APPENDIX I

WHPA AND DWSMA DELINEATIONS AND VULNERABILITY ASSESSMENTS

WHPA and DWSMA Delineations and Vulnerability Assessments -Appendix I contains the first part of the plan, consisting of the delineation of the wellhead protection area (WHPA), the drinking water supply management area (DWSMA), and the vulnerability assessments for the public water supply wells and the DWSMA. This part of the plan is summarized in Chapter 3.

Protecting, maintaining and improving the health of all Minnesotans

June 5, 2013

Mr. Al Fahey, Manager
City of Belle Plaine
P.O. Box 129
Belle Plaine, Minnesota 56011-0129

Dear Mr. Fahey:

Subject: **Scoping Decision Notice No. 1 for the City of Belle Plaine, PWSID 1700001, for Amending the Wellhead Protection Plan**

This letter provides notice of the results of the Scoping 1 meeting that Robyn Hoerr (Minnesota Rural Water Association) and Joy Loughry (Minnesota Department of Health [MDH]) held with you and Joe Duncan, City Engineer, on May 8, 2013, regarding amending your Wellhead Protection Plan. During the meeting, we discussed the preparation of Part I of a Wellhead Protection Plan that will document the 1) delineation of a wellhead protection 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 used by Belle Plaine.

It is our understanding that the city also has one well (Table 1) that it retains for emergency standby use. The city must manage an inner wellhead management zone (IMWZ) that is defined by a 200-foot radius around the emergency standby well. This serves as the wellhead protection area for emergency wells.

According to the state wellhead protection rule, the city will have until August 4, 2015, to amend its entire Wellhead Protection Plan, Part I and Part II. The Minnesota Department of Health (MDH) highly recommends that half of the time allotted be dedicated to completing Part II of the plan.

It is our understanding that you will be contracting a consultant to prepare the delineations and vulnerability assessments for the city. MDH has a draft Request for Proposal (RFP) that can be used to help select a consultant that has experience in wellhead protection planning and, in particular,with preparing a Part I report. Please contact Karen S. Voz at the phone number below if you want to discuss using the draft RFP.

At the May 8, 2013, meeting, the rule requirements and the types of information needed to amend the Part I report were discussed. The Wellhead Protection 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 must provide to MDH to meet rule requirements for preparing Part I of the Wellhead Protection 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 1) lists the Minnesota unique well number and well construction for each well that will be included in the Wellhead Protection Plan [Table 1]; 2) lists the pumping volumes for each well [Table 2]; 3) lists other high-capacity wells in the area that will need to be accounted for in the groundwater model [Table 3]; and 4) includes a map of the well locations. A summary of the information that the city needs to provide is included at the end of the Scoping Decision Notice No. 1 form.

After your consultant has had an opportunity to develop a conceptual model of the local hydrogeologic setting, MDH staff would like to meet with your consultant to discuss the proposed delineation approach. This pre-delineation meeting may be accomplished by a conference call if 1) MDH approves and 2) the consultant provides figures for the discussion beforehand. The delineation could be performed using either the model used for the 2003 delineation or the new Metro Model that Barr Engineering developed for the Metropolitan Council. In both cases, local detail and/or new information should be added as required and recalibration should be performed to reflect the hydrogeological conditions in Scott County.

Prior to finalizing the wellhead protection area boundaries, we highly recommend that MDH staff informally review preliminary model results and assess whether any changes are needed to meet rule requirements. Model input and solution files should be submitted in electronic form. The same applies to geographical data, such as the wellhead protection area and drinking water supply management area. When geographic data are submitted electronically, ArcInfo export or ArcView shapefile formats are preferred. It will greatly accelerate our review if these geographic data use the 1983 North American Datum (NAD83), Universal Transverse Mercator, Zone 15 North (UTM, Z15N) projection, with meter distance units. Other datum and projection systems are acceptable as long as they are documented. Specific questions regarding electronic geographic data can be directed to Michael Baker, Source Water Protection Unit, at 651/201-4651.

Finally, it is our understanding that you will serve officially as the wellhead protection manager on behalf of the city. You are responsible for providing written notice to local units of government of the city's intent to amend the Wellhead Protection Plan, as required by the wellhead protection rule (part 4720.5300, subpart 3). A copy of this notice should be forwarded to MDH and must include a list of the city's wells,

identified by unique number, and contact information for you as wellhead protection manager. Robyn Hoerr can provide you with some examples of the notification of intent that other communities have used, if you do not have a copy of your original notice of intent. Please contact Robyn Hoerr at 218/821-5028.

In closing, we look forward to working with you on amending your Wellhead Protection Plan. If you have any questions regarding our comments, please contact Karen S. Voz at 320/223-7322.

Sincerely,

Steve Robertson, Supervisor
Source Water Protection Unit
Drinking Water Protection
Environmental Health Division
P.O. Box 64975
St. Paul, Minnesota 55164-0975

JEL: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 Belle Plaine Wells, Table 3 – Permitted High-Capacity Wells, Map of Well locations

cc: Joseph Duncan, Bolton & Menk, Inc.
Karen S. Voz, Planner, Minnesota Department of Health, St. Cloud District Office
Robyn Hoerr, Minnesota Rural Water Association
Byron Adams, Water Monitoring Section, Minnesota Pollution Control Agency
Joe Richter, Division of Waters, Minnesota Department of Natural Resources
Ron Struss, Minnesota Department of Agriculture
Eric Mohring, Board of Water and Soil Resources

SCOPING DECISION NOTICE No. 1
(Vulnerable Setting)

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 public water supply (PWS) so that the PWS can develop land use or management practices to protect their groundwater resource from contamination. Specifically, the Part I Report documents the delineation of the wellhead protection area (WHPA), the delineation of the drinking water supply management area (DWSMA), and assesses the vulnerability of the PWS wells and DWSMA.

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

Name of Public Water Supply **Belle Plaine (PWSID = 1700001)**		**Date** June 5, 2013
Name of the Wellhead Protection Manager Mr. Al Fahey, Manager		
Address P.O. Box 129	**City** Belle Plaine	**Zip** 56011-0129
Unique Well Numbers 538038 (Well 3), 651697 (Well 4), 201245 (West Well 1 – Emergency)*		**Phone** 952-873-5553

*Emergency wells only use the IWMZ Form for data collection

Instructions for Completing the Scoping No. 1 Form

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

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

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

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

DATA ELEMENTS ABOUT THE PHYSICAL ENVIRONMENT

A. PRECIPITATION

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

Technical Assistance Comments: Precipitation values can be used to determine the local recharge in the groundwater model. The map can be used to determine the closest gauging station. The locations of the gauging stations are available in the public domain.

N	D	V	S	
	X		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, or may be obtained from the local wastewater treatment plant.

B. GEOLOGY

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

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

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

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

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

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

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

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

C. SOILS

N	D	V	S	
	X	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			D.1: An existing map of the boundaries and flow directions of major watershed units and minor watershed units.

Technical Assistance Comments: This information is in the public domain and may be used to delineate the surface water contribution area of the WHPA.

N	D	V	S	
	X	X		D.2: An existing map and a list of public waters as defined in Minnesota Statutes, section 103G.005, subdivision 15, and public drainage ditches.

Technical Assistance Comments: This information is in the public domain and may be used to delineate the surface water contribution area of the WHPA and determine the vulnerability of the DWSMA.

N	D	V	S	
X				D.3: The shoreland classifications of the public waters listed under sub-item (2), pursuant to part 6120.3000 and Minnesota Statutes, sections 103F.201 to 103F.221.

Technical Assistance Comments:

N	D	V	S	
X				D.4: An existing map of wetlands regulated under Chapter 8420 and Minnesota Statutes, section 103G.221 to 103G.2373.

Technical Assistance Comments:

N	D	V	S	
X				D.5: An existing map showing those areas delineated as floodplain by existing local ordinances.

Technical Assistance Comments:

DATA ELEMENTS ABOUT THE LAND USE

E. LAND USE

N	D	V	S	
	X		X	E.1: An existing map of parcel boundaries.

Technical Assistance Comments: This information may be helpful in delineating the DWSMA, if available. If this information is provided, identification numbers must be provided for each parcel. An electronic format for the map is preferable.

N	D	V	S	
	X		X	E.2: An existing map of political boundaries.

Technical Assistance Comments: Please provide this information if the boundaries have been updated/changed. This information may be helpful in delineating the DWSMA. An electronic format for the map is preferable.

N	D	V	S	
	X			E.3: An existing map of public land surveys, including township, range, and section.

Technical Assistance Comments: This information is available in the public domain and may be helpful in delineating the DWSMA.

N	D	V	S	
X				E.4: A map and an inventory of the current and historical agricultural, residential, commercial, industrial, recreational, and institutional land uses and potential contaminant sources.

Technical Assistance Comments:

N	D	V	S	E.5: An existing, comprehensive land-use map.
X				

Technical Assistance Comments:

N	D	V	S	E.6: Existing zoning map.
X				

Technical Assistance Comments:

F. PUBLIC UTILITY SERVICES

N	D	V	S	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		X	

Technical Assistance Comments: Do not submit a map of the storm sewers and sanitary sewers. Describe the difference in how much water is pumped and how much is sold. The difference is the leakage that may be used as recharge in the groundwater model.

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 well(s) 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(s) 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	X	X	G.3: An existing list of permitted withdrawals from lakes and streams, including source, use, and amounts withdrawn.

Technical Assistance Comments: Only required if different from the DNR database. Surface water bodies may be in direct hydraulic connection with the aquifer(s) of concern and withdrawals may affect water levels in both the surface water and adjacent groundwater systems.

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(s) of concern.

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

Technical Assistance Comments: Please notify MDH of surface water/well interference problems of which the PWS is aware. Conflicts between use of groundwater resources and surface water bodies would indicate a hydrologic boundary that would need to be considered in delineating the WHPA.

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

Technical Assistance Comments: This information can be used to evaluate surface water/groundwater interactions and aquifer water quality. Submit if the PWS has information that is not available in the public domain.

J. GROUNDWATER QUALITY

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

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

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

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

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

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

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

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

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

Technical Assistance Comments:

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

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

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

As discussed during the first Scoping Meeting on May 8, 2013, the public water supply (PWS) will supply the following information for Part I of their Wellhead Protection Plan to the Minnesota Department of Health. The number of the data element that refers to the information needed to prepare the Part I Report is listed in the parenthesis at the end of each request.

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

   Table 1 lists well use and construction for each PWS well. Have you reconstructed the wells? Is there a well record for the reconstruction?

   The enclosed map shows the locations of the public water supply wells. Please let us know if you feel the map is incorrect. The locations of the primary wells must be used for the delineation.

   Table 2 shows the available pumping information and indicates what information the PWS needs to provide for the delineation of the capture zone. Please provide 1) the pumping data for 2013 that was sent to the DNR, 2) whether this rate was measured or estimated, and 3) the projected annual pumping amounts for the next five years.

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

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

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

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

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

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

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

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

10) Please describe the annual amount of water that is lost due to leaks in the distribution system. Can you identify specific parts of the distribution system where this loss occurs? (F.2)

11) If local precipitation information is not available in the public domain within a couple of miles and in the same geomorphic setting, please provide average monthly precipitation values from the wastewater treatment facility during the preceding five years. (A.2)

12) Please identify any other reports about surface water withdrawals or surface water monitoring data from lakes, streams, or wetlands that are not in the public domain that MDH staff could review and copy. (G.3 and I.2)

Table 1
Public Water Supply Well Information
Belle Plaine, Minnesota

Local Well Name	Unique Number	Use/ Status [1]	Casing Diameter (inches)	Casing Depth (feet)	Well Depth (feet)	Date Constructed/ Reconstructed	Well Vulnerability	Aquifer
West Well 1	201245	E	16	261	280	1949	Vulnerable	QBAA
Well 3	538038	P	18	239	330	1994	Vulnerable	QBAA
Well 4	651697	P	18	245	331	2001	Vulnerable	QBAA

Note: 1. Primary (P) or Emergency Backup (E) Well

Table 2
Annual Volume of Water Pumped from Belle Plaine Wells
(millions of gallons)

Local Well Name	Unique Number	2008	2009	2010	2011	2012	Highest annual rate from previous 5 years
West Well 1	201245	0	0	0	0	0	n/a
Well 3	538038	67.3	109.6	**112.4**	99.9	91.7	112.4
Well 4	651697	146.6	107.2	103.8	134.2	**152.6**	152.6
Total		213.9	216.8	216.2	234.1	244.3	265

Source: DNR State Water Use Database System.

Table 3
Permitted High-Capacity Wells
DNR State Water Use Database System

Unique Number	Well Name	DNR Permit Number	Aquifer	Use	Average Annual Volume of Water Pumped 2007-2011 (Millions of Gallons)
161323	Phillip A Morris	1991-6121	QBAA	Non-Crop Irrigation	3.5
469306	Valley View Golf Club LLC	1992-6125	QBUA	Non-Crop Irrigation	15.1
212293	Eugene Korninder	1977-6401	CSTL-CIGL	Major Crop Irrigation	1.4

* Active SWUDS wells with reported pumping for the years 2007-2011 within approximately 3.5 miles of the Belle Plaine wells. Additional wells further from the city may need to be accounted for depending on the scale of the groundwater model domain.

Map

Belle Plaine #4
Belle Plaine #3
Belle Plaine #1 - West Well
Public Supply Wells
N
W
E
S
0 75 150 300 Feet
MINNESOTA
MDH
DEPARTMENT of HEALTH
Well Locations
Belle Plaine, MN

Amendment to the
Wellhead Protection Plan

Part I

Delineation of Wellhead Protection Area, Drinking Water Supply Management Area, and Drinking Water Supply Management Area Vulnerability Assessment

June 2014

Prepared for

The City of Belle Plaine

by

Leggette, Brashears & Graham, Inc.

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Figure 13: Existing 2003 and 2014 Drinking Water Supply Management Areas

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, part 103I.005, subdivision 24).

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

1. Introduction

Leggette, Brashears and Graham, Inc. (LBG) has developed Part I of the Wellhead Protection (WHP) Plan for the City of Belle Plaine (City) (public water supply identification number 1700001). The work was performed in accordance with the Minnesota Wellhead Protection Rule (MR), parts 4720.5100 to 4720.5590. The City's existing WHP Plan, approved November 2, 2005, is being amended now because it needs to be updated before its expiration date, which is ten years from when it was previously approved. Pumping rates have not significantly increased nor have any new wells been added.

The results of the development of this amended WHP Plan are presented in the text below, on Tables 1 through 7, and Figures 1 through 12, which are listed in the Table of Contents.

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 well and DWSMA. Figure 10 shows the boundaries of the WHPA and the DWSMA, respectively. These are based on a WHPA that is defined by a 10-year time of travel. Figure 10 also shows the emergency response areas (ERA), which are defined by a 1-year time of travel.

This report also lists the technical information that was used to prepare this portion of the WHP Plan in accordance with the MR. Information pertaining to the Aquifer Test Plan (ATP) and the well vulnerability sheets can be obtained from the (Minnesota Department of Health) MDH.

The City Wells included in the WHP Plan are listed in Table 1.

Table 1 - Water Supply Well Information
City of Belle Plaine

Local Well Name	Unique Number	Type	Casing Diameter (inches)	Casing Depth (feet)	Well Depth (feet)	Date Constructed/ Reconstructed	Well Vulnerability	Aquifer
West Well No. 1	201245	Emergency	16	261	280	1949	Vulnerable	QBAA
Well No. 3	538038	Primary	24x18	239	330	1994	Vulnerable	QBAA
Well No. 4	651697	Primary	24x18	245	331	2001	Vulnerable	QBAA

QBAA- Quaternary age sand and gravel (Quaternary Buried Artesian Aquifer)

2. Assessment of the Data Elements

Table 2 presents the assessment of the data elements as outlined in the MDH's scoping letter relative to the present and future implications of planning items that are specified in MR, part 4720.5210.

Table 2 - Assessment of Data Elements

Data Element	Present and Future Implications				Data Source (See Selected References for Numbered Citations)
	Use of the Well (s)	Delineation Criteria	Quality and Quantity of Well Water	Land and Groundwater Use in DWSMA	
Precipitation	H	H	H	H	MN Climatology Working Group, City
Geology					
Maps and geologic descriptions	H	H	H	H	Mossler, 1998 and 2000
Subsurface data	H	H	H	H	Mossler, 1998 and 2000
Borehole geophysics	H	H	H	H	MGS
Surface geophysics	H	H	H	H	None Available
Maps and soil descriptions	M	H	H	H	NRCS
Water Resources					
Watershed units	L	M	L	M	National Hydrography Dataset (USGS)
List of public waters	L	H	L	L	DNR, National Hydrography Dataset (USGS)
Land Use					
Parcel boundaries map	L	L	L	L	Scott County GIS Data
Political boundaries map	L	H	L	L	ESRI Data
PLS map	L	H	L	L	ESRI Data
Public Utility Services					
Transportation routes and corridors	L	M	M	M	ESRI
Storm/sanitary sewers and PWS system map	M	L	L		City, County
Public drainage systems map or list	L	L			ESRI Data
Records of well construction, maintenance, and use	H	H	H	H	City, CWI, MDH Files
Surface Water Quantity					
Stream flow data	M	H	M		USGS, DNR, Metropolitan Council
Ordinary high water mark data	L	L			FEMA, DNR
Permitted withdrawals	L	L			DNR
Protected levels/flows	L	L			DNR
Water use conflicts	L	L			DNR
Groundwater Quantity					
Permitted withdrawals	H	H	H	H	DNR
Groundwater use conflicts	H	H	H	H	DNR
Water levels	H	H	H	H	DNR, MPCA, MDH, City

Data Element	Present and Future Implications				Data Source (See Selected References for Numbered Citations)
	Use of the Well (s)	Delineation Criteria	Quality and Quantity of Well Water	Land and Groundwater Use in DWSMA	
Surface Water Quality					
Monitoring data summary	L	M			MDH, MPCA, MDA, DNR, City
Groundwater Quality					
Monitoring data	H	H	H	H	MPCA, MDH, USGS
Isotopic data	H	H	H	H	MPCA, MDH. USGS, UMN
Tracer studies	H	H	H	H	None Available
Contamination site data	H	H	H	M	City, MPCA and MDA
MPCA and MDA spills/release reports	H	H	H		MPCA and MDA

Definitions Used for Assessing Data Elements:

High (H) – The element has a direct impact.

Moderate (M) – The element has an indirect or marginal impact.

Low (L) – The element has little if any impact.

Shaded – The element was not required by MDH for preparing the WHP Part 1 Plan.

3. General Descriptions

3.1 Description of the Water Supply System

The City, shown on Figure 1, obtains its drinking water supply from two primary wells, City Wells No. 3 and 4. The wells are shown on Figure 2 and Table 1 summarizes information regarding them.

3.2 Description of the Hydrogeologic Setting

The hydrologic settings for the Quaternary Buried Confined Aquifer (QBAA) are described in the City's original Part I WHP Plan (LBG, 2003) and a summary of the hydrologic conditions at the City Wells is presented in Table 3.

Table 3 - Description of the Hydrogeologic Setting at Wells No. 3 and 4

Aquifer	Attribute	Descriptor	Data Source
Quaternary Buried Artesian Aquifer (QBAA)	Aquifer Material	Sand and Gravel	Well No. 3 well log (538038) Well No. 4 well log (651697)
	Primary Porosity	0.25	Value recommended by MDH.
	Aquifer Thickness	145 feet (Well 1) to 217 feet (Well 3)	Well No. 3 well log (538038) Well No. 4 well log (651697)
	Stratigraphic Top Elevation	735 feet-amsl	Well No. 3 well log (538038) Well No. 4 well log (651697)
	Stratigraphic Bottom Elevation	530 feet-amsl	Well No. 3 well log (538038) Well No. 4 well log (651697)
	Hydraulic Confinement	Unconfined	Well No. 3 well log (538038) Well No. 4 well log (651697)
	Transmissivity (T)	Reference Value/Range: 125,000 ft^2/day (71,000 – 138,000 ft^2/day)	The Aquifer Test Plan was approved on May 5th, 2013, and the reference value and range for the transmissivity were determined from a pumping test conducted at City of Belle Plaine Well No. 3 (538038) in November of 2001.
	Hydraulic Conductivity (K)	Reference Value/Range: 610 ft/day (345 – 673 ft/day)	The Aquifer Test Plan was approved on May 5th, 2013, and the reference value and range for the transmissivity were determined from a pumping test conducted at City of Belle Plaine Well No. 3 (538038) in November of 2001 and uses an aquifer thickness of 205 feet.
	Groundwater Flow Field	Flow in QBAA is to the north northwest toward the Minnesota River. Hydraulic Gradient: variable	Measured from model results.

4. Delineation of the Wellhead Protection Area

4.1 Delineation Criteria

The boundaries of the WHPA for the City are shown in Figure 10. Table 4 provides descriptions of how the delineation criteria that are specified under MR, part 4720.5510 were included in the model.

Table 4 - Description of WHPA Delineation Criteria

Criterion	Descriptor	How the Criterion was Addressed
Flow Boundary	Minnesota River and Sand Creek	The rivers provide boundary conditions to the local model that extends to these natural boundaries. They were included in the model and set the local groundwater flow.
Flow Boundary	Other High-Capacity Wells (Appendix B Table 1)	The pumping amounts were determined based on the averaged 2008-2012 pumped volumes. The pumping amounts of these high-capacity wells were included in the methods used for the delineation.
Daily Volume of Water Pumped	See Table 5	Pumping information was obtained from the Minnesota Department of Natural Resources Appropriations Permit 1980-6176. The annual pumped volumes were converted to a daily volume pumped by a well.
Groundwater Flow Field	See Figures 9 & 10	The model calibration process addressed the relationship between the calculated versus observed groundwater flow field.
Transmissivity (T)	Reference Value/Range: 125,000 ft^2/day (71,000 – 138,000 ft^2/day)	The Aquifer Test Plan was approved on May 5th, 2013, and the reference value and range for the transmissivity were determined from a pumping test conducted at City of Belle Plaine Well No. 3 (538038) in November of 2001.
Time of Travel	10 years	The public water supplier selected a 10-year time of travel.

Information provided by the City and from the Minnesota Department of Natural Resources (DNR) SWUDS database were used to identify the maximum volume of water pumped annually by each well over the previous five-year period. The City's projected volume is equal to the highest value over the years 2008-2012 plus an additional 2%. The rates used in the delineation from the previous five years are summarized in Table 5. The total volume used in the current plan, illustrated in Table 5 (270.3 MGY), is approximately 10% greater than the highest single-year demand over the period of record (244.3 MGY in 2012), indicating a conservative delineation volume. 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. The average volume pumped from other permitted wells over the past 5 years, in the area of the City Wells, is summarized in Table 6.

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

Well Name	Unique Number	Total Annual Withdrawal (million gallons/year[MGY])					Maximum Withdrawal 2008 - 2012 (MGY)	Withdrawal used in Current WHP Plan* (MGY)
		2008	2009	2010	2011	2012		
West Well No. 1	201245	0	0	0	0	0	n/a	0
Well No. 3	538038	67.3	109.6	**112.4**	99.9	91.7	112.4	114.6
Well No. 4	651697	146.6	107.2	103.8	134.2	**152.6**	152.6	155.7
Totals		213.9	216.8	216.2	234.1	**244.3**	265	270.3

*Future pumping rate estimated by City is the 2008-2012 maximum plus 2%.
Source: The DNR State Water Use Database System (SWUDS) Permit Number 1980-6176.

