 55709
86-420-1495	VILLEBRUN, KEVIN & KARLA	PO BOX 316	BOVEY MN 55709-0316
86-410-1435	BEATY, MARLA	31909 MACDOUGAL BAY RD	GRAND RAPIDS MN 55744
86-420-1071	BOWMAN, JOHNNY D	200 PARK LN S	MINNETONKA MN 55305
86-420-1350	BERNAL, JESSE	PO BOX 173	BOVEY MN 55709
86-420-1180	OLSON, KENNETH A	20751 S EAGLE LN	GRAND RAPIDS MN 55744-6156
86-420-0520	BROWN, KENNETH & WENDY	PO BOX 342	BOVEY MN 55709
86-410-0840	PETERSON, RICHARD & PATRICIA	PO BOX 93	BOVEY MN 55709
86-410-0550	BUESCHER, HOLLY JO	PO BOX 37	BOVEY MN 55709
86-410-0225	UGRICH, STEVE & JILL	PO BOX 241	BOVEY MN 55709
86-410-0360	SWEEDEEN, ASHLEY	304 3RD AVE	BOVEY MN 55709
86-032-1304	TOK, ROBERT M & KAREN	PO BOX 313	BOVEY MN 55709
86-420-0750	NELSON, TYLER D	PO BOX 27	BOVEY MN 55709
86-420-1430	SURFACE, KARYN A	PO BOX 58	BOVEY MN 55709
86-410-1560	A.K. RENTAL CORPORATION	604 NW 16TH AVE	GRAND RAPIDS MN 55744
86-420-0835	SCHUSTER PROPERTIES LLC	27477 CO RD 60	GRAND RAPIDS MN 55744
86-420-0890	WILLOW CREEK PROPERTIES LLC	16990 RIVER RD	GRAND RAPIDS MN 55744
86-410-1305	JOHNSON, DALE L	PO BOX 396	BOVEY MN 55709
86-032-2408	CITY OF BOVEY & CITY OF COLERAINE	PO BOX 399	BOVEY MN 55709
86-032-2408	CITY OF BOVEY & CITY OF COLERAINE	PO BOX 399	BOVEY MN 55709
86-420-0140	GRAM, DALLAS & STEEL, TERRY	25480 WILLOW CREEK TRL	BOVEY MN 55709
86-410-0805	DEGUISEPPI, PAUL	PO BOX 287	COLERAINE MN 55722
86-437-0110	DUROCHER, SUSAN, NAOMI, JEREMIAH,	42636 CO RD 117	COHASSET MN 55721
86-410-1460	SARICH, GEORGIA M	PO BOX 177	BOVEY MN 55709
86-420-1040	SCHUSTER PROPERTIES LLC	27477 CO RD 60	GRAND RAPIDS MN 55744
86-420-0440	THIESCHAFER, JORDAN D & BROOKE M	720 CIRCLE DR	GRAND RAPIDS MN 55744
86-420-0130	CRABB, DEAN & LINDA & DEAN S	PO BOX 392	BOVEY MN 55709
86-410-0365	KUJALA, KEVIN & JENNIFER	PO BOX 282	BOVEY MN 55709
86-410-1455	KEMPPAINEN, PAIGE N	114 4TH AVE	BOVEY MN 55709

PARCELS LOCATED WITHIN THE CITY OF BOVEY DWSMA

PARCEL	OWNER NAME	MAILING ADDRESS	CITY_STATE_ZIP
86-420-0960	SCHUSTER PROPERTIES LLC	27477 CO RD 60	GRAND RAPIDS MN 55744
88-032-2202	SAVAGE COMMUNICATIONS INC	PO BOX 810	HINCKLEY MN 55037
88-032-2202	SAVAGE COMMUNICATIONS INC	PO BOX 810	HINCKLEY MN 55037
86-410-1350	ROUSH, KATHLEEN M	1424 E SKYLINE PKWY	DULUTH MN 55805
86-032-2410	KMDA	PO BOX 509	BOVEY MN 55709
86-032-2410	KMDA	PO BOX 509	BOVEY MN 55709
86-420-0255	MCCARTNEY, DEBORAH S	PO BOX 190	BOVEY MN 55709
86-420-1415	ZILBERT, JOHN G & BETSY J	PO BOX 176	BOVEY MN 55709
86-435-0405	MJOLSNES, JAYLEE & GUYER, TREVOR	PO BOX 2	BOVEY MN 55709-0002
86-410-1445	JBS HOLDINGS LLC	415 NW 8TH AVE STE B	GRAND RAPIDS MN 55744
86-410-0845	KANGAS, JACOB W & LISA J	PO BOX 431	BOVEY MN 55709
86-410-0430	GERLACH, GRANT A	PO BOX 511	BOVEY MN 55709
86-420-0650	SHOFNER, DEAN	201 8TH AVE	BOVEY MN 55709
86-420-1475	DELICH, MICHAEL & MUSTAR, DARLA &	PO BOX 12	BOVEY MN 55709
86-420-1070	NOBLE, AMANDA O	302 OTTUM AVE	BIGFORK MN 55628
86-435-0105	HOLZEMER, RICHARD A	PO BOX 524	BOVEY MN 55709
86-420-1250	GORMAN, CHARLES E & KATRINA M	PO BOX 535	BOVEY MN 55709
88-029-3200	RGGS LAND & MINERALS LTD LP	100 WAUGH DR STE 400	HOUSTON TX 77007
86-420-0460	ODDEN, KEVIN D & SHUNTAI LI	PO BOX 83	BOVEY MN 55709
86-410-0660	PARKINEN, JAY J	3578 BLUE JAY WAY # 206	EAGAN MN 55123
86-410-1215	MEESE PROPERTIES LLC	36880 INGEBO TRL	COHASSET MN 55721
86-410-0305	STROM, CARL	PO BOX 287	BOVEY MN 55709
86-420-0215	SCOVEL, MIRANDA	PO BOX 124	BOVEY MN 55709-0124
86-410-0785	ELIOFF, JOHN D & JACQUELINE S	PO BOX 111	PENGILLY MN 55775
86-410-0980	CASEY, JANET L	PO BOX 5	BOVEY MN 55709
86-420-0235	CLOUTIER, ROBERT & SHERILYN	PO BOX 186	BOVEY MN 55709
86-435-0325	DIEDRICH, ALVIN	PO BOX 427	BOVEY MN 55709
86-410-0920	NAIL, JEFF & MEYER-NAIL, NANCILYN	PO BOX 236	BOVEY MN 55709
86-412-1000	TROUMBLY, JAMES	20648 OLD LOOP RD	GRAND RAPIDS MN 55744
86-410-0710	HIGGINS HOMES LLC	196 139TH AVE NW	ANDOVER MN 55304
86-435-0210	BROWN, JENNIFER & WEEK, LANCE	PO BOX 323	BOVEY MN 55709
86-420-0825	CALBERY, RUSSELL & LYNN	PO BOX 243	BOVEY MN 55709
86-410-0640	BEATY, MARLA	31909 MACDOUGAL BAY RD	GRAND RAPIDS MN 55744
86-410-0455	WILLOW CREEK PROPERTIES LLC	16990 RIVER RD	GRAND RAPIDS MN 55744
86-410-0770	PELUSO, MARC A	PO BOX 76	COLERAINE MN 55722
86-420-1150	KULENKAMP, LAURELLE J	PO BOX 172	BOVEY MN 55709
86-032-2407	CITY OF BOVEY	PO BOX 399	BOVEY MN 55709
86-032-2407	CITY OF BOVEY	PO BOX 399	BOVEY MN 55709
86-435-0330	WEITZEL, LEE	305 NORTH ST	BOVEY MN 55709
86-410-0910	BERGHAMMER, CAROL L	PO BOX 50	BOVEY MN 55709
86-410-0855	RICHARDSON, WILLIAM & DEBRA	PO BOX 4	BOVEY MN 55709
86-420-1160	BETHEL TRINITY LUTHERAN CHURCH	PO BOX 440	BOVEY MN 55709
86-410-0445	MILLER, SHAYNE & TAMMY	PO BOX 242	GRAND RAPIDS MN 55744
86-420-0335	WILLOW CREEK PROPERTIES LLC	16990 RIVER RD	GRAND RAPIDS MN 55744
86-420-0510	MCMULLEN, EDWARD & PENNY	PO BOX 332	BOVEY MN 55709
86-435-0500	STEIN, ROBERT A JR & LINDA M	310 1ST AVE SW	GRAND RAPIDS MN 55744
86-410-1255	VEKICH, DEREK	PO BOX 509	BOVEY MN 55709
86-410-0335	MALLUM, JASON & LYNN	PO BOX 701	COLERAINE MN 55722
86-420-0490	JOHNSON, AUSTIN J & TAMMY M	PO BOX 472	BOVEY MN 55709-0472
86-420-0820	CARLSON, WILLIAM E	PO BOX 291	BOVEY MN 55709
86-410-0425	ALLEN, ALFRED K	PO BOX 421	BOVEY MN 55709
86-420-1270	STEIN, ROBERT & ROSALIND	PO BOX 99	BOVEY MN 55709
86-420-0680	FELTUS, TERRY & HASE, JERRY	PO BOX 277	BOVEY MN 55709
86-420-0410	SCHUSTER PROPERTIES LLC	27477 CO RD 60	GRAND RAPIDS MN 55744
86-410-0850	KANGAS, JACOB W & LISA J	PO BOX 431	BOVEY MN 55709
86-420-0270	THOMPSON, KEITH A	PO BOX 413	BOVEY MN 55709
86-029-4303	CITY OF BOVEY	PO BOX 399	BOVEY MN 55709
86-029-4303	CITY OF BOVEY	PO BOX 399	BOVEY MN 55709
86-410-0240	SCHUSTER PROPERTIES LLC	27477 CO RD 60	GRAND RAPIDS MN 55744
86-029-4302	VEKICH, DEREK	PO BOX 509	BOVEY MN 55709
86-410-1365	CLARK, LEONARD	PO BOX 222	GRAND RAPIDS MN 55744
86-435-0425	WILLIAMS, MICHAEL	PO BOX 453	BOVEY MN 55709
86-420-0965	CROSSLEY, LEAH	18207 TRIGGER TRL	GRAND RAPIDS MN 55744
86-410-0560	YOST, KELSIE & ANGEL	PO BOX 523	BOVEY MN 55709
86-420-0330	PETERSON, KELLY	PO BOX 93	BOVEY MN 55709
86-437-0120	ARCHILA, JULIO & MARILUZ	PO BOX 539	BOVEY MN 55709

PARCELS LOCATED WITHIN THE CITY OF BOVEY DWSMA

PARCEL	OWNER NAME	MAILING ADDRESS	CITY_STATE_ZIP
86-420-0610	GOODMAN, HOLLI LIN	PO BOX 215	BOVEY MN 55709
86-410-1425	VEKICH, DEREK & ANGELA	PO BOX 509	BOVEY MN 55709
86-410-0355	KOVACOVICH, STEVEN M & SUSAN E	PO BOX 154	BOVEY MN 55709
86-420-0830	CALBERY, RUSSELL & LYNN	PO BOX 243	BOVEY MN 55709
86-420-1010	CITY OF BOVEY	PO BOX 399	BOVEY MN 55709
86-420-0875	PEREZ, ANGEL M	20531 156TH ST NW	ELK RIVER MN 55330
86-420-0305	PURDY, ELMER E & CAROL	PO BOX 73	BOVEY MN 55709
86-410-1550	HALLING, DELBERT E & SANDRA M	28320 HWY 65	PENGILLY MN 55775
86-420-0910	VEKICH, ANGELA	PO BOX 509	BOVEY MN 55709
86-420-0905	GENERATIONAL INVESTMENTS LLC	75 COLUMBIA AVE	CEDARHURST NY 11516
86-420-1490	FELS, GORDON	PO BOX 447	BOVEY MN 55709
86-420-0640	TROBEC, MICHAEL & WILDE, JESSICA L	PO BOX 262	BOVEY MN 55709
86-410-1430	MY RENTAL HOME LLC	5871 CEDAR LAKE RD S	ST LOUIS PARK MN 55416
86-420-0855	TREBNICK, JUNE A	PO BOX 121	BOVEY MN 55709
86-410-1240	LEPPALA, DEAN R & KRISTINE A	PO BOX 466	BOVEY MN 55709
86-420-0775	ERICKSON, KRISTINE & ALAN	PO BOX 306	BOVEY MN 55709
86-420-0925	TREST, WESLEY A	PO BOX 260	BOVEY MN 55709
86-420-0530	FUNNELL, BRITNEY	309 8TH AVE	BOVEY MN 55709
86-420-0860	SCHUSTER PROPERTIES LLC	27477 CO RD 60	GRAND RAPIDS MN 55744
86-410-1360	SHEIMAN, JASON	1247 AUTUMN LN	BOVEY MN 55709
86-410-1335	MEYER, NANCILYN	111 2ND AVE	BOVEY MN 55709
86-410-0880	BERDAHL, STEVEN J	3255 HARBOR LN N APT 209	MINNEAPOLIS MN 55447-5253
86-410-0880	BERDAHL, STEVEN J	3255 HARBOR LN N APT 209	MINNEAPOLIS MN 55447-5253
86-437-0170	KISLENGER, BEVERLY	PO BOX 8	BOVEY MN 55709
86-410-0440	BONHAM, MICHAEL & GINGER	PO BOX 411	BOVEY MN 55709
86-420-0760	SMITH, THOMAS D	PO BOX 61	BOVEY MN 55709
86-420-0540	TOK, ROBERT M & KAREN	PO BOX 313	BOVEY MN 55709
86-435-0110	GARERI, THERESA F	PO BOX 134	BOVEY MN 55709
86-410-0265	GO GREEN THRIFT STORE & BOUTIQUE	112 BAY RD	COLERAINE MN 55722
86-420-0865	SCHUSTER PROPERTIES LLC	27477 CO RD 60	GRAND RAPIDS MN 55744
86-420-1120	BOGDANOVICH, ELIZABETH M	PO BOX 317	BOVEY MN 55709
86-410-1390	MORAND, MELLISSA	2540 RIVER RD	GRAND RAPIDS MN 55744
86-420-0320	WILLIAMS, OZZEY & AMANDA	PO BOX 375	BOVEY MN 55709
86-410-1510	AULTMAN, CORY L & ELIZABETH	101 4TH AVE	BOVEY MN 55709
86-420-1240	DUQUETTE, JACQUES P & DOROTHY E	PO BOX 127	BOVEY MN 55709
86-420-0740	VEKICH, DEREK & ANGELA	PO BOX 509	BOVEY MN 55709
86-410-1330	MEYER, NANCILYN	111 2ND AVE	BOVEY MN 55709
86-410-0510	GRIFE, KELLY	PO BOX 247	BOVEY MN 55709
86-410-1470	INGMAN, MICHAEL	102 4TH AVE BOX 21	BOVEY MN 55709
86-410-0930	NAIL, JEFF & MEYER-NAIL, NANCILYN	PO BOX 236	BOVEY MN 55709
86-032-1301	RGGS LAND & MINERALS LTD LP	100 WAUGH DR STE 400	HOUSTON TX 77007
86-032-1301	RGGS LAND & MINERALS LTD LP	100 WAUGH DR STE 400	HOUSTON TX 77007
86-410-0450	MOHN, JESSICA R	PO BOX 293	BOVEY MN 55709-0293
86-437-0140	OOHOUDT, NYCOLE C	PO BOX 105	BOVEY MN 55709
86-420-1310	YOURCHUCK, JOANNE	103 6TH AVE	BOVEY MN 55709
86-410-0775	SCHNEIDER, THEODORE J	313 3RD ST	BOVEY MN 55709
86-410-0760	TRUDEL, JOSHUA R	PO BOX 271	BOVEY MN 55709
86-410-0250	SCHUSTER PROPERTIES LLC	27477 CO RD 60	GRAND RAPIDS MN 55744
86-029-3400	CITY OF BOVEY	PO BOX 399	BOVEY MN 55709
86-029-3400	CITY OF BOVEY	PO BOX 399	BOVEY MN 55709
86-412-0220	KARNES, WADE J & TERESA R	21728 CO RD 71	GRAND RAPIDS MN 55744
86-412-0220	KARNES, WADE J & TERESA R	21728 CO RD 71	GRAND RAPIDS MN 55744
86-420-1060	BOWMAN, JOHNNY D	200 PARK LN S	MINNETONKA MN 55305
86-435-0215	OLSON, JACKIE	PO BOX 269	BOVEY MN 55709
86-435-0340	FOSS, MIKE & MARY A	PO BOX 343	BOVEY MN 55709
86-420-1080	PECKA, ORANNA R & JULIEN, JERRY JR	PO BOX 205	BOVEY MN 55709
86-420-0815	CITY OF BOVEY	PO BOX 399	BOVEY MN 55709
86-420-1470	DOTLICH, DAN	PO BOX 286	BOVEY MN 55709
86-032-2403	CITY OF BOVEY	PO BOX 399	BOVEY MN 55709
86-410-1310	YOST, ANGELA	PO BOX 420	BOVEY MN 55709
86-420-0920	RAMIREZ, ANABELLE	202 6TH ST	BOVEY MN 55709
86-410-1405	HUSTAD, JOSEPH B	PO BOX 372	BOVEY MN 55709-0372
86-410-1440	BEATY, MARLA	31909 MACDOUGAL BAY RD	GRAND RAPIDS MN 55744
86-420-1140	LEPPALA, DEAN R & KRISTINE A	PO BOX 466	BOVEY MN 55709
86-410-0780	DEGUISEPII, TARA M	28523 CO RD 69	BOVEY MN 55709
86-410-0740	CITY OF BOVEY	PO BOX 399	BOVEY MN 55709

PARCELS LOCATED WITHIN THE CITY OF BOVEY DWSMA

PARCEL	OWNER NAME	MAILING ADDRESS	CITY_STATE_ZIP
86-032-1306	MT OLIVE LUTHERAN CHURCH BOVEY	PO BOX 508	BOVEY MN 55709
86-410-1241	LEIFERMANN, DENNIS & ANITA	20526 ASPEN DR	GRAND RAPIDS MN 55744
86-420-0715	NORGARD, CHARLES	PO BOX 285	BOVEY MN 55709
86-410-0950	NAIL, JEFF & MEYER-NAIL, NANCILYN	PO BOX 236	BOVEY MN 55709
86-435-0470	JOHNSON, BRYAN D	PO BOX 117	BOVEY MN 55709
86-029-4301	CITY OF BOVEY	PO BOX 399	BOVEY MN 55709
86-029-4301	CITY OF BOVEY	PO BOX 399	BOVEY MN 55709
86-420-0915	KARJALA, CRAIG A & BARBARA	PO BOX 238	BOVEY MN 55709
86-435-0440	CITY OF BOVEY	PO BOX 399	BOVEY MN 55709
86-420-0895	WILLOW CREEK PROPERTIES LLC	16990 RIVER RD	GRAND RAPIDS MN 55744
86-410-0230	UGRICH, STEVE & JILL	PO BOX 241	BOVEY MN 55709
86-410-0860	CASPER, CHAUNTEL R	PO BOX 252	BOVEY MN 55709
86-420-0480	ACKERMAN, ALYSSA	PO BOX 337	BOVEY MN 55709
86-410-1315	YOST, ANGEL	PO BOX 420	BOVEY MN 55709
86-032-1305	MT OLIVE LUTHERAN CHURCH BOVEY	PO BOX 508	BOVEY MN 55709
86-420-1420	BRANCH, DUSTIN JL	3255 WASHINGTON ST	PLASERVILLE CA 95667
86-410-0580	MEDVED, BARBARA A & LUKENS, MICHAEL	PO BOX 221	BOVEY MN 55709
86-410-0865	GROSSE, STACY L	PO BOX 483	BOVEY MN 55709
86-410-1220	SHEIMAN, JASON B	415 NW 8TH AVE	GRAND RAPIDS MN 55744
86-437-0210	CONNOLLY, THOMAS J	PO BOX 471	BOVEY MN 55709
86-420-0150	PICKETT, DARIEL G & DONNA	PO BOX 223	BOVEY MN 55709
86-420-1280	VEKICH, DEREK	PO BOX 509	BOVEY MN 55709
86-410-0835	LIVINGSTON, JOSEPH M	PO BOX 174	BOVEY MN 55709
86-420-1480	DANIELS, MELISSA L	PO BOX 517	BOVEY MN 55709
86-410-1010	COUNTY OF ITASCA	1177 LAPRAIRIE AVE	GRAND RAPIDS MN 55744
86-435-0310	MIKULICH, GREGORY W	205 NORTH ST	BOVEY MN 55709
86-420-0705	LESARGE, CHAD P & SAMANTHA E	865 NICK LN	BOVEY MN 55709
86-420-0420	SCHUSTER PROPERTIES LLC	27477 CO RD 60	GRAND RAPIDS MN 55744
86-435-0450	CITY OF BOVEY	PO BOX 399	BOVEY MN 55709
86-435-0450	CITY OF BOVEY	PO BOX 399	BOVEY MN 55709
86-410-1205	RANDALL, DEAN R & MARY	PO BOX 36	BOVEY MN 55709
86-420-0240	PASSERI, SAUL S & WATERMAN, RACHEL	33519 COUNTY ROAD 143	DEER RIVER MN 56636
86-420-0720	LARSON, DONALD W TRUSTEE	PO BOX 116	BOVEY MN 55709
86-410-0970	PETROFF, STEVE	PO BOX 296	BOVEY MN 55709
86-420-0810	VEKICH, DEREK & ANGELA	PO BOX 509	BOVEY MN 55709
86-420-0870	SCHUSTER PROPERTIES LLC	27477 CO RD 60	GRAND RAPIDS MN 55744
86-410-0475	LILLO, MICHELLE R.B.	PO BOX 161	BOVEY MN 55709
86-410-0890	ZERFAS PROPERTIES LLC	1029 GOLF COURSE RD	GRAND RAPIDS MN 55744
86-420-0265	STUPAR, MICHAEL S & CAROLINE Y	PO BOX 94	BOVEY MN 55709
86-032-1307	MT OLIVE LUTHERAN CHURCH BOVEY	PO BOX 508	BOVEY MN 55709
86-420-0725	SCHUSTER PROPERTIES LLC	27477 CO RD 60	GRAND RAPIDS MN 55744
86-435-0600	CITY OF BOVEY	PO BOX 399	BOVEY MN 55709
86-435-0305	MIKULICH, GREGORY W	205 NORTH ST	BOVEY MN 55709
86-420-1485	MAKI, GINA	PO BOX 463	BOVEY MN 55709
86-032-2406	VERTHEIN, TIMOTHY E & RONNA L	PO BOX 481	BOVEY MN 55709
86-420-0745	JUREK, WENDY & TAUSK, EDWARD	1825 SOUTH ST	DULUTH MN 55812
86-410-0830	CARLSON, ERNEST W, JR	PO BOX 258	BOVEY MN 55709
86-437-0180	KELLY, JASON A	PO BOX 270	BOVEY MN 55709
86-410-0110	COUNTY OF ITASCA	1177 LAPRAIRIE AVE	GRAND RAPIDS MN 55744
86-420-0160	METZER, WILLIAM & CLARISSA	PO BOX 295	BOVEY MN 55709
86-420-0450	MALCOLM, WARREN D	PO BOX 335	BOVEY MN 55709-0335
86-410-1420	VEKICH, DEREK & ANGELA	PO BOX 509	BOVEY MN 55709
86-410-0755	TRUDEL, JOSHUA R	PO BOX 271	BOVEY MN 55709
86-420-1210	VEKICH, DEREK	PO BOX 509	BOVEY MN 55709
86-410-1530	VERTHEIN, TIMOTHY E & RONNA L	PO BOX 481	BOVEY MN 55709
86-410-1580	JASPER, MICHAEL	17823 BAYVIEW PL	GRAND RAPIDS MN 55744
86-437-0220	MORHART, AARON & ALICIA	PO BOX 348	BOVEY MN 55709
86-410-0520	BYMARK, AMBER L	303 4TH AVE	BOVEY MN 55709
86-420-1370	C AND T ENTERPRISES LLC	13991 N MANNING TRL	STILLWATER MN 55082
86-410-0420	MAKI, RONALD LEE	PO BOX 599	COLERAINE MN 55722
86-420-0230	FINCKBONE, BRANDON C	PO BOX 62	BOVEY MN 55709
86-435-0455	JOHNSON, LEE R & CHELSIE M	104 NW AVE	BOVEY MN 55709
86-410-0235	GROSHONG, JEFFREY S & KELLY J	PO BOX 1	TACONITE MN 55786
86-410-1250	MITCHELL, RUTH F & PATRICIA ANN	PO BOX 26	BOVEY MN 55709
86-410-0630	MCCARTNEY, KEVIN R & SUSAN	PO BOX 299	BOVEY MN 55709
86-410-0735	CITY OF BOVEY	PO BOX 399	BOVEY MN 55709