Table 6 - Other Permitted High-Capacity Wells Included in Model

Unique Number	Well Name	DNR Permit Number	Aquifer	Use	Average Withdrawal (2007-2011) MGY
132296	HENDERSON 1	CMTS	1980-4312	Waterworks	24.0
161323	Philip A. Morris	QBAA	1991-6121	Non-Crop Irrigation	3.5
212293	KORNDER	MTPL	1977-6401	Major Crop Irrigation	1.4
240052	NEW PRAGUE 1	CFMS	1979-6297	Waterworks	39.5
240053	NEW PRAGUE 2	CFIE	1979-6297	Waterworks	23.3
240054	NEW PRAGUE 3	CFIE	1979-6297	Waterworks	48.8
433280	NEW PRAGUE 4	CMTS	1979-6297	Waterworks	59.7
462924	JORDAN 5	CFIG	1980-6175	Waterworks	37.6
469306	Valley View Golf Club	CSTL-CIGL	1977-6401	Non-Crop Irrigation	15.1
680502	NEW PRAGUE 5	CFIE	1979-6297	Waterworks	61.0
693065	JORDAN 7	CMTS	1980-6175	Waterworks	49.3
749843	NEW PRAGUE 6	CMTS	1979-6297	Waterworks	56.0

4.2 Method Used to Delineate the Wellhead Protection Area

Figure 10 shows the WHPA delineated for the City Wells using the results of the porous media modeling delineations. The WHPA is a composite of all the areas identified using methods described in this report that potentially contribute recharge to the aquifers used by the City Wells within a 10-year time of travel.

4.2.1. Porous Media Delineations

The porous media delineations of the WHPA for the City Wells were completed using an existing regional MODFLOW model, Metromodel 2.0, which was provided by the Metropolitan Council (Met

Council, 2009). MODFLOW is a 3D, cell-centered, finite difference, saturated flow model developed by the USGS (Harbaugh et al., 2000).

The regional Metromodel consists of nine layers that represent the major aquifers and aquitards within the seven-county metropolitan area. These layers represent, from top to bottom, the following units: (1) surficial aquifer of glacial deposits; (2) St. Peter Sandstone or Quaternary Buried Artesian Aquifer; (3) Prairie du Chien Group; (4) Jordan Sandstone; (5) St. Lawrence Formation (aquitard); (6) Franconia Formation; (7) Ironton-Galesville Aquifer, (8) Eau Claire Formation (aquitard); and (9) Mt. Simon Sandstone. The regional groundwater model was calibrated to steady-state water levels and river base flows.

A local-scale model, limited to parts of Scott and Carver Counties, was extracted from the regional seven-county model and is shown on Figure 5. The local model and all of the modeling for this amendment was completed using GMS (Aquaveo, 2013), a pre- and post-processor for MODFLOW. The local model was created using the technique of local grid refinement where a smaller, more refined grid is used within the regional model. The heads computed from the regional model then provide some of the boundary conditions for the local model as specified heads. The size of the domain and the general flow-field characteristics of the model were based on the Metromodel and the results of the original delineation.

The local model domain was divided into a three-dimensional, non-uniform grid. The model has 166 rows, 193 columns, and nine layers. The details of the Metromodel were then translated to the local-scale model using GMS. Finer grid spacing was applied in the local model with telescopic mesh refinement used in the area of the site where the City wells are located. This grid spacing (~5 m in the area of the City's wells) provides better definition in the area of the flow field where simulating the influence of pumping from the wells was critical. The base of the model is variable at an elevation of approximately 100 meters (m) above mean sea level (amsl). There are nine layers in the local model to represent the bedrock units and unconsolidated materials. These layers correspond to the approximate vertical extent of the various stratigraphic units observed in the vicinity of the City. Layers 1 through 3 represent the unconsolidated materials, primarily clay till and sand units. Layer 4 represents overburden and the Jordan Sandstone, where present. Layers 5 and 6 represent the St. Lawrence and Franconia Formations, Layer 7 represents the Ironton-Galesville Sandstone and Layers 8 and 9 represent the Eau Claire Formation and the Mt. Simon Sandstone, respectively. In the area of the City's wells, the overburden is carried through to Layer 8 as the wells were constructed in a north-south trending buried valley that extends all the way to the Mt. Simon aquifer. This valley is narrow and bedrock rises steeply immediately east of the wells.

The size of the domain and the general flow-field characteristics of the model were based on the Metromodel and the results of the original delineation.

Changes were made to the original Metromodel defined characteristics in the area of interest around the City's Wells as well as some other changes to increase the accuracy of the model to the east of the City's wells. The modification area is shown on Figure 5. Site specific information allowed for more accurate definition of aquifer characteristics. These changes were confined primarily to the unconsolidated aquifer in the area of the City. One of the changes was to increase the conductance of the QBAA aquifer in the vicinity of the City Wells in order to reflect the information from the ATP. Another significant change involved adding a zone of low conductivity material in layers 3 and 4 along a bedrock ridge east of the City. In the original Metromodel 2, there are extensive layers of high conductivity material overlying the bedrock in this area. As shown on the cross-section in Figure 3, there is a zone where low conductivity till directly overlies the Franconia and St. Lawrence formations.

It appears that this till, in conjunction with the low conductivity of the St. Lawrence aquitard leads to the significant difference in hydraulic head between the wellfield area and areas a short distance to the east. The till restricts the horizontal flow near the edge of the buried valley and the St. Lawrence aquitard restricts vertical flow causing the steep gradient found immediately east of the City. A corresponding reduction of recharge in the area was needed as it appears the original Metromodel calibration attempted to use higher recharge, rather than lower conductivity, to increase hydraulic heads in the area. These changes dramatically improved the calibration in the area east of the City Wells and in the model in general.

In addition to the previously mentioned changes, the following modifications were incorporated in the refined model:

- The pumping rates from Table 5 were assigned to the City Wells, and;
- The pumping rates from Table 6 were assigned to the permitted high-capacity wells located near the City Wells.

A series of 20 particles were launched at each City Well. A porosity of 25 percent was used for the QBAA aquifer.

As part of the sensitivity analysis, groundwater pathline analyses were performed to delineate the 1-, 5- and 10-year capture zones and ultimately the WHPA. The pathline analysis consisted of using MODPATH, a flowpath calculation program, to determine the capture zone for each of the City Wells. This was completed by tracing 20 flow paths from each well for a 10-year travel time.

The resulting WHPA boundary (Figure 10) is a composite of the 10-year capture zones calculated using this model for the base-case parameters and the parameter values used in the sensitivity analysis that are discussed in the following section. The model input files are available upon request from the MDH.

4.3 Results of Model Calibration and Sensitivity Analysis

The goal of numerical model calibration is to obtain a reasonable correlation between the simulated model results and observed field data. The calibration process is generally completed by running a series of steady-state simulations (simulations where the flow magnitude and direction are constant with time), comparing calculated heads to the measured heads at wells within the model domain while changing the model parameters until the best match between the two is achieved. After a model is reasonably calibrated a sensitivity analysis is used to determine the impact that changes to an input parameter have on the output of the model. In areas where there is a great deal of uncertainty in the physical parameters, either as a consequence of lack of data or based on the uncertainty associated with the interpretation of available data (i.e. pumping test analyses), a number of models are generally run to observe the effect on the model results over the range of potential values for each of the significant parameters. While none of the individual capture zones delineated as part of this analysis should be considered the “correct” one, it is assumed that the actual capture zone is encompassed by the resulting concatenation of analysis zones.

4.3.1. Calibration

The calibration plot, showing measured versus simulated hydraulic head values, for Layers 1 through 9 of the local model is illustrated on Figure 6. The plot shows that the simulated values and measured

head values generally compare quite favorably and have a normalized root mean squared error of approximately 10 percent.

More extensive observation data collected within the same general time period and more accurate, site-specific transmissivity values throughout the model domain would improve calibration and model confidence.

The groundwater flow field and hydraulic heads in the area of the City for the calibrated model are shown on Figure 7. The 1-, 5-, and 10-year capture zones, predicted using the calibrated model, are shown on Figure 8.

4.3.2. Sensitivity Analysis

Sensitivity is the amount of change in model results caused by the variation of a particular input parameter. For example, changing the hydraulic conductivity of an area can change the calculated head values in and around the area of the modified model as compared to the heads in unmodified model. Because of the relative simplicity of the area of interest in this model, the size and orientation of the modeled capture zone may be sensitive to any of the input parameters:

The **pumping rate** determines the volume of the aquifer that donates water to the well. Increasing the pumping rate will expand the capture zone, for a given thickness, and decreasing is will make the capture zone smaller.

- **Results –** The pumping rate for each well was defined by MR and therefore is not a variable for consideration in this analysis.

The **direction of groundwater flow** and gradient can often be variable and change significantly with changing conditions such as fluctuations in local surface water elevations or the pumping rates in local wells

- **Results** – The regional flow direction and gradient were determined through the modeling process and closely resemble the flow direction and gradient determined through mathematical analysis of the measured heads in the area. The models were calibrated to hydraulic heads, and the local refined model calibration improved upon the regional calibration. Based on the regional observation data, flow field characteristics and the use of the aquifer of interest, there is not likely to be a large change to the flow direction. However, the direction of groundwater flow does change significantly immediately to the east of the City's wells. Due to the uncertainty associated with significantly different flow directions in a limited area, alternate potential capture areas were defined as part of the uncertainty analysis described in Section 4.4.

The **horizontal hydraulic conductivity** influences the size and shape of the capture zone. The pumping test at City of Belle Plaine Well No. 3, which is only open to the QBAA aquifer indicates the hydraulic conductivity of the QBAA aquifer is approximately 610 ft/d (185.9 m/d). Analysis of well data indicated the hydraulic conductivity of the QBAA aquifer could be as high as 673 (ft/d) (205.1 m/d) and as low 345 ft/d (105.1 m/d). All of the transmissivity data and the analysis can be found in the ATP documentation from the MDH.

These values are higher than the general range of values used for the area in the Metromodel. Modifications were made in the local model to match the well data in the area of the locations shown on Figure 7, and to perform an uncertainty analysis. The ranges of conductivities used in the analysis

are described in Table 3. The modeled capture zones for this analysis were plotted together and the resulting outline forms the "composite" capture zone used in the DWSMA delineation.

Results - A change in the hydraulic conductivity of the aquifer slightly shifts the location of the capture zones. Since the transmissivity values for the QBAA, obtained from the November, 2001 Well No. 3 test mentioned previously, showed some variability the values were attached with a low level of confidence. As a result the range of potential values of hydraulic conductivity was examined during the uncertainty analysis. The range of hydraulic conductivity considered in the sensitivity analysis runs is given in Table 3 and the values used for each of the runs in the uncertainty analysis are presented in Table 7.

Table 7 – Hydraulic Conductivity Values Used in Sensitivity Analysis

Simulation Number	Conductivity (ft/d)	Conductivity (m/d)
1*	610	185.9
2	345	105.1
3	673	205.1

* Base Case Model
- Conductivities were determined through testing and analysis as summarized in the Aquifer Test Plan
.

The aquifer **thickness** and **porosity** influence the size and shape of the capture zone by limiting the water-bearing volume within a given area of aquifer. Decreasing or increasing either thickness or porosity forces a proportional decrease or increase in the areal extent of the capture zone.

Results - The thickness of the aquifers around the wells in the model was adjusted to reflect the approximate thickness from the well logs. In the areas around Wells No. 3 and 4, the base and surface elevations of the aquifers were reasonably consistent, therefore, the base and surface of the layers in the model were defined to encompass the respective values from the well logs. The porosity values used in the model are conservative and consistent with the material.

4.4 Addressing Model Uncertainty

Using computer models to simulate groundwater flow always requires that simplifying assumptions be made. Local geology can be highly variable and information from well logs and pumping tests indicates that this is likely the case near the City Wells. Unfortunately, existing information is not detailed enough to define this degree of variability and interpretation of log and test data is often inconsistent. For models of the scale used in this study, the information and computational ability does not exist to precisely delineate the WHPA. To account for this, a number of models are run to examine the various potential WHPAs for the wells, given the range of the input data mentioned previously.

MODFLOW models were used to delineate the capture zones for the QBAA aquifer that supplies water to the City's Wells. As determined from the sensitivity analysis, the hydraulic conductivity was the single model variable identified that would cause the greatest change in the WHPAs for the City's Wells within the calibrated model. Capture areas were delineated for the assessed range of aquifer conductivities for a time-of-travel period of 10 years and are shown on Figure 9.

In addition to the results of the sensitivity analysis of the calibrated model, the rapid change from a northerly to a west-northwesterly flow direction immediately east of the City is of particular concern.

The direction of groundwater flow is highly variable in the area of the City's Wells, as shown on Figure 9. A small shift in hydraulic head or slight change in model conditions could potentially change the flow direction at the wells significantly. To account for this uncertainty, after discussions with the MDH, the composite capture zone created in the sensitivity analysis was rotated through the potential directions of flow and an outline encompassing that entire area was created to represent the composite WHPA. As flow at the wells could be coming from any direction from almost directly south to nearly directly east, the capture zone needed to encompass nearly a 90 degree range, as seen on Figure 10.

The final WHPAs for the City's Wells consist of a composite of the porous media aquifer delineations for the different input parameters used in the sensitivity analysis and the rotation of these zones through the potential directions of flow. This provides a conservative approach to addressing model uncertainty and produces a WHPA that will likely be most protective of public health.

5. Delineation of the Drinking Water Supply Management Area

The boundaries of the DWSMA were defined using the following features (Figure 10):

- City streets and other roads
- PLSS boundaries

Due to significant clay or till above the aquifer that supplies the City Wells, surface water is not hydraulically connected to the aquifers, and therefore a conjunctive delineation was not necessary.

6. Vulnerability Assessments

The Part I WHP Plan includes the vulnerability assessments for the public water supply well and DWSMA. These vulnerability assessments are used to help define potential contamination sources within the DWSMA and to select appropriate measures for reducing the risk that they present to the public water supply.

6.1 Assessment of Well Sensitivity

Review of site-specific data from the CWI indicates that significant low permeability material overlies the QBAA (65 feet of sandy clay till).

The well vulnerability assessment was conducted in accordance with the MDH guidance document, Assessing Well Vulnerability for Wellhead Protection (MDH, 1997). A well's vulnerability is scored based on the following six categories: DNR geologic sensitivity rating, casing integrity, casing depth, pumping rate, isolation distance from contaminant sources, and chemical and isotopic information.

The assessment of geologic sensitivity is useful metric when estimating the relative vertical downward travel time of contaminants from grade level to the water table or source aquifer. A Level-3 DNR geologic sensitivity assessment was used for the City Wells. The Level-3 DNR geologic sensitivity rating is an empirical value determined by dividing the cumulative thickness of low permeability units above the aquifer by 10 (DNR, 1991). The resulting score is termed the "L-score". A higher L-score indicates more low-permeability material above the aquifer, and therefore a lower vulnerability. A low L-score represents higher vulnerability. For example, a rating of L-1 has a higher vulnerability than L-9, because there is less low-permeability material present above the aquifer. A Level-3 assessment was conducted since the aquifers are overlain by varying thicknesses of clay. As mentioned above, points

are also assigned to casing integrity and depth, pumping rate, isolation distance to contaminant sources, and chemical data, in addition to the geologic sensitivity.

A Level-3 assessment was conducted for all CWI wells located in the vicinity of the DWSMA delineation. The geologic sensitivity "L-scores" were calculated by MDH using a Geographic Information System tool that utilizes lithology information from the MN CWI. Figure 11 illustrates the geologic sensitivity for the DWSMA as determined by mapping L-scores from the 8 well logs across the DWSMA and additional wells immediately outside the DWSMA. As a result, the geologic sensitivity in the vicinity of City Wells No. 3 and 4 is moderate (Figure 11). Sensitivity across the DWSMA ranges from very low to moderate.

Vulnerability assessment rating sheets and vulnerability scores for Wells No. 3 and 4 were received from MDH and reviewed by LBG.

6.2 Assessment of the Drinking Water Supply Management Area Vulnerability

In the proposed DWSMA, the groundwater that supplies the City wells is from the QBAA. This aquifer is overlain by significant glacial deposits consisting of till that provide protection from the vertical migration of contaminants from grade to the underlying QBAA.

Once the geologic sensitivity was determined for wells in the DWSMA and for the area within the DWSMA, the vulnerability ratings could be determined. Since tritium has been detected above 1 Tritium Unit (TU) at Wells No. 3 and 4, the vulnerability rating in the vicinity of the City Wells and across the DWSMA has been increased by one level and ranges from low to high (Figure 12).

7. Recommendations

Upon completion of this Part I WHP Plan amendment, the following recommendations are provided for the City to consider for better understanding the hydrogeologic conditions of the source aquifers and refinement of future WHPA delineations.

- Obtain more area-specific hydraulic conductivity data in the area of the City Wells to reduce model uncertainty and potentially the size of the capture zones and DWSMA. This can be completed by conducting additional pumping tests on the City Wells or other existing high capacity wells.

- Collect samples of City Well water, surface water and precipitation and conduct stable isotope analyses of these to evaluate the mixture of surface water and groundwater.

- Continue collecting groundwater samples for analysis of regulated contaminants and provide the data to the MDH.

- Regularly measure groundwater levels east, southeast and south of the City wells to better understand flow directions. This could reduce model uncertainty and the size of the capture zones and potentially the DWSMA.

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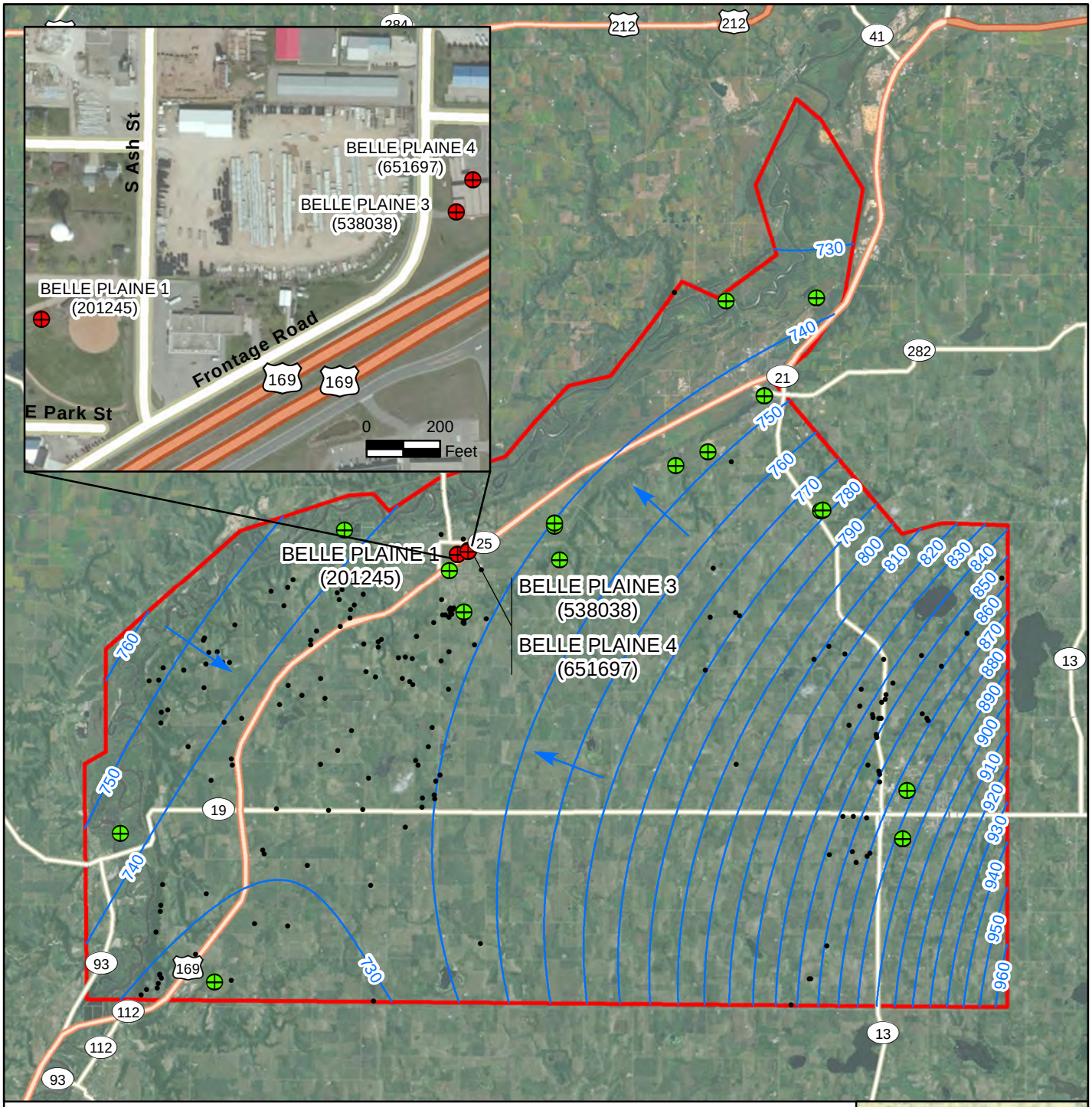
Figures



City Well

High Capacity Well

CWI Well Used in Groundwater Elevation Contours

745 Groundwater Elevation Contour (ft amsl)

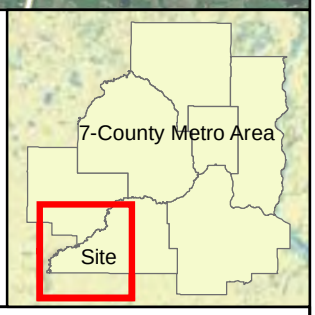
Groundwater Flow Direction

Local Model Domain

Source: Imagery from MnGeo WMS Server. MN County Well Index.

N

0 3 Miles



Prepared By:
LEGGETTE, BRASHEARS & GRAHAM, INC.
Professional Groundwater and
Environmental Engineering Services
8 Pine Tree Drive, Suite 250
St. Paul, Minnesota 55112
(651) 490-1405

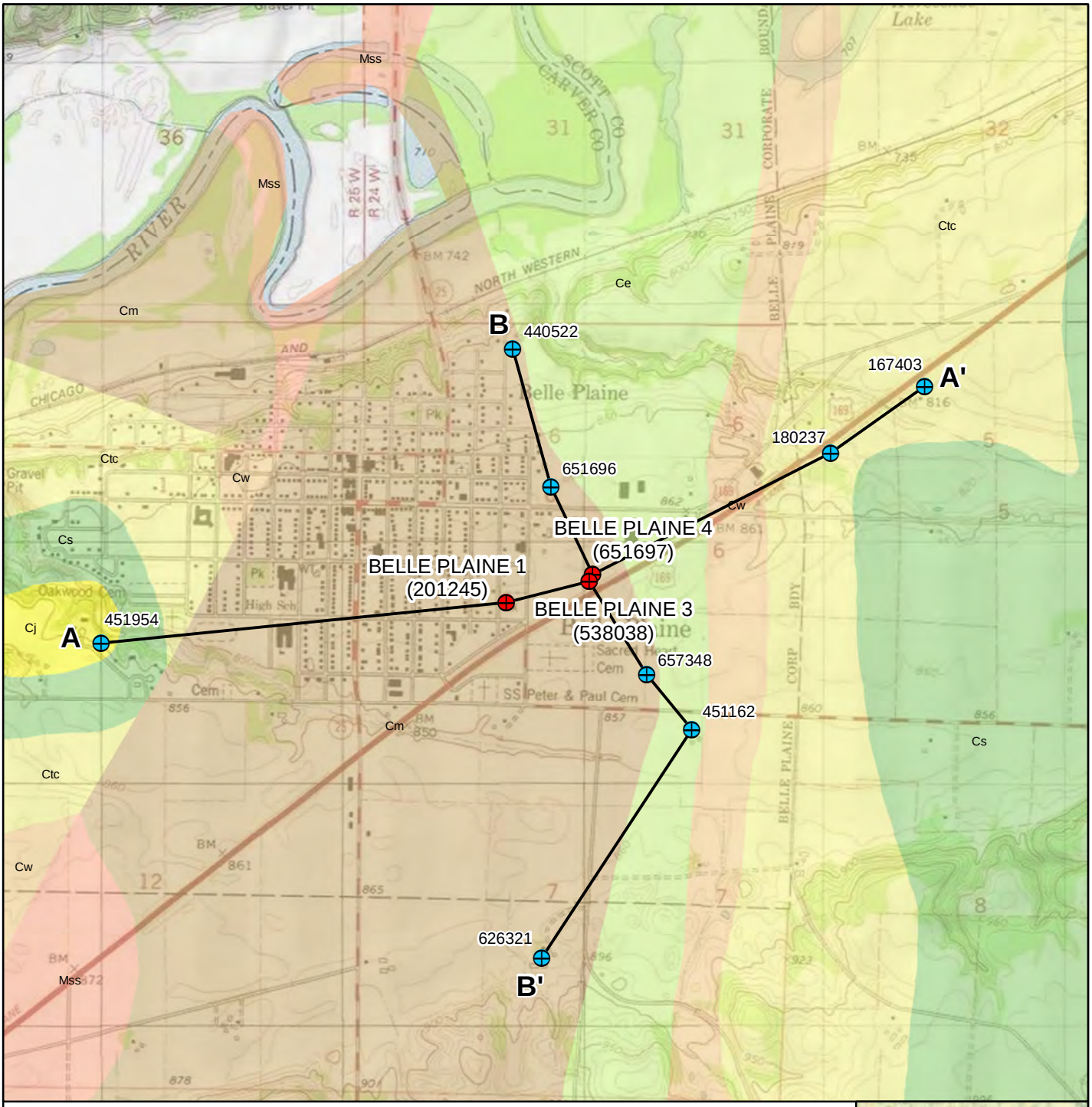
CITY OF BELLE PLAINE

BELLE PLAINE, MINNESOTA

SITE LOCATION, HIGH-CAPACITY WELLS, GROUNDWATER ELEVATION CONTOURS, AND LOCAL MODEL BOUNDARY

FILE: g3belleplnwhp01a.MXD	DATE: 4/7/2014	FIGURE: 1

G:\GIS\Belle_Plaine_WHP\maps\g3belleplnwhp01a.mxd, 4/7/2014, 11:36:33 AM, NAD 1983 UTM Zone 15N



City Well

MN CWI Well Used in Cross Section

Hydrogeologic Cross-Section Line

Cj Jordan Sandstone

Cs St. Lawrence Formation

Ctc Tunnel City Group (Formerly Franconia Formation)

Cw Wonewoc Sandstone (Formerly Ironton-Galesville Sandstone)

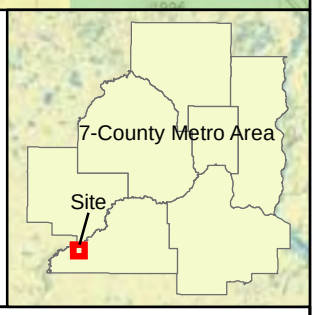
Ce Eau Claire Formation

Cm Mt. Simon Sandstone

Mss Keweenawan Supergroup

N

0 2,000 Feet



Source: Imagery from MnGeo WMS Server. MN County Well Index.

G:\GIS\Belle_Plaine_WHP\maps\g3belleplnwhp01b.mxd, 2/11/2014, 8:38:32 AM, NAD 1983 UTM Zone 15N

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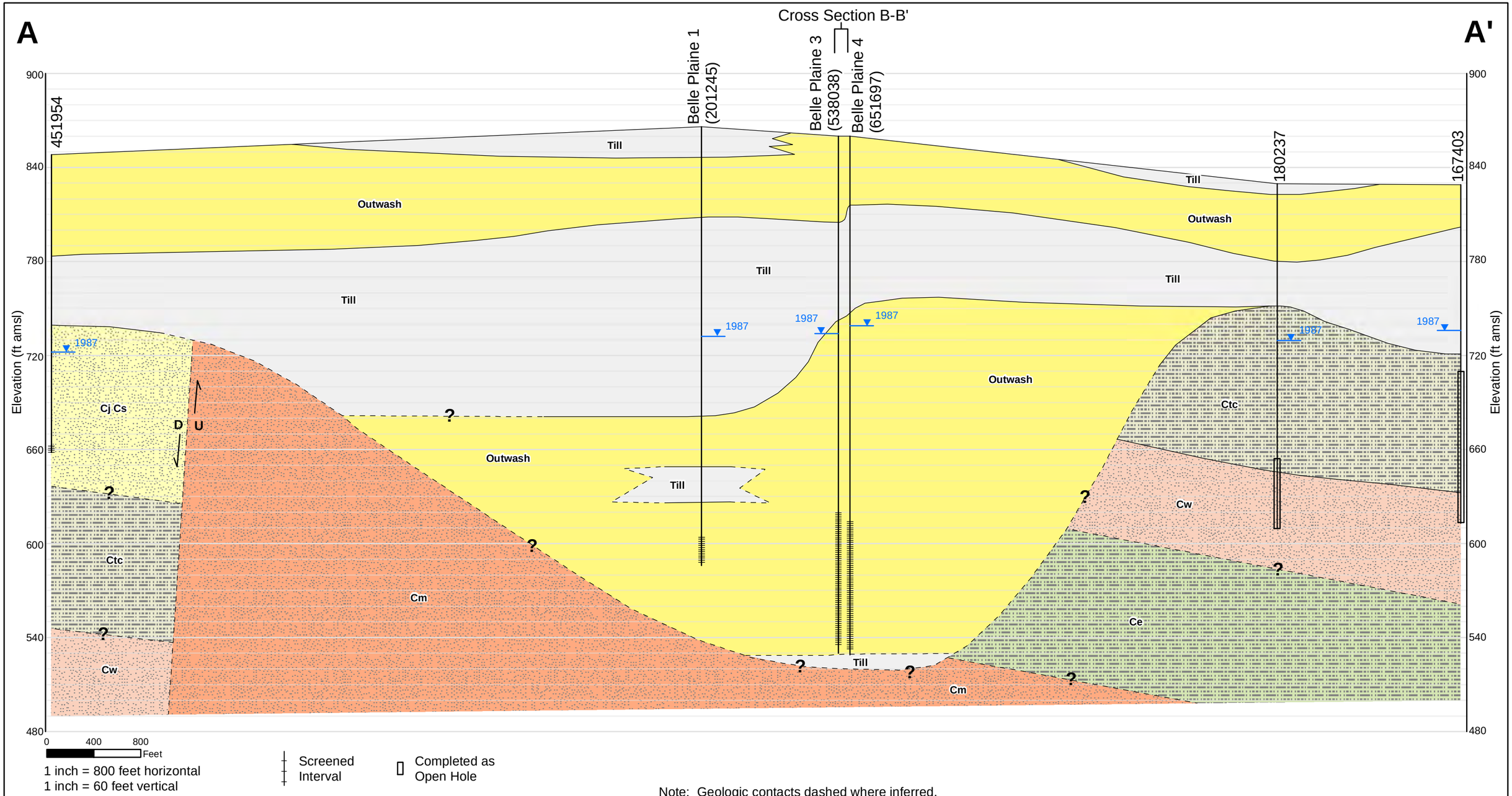
CITY OF BELLE PLAINE

BELLE PLAINE, MINNESOTA

HYDROGEOLOGIC CROSS SECTION LOCATIONS AND BEDROCK GEOLOGY

FILE: g3belleplnwhp01b.MXD	DATE: 2/11/2014	FIGURE: 2



Note: Geologic contacts dashed where inferred.

Till, Silt, Silty Clayey Sand

Sand and Gravel

Cj Cs — Jordan Sandstone / St. Lawrence Formation

Ctc — Tunnel City Group (Formerly Franconia Formation)

Cw — Wonewoc Sandstone (Formerly Ironton-Galesville Sandstone)

Ce — Eau Claire Formation

Cm — Mt. Simon Sandstone

Source: Geologic information from Minnesota County Well Index.

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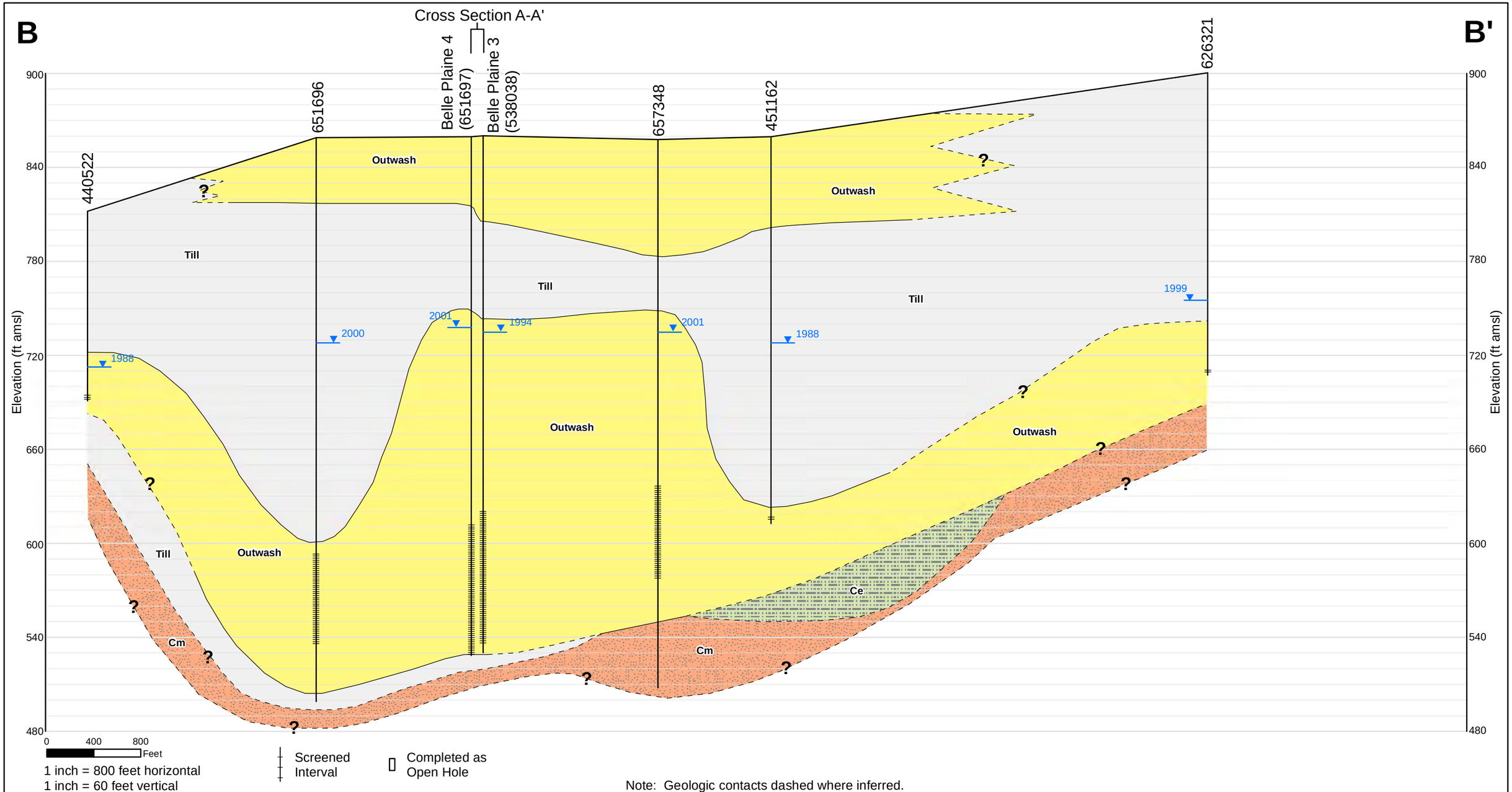
CITY OF BELLE PLAINE

BELLE PLAINE, MINNESOTA

HYDROGEOLOGIC CROSS-SECTION A-A'

FILE: g3belleplnwhp01c - A-A.MXD	DATE: 5/29/2014	FIGURE: 3

G:\GIS\Belle_Plaine_WHP\maps\g3belleplnwhp01c - A-A.mxd, 5/29/2014, 1:25:10 PM, NAD 1983 StatePlane Minnesota South FIPS 2203 Feet



Till, Silt, Silty Clayey Sand

Sand and Gravel

Ce Eau Claire Formation

Cm Mt. Simon Sandstone

Source: Geologic information from Minnesota County Well Index.

Prepared By:
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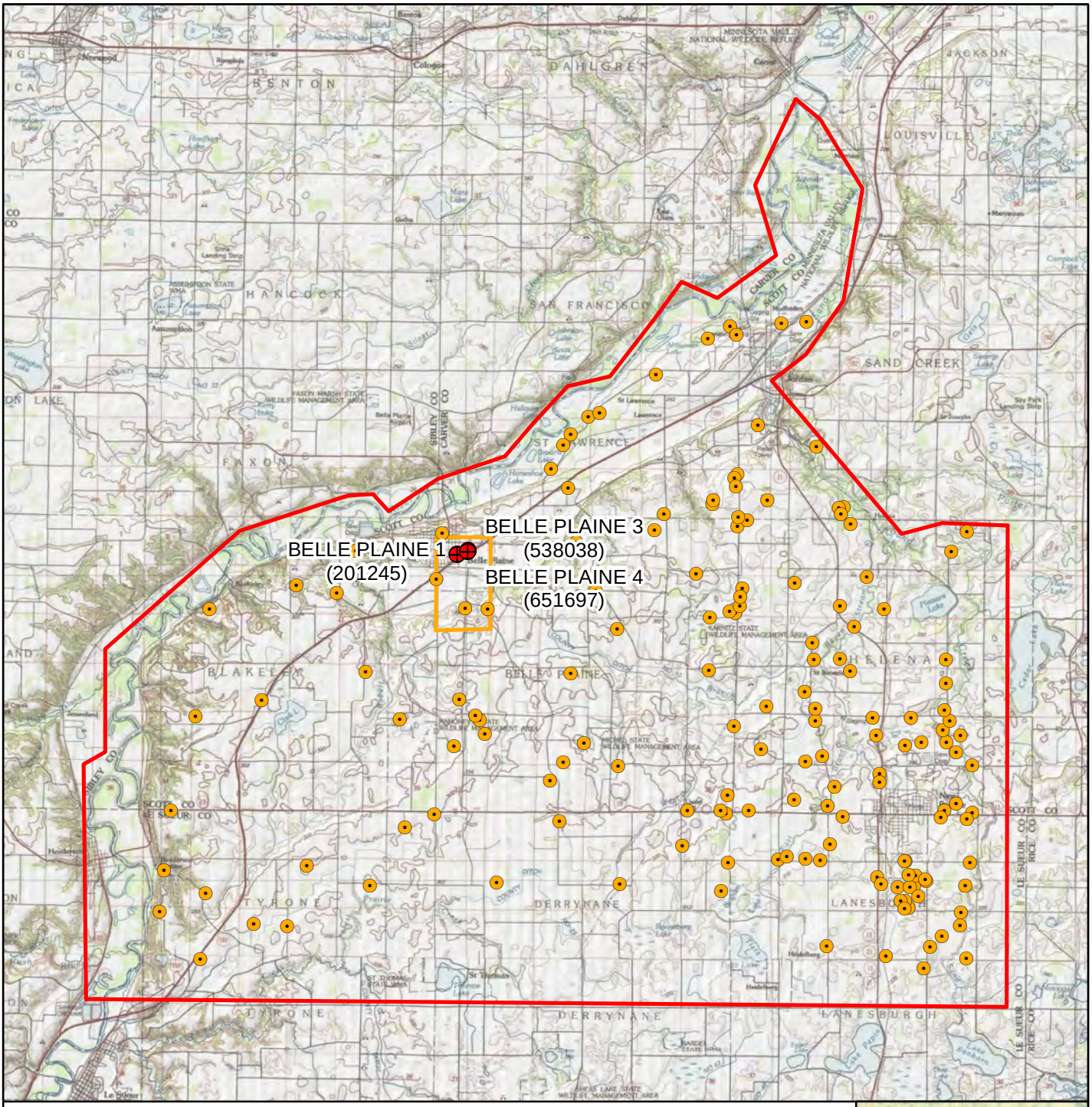
CITY OF BELLE PLAINE

BELLE PLAINE, MINNESOTA

HYDROGEOLOGIC CROSS-SECTION B-B'

FILE: g3belleplnwhp01d - B-B.MXD	DATE: 5/29/2014	FIGURE: 4

G:\GIS\Belle_Plaine_WHP\maps\g3belleplnwhp01d - B-B.mxd, 5/29/2014, 1:25:20 PM, NAD 1983 StatePlane Minnesota South FIPS 2203 Feet



City Well

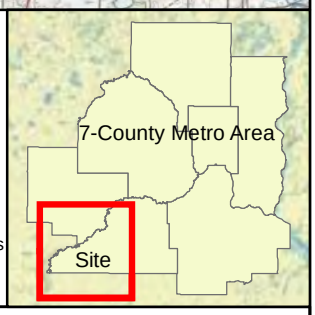
Calibration Points

Local Model Domain

Modification Area

N

0 3 Miles



Source: Imagery from MnGeo WMS Server. MN County Well Index.

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(651) 490-1405

CITY OF BELLE PLAINE

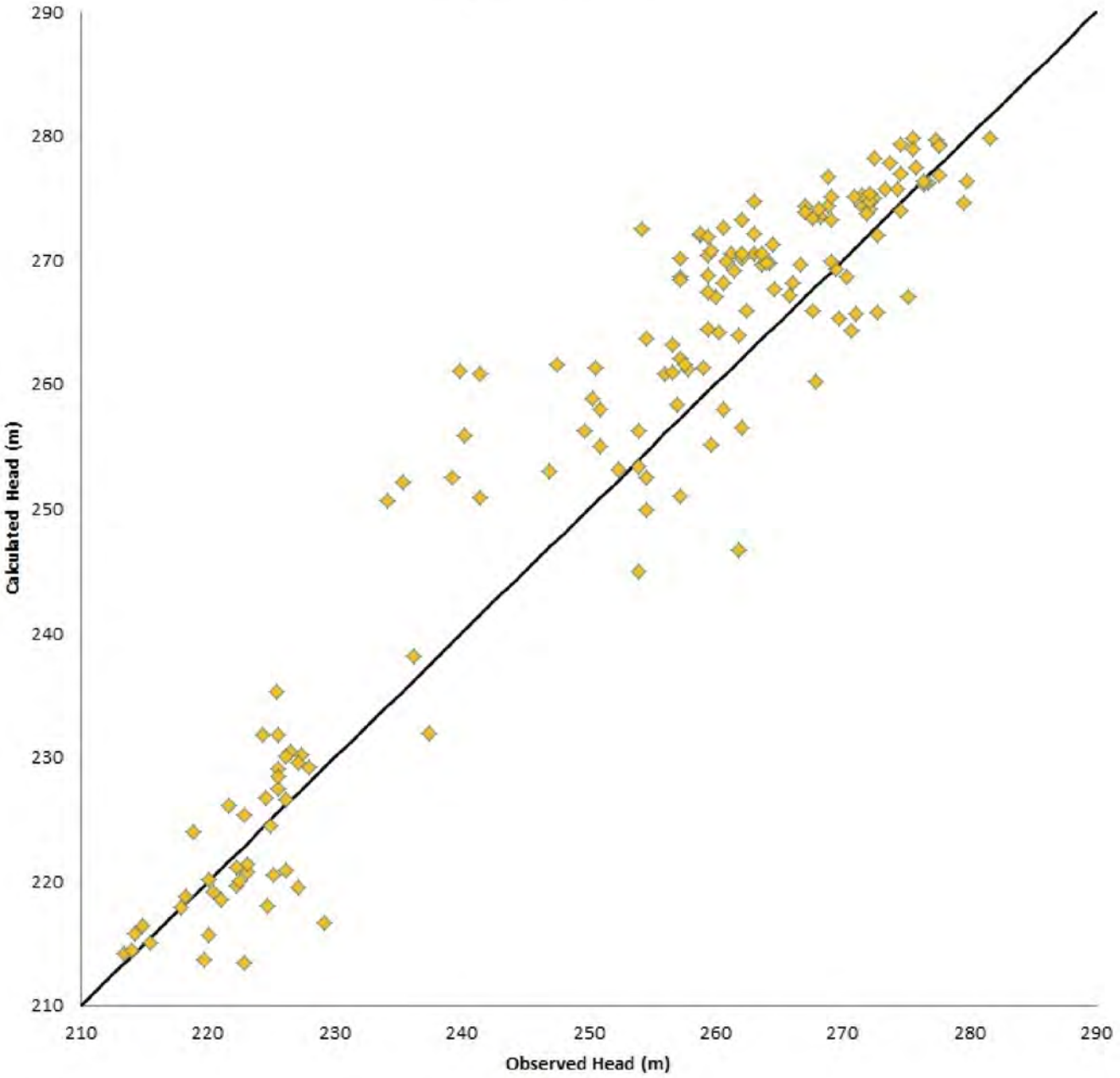
BELLE PLAINE, MINNESOTA

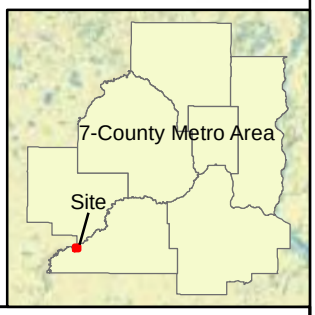
LOCAL MODEL DOMAIN AND MODIFICATION AREA

FILE: g3belleplnwhp01e.MXD	DATE: 1/21/2014	FIGURE: 5

G:\GIS\Belle_Plaine_WHP\maps\g3belleplnwhp01e.mxd, 1/21/2014, 10:24:01 AM, NAD 1983 UTM Zone 15N

Computed vs. Observed Values
Hydraulic Head





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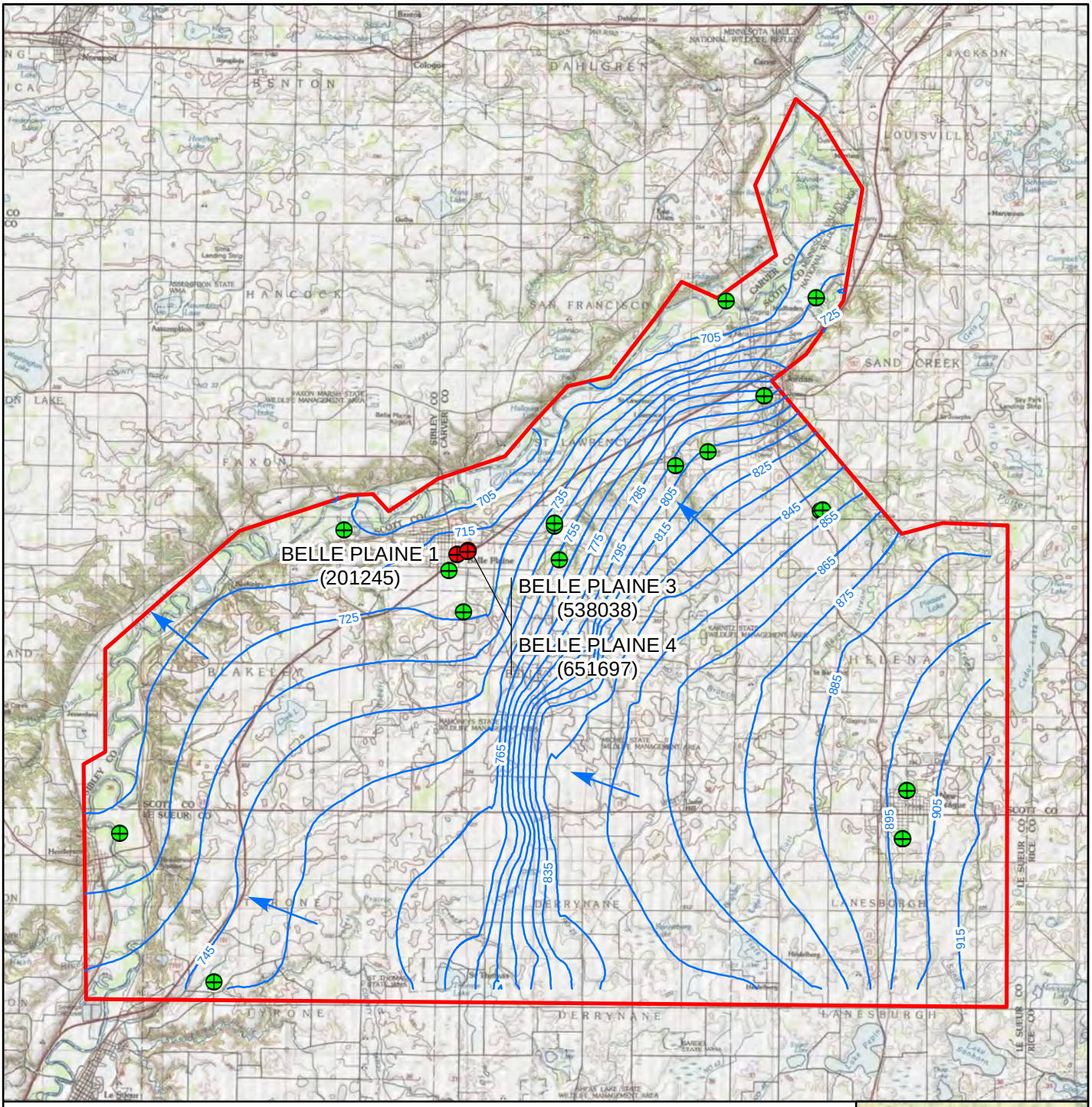
(651) 490-1405

CITY OF BELLE PLAINE
BELLE PLAINE, MINNESOTA

LOCAL MODEL CALIBRATION

FILE: g3belleplnwhp01f.MXD	DATE: 1/17/2014	FIGURE: 6

G:\GIS\Belle_Plaine_WHP\maps\g3belleplnwhp01f.mxd, 1/17/2014, 1:58:59 PM, NAD 1983 UTM Zone 15N



City Well

High Capacity Well

CWI Well Used in Groundwater Elevation Contours

745 Simulated Groundwater Equipotential Contour (ft amsl)

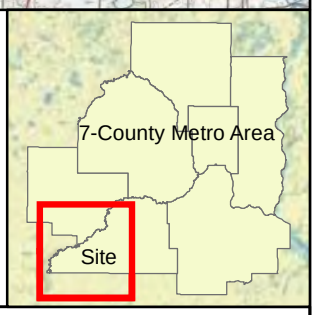
Groundwater Flow Direction

Local Model Domain

Source: Imagery from MnGeo WMS Server. MN County Well Index.