PARCELS LOCATED WITHIN THE CITY OF BOVEY DWSMA

PARCEL	OWNER NAME	MAILING ADDRESS	CITY_STATE_ZIP
86-420-1030	HEINZER, GARY J	PO BOX 188	BOVEY MN 55709
86-410-0620	PAYNE, NEAL A & TIA M	203 4TH AVE	BOVEY MN 55709
86-420-0275	QUADE, AUSTIN J & BAKER, EMILY	PO BOX 56	BOVEY MN 55709
86-410-0245	SCHUSTER, DOUGLAS A & DIANE F	27477 CO RD 60	GRAND RAPIDS MN 55744
86-410-1320	BLUE SKY PROPERTY LLC	6 NE 14TH ST	GRAND RAPIDS MN 55744
86-410-0715	NIELSEN, DANIEL P & JENNY L	6 NE 14TH ST	GRAND RAPIDS MN 55744
86-420-0245	BOORMAN, DUANE K & ROSEMARIE I	PO BOX 384	CALUMET MN 55716
86-032-2405	CITY OF BOVEY	PO BOX 399	BOVEY MN 55709
86-032-2405	CITY OF BOVEY	PO BOX 399	BOVEY MN 55709
86-032-2405	CITY OF BOVEY	PO BOX 399	BOVEY MN 55709
86-420-0935	MEESE PROPERTIES LLC	36880 INGEBO TRL	COHASSET MN 55721
86-437-0240	MOREN, AARON	PO BOX 128	BOVEY MN 55709
86-437-0240	MOREN, AARON	PO BOX 128	BOVEY MN 55709
86-410-0745	CITY OF BOVEY	PO BOX 399	BOVEY MN 55709
86-410-0435	ELIOFF, CAROLINE C	PO BOX 195	BOVEY MN 55709
86-420-1230	THOENNES, TABITHA	PO BOX 104	BOVEY MN 55709
86-410-0940	NAIL, JEFF & MEYER-NAIL, NANCILYN	PO BOX 236	BOVEY MN 55709
86-437-0150	BRAY, GARY & JOSEPHINE	PO BOX 235	BOVEY MN 55709
86-420-0325	CASIO, GREGORY J & CORRINE	PO BOX 75	BOVEY MN 55709
86-435-0115	YUNK, ANTHONY W & LORETTA M	PO BOX 142	BOVEY MN 55709
86-420-0845	TREBNICK, BRUCE F	PO BOX 125	BOVEY MN 55709
86-410-1380	DEGUISEPPI, PAUL & TARA	28523 CO RD 69	BOVEY MN 55709
86-420-0970	RIENDEAU, DARRYN L	207 NE 20TH ST	GRAND RAPIDS MN 55744
86-420-0315	ROEHL, TUCKER & BAKER, MONTANA	307 6TH AVE	BOVEY MN 55709
86-410-0820	STANLEY, TRINA	PO BOX 338	MARBLE MN 55764
86-420-1305	JOHNSON, DONALD L	PO BOX 267	BOVEY MN 55709
86-410-1375	CARNER, LACY M	PO BOX 20	BOVEY MN 55709
86-420-0735	BIBICH, MICHAEL J	PO BOX 163	BOVEY MN 55709
88-029-3300	TAX FORFEIT		
88-029-3300	TAX FORFEIT		
86-420-1465	SHEIMAN, JASON	1247 AUTUMN LN	BOVEY MN 55709
86-032-1302	NK-G PROPERTIES LLC	PO BOX 152	KEEWATIN MN 55753
86-420-1315	OLSON, ANDREW L	1604 E HWY 169	GRAND RAPIDS MN 55744
86-410-1415	MATTHEWS, BRIAN	113 3RD AVE	BOVEY MN 55709
86-420-1260	HARLING, GERALD H	PO BOX 187	BOVEY MN 55709
86-420-0630	VAILLETTE, RITA A	5373 IVANHOE AVE	RIVERSIDE CA 92503-2435
86-410-0610	CITY OF BOVEY	PO BOX 399	BOVEY MN 55709
86-420-0660	SCHAFFER, PAULA J & BIBICH, MICHAEL	PO BOX 91	BOVEY MN 55709
86-410-0205	TAX FORFEIT		
86-410-0825	OLSON, GARY T	307 GILL ST	HILL CITY MN 55748
86-410-0220	SKYBERG, HARVEY O & RITA	PO BOX 178	BOVEY MN 55709
86-420-1365	BROTEN, DEAN	PO BOX 160	BOVEY MN 55709
86-410-1385	BISCHOFF, DONALD W	25997 W INGEBO RD	COHASSET MN 55721
86-420-0850	TREBNICK, JUNE A	PO BOX 121	BOVEY MN 55709
86-420-0930	QUIRK, BENJAMIN H	25330 INGEBO RD	COHASSET MN 55721
86-420-0805	VEKICH, DEREK	PO BOX 509	BOVEY MN 55709
86-420-0670	BETZ, ROGER	PO BOX 185	BOVEY MN 55709
86-410-1540	POLOVINA, STEVEN G ETAL	PO BOX 191	BOVEY MN 55709
86-435-0335	MALCOLM, WARREN & RITA	PO BOX 335	BOVEY MN 55709
86-410-0320	KOVACOVICH, STEVEN M & SUSAN E	PO BOX 154	BOVEY MN 55709
86-435-0430	CARPENTER, SHIRLEY T	PO BOX 492	BOVEY MN 55709
86-410-0990	HURLBUT, JORDAN S	PO BOX 327	BOVEY MN 55709
86-420-0250	PELUSO, MARCA	PO BOX 76	COLERAINE MN 55722
86-410-0405	MADSEN, HEIDI L	PO BOX 304	BOVEY MN 55709
86-420-1360	BROSE, JACK	32052 S PIT RD	GRAND RAPIDS MN 55744
86-420-1455	SCHUSTER PROPERTIES LLC	27477 CO RD 60	GRAND RAPIDS MN 55744
86-410-0530	BOORMAN, DUANE K	PO BOX 384	CALUMET MN 55716
86-410-1230	TLK RESTORATION LLC	2222 PEAR LAKE RD	GRAND RAPIDS MN 55744
86-410-0540	HOWARD, DIANA R &	307 4TH AVE	BOVEY MN 55709
86-410-0460	SCHUSTER PROPERTIES LLC	27477 CO RD 60	GRAND RAPIDS MN 55744
86-410-1370	WEED, THOMAS J & KRISTINE M	PO BOX 85	BOVEY MN 55709
86-435-0465	JOHNSON, BRYAN D	PO BOX 117	BOVEY MN 55709
86-420-0310	SUSANNA PROPERTIES LLC	335 SUSANNA LN	BOVEY MN 55709
86-435-0320	MIKULICH, GREGORY W	205 NORTH ST	BOVEY MN 55709
86-420-0840	TRUDEL, DENISE R	PO BOX 275	BOVEY MN 55709

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

PUBLIC WATER SYSTEM INFORMATION

PWS ID NAME ADDRESS	1310003 Bovey Bovey Water Superintendent, Bovey City Hall, PO Box 399, 402 2nd Avenue, Bovey, MN 557090399	COMMUNITY
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FACILITY (WELL) INFORMATION

NAME	Well #1	IS THERE A WELL LOG OR ADDITIONAL CONSTRUCTION INFORMATION AVAILABLE? <input type="checkbox"/> YES (Please attach a copy) <input type="checkbox"/> NO <input type="checkbox"/> UNDETERMINED
SAMPLE POINT ID	S01	
UNIQUE WELL NO.	228834	
COUNTY	Itasca	

PWS ID / SAMPLE POINT ID	1310003	UNIQUE WELL NO.	228834
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PCSI CODE	ACTUAL OR POTENTIAL CONTAMINATION SOURCE	ISOLATION DISTANCES (FEET)			LOCATION	
		Minimum Community	Non-community	Sensitive Well ¹	Within 200 Ft. Y/N/U	Dist. from Well	Est. (?)
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	
AA1	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	1310003	S01	UNIQUE WELL NO.	228834
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PCSI CODE	ACTUAL OR POTENTIAL CONTAMINATION SOURCE	ISOLATION DISTANCES (FEET)			LOCATION
		Minimum Distances Community	Non-community	Sensitive Well'	
*GW1	Gray-water dispersal area	50	50	100	N
LC1	Large capacity cesspools (Class V well - illegal)?	75	75	150	N
MVW	Motor vehicle waste disposal (Class V well - illegal)?	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
*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
SWM	Storm water drainage well? (Class V well - illegal ⁶)	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	1310003	S01	UNIQUE WELL NO.	228834
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PCSI CODE	ACTUAL OR POTENTIAL CONTAMINATION SOURCE	ISOLATION DISTANCES (FEET)				LOCATION
		Minimum Distances Community	Non-community	Sensitive Well ¹	Within 200 Ft. Y / N / U	
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		Y	195
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	Y	100

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.					
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* 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

1310003 S01

UNIQUE WELL NO.

228834

SETBACK DISTANCES

All potential contaminant sources must be noted on sketch.

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



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

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

INSPECTOR	Parthun, Christopher	DATE	5 - 23 - 2022
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PWS ID / SAMPLE POINT ID	1310003	S01	UNIQUE WELL NO.	228834
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RECOMMENDED WELLHEAD PROTECTION (WHP) MEASURES				WHP MEASURE IMPLEMENTED? Y or N	DATE VERIFIED
Explore opportunities, including a MDH grant, to remove the private inactive fuel tank located northwest of the city well.					
Any sewer lines that are observed to be leaking, cracked, or deteriorated, should be replaced.					
Tanks and secondary containments should be inspected on a regular basis for leak or spill detection . See: http://www.pca.state.mn.us/index.php/waste/waste-and-cleanup/waste-management/index.html for information, or call the Minnesota Pollution Control Agency at 1-800-657-3864.					