N

0 3 Miles



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St. Paul, Minnesota 55112
(651) 490-1405

CITY OF BELLE PLAINE
BELLE PLAINE, MINNESOTA

SIMULATED GROUNDWATER EQUIPOTENTIAL CONTOURS

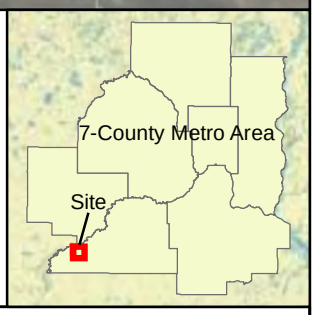
FILE: g3belleplnwhp01g.MXD	DATE: 2/11/2014	FIGURE: 7

G:\GIS\Belle_Plaine_WHP\maps\g3belleplnwhp01g.mxd, 2/11/2014, 10:07:44 AM, NAD 1983 UTM Zone 15N

City Well
1-Year Flowpaths - Quaternary Buried Confined Aquifer
5-Year Flowpaths - Quaternary Buried Confined Aquifer
10-Year Flowpaths - Quaternary Buried Confined Aquifer

N

0 2,000 Feet



Source: Imagery from MnGeo WMS Server. MN County Well Index.

Prepared By:
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Environmental Engineering Services
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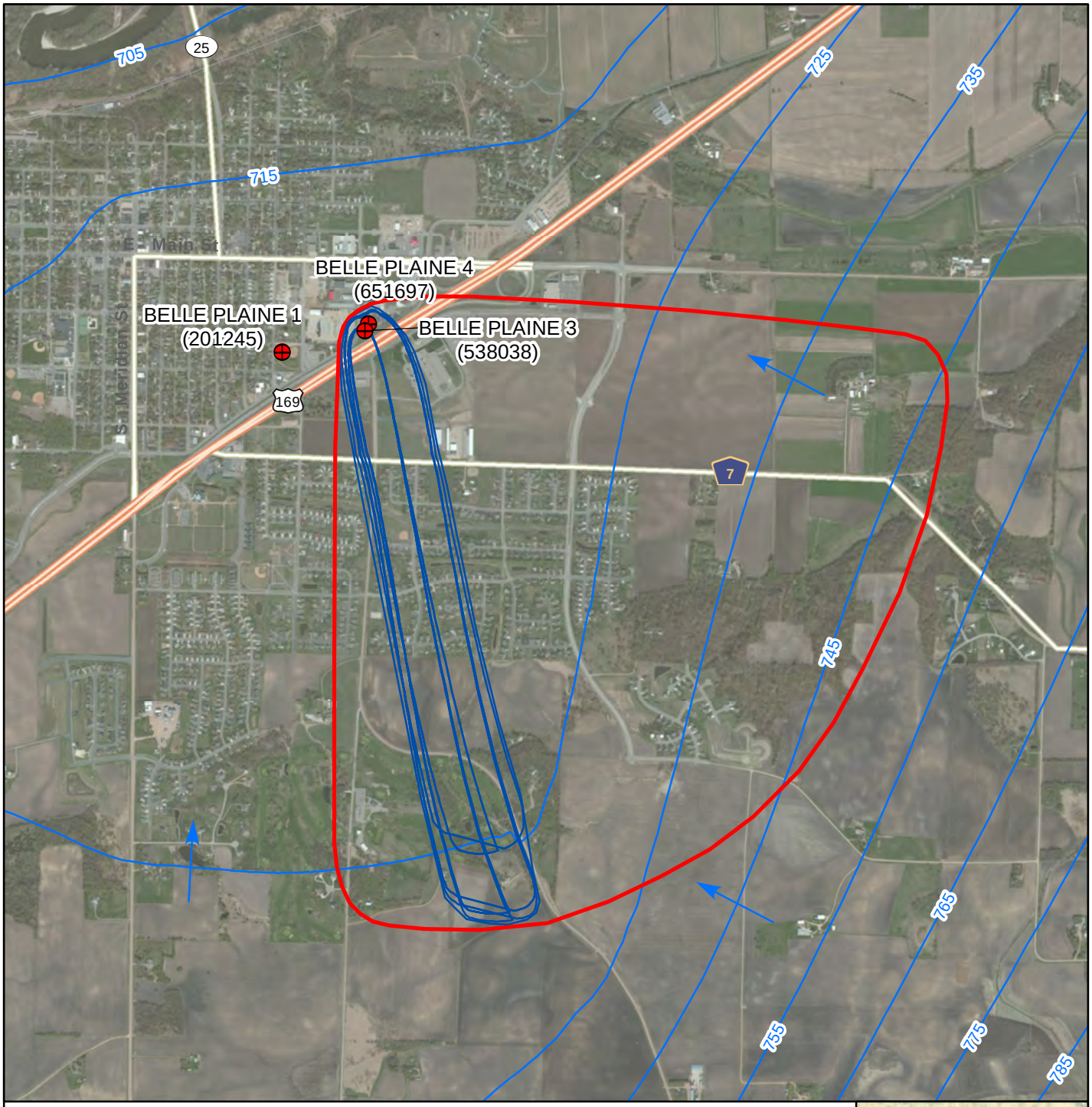
CITY OF BELLE PLAINE
BELLE PLAINE, MINNESOTA

1-, 5-, AND 10-YEAR FLOWPATHS FOR CALIBRATED MODEL

FILE: g3belleplnwhp01h.MXD	DATE: 4/7/2014	FIGURE: 8

G:\GIS\Belle_Plaine_WHP\maps\g3belleplnwhp01h.mxd, 4/7/2014, 11:39:29 AM, NAD 1983 UTM Zone 15N



City Well

Uncertainty Analysis 10-Year Capture Zones

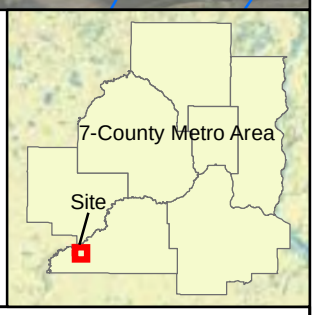
745 Simulated Groundwater Equipotential Contour (ft amsl)

Groundwater Flow Direction

Uncertainty Analysis Flow Direction Uncertainty Area

N

0 2,000 Feet



Source: Imagery from MnGeo WMS Server. MN County Well Index.

G:\GIS\Belle_Plaine_WHP\maps\g3belleplnwhp01i.mxd, 4/7/2014, 11:40:21 AM, NAD 1983 UTM Zone 15N

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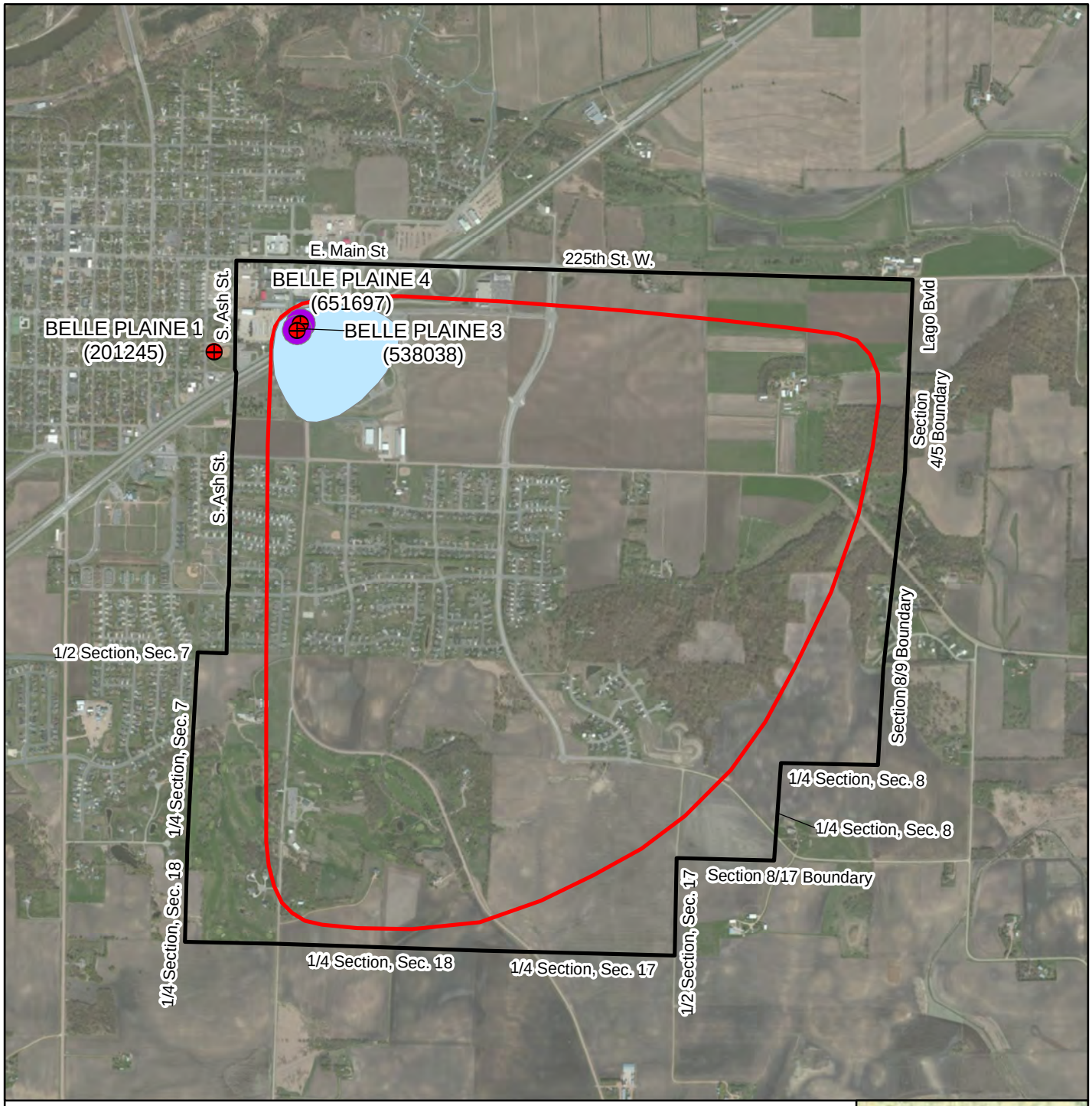
CITY OF BELLE PLAINE

BELLE PLAINE, MINNESOTA

UNCERTAINTY ANALYSIS - 10-YEAR CAPTURE ZONES
AND FLOW DIRECTION UNCERTAINTY AREA

FILE: g3belleplnwhp01i.MXD	DATE: 4/7/2014	FIGURE: 9



City Well

Combined Wellhead Protection Area

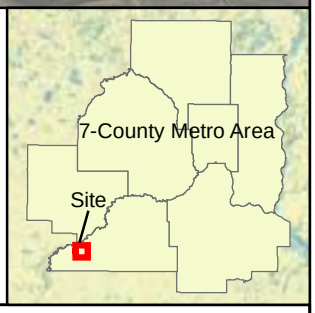
Drinking Water Supply Management Area
(Delineated Based Roads and Section Boundaries)

ERA (Emergency Response Area)

IWMZ (Inner Wellhead Management Zone)

N

0 2,000 Feet



Source: Imagery from MnGeo WMS Server. MN County Well Index.

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Environmental Engineering Services
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St. Paul, Minnesota 55112
(651) 490-1405

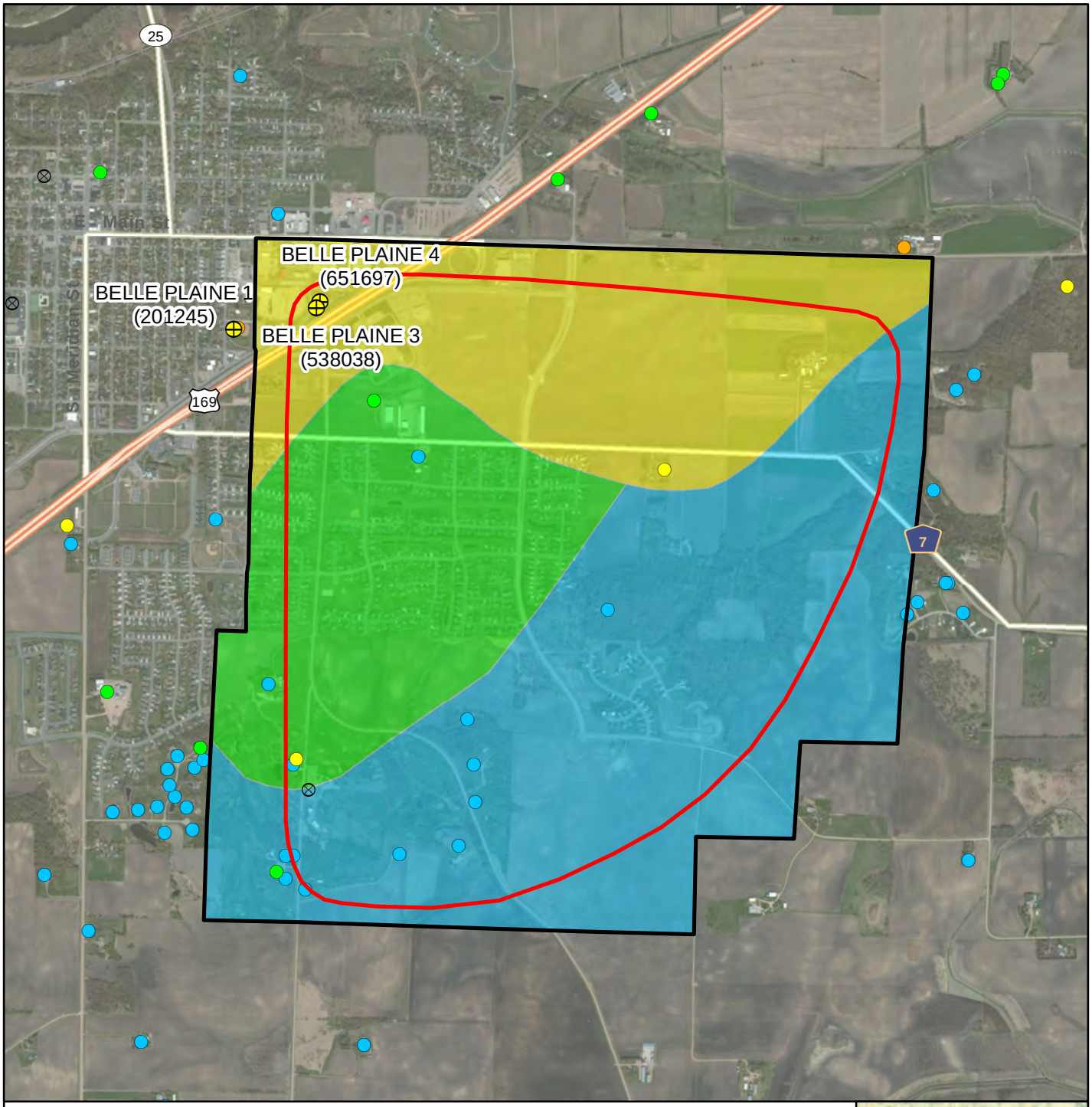
CITY OF BELLE PLAINE

BELLE PLAINE, MINNESOTA

COMBINED WELLHEAD PROTECTION AREA BOUNDARY AND
DRINKING WATER SUPPLY MANAGEMENT AREA DELINEATION

FILE: g3belleplnwhp01j.MXD	DATE: 5/27/2014	FIGURE: 10

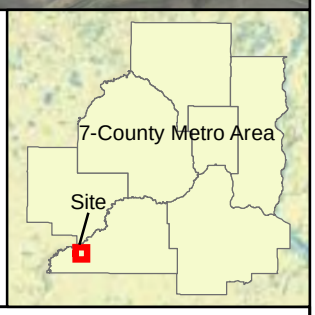
G:\GIS\Belle_Plaine_WHP\maps\g3belleplnwhp01j.mxd, 5/27/2014, 4:09:29 PM, NAD 1983 UTM Zone 15N



City Well
Domestic Well
Combined Wellhead Protection Area
Drinking Water Supply Management Area

Geologic Sensitivity
High Sensitivity
Moderate Sensitivity
Low Sensitivity (L-Score: 1-4)
Very Low Sensitivity (L-Score: >4)

N
0 2,000 Feet



Source: Imagery from MnGeo WMS Server. MN County Well Index.

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Environmental Engineering Services
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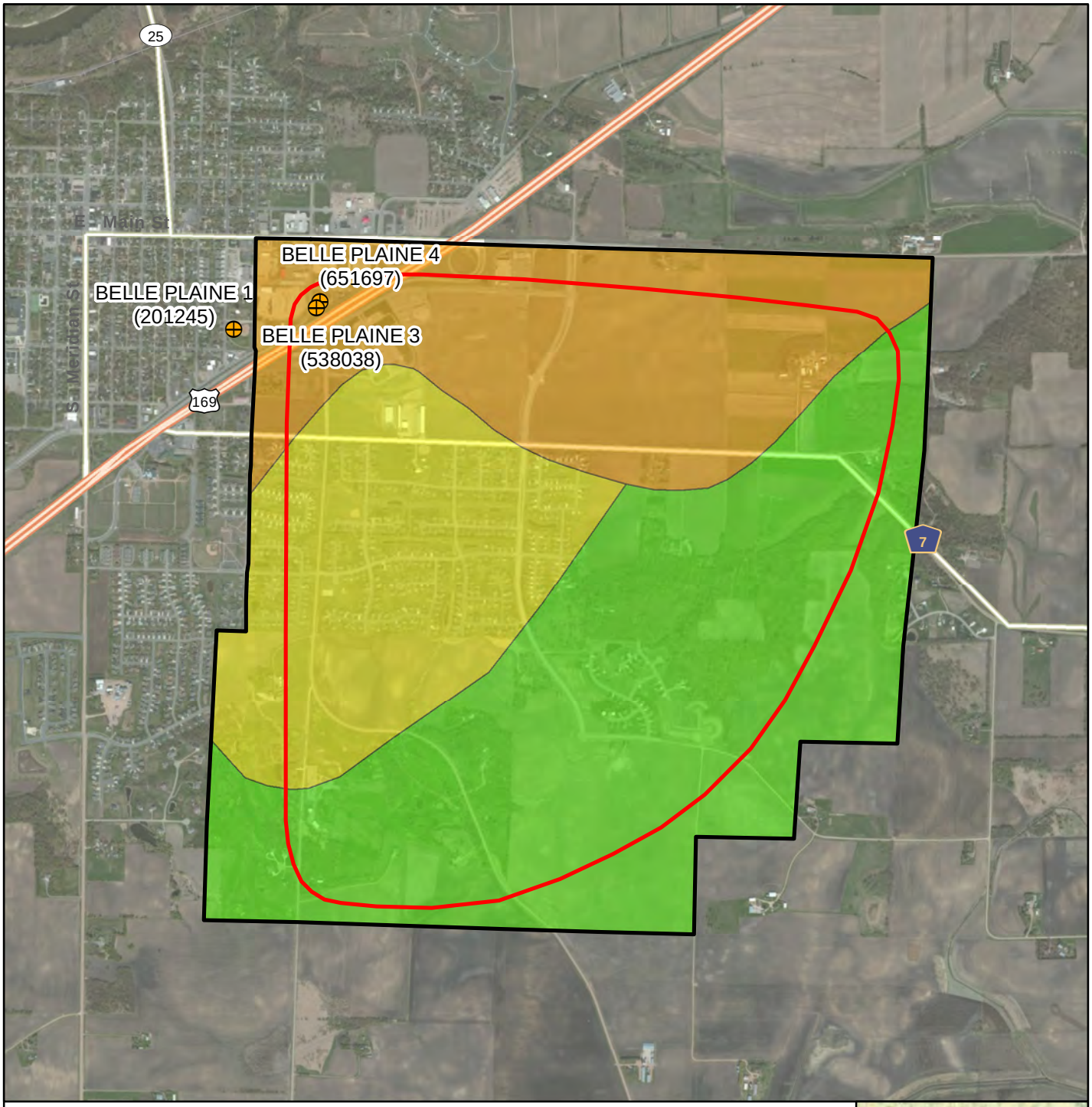
(651) 490-1405

CITY OF BELLE PLAINE
BELLE PLAINE, MINNESOTA

DRINKING WATER SUPPLY MANAGEMENT AREA
GEOLOGIC SENSITIVITY ASSESSMENT

FILE: g3belleplnwhp01k.MXD | DATE: 5/29/2014 | FIGURE: 11

G:\GIS\Belle_Plaine_WHP\maps\g3belleplnwhp01k.mxd, 5/29/2014, 3:45:02 PM, NAD 1983 UTM Zone 15N

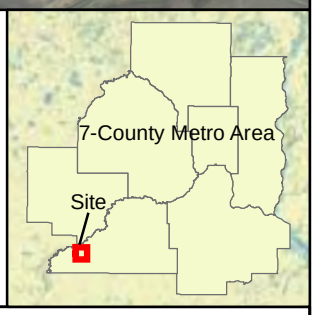


City Well
Combined Wellhead Protection Area
Drinking Water Supply Management Area

DWSMA Vulnerability
- Very High
- High
- Moderate
- Low

N

0 2,000 Feet



Source: Imagery from MnGeo WMS Server. MN County Well Index.

G:\GIS\Belle_Plaine_WHP\maps\g3belleplnwhp01l.mxd, 5/29/2014, 3:40:02 PM, NAD 1983 UTM Zone 15N

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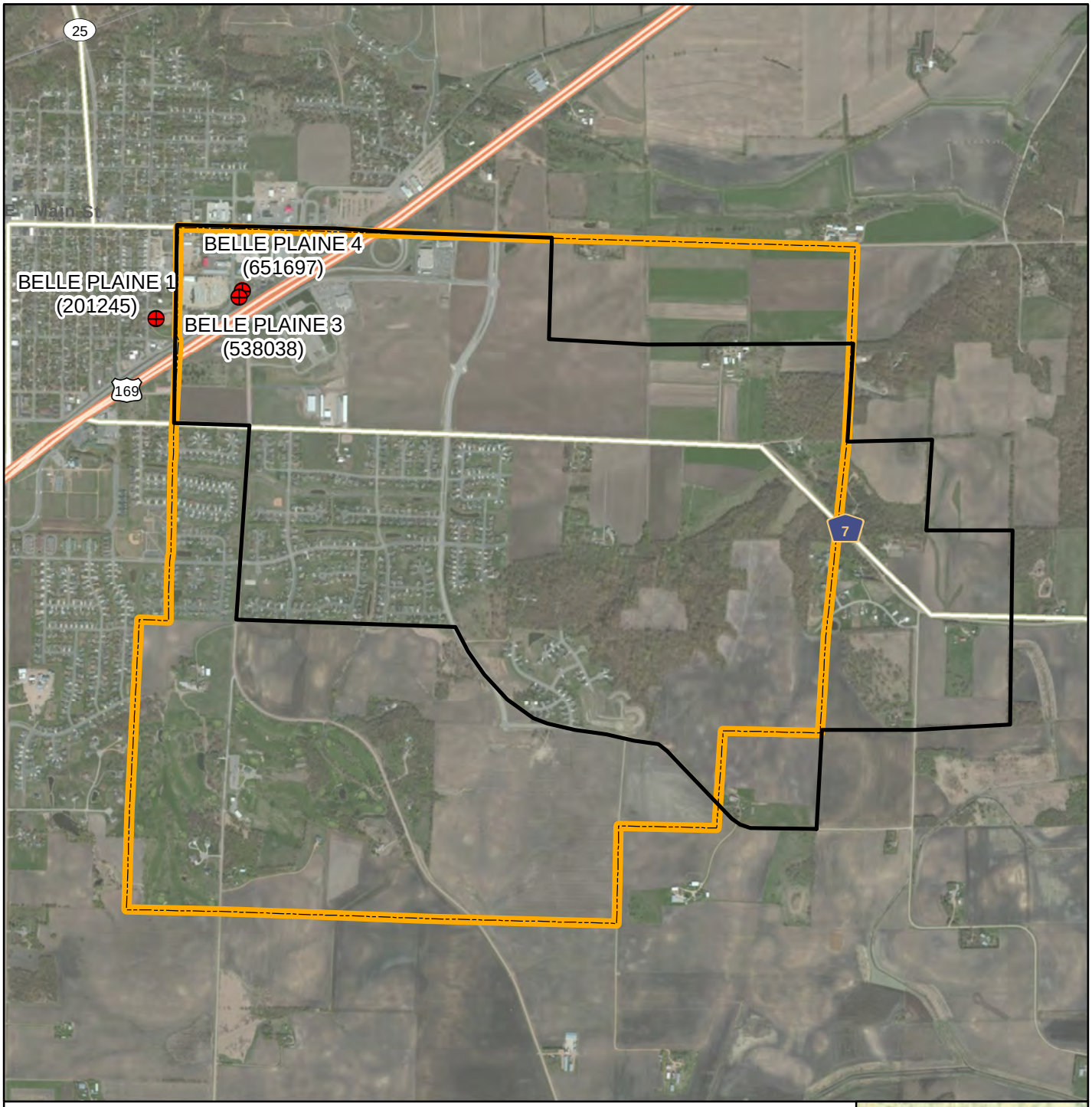
St. Paul, Minnesota 55112
(651) 490-1405

CITY OF BELLE PLAINE
BELLE PLAINE, MINNESOTA

DRINKING WATER SUPPLY MANAGEMENT AREA
VULNERABILITY ASSESSMENT

FILE: g3belleplnwhp01l.MXD	DATE: 5/29/2014	FIGURE: 12



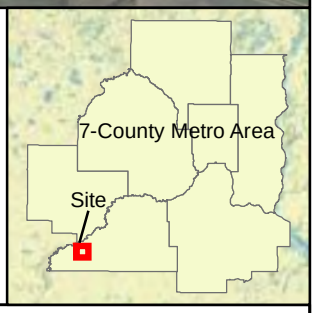
City Well

2003 Drinking Water Supply Management Area

2014 Drinking Water Supply Management Area

N

0 2,000 Feet



Source: Imagery from MnGeo WMS Server. MN County Well Index.

G:\GIS\Belle_Plaine_WHP\maps\g3belleplnwhp01m.mxd, 4/7/2014, 11:44:42 AM, NAD 1983 UTM Zone 15N

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Environmental Engineering Services
8 Pine Tree Drive, Suite 250
St. Paul, Minnesota 55112
(651) 490-1405

CITY OF BELLE PLAINE

BELLE PLAINE, MINNESOTA

EXISTING 2003 AND NEW 2014 DRINKING WATER SUPPLY MANAGEMENT AREAS

FILE: g3belleplnwhp01m.MXD	DATE: 4/7/2014	FIGURE: 13

COPY

MINNESOTA MDH DEPARTMENT OF HEALTH

Protecting, maintaining and improving the health of all Minnesotans

September 11, 2014

Mr. Al Fahey
Public Works Superintendent
City of Belle Plaine
P.O. Box 129
Belle Plaine, Minnesota 56011-0129

Dear Mr. Fahey:

We are writing to notify you that the Minnesota Department of Health has approved the amended 1) delineation of the wellhead protection area, 2) delineation of the drinking water supply management area, and 3) assessments of well and aquifer vulnerability for your public water supply wells, as submitted. The approval pertains to the following public wells:

Well No. 3	Unique Well No. 538038
Well No. 4	Unique Well No. 651697

Procedurally, you must submit a copy of the amended delineated wellhead protection area, drinking water supply management area, and assessments of well and aquifer vulnerability to local units of government that are wholly or partially within these areas. Notification must occur within 30 days after receiving this letter. If you need assistance getting this information out, please contact Ms. Karen Voz of the Minnesota Department of Health at (320) 223-7322.

The wellhead protection rule also requires the city of Belle Plaine to hold a public information meeting regarding the amended delineations and vulnerability assessments within 60 days of receiving approval by the health department. This meeting can be held solely for this purpose or it can be incorporated into another public meeting, such as a meeting of the city council. If you would like a representative of the state's wellhead protection program to be present at the public information meeting, please contact Ms. Voz.

Ms. Voz will be contacting you shortly to go over procedural issues in preparing the remainder of your wellhead protection plan amendment. Please contact me at (651) 201-4649 if you have any questions regarding this letter.

Sincerely,

James R. Lundy, Hydrologist Supervisor
Source Water Protection Unit
Environmental Health Division
P.O. Box 64975
St. Paul, Minnesota 55164-0975

JRL:TVW
cc: Ms. Holly Kreft, Administrator, City of Belle Plaine
Ms. Robyn Hoerr, Minnesota Rural Water Association
Ms. Karen Voz, Planner, Source Water Protection Unit, St. Cloud District Office
Mr. Paul Flynn, Natural Resource Conservation Service
Ms. Wanda Garry, Farm Service Agency

September 16, 2014

Jean McDermand
Belle Plaine Township
9735 West 273rd Street
Belle Plaine, MN 56011

Dear Ms. McDermand:

Please find enclosed the Amendment to the Wellhead Protection Plan dated June of 2014. The Minnesota Department of Health recently approved the amendment and we are required to submit a copy to local governments that are wholly or partially within these areas. The eastern portion of the amended delineated wellhead protection area, drinking water supply management area, and vulnerability area is located within Belle Plaine Township as shown in Figures 10, 11, and 12. Figure 13 offers a comparison of the 2003 and 2014 Drinking Water Supply Management Areas.

If you have any questions or need additional information, please feel free to contact me at hkreft@ci.belleplaine.mn.us or (952) 873-5553.

Best wishes-

Holly J. Kreft
City Administrator

CC: Joe Duncan, City Engineer
Enc.

September 16, 2014

Paul Nelson
Scott County Natural Resources
Government Center
200 Fourth Avenue West
Shakopee, MN 55379

Dear Paul:

Please find enclosed the Amendment to the Wellhead Protection Plan dated June of 2014. The Minnesota Department of Health recently approved the amendment and we wanted you to have a copy on hand. We will be begin the Phase II amended in coming months.

If you have any questions or need additional information, please feel free to contact me at hkreft@ci.belleplaine.mn.us or (952) 873-5553.

Best wishes-

Holly J. Kreft
City Administrator

CC: Joe Duncan, City Engineer
Enc.

September 23, 2014

Mr. Troy Kuphal, Manager
Scott County SWCD
7151 West 190th Street Suite 125
Jordan, MN 55352

Dear Troy:

Please find enclosed the Amendment to the Wellhead Protection Plan dated June of 2014. The Minnesota Department of Health recently approved the amendment and we wanted you to have a copy on hand. We will be begin the Phase II amended in coming months. The public meeting will be held on October 20th during the regular Council meeting starting at 6:30 p.m.

If you have any questions or need additional information, please feel free to contact me at hkreft@ci.belleplaine.mn.us or (952) 873-5553.

Best wishes-

Holly J. Kreft
City Administrator

CC: Joe Duncan, City Engineer
Enc.

MOTION by Councilmember Trost, second by Councilmember Coop, to approve Resolution 14-110 Establishing a $1,500,000 Per Occurrence Limit on Liability Insurance Coverage and Electing Group and Individual Open Meeting Law Insurance Coverage for the Mayor and City Council Members. ALL VOTED AYE. MOTION CARRIED.

8.3. Public Meeting Regarding Wellhead Protection Plan.

Mayor Pingalore referenced a memo dated October 20, 2014 from City Engineer Joe Duncan.

City Engineer Duncan explained the City began the process of amending the wellhead protection plan for its drinking water supply wells in May, 2013. The last update of the plan was approved in 2005 and is in effect until November 2, 2015. As required by the Minnesota Wellhead Protection Rule (part 4720.5330, subpart 6), the Minnesota Department of Health approved Part 1 of the plan amendment for our system on September 11, 2014. This portion of the plan includes information pertaining to the delineation of the wellhead protection area, the drinking water supply management area boundary, and the well and drinking water supply management area vulnerability assessment. A complete copy of the amended Part 1 Plan containing the technical information used to delineate the wellhead protection area, drinking water supply management area, and vulnerability of the wells and aquifer is available for anyone wishing to review that document.

Consistent with the Wellhead Protection Rule (part 4720.5330, subpart 7), a Public Information Meeting has been scheduled for tonight to discuss issues and concerns with this portion of the plan amendment. The following LGUs have been noticed for this meeting: Minnesota Department of Health, Minnesota Department of Agriculture, Minnesota Rural Water Association, Metropolitan Council Water Supply Planning, Belle Plaine Township, Scott County Board, Scott County Environmental Services, Scott County WMO and Scott County SWCD.

There were no comments and no further action was necessary at this time.

Councilmember Trost commented that he is aware of a township resident whose private well is of a different depth than the City wells.

8.4. Resolution 14-074 Authorizing the Purchase of Wireless Microphone System for the Council Chambers.

Mayor Pingalore referenced a memo dated October 20, 2014 from City Administrator Kreft regarding the purchase of wireless microphone system.

City Administrator Kreft explained the Council reviewed potential purchase of a wireless microphone system at the July 7, 2014 Council meeting. The request was tabled for further review by the Cablevision Committee. The Cablevision Committee reviewed the information at their September 10, 2014 meeting. The Committee discussed the proposed system. Staff noted that since the primary election in August, there have been issues with the system and including feedback and crackling. Staff discussed that as long as the room continues to be multi-purpose, there will be potential damages to the existing system. The Committee requested that staff obtain information on the costs to replace the existing system versus upgrading to the wireless system. Staff noted that the wireless system won't require moving of equipment for elections and other events and will also include rechargeable batteries versus the batteries that are currently replaced prior to every meeting. Staff met with the vendor for the sound system, Terry Dahl of video services inc. Mr. Dahl viewed the system and provided a quote of $18,995 to replace the existing system with wireless technology including the microphone for the podium. Attached is the quote. Since Mr. Dahl is familiar with the equipment and has installed both the sound and video for the City, an additional quote was not obtained. Mr. Dahl provided an estimate of $6,000 -$7,000 to replace the existing system with the same technology – stand microphones

APPENDIX II

SCOPING 2 DECISION NOTICE AND DATA ELEMENTS

Appendix II contains the Scoping 2 Decision Notice letter and the data elements that the letter requests.

MINNESOTA MDH DEPARTMENT OF HEALTH

COPY

Protecting, maintaining and improving the health of all Minnesotans

November 25, 2014

Mr. Al Fahey
Public Works Superintendent
City of Belle Plaine
P.O. Box 129
Belle Plaine, Minnesota 56011-0129

Dear Mr. Fahey:

Subject: **Scoping 2 Decision Notice and Meeting Summary – City of Belle Plaine– PWSID 1700001**

This letter provides notice of the results of the second scoping meeting held with you and Joe Duncan, Bolton & Menk on October 14, 2014, at the Belle Plaine Public Works Office regarding Part II of your wellhead protection (WHP) plan. During the meeting, we discussed 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. The data elements must be compiled and assessed in terms of their present and 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 drinking water supply management areas. We also discussed a summary of planning issues identified during the Part I WHP Plan development process which should be considered for inclusion in your Part II WHP Plan.

The city of Belle Plaine has not met the requirements to distribute copies of the first part of the WHP plan to local units of government and hold an informational meeting for the public. The city of Belle Plaine will have until August 4, 2015, to complete its WHP plan.

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

Sincerely,

Karen S. Voz

Karen S. Voz, Planner
Source Water Protection Unit
Environmental Health Division
3333 West Division Street, Suite 212
St. Cloud, Minnesota 56301-4557

KSV:erw
Enclosures
cc: Joe Duncan, Bolton & Menk
Amy Lynch, MDH Engineer, Mankato District Office
Robyn Hoerr, Minnesota Rural Water Association
Ron Struss, Minnesota Department of Agriculture

SCOPING 2 DECISION NOTICE
Variable Vulnerable DWSMA

Remainder of the Wellhead Protection Plan

Name of Public Water Supply: **City of Belle Plaine** **PWSID 1700001**		**Date:** November 25, 2014
Name of the Wellhead Protection Manager: Al Fahey, Public Works Superintendent		
Address: P.O. Box 129	**City:** Belle Plaine	**Zip:** 56011-0129
Unique Well Numbers: 538038 (Well 3), 651697 (Well 4)		**Phone:** (952) 873-6742

Instructions for Completing the Scoping 2 Form

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

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

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

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

DATA ELEMENTS ABOUT THE PHYSICAL ENVIRONMENT

PRECIPITATION

N	R	S	
	X	X	An existing map or list of local precipitation gauging stations.

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

N	R	S	
	X	X	An existing table showing the average monthly and annual precipitation in inches for the preceding five years.

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

GEOLOGY

N	R	S	
	X		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: The management of all the Drinking Water Supply Management Area(s) must reflect what is known about these data elements.

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

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

N	R	S	
	X		Existing borehole geophysical records from wells, borings, and exploration test holes.

Technical Assistance Comments: The management of all the Drinking Water Supply Management Area(s) must reflect the geology of the areas.

N	R	S	
	X		Existing surface geophysical studies.

Technical Assistance Comments: The management of all the Drinking Water Supply Management Area(s) must reflect the geology of the areas.

SOILS

N	R	S	
	X	X	Existing maps of the soils and a description of soil infiltration characteristics.

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

N	R	S	
	X	X	A description or an existing map of known eroding lands that are causing sedimentation problems.

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

WATER RESOURCES

N	R	S	
	X		An existing map of the boundaries and flow directions of major watershed units and minor watershed units.

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

N	R	S	
	X		An existing map and a list of public waters as defined in Minnesota Statutes, section 103G.005, subdivision 15, and public drainage ditches.

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

N	R	S	
	X		The shoreland classifications of the public waters listed under subitem (2), pursuant to part 6120.3000 and Minnesota Statutes, sections 103F.201 to 103F.221.

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

N	R	S	
	X		An existing map of wetlands regulated under Chapter 8420 and Minnesota Statutes, section 103G.221 to 103G.2373.

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

N	R	S	
	X		An existing map showing those areas delineated as floodplain by existing local ordinances.

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

DATA ELEMENTS ABOUT THE LAND USE

LAND USE

N	R	S	
	X	X	An existing map of parcel boundaries.

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

N	R	S	
	X	X	An existing map of political boundaries.

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

N	R	S	
	X		An existing map of public land surveys including township, range, and section.

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

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

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

Mixed Vulnerability - 1) All potential contaminant sources and facility designations as listed on the attachments, 2) a land use/land cover map and table, and 3) an inventory of the Inner Wellhead Management Zone (IWMZ).

As a starting point, MDH will provide a 2006 land cover map and table from federal data bases. This data set must be used unless an alternative electronic data set that is more current and detailed is available.

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

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

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

N	R	S	
	X	X	Existing zoning map.

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

PUBLIC UTILITY SERVICES

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

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

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

Technical Assistance Comments: It is not necessary to include a map of your public water supply system in your plan if you feel it would pose a threat to the security of your system. An existing map of the storm sewers and sanitary sewers in the Drinking Water Supply Management Area(s) must be included in the wellhead protection plan and must also be submitted to the MDH as part of the approval.

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

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

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

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

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

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

DATA ELEMENTS ABOUT WATER QUANTITY

SURFACE WATER QUANTITY

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

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

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

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

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

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

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

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

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

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

GROUNDWATER QUANTITY

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

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

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

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

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

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

DATA ELEMENTS ABOUT WATER QUALITY

SURFACE WATER QUALITY

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

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

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

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

GROUNDWATER QUALITY

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

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

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

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

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

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

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

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

N	R	S	An existing property audit identifying contamination.
	X		

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

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

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

Scoping 2 Decision Notice Attachment
Potential Contaminant Source Inventory Requirements

Highly and Very Highly Vulnerable DWSMA

The following current and historical potential contaminant sources and related codes, materials and related codes, and facility designation and related codes are required to be included in the potential contaminant source inventory. Each potential contaminant source identified must be assigned a facility designation and related code. In cases where a materials identification is required, a materials designation and code must be assigned.

Potential Contaminant Sources (PCS)	PCS Codes
Material	**Material Codes**
Above-Ground Storage Tank	AST
Chemicals	C000
Fertilizers	A050
Fuels, gases, and oils	F000
Hazardous substances	C001
Solvents and coatings	S000
Waste	W000
Agricultural Drainage Well (potential Class V)	ADW
Animal Burial Site	ABS
Animal Feedlot	AFL
Ash Disposal Site	ASHD
Disposal Well (potential Class V)	DISWLL
Grave(s)	GRV
Hazardous Waste Generator	HWG
Hazardous Waste Handler	HWH
Individual Sewage Treatment System	ISTS
Industrial Drainage Well (potential Class V)	INDW
Large Capacity Cesspool (potential Class V)	CVLCC
Large Capacity Waste Water Disposal Site (potential Class V)	CVWWD
Leaking Underground Storage Tank	LUST
Misc. Injection Well (potential Class V)	INJWLL
Motor Vehicle Waste Disposal Well (potential Class V)	CVMVW
Nuclear Reactor	NR
Pipeline Facility	PLFAC
Pit (aggregate)	PIT
Potential Contamination Site[1]	PCS
Recharge Well (potential Class V)	RWLL
Reinjection Well (potential Class V)	RIWLL

Potential Contaminant Sources (PCS) Material	PCS Codes Material Codes
Sludge Disposal Site	SLDG
Solid Waste Management Site	SWMS
Special Drainage Well (potential Class V)	SPDW
Spills	SPL
Storage or Preparation Area	STOR
Agricultural chemicals	C010
Chemicals (include RMP facilities here)	C000
Fertilizers	A050
Fuels, gases, and oils	F000
Hazardous substances (include TRIS facilities here)	C001
Road salt	C020
Solvents and coatings	S000
Pressure-treated wood	C220
Waste (used unless one of the materials listed below apply)	W000
Solid waste	W100
Animal manure	W520
Waste oils	W700
Motor vehicle waste	W710
Tires	W120
Stormwater Basin	SWB
Stormwater Injection Well (potential Class V)	SWI
Stormwater Outlet	SROUT
Suspected Contaminant of Concern	SCC
Chemical	C000
Food, agricultural, and consumer products	A000
Fuels, gases, and oils	F000
Materials and minerals	M000
Pathogens	P000
Solvents and coatings	S000
Waste	W000
Underground Storage Tank	UST
Chemicals	C000
Fertilizers	A050
Fuels, gases, and oils	F000
Hazardous substances	C001
Solvents and coatings	S000
Waste	W000
Waste - Metro Area	IWS
Wastewater Disposal Site[2]	WWDS
Wastewater Stabilization Pond	WSP
Wastewater Treatment Pond	WWTD
Wells	WEL

Footnotes:

[1]Potential Contamination Sites (PCS) include the following:

Brownfields (BMS)
Delisted State Superfund Sites (DPLP)
Federal Superfund Sites (NPL)
Hazardous Waste Investigative/cleanup (HWIC)
No Further Remedial Action Planned (NFRAP)
State Superfund Sites (PLP)
Suspected Hazardous Waste Site (CERCL)
Voluntary Investigative Cleanup (VIC)
State Assessment Site (SAS)

[2]Wastewater Disposal Sites (WWDS) include the following:

National Pollutant Discharge Elimination System (NDPES)
State Disposal System Permit (SDS)

List of Facility Designations and Codes

Residential

Residential Category Description: includes all establishments offering residence or accommodation, such as homes, apartments, housing for the elderly, hotels, and motels.

Facility Codes and Designations

1100: Private Household **(used unless one of the facility designations listed below apply)**

- **1100-01:** Residence
- **1100-02**: Apartment or condominium
- **1100-03**: Mobile home park

1200: Housing Services for Special Needs

1300: Hotels, Motels, or Other Accommodation Services

Commercial

Commercial Category Description: includes establishments typically associated with commercial land use. Examples include: general sales and service; retail sales and service; automobile sales and service; finance and insurance; business, professional, scientific and technical services; food services, and personal services.

Facility Codes and Designations

- **2000**: General Sales and Service **(used unless one of the facility designations listed below apply)**
  - **2100**: Retail sales or service
    - **2110**: Automobile sales or service establishment
      - **2110-01**: Automotive/vehicle repair
      - **2110-02**: Car wash
    - **2114**: Boat or marine craft dealer
      - **2114-01**: Boat services/repair/refinishing
    - **2116:** Gasoline services
    - **2120:** Heavy consumer goods, sales, or service establishments
      - **2120-01:** Furniture repair/refinishing
    - **2122:** Hardware stores and home centers
    - **2123:** Lawn and garden supply establishments
    - **2124:** Department stores, warehouse clubs or superstores
    - **2126:** Lumber yards and building materials
    - **2130:** Durable consumer goods, sales, or service
      - **2130-01:** Paint stores
  - **2200:** Financial and insurance establishments
  - **2300:** Rental, leasing, and storage establishments
  - **2400:** Professional, scientific and technical services and general business
    - **2416:** Research and development establishments (scientific, etc.)
    - **2417:** Advertising, media and photography services
      - **2417-01:** Photographic services
    - **2451:** Extermination and pest control establishments - non-agriculture
    - **2452:** Janitorial
    - **2453:** Landscaping
    - **2454:** Carpet and upholstery cleaning
    - **2455:** Packing and crating services
  - **2500:** Food Services
  - **2600:** Personal Services
    - **2600-01** Dry cleaners
    - **2600-02** Laundromat
  - **2700:** Pet and animal services (except veterinary)

Industrial

Industrial Category Description: includes manufacturing establishments located in plants, factories or mills and employs power-driven machines and materials handling equipment. Many manufacturing establishments process products of agriculture, forestry, fishing, mining or quarrying.