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



Protecting, Maintaining and Improving the Health of All Minnesotans

Old Municipal Well Report for Bovey

PWSID: 1310003

MDH

March 2019



Minnesota Department of Health Environmental Health in Minnesota

MDH Public Water Supply Sources Report

PWSID: [1310003](#)

PWS Name: **Bovey**

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 incomplete 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. (inches)	Drill Date	Depth Completed (in feet)	Case Depth (in feet)	Case Diam. (inches)
S01	Well #1	GW	Primary	Active	228834 O*	02/18/2004 (J. Walsh)	1953	92	50	16	00-00-1953	92	50	16

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	Well 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	Coleraine Well No. 1	241430 S*	114		68	24	Before 1939	Rotary/Drilled				Main pump station		
Well B	Coleraine No. 2		130		70	18	Before 1939	Rotary/Drilled						
Well C		228832	120			24	1950	Rotary/Drilled				300 ft E of Coleraine Well No. 1		
Well D	Well No. 1	228834 S*	97		50	16	1953	Cable Tool/Bored				Property owned by the Oliver Iron Mining Company on First Avenue approx. 125 ft S of the center of Fourth Street.	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														

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
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: 3/22/2019 2:57:01 PM													

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
1	Coleraine Well Number (No.) 1	241430 S*	114 feet		0-68 feet	24 inch	1918	Drilled					
2	Coleraine Well No. 2		130 feet		0-70 feet	18 inch	1918	Drilled	1961: Well Abandoned				
3	Cross Connection with High School Swimming Pool								1948: Connection Eliminated				
4	Coleraine Well No. 3	228832	120 feet		0-100 feet	24 inch	1950	Drilled	1976: Well Abandoned and Filled			*300 feet East of Well No. 1	
5	Bovey Well No. 1 (STILL IN USE)	228834 S*											
6	Cross Connection with Mesaba Creamery						1955: Connection first mentioned						
Databases Searched												Remarks	
Old Municipal Well Data Compiled By: Jim Walsh Compiled Date: 7/16/2007													

Source: MN Dept. of Health - 3/22/2019

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

Bovey

9/13/39

to

~~1818111~~

512184

MINNESOTA DEPARTMENT OF HEALTH
Division of Sanitation

Report on the Water Supply of
Bovey, Minnesota
September 13, 1939

This water supply is obtained from the public supply of the village

of Coleraine. A description of the sources, pumps, reservoirs, etc., is as follows:

Location of Sources

Well A Well No. 1 is located at the main pump station. The well casing passes through the basement of the building which is drained to the lake and is subject to flooding. The surface drainage is good, the earth formations are largely clay, and the site is not subject to flooding. The static head in the well is at lake level which is about 25 feet below the ground surface at the well. The toilet in the basement is about 27 feet from the well and discharges through a clay tile sewer to the street sewer in Elizabeth Avenue. This sewer connection passes about 22 feet from well No. 1 and crosses under the discharge from well No. 2. In case of leakage of the sewer the amount of earth filtration between the sewer and the well is not considered sufficient to provide an adequate factor of safety. The site otherwise is free from sources of contamination.

Well B Well No. 2 is situated on lower ground which is close to lake level and has poor surface drainage. The soil is clay mixed with gravel. There are no sources of contamination near the well.

Wells, Pumps and Pumphouses

The following data describe the wells:

	Well A	Well B
	Well No. 1	Well No. 2
Depth . . .	114 ft.	130 ft.
Diameter . . .	24-inch	18-inch
Cased . . .	68 ft.	70 ft.
Screen . . .	46 ft.	60 ft.
V.T. Pumps . . .	500 gpm	500 gpm
Drawdown . . .	80 ft.	80 ft.

MINNESOTA DEPARTMENT OF HEALTH
Division of SanitationSanitation Rating of Bovey Water SupplyOwner Municipal Date March 27, 1946

	Perfect Score	As Found	As Recommended	See Recommendation No. in Attached Report
(A) Source				
Bacteriological safety)	30	18		
Adequacy of treatment)				
Physical quality	2	2		
Chemical quality	4	2		
Biological quality	2	2		
Adequacy of quantity	2	2		
Sub-total	40			
Penalty deducted	0			
Total	40	26		
(B) Prime Moving Equipment				
Well or intake	8	8		
Pumps	7	6		
Piping arrangement	5	3		
Reservoirs	7	5		
Equipment housing	3	3		
Sub-total	30			
Penalty deducted	0			
Total	30	25		
(C) Distribution System				
Street mains	5	3		
Building services	2	2		
Plumbing	3	$1\frac{1}{2}$		
Hydrants	1	1		
Storage	4	4		
Pressure	2	2		
Tap-water quality	3	3		
Sub-total	20			
Penalty deducted	0			
Total	20	16 $\frac{1}{2}$		
(D) Operation and Operators				
Control of plant	5	4		
Condition of plant	3	2		
Training and experience	2	1		
Sub-total	10			
Penalty deducted	0			
Total	10	7		
GRAND TOTAL AND RATING	100	73$\frac{1}{2}$		

Grade A: Ratings from 90 and upward. Indicates a high degree of safety.**Grade B:** Ratings from 80 to 90. Indicates a reasonable degree of protection**Grade C:** Ratings from 70 to 80. Indicates that there are serious hazards in the supply that demand attention. Any grade below "C" portrays a dangerous condition of the supply from which serious consequences can develop. Emergency measures for immediate protection of the supply are recommended under these circumstances and prompt action should be taken to provide a permanent remedy of the defects.

MINNESOTA DEPARTMENT OF HEALTH
Division of SanitationSanitation Rating of Lovey Water SupplyOwner Municipal Date April 23, 1947

	Perfect Score	As Found	As Recommended	See Recommendation No. in Attached Report
(A) Source				
Bacteriological safety)	30	18	29	1, 4, 5
Adequacy of treatment)	2	2		
Physical quality	4	2		
Chemical quality	2	2		
Biological quality	2	2		
Adequacy of quantity	2	2		
Sub-total	40			
Hazard adjustment factor deducted	0			
Total	40	26	37	
(B) Prime Moving Equipment				
Well or intake	8	8	7	2
Pumps	7	6	5	3
Piping arrangement	5	3		
Reservoirs	7	5		
Equipment housing	3	3		
Sub-total	30			
Hazard adjustment factor deducted	0			
Total	30	25	30	
(C) Distribution System				
Street mains	5	4		
Building services	2	1		
Plumbing	3	0.5	3	6, 7
Hydrants	1	1		
Storage	4	4		
Pressure	2	2		
Tap-water quality	3	3		
Sub-total	30			
Hazard adjustment factor deducted	0			
Total	20	15.5	18	
(D) Operation and Operators				
Control of plant	5	4		
Condition of plant	3	2		
Training and experience	2	1		
Sub-total	10			
Hazard adjustment factor deducted	0			
Total	10	7	7	
GRAND TOTAL AND RATING	100	72.5	92	

Grade A: Ratings from 90 and upward. Indicates a high degree of safety.**Grade B:** Ratings from 80 to 90. Indicates a reasonable degree of protection**Grade C:** Ratings from 70 to 80. Indicates that there are serious hazards in the supply that demand attention. Any grade below "C" portrays a dangerous condition of the supply from which serious consequences can develop. Emergency measures for immediate protection of the supply are recommended under these circumstances and prompt action should be taken to provide a permanent remedy of the defects.

MINNESOTA DEPARTMENT OF HEALTH
DIVISION OF WATER SUPPLY AND PLUMBING

Sanitation Rating of Bovey Water Supply

Owner Municipal Date October 27, 1948

	Perfect Score	As Found	As Recommended	See Recommendation No. In Attached Report
(A) Source				
Sanitary Safety	30	18	29	1, 4, 5
Adequacy of treatment				
Physical quality	2	2		
Chemical quality	4	2		
Biological quality	2	2		
Adequacy of quantity	2	2		
Sub-total	40			
Hazard adjustment factor deducted	0			
Total	40	26	37	
(B) Prime Moving Equipment				
Well or intake	8	8	7	2
Pumps	7	6	5	3
Piping arrangement	5	3		
Reservoirs	7	5		
Equipment housing	3	3		
Sub-total	30			
Hazard adjustment factor deducted	0			
Total	30	25	30	
(C) Distribution System				
Street mains	5	4		
Building services	2	1		
Plumbing	3	0.5	3	6
Hydrants	1	1		
Storage	4	4		
Pressure	2	2		
Tap water quality	3	3		
Sub-total	20			
Hazard adjustment factor deducted	0			
Total	20	15.5	18	
(D) Operation and Operators				
Control of system	5	4		
Condition of system	3	2		
Training and experience	2	1		
Sub-total	10			
Hazard adjustment factor deducted	0			
Total	10	7	7	
GRAND TOTAL AND RATING	100	73.5	92	

Grade A: 80 and upward - high degree of safety.

Grade B: 65 to 80 - moderately high degree of safety.

Grade C: 60 to 65 - moderately safe - improvement needed.

Grade D: 70 to 79 - low degree of safety - improvement urgent.

MINNESOTA DEPARTMENT OF HEALTH
District No. 1
Bemidji Minnesota

Report on Investigation of Water Supply
Bovey, Minnesota

November 9, 1950

1. Ownership: Municipal
2. Date of Survey: July 14, 1929
3. Investigations Since Survey: Ten
4. Date of Last Investigation: November 25, 1949
Rating of Supply at Last Investigation: 73.5
Change in Rating Since Last Investigation: None
5. Source: Well C The supply has been augmented by the addition of a new well which is located about 300 feet east of Well No. 1. It is 120 feet deep, cased with 24 inch pipe and equipped with 20 feet of 24 inch screen. The static water level is 16 feet below the surface of the ground and the drawdown is 19 feet.
6. Pumphouses and Pumps: The new well and pumping equipment are housed in a building of cement block construction. The discharge valve and tee are located above the pumphoom floor.
Water is drawn from the well by means of a vertical turbine pump which has a capacity of 500 gallons per minute.
7. Storage: No change.
8. Distribution System: No change.
9. Plumbing: No change.
10. Analytical Results: (See attached sheet)

Sample No. 5275 and Samples 5278-5281, inclusive, represent water collected at Wells Nos. 2 and 3 and at various points on the distribution system.

The bacteriological examination of these samples showed the water to be

MINNESOTA DEPARTMENT OF HEALTH
DIVISION OF WATER SUPPLY AND PLUMBING

Sanitation Rating of **Bovey** Water Supply

Owner **Municipal** Date **November 9, 1950**

	Perfect Score	As Found	As Recommended	See Recommendation No. in Attached Report
(A) Source				
Sanitary Safety	30	18	29	1, 4, 5
Adequacy of treatment				
Physical quality	2	2		
Chemical quality	4	2		
Biological quality	2	2		
Adequacy of quantity	2	2		
Sub-total	40			
Hazard adjustment factor deducted	0			
Total	40	26	37	
(B) Prime Moving Equipment				
Well or intake	8	8	7	2, 6
Pumps	7	6	5	3
Piping arrangement	5	3		
Reservoirs	7	5		
Equipment housing	3	3		
Sub-total	30			
Hazard adjustment factor deducted	0			
Total	30	25	30	
(C) Distribution System				
Street mains	5	4		
Building services	2	1		
Plumbing	3	0.5	3	7
Hydrants	1	1		
Storage	4	4		
Pressure	2	2		
Tap water quality	3	3		
Sub-total	20			
Hazard adjustment factor deducted	0			
Total	20	15.5	18	
(D) Operation and Operators				
Control of system	5	4		
Condition of system	3	2		
Training and experience	2	1		
Sub-total	10			
Hazard adjustment factor deducted	0			
Total	10	7	7	
GRAND TOTAL AND RATING	100	73.5	92	

Grade A: 90 and upward - high degree of safety.

Grade B: 85 to 89 - moderately high degree of safety.

Grade C: 80 to 84 - improvement needed.

Grade D: 70 to 79 - improvement urgent.

Grade E: 64 and lower - very dangerous condition. emergency measures recommended.

MINNESOTA DEPARTMENT OF HEALTH
DIVISION OF WATER SUPPLY AND PLUMBING

Sanitation Rating of Bovey Water Supply

Owner Municipal

Date

August 1, 1951

	Perfect Score	As Found	As Recommended	See Recommendation No. in Attached Report
(A) Source				
Sanitary Safety	30	18	29	a, d, e
Adequacy of treatment	2	2		
Physical quality	4	2		
Chemical quality	2	2		
Biological quality	2	2		
Adequacy of quantity	2	2		
Sub-total	40			
Hazard adjustment factor deducted	0			
Total	40	26	27	
(B) Prime Moving Equipment				
Well or intake	8	8	7	b, f
Pumps	7	6	5	
Piping arrangement	5	3		
Reservoirs	7	5		
Equipment housing	3	3		
Sub-total	30			
Hazard adjustment factor deducted	0			
Total	30	25	30	
(C) Distribution System				
Street mains	5	4		
Building services	2	1		
Plumbing	3	.5	3	g
Hydrants	1	1		
Storage	4	4		
Pressure	2	2		
Tap water quality	3	3		
Sub-total	20			
Hazard adjustment factor deducted	0			
Total	20	15.5	18	
(D) Operation and Operators				
Control of system	5	4		
Condition of system	3	2		
Training and experience	2	1		
Sub-total	10			
Hazard adjustment factor deducted	0			
Total	10	7	7	
GRAND TOTAL AND RATING	100	73.5	92	

Grade A: 90 and upward - high degree of safety.