Facility Codes and Designations

3000: Manufacturing and Wholesale Trade **(used unless one of the facility designations listed below apply)**

- **3110** Food and beverages
  - **3110-01:** Food processing plant
  - **3110-02:** Rendering plant
- **3120:** Tobacco manufacturing establishment
- **3130:** Textiles
- **3140:** Leather and allied products
- **3210:** Wood products establishment
  - **3210-01:** Wood preserving plant
  - **3210-02:** Sawmill
- **3220:** Paper and printing materials
  - **3220-01:** Printing
  - **3220-02:** Paper mill
- **3230:** Furniture manufacturing
- **3310:** Petroleum and coal products
  - **3310-01:** Petroleum refining/processing
  - **3310-02:** Asphalt production
- **3320:** Chemical manufacturing/processing plant
  - **3320-01:** Plastics/synthetics manufacturing
- **3330:** Nonmetallic mineral products
  - **3330-01:** Cement/concrete plants
- **3340:** Primary metal manufacturing
  - **3340-01:** Foundry/metal plating
  - **3340-02:** Electroplaters
- **3350:** Machinery manufacturing
- **3360:** Electrical/electronic products manufacturing
- **3370:** Transportation, automobile manufacturing
- **3410:** Jewelry and silverware manufacturing
- **3420:** Dolls, toys, games and musical instruments manufacturing
- **3440:** Sign manufacturing
- **3600:** Warehouse

Transportation, Communication and Utilities

Transportation, Communication, and Utilities Category Description: a catch-all category that includes transportation, communication, and utilities for essential facilities.

Facility Codes and Designations

4000: Transportation, Communication, Information, and Utilities **(used unless one of the facility designations listed below apply)**

- **4110:** Air transportation establishments
- **4120:** Rail transportation establishments
- **4130:** Road, ground, passenger, and transit
- **4140:** Fleet/trucking/bus terminals
- **4150:** Marine and water transportation
- **4160:** Courier and messenger services
- **4170:** Postal service establishments
- **4180:** Pipeline transportation
- **4200:** Communications and information establishments
- **4310:** Electric power plant
  - **4310-01:** Power substation
- **4311:** Hydroelectric power plant
- **4312:** Fossil power plant
- **4313:** Nuclear power plant
- **4314:** Alternative energy sources
- **4320:** Natural gas, petroleum, fuels, etc. establishments
- **4330:** Water, steam, air conditioning supply establishments
- **4340:** Sewer, solid waste, and related services
  - **4340-01:** Wastewater treatment plant
- **4341:** Hazardous waste collection facility
- **4342:** Hazardous waste treatment and disposal
- **4343:** Solid waste collection services
- **4344:** Solid waste combustor or incinerator
- **4345:** Sanitary landfill (disposal)
- **4346:** Waste treatment and disposal
  - **4346-01:** Salvage yard
  - **4346-02:** Demolition debris landfill
  - **4346-03:** Composting site
  - **4346-04:** Recycling site
  - **4346-05:** Transfer station
  - **4346-06:** Dump
  - **4346-07:** State closed landfill
- **4347:** Septic hauler

Arts, Entertainment and Recreation

Arts, Entertainment and Recreation Category Description: includes establishments that provide services for cultural, entertainment, and recreational activities such as live performances, events, exhibits intended for public viewing, and historical sites.

Facility Codes and Designations

5000: Arts, Entertainment and Recreation **(used unless one of the codes listed below apply)**
- **5100:** Performing arts or supporting establishment
- **5130:** Racetrack establishment
- **5140:** Fairgrounds
  - **5140-02:** Stadium
- **5200:** Museums and other special purpose recreational establishments
- **5230:** Zoo
- **5231:** Garden
- **5233:** Arboretum
- **5300:** Amusement, sports, or recreation establishment
- **5360:** Marina or yachting club facility operators
- **5370:** Golf courses
- **5400:** Camp, camping, and related establishments
- **5500:** Natural and other recreational parks

Education, Public Administration, Health Care and other Institutions

Institutional Category Description: a catch-all category that includes education, public administration, health care, and other institutions. Examples include schools of all types, governmental buildings, military installations, public safety facilities, medical clinics and hospitals, other health and human services facilities, religious institutions, and death care services.

Facility Codes and Designations

6000: Education, Public Administration, Health Care, and Other Institutions **(used unless one of the facility designations listed below apply)**
- **6100:** Schools
- **6200:** Public administration establishments
- **6310:** Military installation and national security facilities
- **6320:** Space research and technology services
- **6400:** Public safety facilities
- **6500:** Health and human services facilities
- **6511:** Clinics
- **6530:** Hospitals
- **6600:** Religious institutions
- **6710:** Funeral homes and services
- **6720:** Cremation and other services
  - **6720-01**: Cemetery

Construction

Construction Category Description: includes establishments that build structures or perform additions, alterations, reconstruction, installation and repairs. Examples include excavation contractors, carpentry, concrete contractors, painters, electricians, painters, highway and street construction, and sewer and well drilling.

Facility Codes and Designations

7000: Construction-Related Businesses

Mining and Extractive Uses

Mining and Extractive Uses Category Description: includes establishments that extract natural mineral solids, liquid materials, and gases.

Facility Codes and Designations

8000: Mining and Extraction Establishments

Agriculture and Forestry

Agricultural and Forestry Category description: includes establishments that grow crops, raise animals, harvest timber and harvest fish and other animals from farms, ranches, or natural habitats.

Facility Codes and Designations

9000: Agriculture, Forestry, Fishing, and Hunting **(used unless one of the facility designations listed below apply)**

- **9000-01:** Farm
- **9000-02**: Crop production
- **9130-01:** Orchard
- **9130-02:** Vineyard

9140: Greenhouse, nursery, and floriculture
9154: Hay
9220: Spraying, dusting, and other related services
9300: Animal production, including slaughter
9360: Fish hatcheries, fisheries, and aquaculture
9400: Forestry and logging

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 facility designation and related codes are required to be included in the potential contaminant source inventory. Each potential contaminant source identified must be assigned a facility designation and related code. In cases where a materials identification is required a materials designation and code must be assigned.

Potential Contaminant Sources (PCS) / Material	PCS Codes / Material Codes
Above-Ground Storage Tank - Greater than 1100 gallons	AST
Chemicals	C000
Fertilizers	A050
Fuels, gases, and oils	F000
Hazardous substances	C001
Solvents and coatings	S000
Waste	W000
Agricultural Drainage Well (potential Class V)	ADW
Disposal Well (potential Class V)	DISWLL
Industrial Drainage Well (potential Class V)	INDW
Large Capacity Cesspool (potential Class V)	CVLCC
Large Capacity Waste Water Disposal Site (potential Class V)	CVWWD
Leaking Underground Storage Tank	LUST
Misc. Injection Well (potential Class V)	INJWLL
Motor Vehicle Waste Disposal Well (potential Class V)	CVMVW
Pipeline Facility	PLFAC
Potential Contamination Site[1]	PCS
Recharge Well (potential Class V)	RWLL
Reinjection Well (potential Class V)	RIWLL
Solid Waste Management Site	SWMS
Special Drainage Well (potential Class V)	SPDW
Spills	SPL
Storage or Preparation Area	STOR
Chemicals (include RMP facilities here)	C000
Fertilizers	A050
Fuels, gases, and oils	F000
Hazardous substances (include TRIS facilities here)	C001
Solvents and coatings	S000
Waste	W000
Stormwater Injection Well (potential Class V)	SWI

Potential Contaminant Sources (PCS)	**PCS Codes**
Material	**Material Codes**
Suspected Contaminant of Concern	SCC
Chemical	C000
Food, agricultural, and consumer products	A000
Fuels, gases, and oils	F000
Materials and minerals	M000
Pathogens	P000
Solvents and coatings	S000
Waste	W000
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:

[1]Potential Contamination Sites (PCS) include the following:

Brownfields (BMS)
Delisted State Superfund Sites (DPLP)
Federal Superfund Sites (NPL)
Hazardous Waste Investigative/cleanup (HWIC)
No Further Remedial Action Planned (NFRAP)
State Superfund Sites (PLP)
Suspected Hazardous Waste Site (CERCL)
Voluntary Investigative Cleanup (VIC)

List of Facility Designations and Codes

Residential

Residential Category Description: includes all establishments offering residence or accommodation, such as homes, apartments, housing for the elderly, hotels, and motels.

Facility Codes and Designations

1100: Private Household **(used unless one of the facility designations listed below apply)**
- **1100-01:** Residence
- **1100-02**: Apartment or condominium
- **1100-03**: Mobile home park

1200: Housing Services for Special Needs

1300: Hotels, Motels, or Other Accommodation Services

Commercial

Commercial Category Description: includes establishments typically associated with commercial land use. Examples include: general sales and service; retail sales and service; automobile sales and service; finance and insurance; business, professional, scientific and technical services; food services, and personal services.

Facility Codes and Designations

2000: General Sales and Service **(used unless one of the facility designations listed below apply)**
- **2100**: Retail sales or service
  - **2110**: Automobile sales or service establishment
    - **2110-01**: Automotive/vehicle repair
    - **2110-02**: Car wash
  - **2114**: Boat or marine craft dealer
    - **2114-01**: Boat services/repair/refinishing
  - **2116:** Gasoline services
  - **2120:** Heavy consumer goods, sales, or service establishments
    - **2120-01:** Furniture repair/refinishing
  - **2122:** Hardware stores and home centers
  - **2123:** Lawn and garden supply establishments
  - **2124:** Department stores, warehouse clubs or superstores
  - **2126:** Lumber yards and building materials
  - **2130:** Durable consumer goods, sales, or service

Industrial

Industrial Category Description: includes manufacturing establishments located in plants, factories or mills and employs power-driven machines and materials handling equipment. Many manufacturing establishments process products of agriculture, forestry, fishing, mining or quarrying.

Facility Codes and Designations

3000: Manufacturing and Wholesale Trade

Transportation, Communication and Utilities

Transportation, Communication, and Utilities Category Description: a catch-all category that includes transportation, communication, and utilities for essential facilities.

Facility Codes and Designations

4000: Transportation, Communication, Information, and Utilities
- **4345:** Sanitary landfill (disposal)
- **4346:** Waste treatment and disposal
  - **4346-01:** Salvage yard
  - **4346-06:** Dump
  - **4346-07:** State closed landfill

Arts, Entertainment and Recreation

Arts, Entertainment and Recreation Category Description: includes establishments that provide services for cultural, entertainment, and recreational activities such as live performances, events, exhibits intended for public viewing, and historical sites.

Facility Codes and Designations

5000: Arts, Entertainment and Recreation

Education, Public Administration, Health Care and other Institutions

Institutional Category Description: a catch-all category that includes education, public administration, health care, and other institutions. Examples include schools of all types, governmental buildings, military installations, public safety facilities, medical clinics and hospitals, other health and human services facilities, religious institutions, and death care services.

Facility Codes and Designations

6000: Education, Public Administration, Health Care, and Other Institutions

Construction

Construction Category Description: includes establishments that build structures or perform additions, alterations, reconstruction, installation and repairs. Examples include excavation contractors, carpentry, concrete contractors, painters, electricians, painters, highway and street construction, and sewer and well drilling.

Facility Codes and Designations

7000: Construction-Related Businesses

Mining and Extractive Uses

Mining and Extractive Uses Category Description: includes establishments that extract natural mineral solids, liquid materials, and gases.

Facility Codes and Designations

8000: Mining and Extraction Establishments

Agriculture and Forestry

Agricultural and Forestry Category description: includes establishments that grow crops, raise animals, harvest timber and harvest fish and other animals from farms, ranches, or natural habitats.

Facility Codes and Designations

9000: Agriculture, Forestry, Fishing, and Hunting

Scoping 2 Decision Notice Attachment
Potential Contaminant Source Inventory Requirements

Non-Vulnerable DWSMA

The following current and historical potential contaminant sources and related codes, and facility designation and related codes must be included in the potential contaminant source inventory. Each potential contaminant source identified must be assigned a facility designation and related code.

Potential Contaminant Sources (PCS)	PCS Codes
Large Capacity Cesspool (potential Class V)	CVLCC
Large Capacity Waste Water Disposal Site (potential Class V)	CVWWD
Motor Vehicle Waste Disposal Well (potential Class V)	CVMVW
Wells	WEL

List of Designated Facilities and Codes

Residential

Residential Category Description: includes all establishments offering residence or accommodation, such as homes, apartments, housing for the elderly, hotels, and motels.

Facility Codes and Designations

1000: All Establishments Offering Residence

Commercial

Commercial Category Description: includes establishments typically associated with commercial land use. Examples include: general sales and service; retail sales and service; automobile sales and service; finance and insurance; business, professional, scientific and technical services; food services, and personal services.

Facility Codes and Designations

2000: General Sales and Service

Industrial

Industrial Category Description: includes manufacturing establishments located in plants, factories or mills and employs power-driven machines and materials handling equipment. Many manufacturing establishments process products of agriculture, forestry, fishing, mining or quarrying.

Facility Codes and Designations

3000: Manufacturing and Wholesale Trade

Transportation, Communication and Utilities

Transportation, Communication, and Utilities Category Description: a catch-all category that includes transportation, communication and utilities for essential facilities.

Facility Codes and Designations

4000: Transportation, Communication, Information, and Utilities

Arts, Entertainment and Recreation

Arts, Entertainment, and Recreation Category Description: includes establishments that provide services for cultural, entertainment, and recreational activities such as live performances, events, exhibits intended for public viewing and historical sites.

Facility Codes and Designations

5000: Arts, Entertainment, and Recreation

Education, Public Administration, Health Care, and other Institutions

Institutional Category Description: a catch-all category that includes education, public administration, health care, and other institutions. Examples include schools of all types, governmental buildings, military installations, public safety facilities, medical clinics and hospitals, other health and human services facilities, religious institutions, and death care services.

Facility Codes and Designations

6000: Education, Public Administration, Health Care, and Other Institutions

Construction

Construction Category Description: includes establishments that build structures or perform additions, alterations, reconstruction, installation and repairs. Examples include excavation contractors, carpentry, concrete contractors, painters, electricians, painters, highway and street construction, and sewer and well drilling.

Facility Codes and Designations

7000: Construction-Related Businesses

Mining and Extractive Uses

Mining and Extractive Uses Category Description: includes establishments that extract natural mineral solids, liquid materials, and gases.

Facility Codes and Designations

8000: Mining and Extraction Establishments

Agriculture and Forestry

Agricultural and Forestry Category Description: includes establishments that grow crops, raise animals, harvest timber and harvest fish and other animals from farms, ranches, or natural habitats.

Facility Codes and Designations

9000: Agriculture, Forestry, Fishing, and Hunting

Scoping 2 Meeting
Wellhead Protection (WHP) Planning Issues Summary

Drinking Water Protection Issues Identified to Date:

A Complex geology with low – high vulnerabilities.

The amended drinking water supply management area (DWSMA) size is approximately the same but the shape changed to extent to the south further and less to the east.

Water Quality Detections and Implications:

Groundwater samples collected from the city supply wells, test wells, and other surrounding high capacity wells shows elevated chloride, nitrates, iron, and manganese are present in the sand and gravel aquifer. High iron and manganese concentrations were detected in Well Nos. 1 and 3, Test Well No. 1, and the O'Brien well. Elevated chloride was detected in the O'Brien well and Test Well No. 1, which are screened in the sand and gravel aquifer and located south and north of Well Nos. 3 and 4. (See Table 2 of Part 1).

Old Municipal Well Information:

The Minnesota Department of Health (MDH) has compiled historical information for use in the planning process.

The Old Municipal Well Report was updated and a copy was provided to the city along with the Sanborn Map information.

Sanborn Maps:

☒ Sanborn Maps are available for this area

☐ Sanborn Maps are not available for this area.

Recommended WHP Measures:

- If wells are constructed within 2 miles of the city or 1 mile of the DWSMA, their locations should be verified so that geologic and water level information from these wells can be used to improve on the delineation in the future.
- The groundwater flow field determined for the QBAA Aquifer is somewhat uncertain because 1) it is based on a relatively small number of wells, some of which may not be completed in the same aquifer as is used by the city wells; and 2) it was generated from wells whose static water levels were obtained over several decades. The city should work with a MDH hydrologist to develop a plan for static water level measurements east, southeast and south of the city wells to better understand flow directions. This could reduce model uncertainty and the size of the capture zones and potentially the DWSMA.
- Water Quality Monitoring: The standard assessment monitoring package should be analyzed during year 5. MDH can provide sample bottles and cover analytical costs. The city may need to collect the samples and ship them to MDH.
- Collect samples of city well water and surface water and conduct stable isotope analyses of these to evaluate the mixture of surface water and groundwater. Work with a MDH hydrologist to develop a sampling plan.
- Management strategies to address present and future storm water conveyance issues should be included in the amendment.
- Spill response and the transportation corridor should be addresses and a plan could be developed.
- Work on locating and sealing old municipal wells should be addressed.
- Address leak sites identified in the high vulnerabilities areas.

This document is intended to be a summary of issues identified to date and is ***not intended to replace the required data elements identified in the Scoping 2 Decision Notice*** *nor is it intended to be an exhaustive list of all potential drinking water issues.*

Precipitation Data

Monthly precipitation data was gathered using the MNgage website (http://climate.umn.edu/HIDENsityEdit/HIDENweb.htm). There are 4 precipitation gages in the vicinity: one is a backyard sampling site (BYRG) and three are controlled by the Soil and Water Conservation District (SWCD). The BYRG gage is located in Township 113N, Range 24W, Section 7. The first SWCD gage is located in Township 113N, Range 24W, Section 5. The second SWCD gage is located in Township 113N, Range 25W, Section 13. The third SWCD gage is located in Township 112N, Range 26W, Section 12.

Minnesota Climatology Working Group

State Climatology Office - DNR Division of Ecological and Water Resources University of Minnesota

Nearest Station Precipitation Data Retrieval

Minnesota's precipitation data archive is searched for data closest to a selected target location for each month. Values from the site closest to the target location are returned below after clicking the ***retrieve monthly data*** or ***retrieve daily data*** buttons. The precipitation data are made up of measured rainfall and the measured liquid content of snowfall.

Temperature, **snowfall**, and **snow depth** data from National Weather Service reporting stations are no longer retrieved from this application. To obtain those data, see our newest data retrieval tool (May 2014). National Weather Service precipitation data continue to be available from this application.

Obtaining data for legal purposes
Guide for column headers in the data table

---

target location: Scott-Belle plaine-Belle Plaine 113N 24W S7 (latitude: 44.61311 longitude: 93.75013)

click to select target location

years: 2009 to 2015

number of **missing days** allowed per month: 3

retrieve monthly data | retrieve daily data

---

results:

Target: T113 R24 S7

mon	year	cc	tttN	rrW	ss	nnnn	oooooooo	pre (inches)	dis
Jan	2009	70	113N	24W	7	BYRG		.61	0 mi.
Feb	2009	70	113N	24W	7	BYRG		1.65	0 mi.
Mar	2009	70	113N	24W	7	BYRG		1.65	0 mi.
Apr	2009	70	113N	24W	7	BYRG		1.53	0 mi.
May	2009	70	113N	24W	7	BYRG		1.39	0 mi.
Jun	2009	70	113N	24W	7	BYRG		2.67	0 mi.
Jul	2009	70	113N	24W	7	BYRG		.91	0 mi.
Aug	2009	70	113N	24W	7	BYRG		6.86	0 mi.
Sep	2009	70	113N	24W	7	BYRG		.53	0 mi.
Oct	2009	70	113N	24W	7	BYRG		6.33	0 mi.
Nov	2009	70	113N	24W	7	BYRG		.81	0 mi.
Dec	2009	70	113N	24W	7	BYRG		2.32	0 mi.
Jan	2010	70	113N	24W	7	BYRG		.73	0 mi.
Feb	2010	70	113N	24W	7	BYRG		.87	0 mi.
Mar	2010	70	113N	24W	7	BYRG		1.16	0 mi.
Apr	2010	70	113N	24W	7	BYRG		1.94	0 mi.
May	2010	70	113N	24W	7	BYRG		2.14	0 mi.
Jun	2010	70	113N	24W	7	BYRG		7.82	0 mi.
Jul	2010	70	113N	24W	7	BYRG		3.38	0 mi.
Aug	2010	70	113N	24W	7	BYRG		6.76	0 mi.
Sep	2010	70	113N	24W	5	SWCD		5.41	0 mi.
Oct	2010	70	113N	24W	7	BYRG		1.55	0 mi.
Nov	2010	70	113N	24W	7	BYRG		1.88	0 mi.
Dec	2010	70	113N	24W	7	BYRG		2.43	0 mi.
Jan	2011	70	113N	24W	7	BYRG		.67	0 mi.
Feb	2011	70	113N	24W	7	BYRG		.99	0 mi.
Mar	2011	70	113N	24W	5	SWCD		2.01	0 mi.
Apr	2011	70	113N	24W	5	SWCD		3.03	0 mi.
May	2011	70	113N	24W	5	SWCD		3.87	0 mi.
Jun	2011	70	113N	24W	5	SWCD		4.44	0 mi.
Jul	2011	70	113N	25W	13	SWCD		10.22	1 mi.
Aug	2011	70	113N	24W	5	SWCD		1.41	0 mi.
Sep	2011	70	113N	24W	5	SWCD		.37	0 mi.
Oct	2011	70	113N	25W	13	SWCD		1.01	1 mi.
Nov	2011	70	113N	24W	5	SWCD		.27	0 mi.
Dec	2011	70	113N	24W	5	SWCD		1.15	0 mi.