Grade B: 85 to 89 - moderately high degree of safety.

Grade C: 80 to 84 - improvement needed.

Grade D: 70 to 79 - improvement urgent.

Grade E: 60 and lower - very dangerous condition.

MINNESOTA DEPARTMENT OF HEALTH
DIVISION OF MUNICIPAL WATER SUPPLY

Sanitation Rating of Bovey

Water Supply

Owner MunicipalDate September 3, 1932

	Perfect Score	As Found	As Recommended	See Recommendation no. In Attached Report
(A) Source				
Sanitary Safety	30	18	29	a, d, e
Adequacy of treatment	2	2		
Physical quality	4	3		
Chemical quality	2	2		
Biological quality	2	2		
Adequacy of quantity	2			
Sub-total	40			
Hazard adjustment factor deducted	0			
Total	40	27	38	
(B) Prime Moving Equipment				
Well or intake	8	8	7	b
Pumps	7	6.5	5	c
Piping arrangement	5	3		
Reservoirs	7	5		
Equipment housing	3	3		
Sub-total	30			
Hazard adjustment factor deducted	0			
Total	30	25.5	30	
(C) Distribution System				
Street mains	5	4		
Building services	2	1		
Plumbing	3	.5	3	f
Hydrants	1	1		
Storage	4	4		
Pressure	2	2		
Tap water quality	3	3		
Sub-total	20			
Hazard adjustment factor deducted	0			
Total	20	15.5	18	
(D) Operation and Operators				
Control of system	3	2		
Condition of system	2	2		
Operator qualifications	5	3		
Sub-total	10			
Hazard adjustment factor deducted	0			
Total	10	7	7	
GRAND TOTAL AND RATING	100	75	93	

Grade A: 90 and upward - high degree of safety.

Grade B: 85 to 89 - moderately high degree of safety.

Grade C: 70 to 84 - poor to dangerous condition.

Grade D: 60 and lower - very dangerous condition, emergency measures recommended.

MINNESOTA DEPARTMENT OF HEALTH
District No. 1
Berndtji
Minnesota

Report on Investigation of Water Supply
Bovey, Minnesota

November 11, 1953

1. Date of Last Investigation: September 3, 1952
2. Rating of Supply at Last Investigation: 75
3. Changes Since Last Investigation:

a. Source: This supply has been augmented by the addition of a new **Well D** gravel packed drilled well located on property owned by the **Oliver Iron Mining Company** on **Fourth Avenue** extended and at a **point approximately 125 feet south of the center of Fourth Street.**

At the time of this investigation this well was connected to the distribution system but water was still being supplied from the Coleraine municipal supply. The site on which the well is located is, as far as could be determined at the time of this investigation, free from sources of contamination.

The ground surface has been graded to provide satisfactory drainage away from the well with the exception that a surface water diversion ditch remains to be constructed along the south side of Fourth Street. **The well is 97 feet deep, cased with sixteen-inch pipe and equipped with forty feet of sixteen-inch screen.** The gravel packed portion of the well is 36 inches in diameter. The static water level is 57 feet and the drawdown is twelve feet when pumping at a rate of 650 gallons per minute.

b. Pump and Pumphouse: The new well and pumping equipment are housed in a building of concrete block construction. The discharge tee and

MINNESOTA DEPARTMENT OF HEALTH

Section of Municipal Water Supply

Sanitation Safety Rating of Bovey Water SupplyDate November 11, 1953

	Perfect Score	As Found	As Recommended	See Recommendation No. In Attached Report
(A) Source				
Sanitary Safety	20	10	20	a, b
Adequacy of treatment				
Bacteriological Quality	10	10		
Physical quality	2	2		
Chemical quality	4	3		
Biological quality	2	2		
Adequacy of quantity	2	2		
Sub-total	40			
Hazard adjustment factor deducted	0			
Total	40	29	40	
(B) Prime Moving Equipment				
Well or intake	8	8	7	a
Pumps	7	6.5	5	a, c
Piping arrangement	5	3		
Reservoirs	7	5		
Equipment housing	3	3		
Sub-total	30			
Hazard adjustment factor deducted	0			
Total	30	25.5	30	
(C) Distribution System				
Street mains	5	4		
Building services	2	1		
Plumbing	3	.5	3	d
Hydrants	1	1		
Storage	4	4		
Pressure	2	2		
Tap water quality	3	3		
Sub-total	20			
Hazard adjustment factor deducted	0			
Total	20	15.5	18	
(D) Operation and Operators				
Control of system	3	2		
Condition of system	2	2		
Operator qualifications	5	2		
Sub-total	10			
Hazard adjustment factor deducted	0			
Total	10	6	6	
GRAND TOTAL AND RATING	100	76	94	

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

85 to 90 - moderately high degree of safety. Connection and maintenance program continued.

MINNESOTA DEPARTMENT OF HEALTH

Section of Municipal Water Supply

Sanitation Safety Rating of Bovey

Water Supply

Date October 19 and November 23, 1954

	Perfect Score	As Found	As Recommended	See Recommendation No. in Attached Report
(A) Source				
Sanitary Safety	20	20		
Adequacy of treatment	10	10		
Bacteriological Quality	2	2		
Physical quality	4	3	2	c
Chemical quality	2	1		
Biological quality	2	2		
Adequacy of quantity	2			
Sub-total	40			
Hazard adjustment factor deducted	0	5	0	a
Total	40	33	30	
(B) Prime Moving Equipment				
Well or intake	8	8		
Pumps	7	5	7	b
Piping arrangement	5	5		
Reservoirs	7	7		
Equipment housing	3	3		
Sub-total	30			
Hazard adjustment factor deducted	0			
Total	30	28	30	
(C) Distribution System				
Street mains	5	4		
Building services	2	1		
Plumbing	3	0.5	2.5	d
Hydrants	1	1		
Storage	4	4		
Pressure	2	2		
Tap water quality	3	3		
Sub-total	20			
Hazard adjustment factor deducted	0			
Total	20	15.5	17.5	
(D) Operation and Operators				
Control of system	3	2		
Condition of system	2	2		
Operator qualifications	5	2.5	5	Operator's attendance at water school
Sub-total	10			
Hazard adjustment factor deducted	0			
Total	10	6.5	6	
GRAND TOTAL AND RATING	100	83.0	95.5	

90 and upward - high degree of safety. Watchful maintenance needed.
85 to 90 - moderately high degree of safety. Correction and maintenance program continued.

MINN-50 A DEPARTMENT OF HEALTH

Section of Municipal Water Supply

Sanitation Safety Rating of Bovey Water SupplyDate October 21, 1955

	Perfect Score	As Found	As Recommended	See Recommendation No. In Attached Report
(A) Source				
Sanitary Safety	20	20		
Adequacy of treatment				
Bacteriological Quality	10	10		
Physical quality	2	2		
Chemical quality	4	2.5	2.5	Satisfactory iron and manganese removal
Biological quality	2	2		
Adequacy of quantity	2	2		
Sub-total	40			
Hazard adjustment factor deducted	0	5	0	a
Total	40	33.5	39.5	
(B) Prime Moving Equipment				
Well or intake	8	8		
Pumps	7	7		
Piping arrangement	5	5		
Reservoirs	7	7		
Equipment housing	3	3		
Sub-total	30			
Hazard adjustment factor deducted	0			
Total	30	30	30	
(C) Distribution System				
Street mains	5	4		
Building services	2	1		
Plumbing	3	.5	2.5	c
Hydrants	1	1		
Storage	4	4		
Pressure	2	2		
Tap water quality	3	3		
Sub-total	20			
Hazard adjustment factor deducted	0	2	0	b
Total	20	13.5	17.5	
(D) Operation and Operators				
Control of system	3	2		
Condition of system	2	2		
Operator qualifications	5	3	5	Operator's attendance at water school
Sub-total	10			
Hazard adjustment factor deducted	0			
Total	10	7	9	
GRAND TOTAL AND RATING	100	84.0	96.0	

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 Municipal Water Supply

Sanitation Safety Rating of Bovey Water SupplyDate October 11, 1956

	Perfect Score	As Found	As Recommended	See Recommendation No. in Attached Report
(A) Source				
Sanitary Safety	20	20		
Adequacy of treatment				
Bacteriological Quality	10	10		
Physical quality	2	2		
Chemical quality	4	3.5		
Biological quality	2	2		
Adequacy of quantity	2	2		
Sub-total	40			
Hazard adjustment factor deducted	0	5	0	Correction of Defects at
Total	40	34.5	39.5	Coveraine
(B) Prime Moving Equipment				
Well or intake	8	8		
Pumps	7	7		
Piping arrangement	5	5		
Reservoirs	7	7		
Equipment housing	3	3		
Sub-total	30			
Hazard adjustment factor deducted	0			
Total	30	30	30	
(C) Distribution System				
Street mains	5	4		
Building services	2	1		
Plumbing	3	0.5	2.5	a
Hydrants	1	1		
Storage	4	4		
Pressure	2	2		
Tap water quality	3	3		
Sub-total	20			
Hazard adjustment factor deducted	0			
Total	20	15.5	17.5	
(D) Operation and Operators				
Control of system	3	2		
Condition of system	2	2		
Operator qualifications	5	3	5	Operator's attendance at
Sub-total	10			water school
Hazard adjustment factor deducted	0			
Total	10	7	9	
GRAND TOTAL AND RATING	100	87.0	96.0	

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 **Bovey** Water SupplyDate **December 8, 1958**

	Perfect Score	As Found	As Recommended	See Recommendation No. in Attached Report
(A) Source				
Sanitary Safety	20	20		
Adequacy of treatment				
Bacteriological Quality	10	10		
Physical quality	2	2		
Chemical quality	4	3		
Biological quality	2	2		
Adequacy of quantity	2	2		
Sub-total	40	5		
Hazard adjustment factor deducted	0			
Total	40	34	40	Correction of defects at Coleraine
(B) Prime Moving Equipment				
Well or intake	8	8		
Pumps	7	7		
Piping arrangement	5	5		
Reservoirs	7	7		
Equipment housing	3	3		
Sub-total	30			
Hazard adjustment factor deducted	0			
Total	30	30	30	
(C) Distribution System				
Street mains	5	4		
Building services	2	1		
Plumbing	3	1		
Hydrants	1	1		
Storage	4	4		
Pressure	2	2		
Tap water quality	3	3		2
Sub-total	20			
Hazard adjustment factor deducted	0			
Total	20	16	17	
(D) Operation and Operators				
Control of system	3	2		
Condition of system	2	2		
Operator qualifications	5	3		
Sub-total	10			
Hazard adjustment factor deducted	0			
Total	10	7	10	
GRAND TOTAL AND RATING	100	87	97	

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 **Bovey** Water SupplyDate **December 8, 1959**

	Perfect Score	As Found	As Recommended	See Recommendation No. in Attached Report
(A) Source				
Sanitary Safety	20	20		
Adequacy of treatment	10	10		
Bacteriological Quality	2	2		
Physical quality	4	3		
Chemical quality	2	2		
Biological quality	2	2		
Adequacy of quantity	40	39		
Sub-total	0	4	40	
Hazard adjustment factor deducted	40	35		Correction of defective associated w/coliforms
Total				
(B) Prime Moving Equipment				
Well or intake	8	8		
Pumps	7	7		
Piping arrangement	5	5		
Reservoirs	7	7		
Equipment housing	3	3		
Sub-total	30	30	30	
Hazard adjustment factor deducted	0			
Total				
(C) Distribution System				
Street mains	5	4		
Building services	2	1		
Plumbing	3	1	2	
Hydrants	1	1		
Storage	4	4		
Pressure	2	2		
Tap water quality	3	3		
Sub-total	20	16	17	
Hazard adjustment factor deducted	0			
Total				
(D) Operation and Operators				
Control of system	3	2		
Condition of system	2	2		
Operator qualifications	5	3	5	3
Sub-total	10			
Hazard adjustment factor deducted	0			
Total	10	7	9	
GRAND TOTAL AND RATING				
	100	88	96	