Jan 2012	70	113N	24W	5	SWCD	.38		0 mi.
Feb 2012	70	113N	24W	5	SWCD	1.80		0 mi.
Mar 2012	70	113N	24W	5	SWCD	1.61		0 mi.
Apr 2012	70	113N	24W	5	SWCD	2.81		0 mi.
May 2012	70	113N	24W	5	SWCD	12.52		0 mi.
Jun 2012	70	113N	24W	5	SWCD	7.88		0 mi.
Jul 2012	70	113N	24W	5	SWCD	3.31		0 mi.
Aug 2012	70	113N	24W	5	SWCD	2.49		0 mi.
Sep 2012	70	113N	24W	5	SWCD	.55		0 mi.
Oct 2012	70	113N	24W	5	SWCD	1.53		0 mi.
Nov 2012	70	113N	24W	5	SWCD	.58		0 mi.
Dec 2012	70	113N	25W	13	SWCD	1.98		1 mi.
Jan 2013	70	113N	24W	5	SWCD	.44		0 mi.
Feb 2013	70	113N	24W	5	SWCD	2.18		0 mi.
Mar 2013	70	113N	24W	5	SWCD	1.23		0 mi.
Apr 2013	70	113N	24W	5	SWCD	5.68		0 mi.
May 2013	70	113N	24W	5	SWCD	4.54		0 mi.
Jun 2013	70	113N	24W	5	SWCD	5.31		0 mi.
Jul 2013	70	113N	24W	5	SWCD	3.06		0 mi.
Aug 2013	70	113N	24W	5	SWCD	.97		0 mi.
Sep 2013	70	113N	24W	5	SWCD	1.37		0 mi.
Oct 2013	70	113N	24W	5	SWCD	.51		0 mi.
Nov 2013	70	113N	24W	5	SWCD	.81		0 mi.
Dec 2013	70	113N	24W	5	SWCD	1.74		0 mi.
Jan 2014	70	113N	24W	5	SWCD	1.35		0 mi.
Feb 2014	70	113N	25W	13	SWCD	.77		1 mi.
Mar 2014	70	113N	25W	13	SWCD	1.17		1 mi.
Apr 2014	70	113N	24W	5	SWCD	6.76		0 mi.
May 2014	70	113N	24W	5	SWCD	8.42		0 mi.
Jun 2014	70	113N	24W	5	SWCD	12.47		0 mi.
Jul 2014	70	113N	24W	5	SWCD	3.49		0 mi.
Aug 2014	70	113N	24W	5	SWCD	2.04		0 mi.
Sep 2014	70	113N	24W	5	SWCD	2.42		0 mi.
Oct 2014	70	113N	24W	5	SWCD	1.42		0 mi.
Nov 2014	72	112N	26W	12	SWCD	.63		9 mi.
Dec 2014	72	112N	26W	12	SWCD	.86		9 mi.
Jan 2015						m	999 mi.	
Feb 2015						m	999 mi.	
Mar 2015						m	999 mi.	
Apr 2015						m	999 mi.	
May 2015						m	999 mi.	
Jun 2015						m	999 mi.	
Jul 2015						m	999 mi.	
Aug 2015						m	999 mi.	
Sep 2015						m	999 mi.	
Oct 2015						m	999 mi.	
Nov 2015						m	999 mi.	
Dec 2015						m	999 mi.	

Where indicated: Missing values are shown as 'm'. Days on which precip accumulated in the gage are shown as '-'. 'TTTT RR SS' is the 'public land survey(PLS)' or 'legal' location of the observed data. Section values greater 36 are SECTIC 'TIC' locations plus 100. 'NWS ID' the National Weather Service Cooperative station number. Note that the 'PLS' will always be correct for precipitation data while the 'NWS ID' will always be correct for the temperature data. If no PLS info is supplied the the 'NWS ID' number applies to all shown data.

State Climatology Office - MnDNR - Ecological and Water Resources

Geology Data

This data element has already been discussed in Part I of the plan. A description of the geological conditions that affect the delineation of the WHPA and the vulnerability of the DWSMA is on file with the MDH. The impact that geological conditions may have on management of potential contaminant sources in the DWSMA was considered during the writing of this plan.

The well logs listed in the MDH's County Well Index for the DWSMA were considered. Some of these well logs are for wells that have previously been sealed; however, the geology data in the well logs are useful. The geology on the north end of the DWSMA is such that contaminants on the ground surface will reach the drinking water in a very short amount of time, and therefore this area must be protected. The geology on the south end of the DWSMA is not as vulnerable, and it is further from the City's wells, so land use and spills are not as much a concern in that area.

CITY WELLS

Minnesota Unique Well No.

201245

County Scott
Quad Belle Plaine South
Quad ID 91D

MINNESOTA DEPARTMENT OF HEALTH

WELL AND BORING RECORD

Minnesota Statutes Chapter 103I

Entry Date 05/05/1989
Update Date 05/22/2014
Received Date

Well Name BELLE PLAINE 1 WEST WELL

Township Range Dir Section Subsections Elevation 866 **ft.**

113 24 W 6 CACDCA **Elevation Method** Calc from DEM (USGS 7.5 min or equiv.)

Well Depth	Depth Completed	Date Well Completed
280 **ft.**	280 **ft.**	00/00/1949

Drilling Method --

Well Address

BELLE PLAINE MN

Drilling Fluid --

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

Use Community Supply **PWS ID** **Source**

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

Geological Material	Color	Hardness	From	To
HARDPAN			0	22
SAND & GRAVEL			22	58
HARDPAN & BOULDERS			58	64
CLAY			64	110
FINE SAND & CLAY			110	115
HARDPAN & BOULDERS			115	185
VERY FINE SAND			185	201
SAND			201	218
HARDPAN			218	241
SAND & GRAVEL			241	280

Casing Diameter	Weight	Hole Diameter
16 in. to 261 ft.	lbs./ft.	

Open Hole from ft. to ft.

Screen YES **Make** JOHNSON EVERDUR **Type**

Diameter	Slot/Gauze	Length	Set Between
16		20	260 ft. and 280 ft.

Static Water Level
134 ft. from Land surface Date Measured 00/00/1949

PUMPING LEVEL (below land surface)
146.5 ft. after hrs. pumping 663 g.p.m.

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

NO REMARKS

Grouting Information Well Grouted? ☐ Yes ☐ No ☐ Not Specified

Located by: Minnesota Department of Health

Method: GPS Differentially Corrected

Unique Number Verification: Info/GPS from data source

Input Date: 06/27/1994

System: *UTM - Nad83, Zone15, Meters*

X: 439666 **Y:** 4940964

Nearest Known Source of Contamination
_feet _direction _type
Well disinfected upon completion? ☐ Yes ☐ No

Pump ☐ Not Installed Date Installed
Manufacturer's name Model number ___ HP _ Volts
Length of drop Pipe _ft. Capacity _g.p.m Type Material

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

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

First Bedrock

Last Strat sand +larger

Aquifer Quat. Buried Artes. Aquifer

Depth to Bedrock **ft.**

Well Contractor Certification

Keys Well Co.	62012	KEYS WELL
License Business Name	Lic. Or Reg. No.	Name of Driller

County Well Index Online Report **201245** Printed 1/21/2015
HE-01205-07

Minnesota Unique Well No.

538038

County Scott
Quad Belle Plaine South
Quad ID 91D

MINNESOTA DEPARTMENT OF HEALTH

WELL AND BORING RECORD

Minnesota Statutes Chapter 103I

Entry Date 07/15/1994
Update Date 03/10/2014
Received Date

Well Name BELLE PLAINE 3

Township Range Dir Section Subsections Elevation 860 **ft.**

113 24 W 6 DBCBCA **Elevation Method** 7.5 minute topographic map (+/- 5 feet)

Well Depth	Depth Completed	Date Well Completed
330 **ft.**	330 **ft.**	06/10/1994

Drilling Method Cable Tool

Well Address
LAREDO ST
BELLE PLAINE MN 56011

Geological Material	Color	Hardness	From	To
SAND & GRAVEL	BROWN	MEDIUM	0	25
BIG BOULDERS	VARIED	HARD	25	55
SANDY CLAY/STONE	BROWN	MEDIUM	55	85
SANDY CLAY/STONE	GRAY	MEDIUM	85	117
FINE SAND	BROWN	SOFT	117	150
WET SAND	BROWN	SOFT	150	273
WET SAND/GRAVEL	GRY/BRN	SOFT	273	289
SAND & GRAVEL	VARIED	SOFT	289	330

Drilling Fluid Bentonite

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

Use Community Supply **PWS ID** 1700001 **Source** S03

Casing Type Steel (black or low carbon) **Joint** Welded **Drive Shoe?** ☐ Yes ☐ No **Above/Below** **ft.**

Casing Diameter	Weight	Hole Diameter
24 in. to 155 ft.	94.6 lbs./ft.	30 in. to 63 ft.
18 in. to 239 ft.	70.6 lbs./ft.	24 in. to 180 ft.

Open Hole from ft. to ft.

Screen YES **Make** JOHNSON **Type** stainless steel

Diameter	Slot/Gauze	Length	Set Between
12	70	85.2	240 ft. and 325 ft.

Static Water Level
126 ft. from Land surface Date Measured 05/24/1994

PUMPING LEVEL (below land surface)
164 ft. after 8 hrs. pumping 2030 g.p.m.

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

NO REMARKS

Located by: Minnesota Department of Health **Method:** GPS Differentially Corrected
Unique Number Verification: N/A **Input Date:** 01/25/1995
System: *UTM - Nad83, Zone15, Meters* **X:** 440010 **Y:** 4941053

Grouting Information Well Grouted? ☑ Yes ☐ No ☐ Not Specified

Grout Material: Neat Cement from 0 to 155 ft. 6 yrds.
Grout Material: Neat Cement from 0 to 120 ft. 6 yrds.

Nearest Known Source of Contamination
_feet _direction _type
Well disinfected upon completion? ☐ Yes ☐ No

Pump ☐ Not Installed Date Installed 09/00/1994
Manufacturer's name AMERICAN TURBINE Model number 12-M-150
HP 125 Volts 460
Length of drop Pipe 180 ft. Capacity 1000 g.p.m Type Turbine Material

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

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

First Bedrock
Last Strat sand +larger
Aquifer Quat. Buried Unconf. Aquife
Depth to Bedrock **ft.**

Well Contractor Certification

Renner E.H. Well	71015	SIGAFOOS, R.
License Business Name	Lic. Or Reg. No.	Name of Driller

County Well Index Online Report **538038** Printed 1/21/2015
HE-01205-07

Minnesota Unique Well No.

651697

County Scott
Quad Belle Plaine South
Quad ID 91D

MINNESOTA DEPARTMENT OF HEALTH

WELL AND BORING RECORD

Minnesota Statutes Chapter 103I

Entry Date 01/30/2002
Update Date 03/10/2014
Received Date

Well Name BELLE PLAINE 4

Township Range Dir Section Subsections Elevation 860 **ft.**

113 24 W 6 DBCBAC **Elevation Method** 7.5 minute topographic map (+/- 5 feet)

Well Depth	Depth Completed	Date Well Completed
331 **ft.**	331 **ft.**	10/09/2001

Drilling Method Driven

Well Address
205 LAREDO ST
BELLE PLAINE MN 56011

Drilling Fluid --

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

Use Community Supply **PWS ID** 1700001 **Source** S04

Casing Type Steel (black or low carbon) **Joint** Welded **Drive Shoe?** ☑ Yes ☐ No **Above/Below** **ft.**

Geological Material	Color	Hardness	From	To
TOPSOIL	BLACK	SOFT	0	3
SAND	BROWN	SOFT	3	44
SAND CLAY ROCKS	BROWN	MEDIUM	44	79
SAND CLAY ROCKS	GRAY	MEDIUM	79	110
FINE SAND	BROWN	SOFT	110	216
MEDIUM SAND	GRY/BRN	SOFT	235	235
FINE SAND	BROWN	SOFT	235	260
MEDIUM COARSE SAND	BROWN	SOFT	260	265
FINE MEDIUM SAND	BROWN	SOFT	265	270
COARSE SAND GRAVEL	BROWN	SOFT	270	275
COARSE SAND & CLAY LAYERS	RED/BRN	SOFT	275	280
COARSE SAND	BROWN	SOFT	280	295
MEDIUM SAND	BROWN	SOFT	295	300
MEDIUM SAND GRAVEL	BROWN	SOFT	300	315
COARSE SAND GRAVEL	BROWN	SOFT	315	330
SILT	BLACK	SOFT	330	331
			331	

Casing Diameter	Weight	Hole Diameter
24 in. to 217 ft.	lbs./ft.	23 in. to 217 ft.
18 in. to 245 ft.	lbs./ft.	17 in. to 245 ft.

Open Hole from ft. to ft.

Screen YES **Make** JOHNSON **Type** stainless steel

Diameter	Slot/Gauze	Length	Set Between
18		86	245 ft. and 331 ft.

Static Water Level
121 ft. from Land surface Date Measured 10/09/2001

PUMPING LEVEL (below land surface)
128 ft. after 1 hrs. pumping 500 g.p.m.

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

REMARKS
M.G.S. NO. 4152.

Located by: Minnesota Department of Health **Method:** GPS SA Off (averaged)
Unique Number Verification: N/A **Input Date:** 11/26/2001
System: *UTM - Nad83, Zone15, Meters* **X:** 440024 **Y:** 4941080

Grouting Information Well Grouted? ☑ Yes ☐ No ☐ Not Specified

Grout Material: Neat Cement from 0 to 217 ft. 11.5 yrds.

Nearest Known Source of Contamination
_feet _direction _type
Well disinfected upon completion? ☑ Yes ☐ No

Pump ☐ Not Installed Date Installed
Manufacturer's name Model number ___ HP _ Volts
Length of drop Pipe _ft. Capacity _g.p.m Type Material

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

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

Cuttings Yes
First Bedrock
Last Strat silt-black
Aquifer Quat. Buried Unconf. Aquife
Depth to Bedrock **ft.**

Well Contractor Certification

Traut M.J. Well Co.	71536	TONY/CHARLIE
License Business Name	Lic. Or Reg. No.	Name of Driller

County Well Index Online Report **651697** Printed 1/21/2015
HE-01205-07

HIGH VULNERABILITY

Minnesota Unique Well No.

235768

County Scott
Quad Belle Plaine South
Quad ID 91D

MINNESOTA DEPARTMENT OF HEALTH

WELL AND BORING RECORD

Minnesota Statutes Chapter 103I

Entry Date 09/21/1989
Update Date 03/10/2014
Received Date

Well Name EXECLSIOR PLASTICS

Township Range Dir Section Subsections Elevation 863 **ft.**

113 24 W 6 DBAABD **Elevation Method** 7.5 minute topographic map (+/- 5 feet)

Well Depth	Depth Completed	Date Well Completed
258 **ft.**	258 **ft.**	07/11/1963

Drilling Method Cable Tool

Drilling Fluid --

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

Use Abandoned **Status** Sealed

Casing Type Steel (black or low carbon) **Joint** Welded **Drive Shoe?** ☐ Yes ☐ No **Above/Below** 0 **ft.**

Casing Diameter	Weight	Hole Diameter
8 in. to 233 ft.	27.74 lbs./ft.	

Open Hole from ft. to ft.

Screen YES **Make** JOHNSON **Type** stainless steel

Diameter	Slot/Gauze	Length	Set Between
8	30	20	238 ft. and 258 ft.

Geological Material	Color	Hardness	From	To
SAND, GRAVEL & BOULDERS			0	56
NIGGER HEADS			56	62
SANDY CLAY	YELLOW		62	80
SANDY			80	90
SANDY CLAY			90	114
SAND			114	215
SANDY	BLUE		215	234
SAND WATER BEARING			234	258

Static Water Level
135 ft. from Land surface Date Measured 07/11/1963

PUMPING LEVEL (below land surface)
151 ft. after 2 hrs. pumping 150 g.p.m.

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

REMARKS
SEALED 06-12-2006 BY 1815; PREVIOUS USE: IN

Located by: Minnesota Department of Health **Method:** Digitization (Screen) - Map (1:24,000)

Unique Number Verification: Information from owner **Input Date:** 11/26/2001

System: *UTM - Nad83, Zone15, Meters* **X:** 440176 **Y:** 4941294

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
Manufacturer's name RAPIDAYTON Model number B 63 HP 15 Volts 220
Length of drop Pipe _ft. Capacity _g.p.m Type Submersible Material

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

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

First Bedrock
Last Strat sand
Aquifer Quat. Buried Unconf. Aquife
Depth to Bedrock ft.

Well Contractor Certification

Mueller Well Co.	96460	KERN, T.
License Business Name	Lic. Or Reg. No.	Name of Driller

County Well Index Online Report **235768** Printed 4/13/2015
HE-01205-07

Minnesota Unique Well No.

573146

County Scott
Quad Union Hill
Quad ID 90C

MINNESOTA DEPARTMENT OF HEALTH

WELL AND BORING RECORD

Minnesota Statutes Chapter 103I

Entry Date 07/20/1998
Update Date 08/18/2014
Received Date

Well Name SIEMON, TERRY & NANCY

Township	Range	Dir	Section	Subsections	Elevation	Elevation Method
113	24	W	8	BABADC	863 ft.	CALC FROM 2-FOOT COUNTY DEM

Well Depth	Depth Completed	Date Well Completed
257 ft.	257 ft.	10/15/1996

Drilling Method Non-specified Rotary

Well Address
10721 230TH ST
BELLE PLAINE MN 56011

Drilling Fluid Qwik gel

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

Use Domestic

Geological Material	Color	Hardness	From	To
SAND	BROWN	SOFT	0	23
SAND & GRAVEL	BROWN	SOFT	23	41
SAND & CLAY	GRAY	SOFT	41	83
ST. LAWRENCE RED/GREEN/WHITE	VARIED	SFT-HRD	83	157
FRANCONIA	GRN/WHT	SFT-HRD	157	257

Casing Type Steel (black or low carbon) **Joint** Threaded **Drive Shoe?** ☑ Yes ☐ No **Above/Below** ft.

Casing Diameter	Weight	Hole Diameter
4 in. to 164 ft.	11 lbs./ft.	8.5 in. to 164 ft.

Open Hole from 164 ft. to 257 ft.

Screen NO **Make** **Type**

Diameter	Slot/Gauze	Length	Set Between

Static Water Level
116 ft. from Land surface Date Measured 10/15/1996

PUMPING LEVEL (below land surface)
121 ft. after 1 hrs. pumping 40 g.p.m.

Well Head Completion
Pitless adapter manufacturer WHITEWATER Model SU45.5
☐ Casing Protection ☐ 12 in. above grade
☐ At-grade (Environmental Wells and Borings ONLY)

REMARKS
FORMER OWNER MARK SIEMON.

Grouting Information Well Grouted? ☑ Yes ☐ No ☐ Not Specified

Grout Material: Neat Cement from to 164 ft.

Located by: Minnesota Geological Survey
Method: Digitization (Screen) - Map (1:24,000)
Unique Number Verification: Address verification
Input Date: 11/15/2004
System: *UTM - Nad83, Zone15, Meters*
X: 441452 **Y:** 4940383

Nearest Known Source of Contamination
100 feet W direction Septic tank/drain field type
Well disinfected upon completion? ☑ Yes ☐ No

Pump ☐ Not Installed Date Installed 10/17/1996
Manufacturer's name AERMOTOR Model number HP Volts
Length of drop Pipe 126 ft. Capacity g.p.m Type Submersible Material

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

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

First Bedrock St.Lawrence Formation
Last Strat Tunnel City-Wonewoc
Aquifer Tunnel City-Wonewoc
Depth to Bedrock 83 ft.

Well Contractor Certification

License Business Name	Lic. Or Reg. No.	Name of Driller
Leuthner Well Co.	10125	LEUTHNER, R.

County Well Index Online Report **573146** Printed 3/18/2015
HE-01205-07

MODERATE VULNERABILITY

Minnesota Unique Well No.

130791

County Scott
Quad Belle Plaine South
Quad ID 91D

MINNESOTA DEPARTMENT OF HEALTH

WELL AND BORING RECORD

Minnesota Statutes Chapter 103I

Entry Date 02/23/1989
Update Date 02/14/2014
Received Date

Well Name STIER, DALE

Township Range Dir Section Subsections Elevation 940 **ft.**

113 24 W 7 DCBCAA **Elevation Method** 7.5 minute topographic map (+/- 5 feet)

Well Depth	Depth Completed	Date Well Completed
280 **ft.**	280 **ft.**	07/02/1978

Drilling Method Non-specified Rotary

Well Address
23800 LAREDO AV
BELLE PLAINE MN 56011

Geological Material	Color	Hardness	From	To
CLAY	BROWN	SOFT	0	18
CLAY & SAND	GRAY	SOFT	18	127
SAND & GRAVEL	BROWN	SOFT	127	137
CLAY & SAND	GRAY	SOFT	137	273
SAND	BROWN	HARD	273	280

Drilling Fluid --

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

Use Domestic

Casing Type Steel (black or low carbon) **Joint** Threaded **Drive Shoe?** ☑ Yes ☐ No **Above/Below** 1 **ft.**

Casing Diameter	Weight	Hole Diameter
4 in. to 275 ft.	lbs./ft.	

Open Hole from ft. to ft.

Screen YES **Make** JOHNSON **Type** stainless steel

Diameter	Slot/Gauze	Length	Set Between
2	12	5	275 ft. and 280 ft.

Static Water Level
201 ft. from Land surface Date Measured 07/02/1978

PUMPING LEVEL (below land surface)
0 ft. after hrs. pumping 30 g.p.m.

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

NO REMARKS

Located by: Minnesota Geological Survey **Method:** Digitized - scale 1:24,000 or larger (Digitizing Table)
Unique Number Verification: N/A **Input Date:** 01/01/1990
System: *UTM - Nad83, Zone15, Meters* **X:** 439927 **Y:** 4939182

Grouting Information Well Grouted? ☑ Yes ☐ No ☐ Not Specified

Grout Material: Cuttings from 0 to ft. 0

Nearest Known Source of Contamination
_feet _direction _type
Well disinfected upon completion? ☐ Yes ☐ No

Pump ☑ Not Installed Date Installed 07/26/1978
Manufacturer's name AEROMETER Model number __ HP 1 Volts 220
Length of drop Pipe _ft. Capacity _g.p.m Type Submersible Material Galvanized

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

Leuthner Well Co.	10125	LEUTHNER, R.
License Business Name	Lic. Or Reg. No.	Name of Driller

First Bedrock
Last Strat sand-brown
Aquifer Quat. Buried Artes. Aquifer
Depth to Bedrock ft.

County Well Index Online Report **130791** Printed 3/18/2015
HE-01205-07

Minnesota Unique Well No.

451162

County Scott
Quad Belle Plaine South
Quad ID 91D

MINNESOTA DEPARTMENT OF HEALTH

WELL AND BORING RECORD

Minnesota Statutes Chapter 103I

Entry Date 04/04/1991
Update Date 02/14/2014
Received Date

Well Name WALERIUS, JOHN

Township Range Dir Section Subsections Elevation 860 **ft.**

113 24 W 7 AABBCB **Elevation Method** CALC FROM 2-FOOT COUNTY DEM

Well Depth	Depth Completed	Date Well Completed
247 **ft.**	247 **ft.**	10/17/1988

Drilling Method Non-specified Rotary

Well Address
1201 SOUTH ST E
BELLE PLAINE MN

Drilling Fluid Qwik gel

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

Use Domestic

Geological Material	Color	Hardness	From	To
SAND & GRAVEL	BROWN	SOFT	0	58
CLAY	BLUE	HARD	58	116
SANDY CLAY	BLUE	MEDIUM	116	121
SAND & CLAY LAYERS	BROWN	HARD	121	207
CLAY	BLUE	MEDIUM	207	216
SAND & SOME CLAY LAYERS	BROWN	MEDIUM	216	229
CLAY	GRAY	MEDIUM	229	237
SAND	BROWN	SOFT	237	247

Casing Type Steel (black or low carbon) **Joint** Threaded **Drive Shoe?** ☑ Yes ☐ No **Above/Below** 1 **ft.**

Casing Diameter	Weight	Hole Diameter
4 in. to 242 ft.	11 lbs./ft.	6 in. to 241 ft.

Open Hole from ft. to ft.

Screen YES **Make** JOHNSON **Type** stainless steel

Diameter	Slot/Gauze	Length	Set Between
4	10	7	242 ft. and 247 ft.

Static Water Level
133 ft. from Land surface Date Measured 10/17/1988

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

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

NO REMARKS

Located by: Minnesota Geological Survey
Method: Digitization (Screen) - Map (1:24,000)
Unique Number Verification: Address verification
Input Date: 11/15/2004
System: *UTM - Nad83, Zone15, Meters*
X: 440433 **Y:** 4940439

Grouting Information Well Grouted? ☑ Yes ☐ No ☐ Not Specified

Grout Material: Cuttings from to 241 ft.
Grout Material: Bentonite from to 241 ft. 0

Nearest Known Source of Contamination
90 feet S direction Barnyard type
Well disinfected upon completion? ☑ Yes ☐ No

Pump ☐ Not Installed Date Installed 10/00/1988
Manufacturer's name WEBTROL Model number HP 1 Volts 220
Length of drop Pipe 165 ft. Capacity 10 g.p.m
Type Submersible Material Galvanized

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

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

First Bedrock
Last Strat sand-brown
Aquifer Quat. Buried Artes. Aquifer
Depth to Bedrock ft.