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 **Bovey**

Water Supply

Date **November 1, 1960**

	Perfect Score	As Found	As Recommended	See Recommendation No. In Attached Report
(A) Source				
Sanitary Safety	20	20		
Adequacy of treatment	10	10		
Bacteriological Quality	2	2		
Physical quality	4	3		
Chemical quality	2	2		
Biological quality	2	2		
Adequacy of quantity				
Sub-total	40	39		
Hazard adjustment factor deducted	0	4		
Total	40	35	39	Correction of defects associated w/ Coliforme supply
(B) Prime Moving Equipment				
Well or intake	8	8		
Pumps	7	7		
Piping arrangement	5	5		
Reservoirs	7	7		
Equipment housing	3	3		
Sub-total	30			
Hazard adjustment factor deducted	0	30	30	
Total	30			
(C) Distribution System				
Street mains	5	4		
Building services	2	1		
Plumbing	3	1		
Hydrants	1	1		
Storage	4	4		
Pressure	2	2		
Tap water quality	3	3		2
Sub-total	20			
Hazard adjustment factor deducted	0	16	17	
Total	20			
(D) Operation and Operators				
Control of system	3	2		
Condition of system	2	2		
Operator qualifications	5	3		
Sub-total	10			
Hazard adjustment factor deducted	0	7	9	
Total	10			
GRAND TOTAL AND RATING	100	88	95	

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 Bovey Water SupplyDate July 27, 1961

(A) Source	Perfect Score	As Found	As Recommended	See Recommendation No. in Attached Report
Sanitary Safety	20	20		
Adequacy of treatment				
Bacteriological Quality	10	10		
Physical quality	2	2		
Chemical quality	4	3		
Biological quality	2	2		
Adequacy of quantity	2	2		
Sub-total	40	39		
Hazard adjustment factor deducted	0	4		
Total	40	35	39	Correction of defects associated w/Co. remains supply
(B) Prime Moving Equipment				
Well or intake	8	8		
Pumps	7	7		
Piping arrangement	5	5		
Reservoirs	7	7		
Equipment housing	3	3		
Sub-total	30			
Hazard adjustment factor deducted	0			
Total	30	30	30	
(C) Distribution System				
Street mains	5	4		
Building services	2	1		
Plumbing	3	1	2	
Hydrants	1	1		
Storage	4	4		
Pressure	2	2		
Tap water quality	3	3		
Sub-total	20			
Hazard adjustment factor deducted	0			
Total	20	16	17	
(D) Operation and Operators				
Control of system	3	2		
Condition of system	2	2		
Operator qualifications	5	3	5	3
Sub-total	10			
Hazard adjustment factor deducted	0			
Total	10	7	9	
GRAND TOTAL AND RATING	100	88	95	

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 Bovey Municipal Water SupplyDate November 27, 1962

	Perfect Score	As Found	As Recommended	See Recommendation No. In Attached Report
(A) Source				
Sanitary Safety } Adequacy of treatment	20	20		
Bacteriological Quality	10	10		
Physical quality	2	2		
Chemical quality	4	3		
Biological quality	2	2		
Adequacy of quantity	2	2		
Sub-total	40	39		Correction of defects associated w/Colarains supply
Hazard adjustment factor deducted	0	4		
Total	40	35	39	
(B) Prime Moving Equipment				
Well or intake	8	8		
Pumps	7	7		
Piping arrangement	5	5		
Reservoirs	7	7		
Equipment housing	3	3		
Sub-total	30			
Hazard adjustment factor deducted	0			
Total	30	30	30	
(C) Distribution System				
Street mains	5	4		
Building services	2	1		
Plumbing	3	1		
Hydrants	1	1		
Storage	4	1		
Pressure	2	4		
Tap water quality	3	2		2
Sub-total	20	3		
Hazard adjustment factor deducted	0			
Total	20	16	17	
(D) Operation and Operators				
Control of system	3	2		
Condition of system	2	2		
Operator qualifications	5	3		
Sub-total	10	5		3
Hazard adjustment factor deducted	0			
Total	10	7	9	
GRAND TOTAL AND RATING	100	88	95	

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 I
Benedict
Minnesota

Report on Investigation of Municipal Water Supply
Bovey, Minnesota
January 20, 1965

Well D This water supply is obtained from one drilled well located within the village limits. Water from this well discharges to the water treatment plant and from there into the distribution system, with the excess being stored in an elevated steel tank. This water system is connected to the Coleraine Municipal Water Supply.

Changes since last investigation -

The defects associated with the Coleraine water supply to which Bovey is connected have been corrected.

Location of source -

Well No. 1 and the water treatment plant are located near the intersection of Fourth Avenue and Fourth Street.

Well, pump and pump house -

Well No. 1 is 16 inches in diameter and 97 feet deep, and is equipped with a screen 18 feet long. The static level is 40 feet. When this well is pumped at 650 gallons per minute, the drawdown is 12 feet. Water is drawn from the well by means of a vertical turbine pump. At the time of this investigation, the well was being pumped at approximately 650 gallons per minute. The pump house was constructed in general accordance with the standards of this Department and appears to be well maintained.

Water treatment -

The water is subjected to aeration and filtration for the removal of iron. A gravity sand iron removal unit is provided. Chlorination equipment

MINNESOTA DEPARTMENT OF HEALTH

Section of Water Supply and General Engineering

Sanitation Safety Rating of Bovey Municipal Water SupplyDate January 20, 1965

	Perfect Score	As Found	As Recommended	See Recommendation No. In Attached Report
(A) Source				
Sanitary Safety	20	20	20	
Adequacy of treatment			10	
Bacteriological Quality	10	10	2	
Physical quality	2	2	3	
Chemical quality	4	2	2	
Biological quality	2	2	2	
Adequacy of quantity	2	2	2	
Sub-total	40			
Hazard adjustment factor deducted	0			
Total	40	39	39	
(B) Prime Moving Equipment				
Well or intake	8	8	0	
Pumps	7	7	7	
Piping arrangement	5	5	5	
Reservoirs	7	7	7	
Equipment housing	3	2	2	
Sub-total	30			
Hazard adjustment factor deducted	0			
Total	30	30	30	
(C) Distribution System				
Street mains	5	4	4	
Building services	2	1	1	
Plumbing	3	1	2	
Hydrants	1	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	17	
(D) Operation and Operators				
Control of system	3	1	3	2, 3
Condition of system	2	2	2	
Operator qualifications	5	4	5	4
Sub-total	10			
Hazard adjustment factor deducted	0			
Total	10	7	10	
GRAND TOTAL AND RATING	100	52	56	

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 Bovey Municipal Water SupplyDate January 28, 1970

	Perfect Score	As Found	As Recommended	See Recommendation No. In Attached Report
(A) Source				
Sanitary Safety	20	20	20	
Adequacy of treatment				
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	39	39	
(B) Prime Moving Equipment				
Well or intake	8	8	8	
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	30	30	
(C) Distribution System				
Street mains	5	4	4	
Building services	2	1	1	
Plumbing	3	1	2	
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	17	
(D) Operation and Operators				
Control of system	3	1	3	
Condition of system	2	2	2	
Operator qualifications	5	4	5	
Sub-total	10			
Hazard adjustment factor deducted	0			
Total	10	7	10	
GRAND TOTAL AND RATING	100	92	96	

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 **Povey Municipal** Water SupplyDate **April 6, 1971**

	Perfect Score	As Found	As Recommended	See Recommendation No. In Attached Report
(A) Source				
Sanitary Safety	20	20	20	
Adequacy of treatment				
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	39	39	
(B) Prime Moving Equipment				
Well or intake	8	8	8	
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	30	30	
(C) Distribution System				
Street mains	5	4	4	
Building services	2	0.5	1.5	2
Plumbing	3	0.5	1.5	1,3
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	15	17	
(D) Operation and Operators				
Control of system	3	1	3	4,5,6
Condition of system	2	2	2	
Operator qualifications	5	4	5	7, Certification
Sub-total	10			
Hazard adjustment factor deducted	0			
Total	10	7	10	
GRAND TOTAL AND RATING	100	91	96	

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 Bovey Municipal Water SupplyDate April 6, 1971

	Perfect Score	As Found	As Recommended	See Recommendation No. In Attached Report
(A) Source				
Sanitary Safety	20	20	20	
Adequacy of treatment	10	10	10	
Bacteriological Quality	2	2	2	
Physical quality	4	3	3	
Chemical quality	2	2	2	
Biological quality	2	2	2	
Adequacy of quantity	40			
Sub-total	0			
Hazard adjustment factor deducted	40	39	39	
Total				
(B) Prime Moving Equipment				
Well or intake	8	8	8	
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	30	30	
(C) Distribution System				
Street mains	5	4	4	1
Building services	2	0.5	1.5	2
Plumbing	3	0.5	1.5	
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	15	17	
(D) Operation and Operators				
Control of system	3	2	3	3,4
Condition of system	2	2	2	
Operator qualifications	5	4	5	5, Certification
Sub-total	10			
Hazard adjustment factor deducted	0			
Total	10	8	10	
GRAND TOTAL AND RATING	100	92	96	

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 Bovey Municipal Water SupplyDate October 18, 1972

	Perfect Score	As Found	As Recommended	See Recommendation No. In Attached Report
(A) Source				
Sanitary Safety	20	20	20	
Adequacy of treatment	10	10	10	
Bacteriological Quality	2	2	2	
Physical quality	4	3	3	
Chemical quality	2	2	2	
Biological quality	2	2	2	
Adequacy of quantity	2	2	2	
Sub-total	40			
Hazard adjustment factor deducted	0			
Total	40	39	39	
(B) Prime Moving Equipment				
Well or intake	8	8	8	
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	30	30	
(C) Distribution System				
Street mains	5	4	4	
Building services	2	1	1.5	
Plumbing	3	1.5	1.5	1
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	16.5	17	
(D) Operation and Operators				
Control of system	3	2	3	2,3
Condition of system	2	2	2	
Operator qualifications	5	4	5	4
Sub-total	10			
Hazard adjustment factor deducted	0			
Total	10	8	10	
GRAND TOTAL AND RATING	100	93.5	96	

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
REPORT ON INVESTIGATION OF PUBLIC WATER SUPPLY

Name of Water Supply: Bovey Municipal Water Supply
 Street: _____
 City: Bovey State: MN Zip Code: 55709
 County: Itasca District: Northwest
 PWS ID Number: 1310003
 Telephone Numbers: _____
 City: (218) 245-1633
 Operator: (218) 245-1633
 Engineer: _____
 Other: _____
 Water Superintendent: Dick Sturk Plant Classification: C Owner Type: Municipal
 Other Operators: None Classification: None Plant Type: Community Plumbing Permits and Inspections Required: Yes No
 Date of Previous Survey: _____ Date of Survey: _____
 City Engineer: _____ April 18, 1979 Sept. 25, 1980

SERVICE AREA CHARACTERISTICS:

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

Population Served: 858 Service Connections: 280 Storage Capacity: (A) _____
 Design Capacity (gal/day): 936,000 Average Daily Production (gal/day): 113,000 gals.
 Emergency Capacity (gal/day): (A) 85,000 elevated Highest Daily Production (gal/day): 200,000 gals.
 Total: 85,000 gals. 85,000 gal. elevated steel tank

Source Name	Availability	TREATMENT								WELL DATA															
		Disinfection	Aeration	Coagulation	Sedimentation	Filtration	Corrosion Con.	Stabilization	Softening	Taste & Odor	Ammoniation	Fluoridation	Other	Year Installed	Casing Diameter	Casing Depth	Screen Length	Well Depth	Water Bearing Formation	Static Level	Drawdown	Pump Type			
Well D Well No. 1 G	P Dc AC					F1						Va	1953	16" 79'	18'	97'	40' 12'	drift				VT	650		

Remarks: (A) Interconnected with the Coleraine water system for emergency supply.

Surveyed by: _____
 Larry D. Cole, P.E. Regional Eng.
 Approved by: _____
 Eugene Jourdan, Regional Supvr.

MINNESOTA DEPARTMENT OF HEALTH

Section of Water Supply and General Engineering

Sanitation Safety Rating of Bovey Municipal Water Supply

Date September 25, 1980

	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	3	3	
Biological quality	2	2	2	
Adequacy of quantity	2	2	2	
Sub-total	40			
Hazard adjustment factor deducted	0			
Total	40	39	39	
(B) Prime Moving Equipment				
Well or intake	8	8	8	
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	30	30	
(C) Distribution System				
Street mains	5	4	4	
Building services	2	1	1.5	2
Plumbing	3	1.5	2.5	
Hydrants	1	1	1	
Storage	4	3	4	1
Pressure	2	2	2	
Tap water quality	3	3	3	
Sub-total	20			
Hazard adjustment factor deducted	0			
Total	20	15.5	18	
(D) Operation and Operators				
Control of system	3	2	3	3
Condition of system	2	2	2	
Operator qualifications	5	3	5	4
Sub-total	10			
Hazard adjustment factor deducted	0			
Total	10	7	10	
GRAND TOTAL AND RATING	100	91.5	97	

90 and upward - high degree of safety. Watchful maintenance needed.
85 to 89 - moderately high degree of safety. Correction and maintenance program continued.

UNIVERSITY OF MINNESOTA
MINNESOTA GEOLOGICAL SURVEY

G. M. SCHWARTZ, DIRECTOR

BULLETIN 32

THE GEOLOGY AND
UNDERGROUND WATERS OF
NORTHEASTERN MINNESOTA

BY

GEORGE A. THIEL

OFFICE COPY

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MINNESOTA GEOLOGICAL SURVEY

UNIVERSITY OF MINNESOTA
MINNEAPOLIS MINNESOTA



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THE UNIVERSITY OF MINNESOTA PRESS

Cooperative Creamery Well, Grand Rapids*
(elevation approximately 1320 feet)

	DEPTH (feet)	THICKNESS (feet)
Drift and alluvium	0-190	190
Iron ore	190-204	14
Slaty taconite (Entered)	204-380	176

Pokegama

* Data from Jack Schultz, well driller.

A few miles south of the city, at low points in the topography, flowing wells may be obtained from the glacial drift at a depth of 80 to 130 feet.

COLERAINE

The city of Coleraine is located at the north end of Trout Lake, in the region of the overridden Patrician glacial moraine. The water supply for the city is taken from a well that is located one city block from Trout Lake and that terminates in the glacial drift at a depth of 142 feet. The well has a casing 18 inches in diameter and a pumping pipe 10 inches in diameter. It yields about 450 gallons per minute.

BOVEY

The village of Bovey is supplied with water by the city of Coleraine. A water main connects directly with the Coleraine supply system.

A well at the Holman-Cliffs Washing Plant penetrated 550 feet of the Virginia slate before reaching the iron-bearing formation. This well has a total depth of 775 feet, with 116 feet of 6-inch casing, 160 feet of 4½-inch, and 311 feet of 3-inch casing. The static water level in the well is about 60 feet below the surface. (See the accompanying log.)

Well at Holman-Cliffs Washing Plant

	DEPTH (feet)	THICKNESS (feet)
Unclassified	0-95	95
Hard, gray slate	95-581	486
Slate and sandstone	581-645	64
Taconite	645-778	133

MARBLE

The village of Marble is located at the south margin of the zone along which the Biwabik iron formation occurs under the glacial drift. The water for the village supply is taken from a well that penetrates 268 feet of the iron-bearing formation. The well is 20 inches in diameter and has a total depth of 400 feet. Its static level is 135 feet below the surface. When pumped at the rate of 250 gallons per minute it shows very little drawdown. (See the accompanying log.)

UNDERGROUND WATERS OF NORTHEASTERN MINNESOTA

low wells is inadequate. In such areas deeper wells with more abundant and more regular supplies are drilled to the sand and gravel beds near the base of the red Patrician drift. In the lowland along the Mississippi River and around many of the lakes, ample supplies of water for farm use may be obtained from shallow driven wells.

TABLE 32. — ANALYSES OF WATERS OF ITASCA COUNTY *

	1	2	3	4	5	6	7	8	9
Depth (feet) . . . . .	...	...	...	...	...	...	140	327	230
Hardness	0	76	209	200	110	368	290	117	183
Alkalinity	205	240	172	160	120	392	320	132	196
Iron . . . . .	.03	1.1	.6	.4	.25	1.4	.2	.2	.4
Manganese . . . . .	.07	.1	...	.1	0	...	.07	...	...
Chlorine	0	5.4	3	6.5	6.6	3	3.9	0	0
Fluorine . . . . .	.2	0	...	.2	.1	...	.2	...	...
SO ₄ radical	0	2.5	...	50	7.5	...	8	...	...
Turbidity	0	10	8	3	8	10	4	0	3
Color	7	20	25	6	0	20	6	0	20
Odor . . . . .	...	...	0	...	0	e-1	...	0	0
pH value	7.8	7.6	...	7.5	7.7	...	7.7	...	...

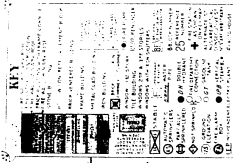
* Data from State Board of Health Laboratory. Hardness, alkalinity, iron, and chlorine in terms of parts per million (1 grain per gallon = 17.1 p.p.m.). For key to turbidity and items following, see standards in Section II.

1. Grand Rapids, new well, April 1939.
2. Grand Rapids, August 1944.
3. Coleraine, 2 drilled wells, 1921.
4. Bovey, 1944.
5. Nashauk, 1944.
6. Deer River, drilled well, 1918.
7. Deer River, flowing well No. 1, 1939.
8. Nashauk, dug and drilled well, 1919.
9. Keewatin, dug well, 1917.

MINN. 502

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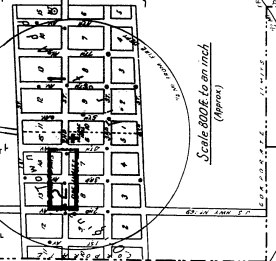
SCALE 100 FT TO AN INCH 2



CORRECTION RECORD	
REV#	DATE
NO. CORRECTION	ATTACHED BY
	DATE ATTACHED



See Map of Coleraine



PAYING: All buildings improved except as shown on Dual Tax Base.

GRADES: Light, sloping lower to West.

WATER FACILITIES

(Other: See Mills, C. Water supply through fire main from Coleraine. Service area No. 95, with gravity flow business section, including 2 Layne & Baker deep well pumps, one service to water tanks 125' above street level, capacity 500 gallons. This system is controlled by automatic pressure tank at 200' above street level. This 10,000 gallon air tank is in Bovey tank at Coleraine elevated 185' above Bovey business section.

3 1/2 miles of 4" or 6" main. 21 double hydrants. Average daily fire pressure 110 lbs.

FIRE DEPARTMENT

Station: 1 volunteer, paid for shift. 1 chief, 1 assistant chief and 20 men. 1 pumper.

1st: 1 Graham truck with 200 gallon per minute Waterosa pump, 1,000' with 200' 2 1/2" main, 1,000' 2 1/2" and 400' 1 1/2" hose in reserve.

2nd: 1 truck with 200 gallon per minute Waterosa pump, 1,000' with 200' 2 1/2" main, 1,000' 2 1/2" and 400' 1 1/2" hose in reserve.

3rd: 1 truck with 200 gallon per minute Waterosa pump, 1,000' with 200' 2 1/2" main, 1,000' 2 1/2" and 400' 1 1/2" hose in reserve.

4th: 1 truck with 200 gallon per minute Waterosa pump, 1,000' with 200' 2 1/2" main, 1,000' 2 1/2" and 400' 1 1/2" hose in reserve.

5th: 1 truck with 200 gallon per minute Waterosa pump, 1,000' with 200' 2 1/2" main, 1,000' 2 1/2" and 400' 1 1/2" hose in reserve.

6th: 1 truck with 200 gallon per minute Waterosa pump, 1,000' with 200' 2 1/2" main, 1,000' 2 1/2" and 400' 1 1/2" hose in reserve.

7th: 1 truck with 200 gallon per minute Waterosa pump, 1,000' with 200' 2 1/2" main, 1,000' 2 1/2" and 400' 1 1/2" hose in reserve.

8th: 1 truck with 200 gallon per minute Waterosa pump, 1,000' with 200' 2 1/2" main, 1,000' 2 1/2" and 400' 1 1/2" hose in reserve.

9th: 1 truck with 200 gallon per minute Waterosa pump, 1,000' with 200' 2 1/2" main, 1,000' 2 1/2" and 400' 1 1/2" hose in reserve.

10th: 1 truck with 200 gallon per minute Waterosa pump, 1,000' with 200' 2 1/2" main, 1,000' 2 1/2" and 400' 1 1/2" hose in reserve.

11th: 1 truck with 200 gallon per minute Waterosa pump, 1,000' with 200' 2 1/2" main, 1,000' 2 1/2" and 400' 1 1/2" hose in reserve.

12th: 1 truck with 200 gallon per minute Waterosa pump, 1,000' with 200' 2 1/2" main, 1,000' 2 1/2" and 400' 1 1/2" hose in reserve.

13th: 1 truck with 200 gallon per minute Waterosa pump, 1,000' with 200' 2 1/2" main, 1,000' 2 1/2" and 400' 1 1/2" hose in reserve.

14th: 1 truck with 200 gallon per minute Waterosa pump, 1,000' with 200' 2 1/2" main, 1,000' 2 1/2" and 400' 1 1/2" hose in reserve.

15th: 1 truck with 200 gallon per minute Waterosa pump, 1,000' with 200' 2 1/2" main, 1,000' 2 1/2" and 400' 1 1/2" hose in reserve.

16th: 1 truck with 200 gallon per minute Waterosa pump, 1,000' with 200' 2 1/2" main, 1,000' 2 1/2" and 400' 1 1/2" hose in reserve.

17th: 1 truck with 200 gallon per minute Waterosa pump, 1,000' with 200' 2 1/2" main, 1,000' 2 1/2" and 400' 1 1/2" hose in reserve.

18th: 1 truck with 200 gallon per minute Waterosa pump, 1,000' with 200' 2 1/2" main, 1,000' 2 1/2" and 400' 1 1/2" hose in reserve.

19th: 1 truck with 200 gallon per minute Waterosa pump, 1,000' with 200' 2 1/2" main, 1,000' 2 1/2" and 400' 1 1/2" hose in reserve.

20th: 1 truck with 200 gallon per minute Waterosa pump, 1,000' with 200' 2 1/2" main, 1,000' 2 1/2" and 400' 1 1/2" hose in reserve.

NO FIRE-RESISTIVE ROOFING ORDINANCE.

SCALE 100 FT TO AN INCH



SCALE 500 FT TO ONE INCH
Copyright 1938 by Saver's Map Co.

BOVEY, MINN. N. O. E. X. P. O. S. U. R. E.
JAN. 1936

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MINN. 502

REPLY TO 2 14 DWGS

N. O. E. X. P. O. S. U. R. E.

2

2



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

County Itasca
 Quad Bovey
 Quad Id 296C

Unique Well Number
228834

Entry Date 1992/07/30
 Update Date 2014/03/10
 Received Date

Well Name **BOVEY 1** **Well ID**
 Township Range Dir Section Subsection Field Located MDH
 56 24 W 32 BDAADB Elevation 1308.00 ft.

Well Depth 92.00 ft Depth Completed 92.00 ft Date Well Completed 1953/00/00

well address BOVEY 1
 BOVEY MN 55709 Changed
 contact address CITY OF BOVEY
 BOVEY MN 55709 Changed

Drillhole Angle
 Drilling Method Cable Tool
 Drilling Fluid Well Hydrofractured? YES NO
 Use community supply(municipal) From ft. to

Casing Type Steel (black or low Drive Shoe? YES NO Hole Diameter (in.)
 Diameter 16 Depth 50
 16.00 in. from 0.00 to 50.00 ft. lbs/ft

Screen Yes Open Hole(ft.) From to
 Make Type
 Diameter Slot Length Set
 42 50 ft. to 92 ft.

Description	Color	Hardness	From	To (ft.)
BLACK DIRT-CLAY			0	4
SANDY CLAY			4	8
BLUE CLAY-BOULDERS			8	39
SAND-FINE TO MEDIUM			39	62
COARSE SAND, GRAVEL & BOU CLAY			62	91
			91	92

Static Water Level (Multiple SWL)
 2.00 ft. top of casing Date measured 2012/12/03

Pumping Level (below land surface)
 52.00 ft. after 10.00 hrs. pumping 650.00 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 Capacity g.p.m.
 Length of drop pipe Material 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 Certification
 United States Geological Survey USGS
 License Business Name Lic. or Reg No.

Remarks
 WELL DRILLED BY LAYNE-MINNESOTA CO. OLD PERMIT NO. 66-5717.
 WELL CLEANED AND TELEVISED DECEMBER 2012. SCREEN STARTS
 AT 50FT, SEDIMENT AT 87

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

ALTERNATIVE WATER SUPPLY; CONTINGENCY STRATEGY

Minnesota Rules 4720.5280

I. PURPOSE

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

II. PUBLIC WATER SUPPLY CHARACTERISTICS

A. CURRENT SUPPLY SOURCE

	Well Number
Supply Source	228834
Well Depth (ft.)	92
Well Diameter (in.)	16
Well Pump Capacity (gpm)	600
Well Pump Rate (gpm)	550

B. TREATMENT

Fluoridation: Fluoridation/Hydrofluosilicic acid
Iron Removal: Aeration/Cone, Filtration (Gravity)/Rapid sand

C. STORAGE AND DISTRIBUTION

One elevated storage at 125,000-gallon capacity.

D. MAPS/PLANS

Maps and plans are available at city hall and the city engineer.

III. PRIORITY OF WATER USERS DURING WATER SUPPLY EMERGENCY

Priority of water use during water supply emergency will be watering bans and limited irrigation when needed.

IV. ALTERNATIVE WATER SUPPLY OPTIONS

A. SURFACE WATER SOURCES AND TREATMENT NEEDS

The Canisteo Mine Pit could potentially be a source of drinking water in an emergency. The Minnesota National Guard can furnish filtration. The state duty officer would be the contact for this resource.

B. BOTTLED WATER SUPPLIES, DELIVERY AND DISTRIBUTION

The Minnesota National Guard can furnish equipment capable of hauling up to 2,000 gallons of potable water from another water supply to a city distribution point or facility in an emergency. The city will contact the state duty officer to arrange this service.

The following vendor can be contacted for providing bottled water supply in the event of an emergency. These vendors can provide bulk, bottled water in five-gallon containers. Truckload and pallet quantities are usually on hand and available.

Vendor:	Range Water Conditioning	Home Depot
	Phone: 218-322-0575	Phone: 218-327-9791

Walmart – Grand Rapids	L & M Supply
Phone: 218-829-2220	Phone: 218-855-5740
Fax: 218-829-7250	Fax: 218-855-5749

C. SYSTEM INTERCONNECTS WITH OTHER WATER SUPPLIES

The city has an interconnect with the City of Coleraine for emergency use.

D. NEW WELL

The city could potentially drill a new well in an emergency.

E. EMERGENCY OR BACKUP WELLS

The city owns a joint well with the City of Coleraine.

F. EMERGENCY TREATMENT OF WATER SYSTEM

The city can treat at the well site.

G. SOURCE MANAGEMENT (BLENDING)

N/A

V. INVENTORY OF AVAILABLE EMERGENCY EQUIPMENT AND MATERIALS

Description	Owner	Telephone	Location
Well Repair	Thein Well	320-796-2111	Spicer, MN
Pump Repair	Thein Well	320-796-2111	Spicer, MN
Electrician	Skoglund Electric	218-360-9269	Grand Rapids, MN
Electrician	A to Z Electric	218-256-1652	Grand Rapids, MN
Plumber	Rapids Plumbing	218-326-0073	Grand Rapids, MN
Backhoe	Casper Construction	218-326-9637	Grand Rapids, MN
Backhoe	Schwartz Excavating	218-326-4321	Grand Rapids, MN
Chemical Feed	Hawkins	218-940-3558	Superior, WI
Meter Repair	MidAmerican Meter	763-478-8041	Medina, MN
Generator	N/A		
Valves	Core & Main	952-937-9666	Eden Prairie, MN
Water Tower	KLM Engineering	651-773-5111	Woodbury, MN

VI. NOTIFICATION PROCEDURES

A. LEAD COORDINATING AGENCY

Water System	Name	Home Telephone	Work Telephone
Mayor/Board Chair	Robert Stein	218-259-2738	NONE
Council Members	Deborah Trbojevich	218-259-8498	NONE
Council Members	Nancilyn Meyer	218-259-6028	NONE
Council Members	Robert Lawson	218-259-3125	NONE
Council Members	Trevor Guyer	218-259-1222	218-262-4581
State Incident Duty Officer			800-422-0798
County Emergency Director	John Linder		218-327-7483
Fire Chief	Ken Decoster	218-259-5689	218-743-3444
Sheriff	Vic Williams		218-326-3477
System Operator	Kevin Odden	218-256-1555	218-245-1633
School Superintendent			218-245-1566
Ambulance	Meds 1		911
Hospital	Grand Itasca		218-326-3401
Power Company	Minnesota Power		800-228-4966
Highway Department	Itasca County		218-327-2853
Telephone Company	Century Link		844-901-3158
Neighboring Water System	City of Coleraine	218-256-7177	218-245-2122
MPCA Groundwater Division			218-723-4660
MRWA Technical Services			218-685-5197
MDH Public Water Supply	Mike Luhrsen		218-343-8123

A. INCIDENT ASSESSMENT TEAM

Responsible Party	Name	Home Phone	Work Phone
Mayor/Board Chair	Robert Stein	218-259-2738	218-245-1633
Council Members	Deborah Trbojevich	218-259-8498	
Council Members	Nancilyn Meyer	218-259-6028	
Council Members	Robert Lawson	218-259-3125	
Council Members	Trevor Guyer	218-259-1222	
Fire Chief	Ken Decoster	218-259-5689	
Sheriff	Vic Williams		218-326-3477
County Emergency Director	John Linder		218-327-7483
Hazardous Materials Response	Grand Rapids Fire/SDO		800-422-0798
System Operator	Kevin Odden	218-256-1555	218-245-1633

C. Public Information Plan

1. Primary spokesperson for the media and/or public comment in the event of an emergency or contamination incident.

Name: Robert Stein
Title: Mayor
Address: PO Box 99, Bovey, MN 55709

Home Phone: 218-259-2738
Work Phone: 218-245-1633

Public Information Center Location during Emergency: City Hall

Times Available: 24 hours

2. Information checklist to be conveyed to the public media:

Name of water system: _Bovey_____

Contaminant of concern and date: _____

Source of contamination: _____

Public health hazard: _____

Steps the public can take: _____

Steps the water system is taking: _____

Other information: _____

3. Media Contacts

Media	Name	Telephone	Address
Newspaper	Scenic Range News	218-245-1422	Nashwauk, MN
Radio	KOZY	218-999-5699	Grand Rapids, MN
TV	WDIO	800-477-1013	Duluth, MN
TV	KBJR	218-720-9666	Duluth, MN

VII. MITIGATION AND CONSERVATION

A. MITIGATION

- Infrastructure maintenance/upgrades/maps:**
 The city water distribution system is flushed two times a year. No new water mains were added since 2015. Current infrastructure maps are available at City Hall.
- Regular inspection of tower, well, pump house:** These items are inspected daily. All structures have keyed entries and are locked. KLM Engineering is contracted for water tower maintenance.
- Staff emergency training:** Staff receives training through MRWA and MDH.
- Site new backup well:** The city has no plans for a new backup well.
- System valving to isolate problems:** The water system is adequately valved to isolate problems
- Sanitation procedures for construction/repairs:** All disinfecting procedures are performed per State specifications.

B. CONSERVATION

- Water Meters:** No water meters are in service.
- Public Education:** The city publishes the Consumer Confidence Report on the city website and a copy is available at the City Hall.
- Rate Structure:** Water is billed as a monthly flat rate.

Glossary of Terms

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

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

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

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

Inner Wellhead Management Zone (IWMZ). The land that is within 200 feet of a public water supply well (Minnesota Rules, part 4720.5100, subpart 19). The 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.

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

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

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

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

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

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

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

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

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

CITY OF BOVEY WHPP - IMPLEMENTATION SCHEDULE

NOTE: -1) For a complete description of each strategy, refer to the WHP Plan, Chapter 5.

2) Year 1 starts 60 days after final plan approval is received from MDH.

STRATEGIES	Potential Grant Funded	On-going or As needed	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	COMPLETION DATE
MONITORING, DATA COLLECTION, AND ASSESSMENT:													
1 - Contact MDH Hydro - set up PWS well and mine pit sampling.	X							X					
2 - Set up aquifer test on well #1 with MDH to coincide with maintenance.	X		X										
3 - Work with MDH to determine feasibility of construction of observation well.	X			X									
4 - Transducers and temperature probes in PWS wells and Traut Lake (purchase and install).	X			X									
5 - Support MGS and DNR in completion of geologic atlas.	X			X									
6 - Update PCSI.	X						X				X		
7 - Notify MDH to update IWMZ survey form.	X								X				
8- Request listing of new wells within 1-mile of DWSMA.	X								X		X		
WELL AND CONTAMINANT SOURCE MANAGEMENT:													
9 - Monitor setbacks for all new potential contaminant sources within the IWMZ.	X		X										
10 - Implement activities directed in the MDH IWMZ (apply for grants).	X		X										
11 - Implement activities directed in the MDH Sanitary Survey (apply for grants).	X		X										
12 - Evaluate need and purchase back-up generator if need is determined.	X		X										
13 - Pursue MDH grant funds to construct a salt shed.	X						X						
14 - Purchase and install generator wiring and controls if generator is purchased.	X								X				
15 - Assess security needs and apply for MDH funding if need is determined.	X								X				
16 - Notify MDH if class V wells are found within DWSMA.	X								X				
17 - Work with property owner to determine status of observation well in DWSMA.	X						X						
18 - Apply for MDH funds to seal any wells located in DWSMA with owner consent.	X								X				
19 - OMW Inventory - work with MDH to verify status of wells in inventory and seal if unused.	X							X					
20 - Discuss old leak sites with MPCA if contaminants are present in the drinking water supply.	X								X				
21 - Work with PCSI #19 property owner and MPCA to determine status of tank. Remove if feasible.	X									X			
EDUCATION AND OUTREACH:													
22 - Wellhead information on city website - apply for grant.	X								X				
23 - Participate in 1W1P when developed.	X								X				
LAND USE AND PLANNING:													
24 - Apply for grant funding if ordinance update is needed.	X								X				
WHP COORDINATION, REPORTING, AND EVALUATION:													
25 - Meeting to review wellhead measures and plan implementation.	X							X		X			X
26 - Maintain WHP folder.	X							X		X			X
27 - Develop Spreadsheet for implementation.	X							X					
28 - Evaluation report every 2.5 years.	X										X		
29 - Summarize plan implementation in year 8 and report to MDH.	X											X	