Well Contractor Certification

Hartmann Well Co.	40174	PETERSON, D.
License Business Name	Lic. Or Reg. No.	Name of Driller

County Well Index Online Report **451162** Printed 3/18/2015
HE-01205-07

Minnesota Unique Well No.

488668

County Scott
Quad Belle Plaine South
Quad ID 91D

MINNESOTA DEPARTMENT OF HEALTH

WELL AND BORING RECORD

Minnesota Statutes Chapter 103I

Entry Date 10/26/1992
Update Date 02/14/2014
Received Date

Well Name SCHAFFLER, SCOTT

Township Range Dir Section Subsections Elevation 920 **ft.**

113 24 W 7 CDADDA **Elevation Method** 7.5 minute topographic map (+/- 5 feet)

Well Depth	Depth Completed	Date Well Completed
288 **ft.**	288 **ft.**	05/00/1992

Drilling Method Non-specified Rotary

Well Address
23800 LAREDO AV
BELLE PLAINE MN 56011

Drilling Fluid Water

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

Use Domestic

Geological Material	Color	Hardness	From	To
CLAY	BROWN	MEDIUM	0	38
CLAY	GRAY	MEDIUM	38	62
CLAY ROCKY STREAKS	BLUE	HARD	62	88
SAND ROCKS	GRAY	HARD	88	124
CLAY & ROCKS	GRAY	HARD	124	234
SAND	GRAY	HARD	234	288

Casing Type Steel (black or low carbon) **Joint** Threaded **Drive Shoe?** ☑ Yes ☐ No **Above/Below** 1 **ft.**

Casing Diameter	Weight	Hole Diameter
4 in. to 284 ft.	11 lbs./ft.	6.8 in. to 272 ft.

Open Hole from ft. to ft.

Screen YES **Make** JOHNSON **Type** stainless steel

Diameter	Slot/Gauze	Length	Set Between
4	10	4	284 ft. and 288 ft.

Static Water Level
221 ft. from Land surface Date Measured 05/00/1992

PUMPING LEVEL (below land surface)
223 ft. after 1 hrs. pumping 25 g.p.m.

Well Head Completion
Pitless adapter manufacturer MONITOR Model 6PS45
☐ Casing Protection ☐ 12 in. above grade
☐ At-grade (Environmental Wells and Borings ONLY)

NO REMARKS

Located by: Minnesota Geological Survey **Method:** Digitization (Screen) - Map (1:24,000)

Unique Number Verification: Address verification **Input Date:** 07/19/2005

System: *UTM - Nad83, Zone15, Meters* **X:** 439912 **Y:** 4939162

Grouting Information Well Grouted? ☑ Yes ☐ No ☐ Not Specified

Grout Material: Cuttings from to ft.
Grout Material: Bentonite from to ft.

Nearest Known Source of Contamination
150 feet S direction Septic tank/drain field type
Well disinfected upon completion? ☑ Yes ☐ No

Pump ☐ Not Installed Date Installed
Manufacturer's name F & W Model number 1BA10 HP 1 Volts 220
Length of drop Pipe 250 ft. Capacity 12 g.p.m
Type Submersible Material Galvanized

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

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

First Bedrock
Last Strat sand-gray
Aquifer Quat. Buried Artes. Aquifer
Depth to Bedrock ft.

Well Contractor Certification

Geib Well Co.	72027	GEIB, S
License Business Name	Lic. Or Reg. No.	Name of Driller

County Well Index Online Report **488668** Printed 3/18/2015
HE-01205-07

Minnesota Unique Well No.

626321

County Scott
Quad Belle Plaine South
Quad ID 91D

MINNESOTA DEPARTMENT OF HEALTH

WELL AND BORING RECORD

Minnesota Statutes Chapter 103I

Entry Date 11/02/1999
Update Date 03/11/2005
Received Date

Well Name STIER, ELMER

Township Range Dir Section Subsections Elevation 901 **ft.**

113 24 W 7 CADBAD **Elevation Method** CALC FROM 2-FOOT COUNTY DEM

Well Depth	Depth Completed	Date Well Completed
193 **ft.**	193 **ft.**	07/01/1999

Drilling Method Non-specified Rotary

Well Address
23580 LAREDO AV
BELLE PLAINE MN 56011

Geological Material	Color	Hardness	From	To
CLAY	BROWN	MEDIUM	0	18
CLAY	BLUE	MEDIUM	18	76
CLAY, ROCKY	YELLOW	HARD	76	82
CLAY	GRAY	MEDIUM	82	157
SAND	BROWN	HARD	157	193

Drilling Fluid Bentonite

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

Use Domestic

Casing Type Steel (black or low carbon) **Joint** No Information **Drive Shoe?** ☑ Yes ☐ No **Above/Below** **ft.**

Casing Diameter	Weight	Hole Diameter
4 in. to 188 ft.	11 lbs./ft.	6 in. to 187 ft.

Open Hole from ft. to ft.

Screen YES **Make** JOHNSON **Type** stainless steel

Diameter	Slot/Gauze	Length	Set Between
3	10	5	188 ft. and 193 ft.

Static Water Level
145 ft. from Land surface Date Measured 07/01/1999

PUMPING LEVEL (below land surface)
180 ft. after 1 hrs. pumping 40 g.p.m.

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

NO REMARKS

Located by: Minnesota Geological Survey **Method:** Digitization (Screen) - Map (1:24,000)

Unique Number Verification: Address verification **Input Date:** 11/15/2004

System: *UTM - Nad83, Zone15, Meters* **X:** 439812 **Y:** 4939492

Grouting Information Well Grouted? ☑ Yes ☐ No ☐ Not Specified

Grout Material: Bentonite from 0 to 188 ft. 2 yrds.

Nearest Known Source of Contamination
50 feet S direction Barnyard type
Well disinfected upon completion? ☐ Yes ☐ No

Pump ☐ Not Installed Date Installed
Manufacturer's name AERMOTOR Model number ___ HP 1 Volts 220
Length of drop Pipe 180 ft. Capacity 12 g.p.m Type Submersible Material

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

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

First Bedrock
Last Strat sand-brown
Aquifer Quat. Buried Artes. Aquifer
Depth to Bedrock **ft.**

Well Contractor Certification

Braunwarth Well Co.	10068	PETERSON, D.
License Business Name	Lic. Or Reg. No.	Name of Driller

County Well Index Online Report **626321** Printed 3/18/2015
HE-01205-07

LOW VULNERABILITY

Minnesota Unique Well No.

102298

County Scott
Quad Union Hill
Quad ID 90C

MINNESOTA DEPARTMENT OF HEALTH

WELL AND BORING RECORD

Minnesota Statutes Chapter 103I

Entry Date 12/28/1989
Update Date 08/18/2014
Received Date

Well Name TIETZ, JOHN

Township	Range	Dir	Section	Subsections	Elevation
113	24	W	7	DDACBB	978 ft.

Elevation Method 7.5 minute topographic map (+/- 5 feet)

Well Depth	Depth Completed	Date Well Completed
345 ft.	345 ft.	05/29/1979

Drilling Method Non-specified Rotary

Well Address
HICKORY BL
BELLE PLAINE MN 56011

Drilling Fluid --

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

Use Domestic

Casing Type Steel (black or low carbon) **Joint** Threaded **Drive Shoe?** ☑ Yes ☐ No **Above/Below** 1 ft.

Casing Diameter	Weight	Hole Diameter
4 in. to 300 ft.	lbs./ft.	

Open Hole from 300 ft. to 345 ft.

Screen NO **Make** **Type**

Diameter	Slot/Gauze	Length	Set Between

Geological Material	Color	Hardness	From	To
CLAY	YELLOW	SOFT	0	60
CLAY	BLUE	SOFT	60	80
CLAY	DK. GRY	SOFT	80	85
CLAY WITH PEBBLES	GRAY	SOFT	85	120
CLAY	GRAY	SOFT	120	133
GRAVEL	GRAY	MEDIUM	133	136
SANDY CLAY	GRAY	HARD	136	195
FINE SAND	GRAY	HARD	195	206
CLAY	GRAY	HARD	206	212
SAND	GRAY	HARD	212	218
CLAY	RED/GRY	MEDIUM	218	225
SAND	GRAY	MEDIUM	225	242
CLAY & SOAPSTONE	WHITE	MEDIUM	242	280
SAND	VARIED	MEDIUM	280	282
SHALE	GREEN	MEDIUM	282	290
SANDSTONE	WHT/YEL	MEDIUM	290	330
SANDSTONE & GREEN SHLE	WHT/YEL	MEDIUM	330	340
SHALE & FINE SANDSTONE	GREEN	MEDIUM	340	345

Static Water Level
246 ft. from Land surface Date Measured 05/29/1979

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

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

REMARKS
M.G.S. NO. 1496.

Located by: Minnesota Geological Survey
Method: Digitized - scale 1:24,000 or larger (Digitizing Table)
Unique Number Verification: Other, note in remarks
Input Date: 01/01/1990
System: *UTM - Nad83, Zone15, Meters*
X: 440663 **Y:** 4939162

Grouting Information Well Grouted? ☑ Yes ☐ No ☐ Not Specified

Grout Material: Bentonite from 0 to 300 ft. 0

Nearest Known Source of Contamination
25 feet North West direction Septic tank/drain field type
Well disinfected upon completion? ☐ Yes ☐ No

Pump ☑ Not Installed Date Installed 06/00/1979
Manufacturer's name FLINT & WALLING Model number HP 1 Volts 220
Length of drop Pipe 270 ft. Capacity 10 g.p.m
Type Submersible Material Galvanized

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

Cuttings Yes
First Bedrock Tunnel CIty/Lone Rock Fm
Last Strat Eau Claire Formation
Aquifer Wonewoc Sandstone
Depth to Bedrock 282 ft.

Well Contractor Certification

License Business Name	Lic. Or Reg. No.	Name of Driller
Hartmann Well Co.	40174	HARTMANN, R.

County Well Index Online Report **102298** Printed 3/18/2015
HE-01205-07

Minnesota Unique Well No.

129154

County Scott
Quad Union Hill
Quad ID 90C

MINNESOTA DEPARTMENT OF HEALTH

WELL AND BORING RECORD

Minnesota Statutes Chapter 103I

Entry Date 02/11/1988
Update Date 08/18/2014
Received Date

Well Name ROBERSON, JOHN

Township	Range	Dir	Section	Subsections	Elevation	Elevation Method
113	24	W	7	DDDBDD	930 ft.	7.5 minute topographic map (+/- 5 feet)

Well Depth	Depth Completed	Date Well Completed
339 ft.	339 ft.	04/20/1976

Drilling Method Non-specified Rotary

Drilling Fluid --

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

Use Domestic

Casing Type Steel (black or low carbon) **Joint** Threaded **Drive Shoe?** ☑ Yes ☐ No **Above/Below** 1 **ft.**

Geological Material	Color	Hardness	From	To
CLAY	BROWN	MEDIUM	0	23
CLAY	GRAY	MEDIUM	23	106
CLAY & GRAVEL	GRAY	MEDIUM	106	140
CLAY	GRAY	MEDIUM	140	210
SHALE	WHITE	MEDIUM	210	231
SHALE & LIMESTONE	WHT/GRY	HARD	231	288
SANDSTONE	WHITE	M.HARD	288	339

Casing Diameter	Weight	Hole Diameter
4 in. to 230 ft.	lbs./ft.	
3 in. to 234 ft.	lbs./ft.	

Open Hole from 234 ft. to 339 ft.

Screen NO **Make** **Type**

Diameter	Slot/Gauze	Length	Set Between

Static Water Level
209 ft. from Land surface Date Measured 04/21/1976

PUMPING LEVEL (below land surface)
211 ft. after hrs. pumping 15 g.p.m.

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

NO REMARKS

Located by: Minnesota Geological Survey
Method: Digitized - scale 1:24,000 or larger (Digitizing Table)
Unique Number Verification: N/A
Input Date: 01/01/1990
System: *UTM - Nad83, Zone15, Meters*
X: 440668 **Y:** 4939003

Grouting Information Well Grouted? ☐ Yes ☑ No ☐ Not Specified

Nearest Known Source of Contamination
65 feet N direction Septic tank/drain field type
Well disinfected upon completion? ☐ Yes ☐ No

Pump ☑ Not Installed Date Installed 04/26/1976
Manufacturer's name A.Y. MCDONALD Model number ___ HP 1 Volts 220
Length of drop Pipe 223 ft. Capacity __g.p.m
Type Submersible Material Galvanized

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

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

First Bedrock Tunnel CIty/Lone Rock Fm
Last Strat Wonewoc Sandstone
Aquifer Tunnel City-Wonewoc
Depth to Bedrock 210 **ft.**

Well Contractor Certification

License Business Name	Lic. Or Reg. No.	Name of Driller
Bohn Well Co.	70350	BOHN, G.

County Well Index Online Report **129154** Printed 3/18/2015
HE-01205-07

Minnesota Unique Well No.

215797

County Scott
Quad Union Hill
Quad ID 90C

MINNESOTA DEPARTMENT OF HEALTH

WELL AND BORING RECORD

Minnesota Statutes Chapter 103I

Entry Date 02/23/1989
Update Date 02/14/2014
Received Date

Well Name EDIGER, PAT

Township Range Dir Section Subsections Elevation 960 **ft.**

113 24 W 18 AABDAA **Elevation Method** 7.5 minute topographic map (+/- 5 feet)

Well Depth	Depth Completed	Date Well Completed
276 **ft.**	276 **ft.**	10/12/1977

Drilling Method --

Well Address
24060 HICKORY BL
BELLE PLAINE MN 56011

Geological Material	Color	Hardness	From	To
CLAY			0	250
FINE SAND			250	267
COARSE SAND			267	276

Drilling Fluid --

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

Use Domestic

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

Casing Diameter	Weight	Hole Diameter
5 in. to 269 ft.	lbs./ft.	

Open Hole from ft. to ft.

Screen YES **Make** **Type**

Diameter	Slot/Gauze	Length	Set Between
4.8	18	7	269 ft. and 276 ft.

Static Water Level
231 ft. from Land surface Date Measured 10/12/1977

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

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

NO REMARKS

Located by: Minnesota Geological Survey **Method:** Digitized - scale 1:24,000 or larger (Digitizing Table)
Unique Number Verification: N/A **Input Date:** 01/01/1990
System: *UTM - Nad83, Zone15, Meters* **X:** 440599 **Y:** 4938824

Grouting Information Well Grouted? ☑ Yes ☐ No ☐ Not Specified

Grout Material: Bentonite from 0 to ft. 0

Nearest Known Source of Contamination
115 feet North West direction Septic tank/drain field type
Well disinfected upon completion? ☐ Yes ☐ No

Pump ☐ Not Installed Date Installed
Manufacturer's name Model number HP 0 Volts
Length of drop Pipe ft. Capacity g.p.m Type Material

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

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

First Bedrock
Last Strat sand
Aquifer Quat. Buried Artes. Aquifer
Depth to Bedrock ft.

Well Contractor Certification

License Business Name	Lic. Or Reg. No.	Name of Driller
Hartmann Well Co.	40174	

County Well Index Online Report **215797** Printed 3/18/2015
HE-01205-07

Minnesota Unique Well No.

249595

County Scott
Quad Belle Plaine South
Quad ID 91D

MINNESOTA DEPARTMENT OF HEALTH

WELL AND BORING RECORD

Minnesota Statutes Chapter 103I

Entry Date 04/22/2003
Update Date 03/10/2014
Received Date

Well Name VALLEY VIEW GOLF CLUB 1

Township Range Dir Section Subsections Elevation 967 **ft.**

113 24 W 7 DCCB **Elevation Method** Calc from DEM (USGS 7.5 min or equiv.)

Well Depth ft. **Depth Completed** ft. **Date Well Completed**

Drilling Method

Drilling Fluid

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

Use Public Supply/non-comm.-transient **PWS ID** 5700330 **Source** S01

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

Casing Diameter **Weight** **Hole Diameter**

Open Hole from ft. to ft.

Screen
Diameter **Slot/Gauze** **Length** **Set Between**

Geological Material **Color** **Hardness** **From** **To**

Static Water Level
ft. from Date Measured

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

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

NO REMARKS

Grouting Information Well Grouted? ☐ Yes ☐ No ☐ Not Specified

Located by: Minnesota Department of Health **Method:** GPS SA Off (averaged)
Unique Number Verification: Info/GPS from data source **Input Date:** 06/06/2005
System: *UTM - Nad83, Zone15, Meters* **X:** 439977 **Y:** 4939056

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

Pump ☐ Not Installed Date Installed
Manufacturer's name Model number __ HP _ Volts
Length of drop Pipe _ft. Capacity _g.p.m Type Material

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

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

Well Contractor Certification

License Business Name Lic. Or Reg. No. Name of Driller

First Bedrock
Last Strat
Aquifer
Depth to Bedrock **ft.**

County Well Index Online Report **249595** Printed 3/18/2015
HE-01205-07

Minnesota Unique Well No.

483001

County Scott
Quad Union Hill
Quad ID 90C

MINNESOTA DEPARTMENT OF HEALTH

WELL AND BORING RECORD

Minnesota Statutes Chapter 103I

Entry Date 03/31/1993
Update Date 04/14/2014
Received Date

Well Name STIER, JOHN

Township Range Dir Section Subsections Elevation 950 **ft.**

113 24 W 7 DADCBD **Elevation Method** 7.5 minute topographic map (+/- 5 feet)

Well Depth	Depth Completed	Date Well Completed
236 **ft.**	236 **ft.**	08/00/1992

Drilling Method Non-specified Rotary

Well Address
23751 HICKORY BL
MN

Drilling Fluid Water

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

Use Domestic

Casing Type Steel (black or low carbon) **Joint** Threaded **Drive Shoe?** ☑ Yes ☐ No **Above/Below** **ft.**

Geological Material	Color	Hardness	From	To
CLAY	TAN	MEDIUM	0	16
CLAY	BLUE	MEDIUM	16	98
GRAVEL	BLUE	HARD	98	106
STONY CLAY	BLUE	HARD	106	168
SAND	YELLOW	MEDIUM	168	220
SAND FINE	YELLOW	MEDIUM	220	230
SAND FAIR	YELLOW	MEDIUM	230	236

Casing Diameter	Weight	Hole Diameter
4 in. to 232 ft.	11 lbs./ft.	6.8 in. to 220 ft.

Open Hole from ft. to ft.

Screen YES **Make** JOHNSON **Type** stainless steel

Diameter	Slot/Gauze	Length	Set Between
4	12	4	232 ft. and 236 ft.

Static Water Level
186 ft. from Land surface Date Measured 08/00/1992

PUMPING LEVEL (below land surface)
188 ft. after 1 hrs. pumping 20 g.p.m.

Well Head Completion
Pitless adapter manufacturer MONITOR Model 6PS45
☐ Casing Protection ☐ 12 in. above grade
☐ At-grade (Environmental Wells and Borings ONLY)

NO REMARKS

Located by: Minnesota Geological Survey **Method:** Digitization (Screen) - Map (1:24,000)

Unique Number Verification: Name on mailbox **Input Date:** 07/19/2005

System: *UTM - Nad83, Zone15, Meters* **X:** 440635 **Y:** 4939348

Grouting Information Well Grouted? ☑ Yes ☐ No ☐ Not Specified

Grout Material: Bentonite from to ft.

Nearest Known Source of Contamination
100 feet North West direction Septic tank/drain field type

Well disinfected upon completion? ☑ Yes ☐ No

Pump ☐ Not Installed Date Installed
Manufacturer's name JACUZZI Model number 1BA10 HP 1 Volts 220
Length of drop Pipe 210 ft. Capacity 12 g.p.m Type Submersible Material

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

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

First Bedrock
Last Strat sand-yellow
Aquifer Quat. Buried Unconf. Aquife
Depth to Bedrock **ft.**

Well Contractor Certification

Geib Well Co.	72027	GEIB, S
License Business Name	Lic. Or Reg. No.	Name of Driller

County Well Index Online Report **483001** Printed 3/18/2015
HE-01205-07

Minnesota Unique Well No.

526672

County Scott
Quad Union Hill
Quad ID 90C

MINNESOTA DEPARTMENT OF HEALTH

WELL AND BORING RECORD

Minnesota Statutes Chapter 103I

Entry Date 01/05/1994
Update Date 08/18/2014
Received Date

Well Name SIEMON, MARVIN

Township	Range	Dir	Section	Subsections	Elevation	Elevation Method
113	24	W	8	BCDADC	985 ft.	CALC FROM 2-FOOT COUNTY DEM

Well Depth	Depth Completed	Date Well Completed
360 ft.	360 ft.	07/19/1993

Drilling Method Non-specified Rotary

Well Address
23551 KITTSON BL
BELLE PLAINE MN

Geological Material	Color	Hardness	From	To
YELLOW CLAY	BROWN	SOFT	0	41
CLAY	GRAY	SOFT	41	168
CLAY & SAND	GRAY	SOFT	168	212
SHALE	GREEN	SFT-HRD	212	330
SANDSTONE	BRN/WHT	HARD	330	360

Drilling Fluid Qwik gel

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

Use Domestic

Casing Type Steel (black or low carbon) **Joint** Threaded **Drive Shoe?** ☑ Yes ☐ No **Above/Below** ft.

Casing Diameter	Weight	Hole Diameter
4 in. to 334 ft.	11 lbs./ft.	8.5 in. to 295 ft.

Open Hole from 334 ft. to 360 ft.

Screen NO **Make** **Type**

Diameter	Slot/Gauze	Length	Set Between

Static Water Level
240 ft. from Land surface Date Measured 07/19/1993

PUMPING LEVEL (below land surface)
245 ft. after 1 hrs. pumping 20 g.p.m.

Well Head Completion
Pitless adapter manufacturer WHITEWATER Model SU45.5
☐ Casing Protection ☐ 12 in. above grade
☐ At-grade (Environmental Wells and Borings ONLY)

NO REMARKS

Located by: Minnesota Geological Survey
Method: Digitization (Screen) - Map (1:24,000)
Unique Number Verification: Address verification
Input Date: 11/15/2004
System: *UTM - Nad83, Zone15, Meters*
X: 441217 **Y:** 4939802

Grouting Information Well Grouted? ☑ Yes ☐ No ☐ Not Specified

Grout Material: Bentonite from to 295 ft.
Grout Material: Neat Cement from to 295 ft.

Nearest Known Source of Contamination
50 feet W direction Septic tank/drain field type
Well disinfected upon completion? ☑ Yes ☐ No

Pump ☐ Not Installed Date Installed 07/21/1993
Manufacturer's name AERMOTOR Model number HP 1.5 Volts 220
Length of drop Pipe 252 ft. Capacity 15 g.p.m Type Submersible Material

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

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

First Bedrock Tunnel CIty/Lone Rock Fm
Last Strat Wonewoc Sandstone
Aquifer Wonewoc Sandstone
Depth to Bedrock 212 ft.

Well Contractor Certification

License Business Name	Lic. Or Reg. No.	Name of Driller
Leuthner Well Co.	10125	LEUTHNER, R

County Well Index Online Report **526672** Printed 3/18/2015
HE-01205-07

Minnesota Unique Well No.

552206

County Scott
Quad Belle Plaine South
Quad ID 91D

MINNESOTA DEPARTMENT OF HEALTH

WELL AND BORING RECORD

Minnesota Statutes Chapter 103I

Entry Date 06/11/1996
Update Date 02/14/2014
Received Date

Well Name GATZ, WILLIAM A.

Township Range Dir Section Subsections Elevation 993 **ft.**

113 24 W 18 ABADAA **Elevation Method** CALC FROM 2-FOOT COUNTY DEM

Well Depth	Depth Completed	Date Well Completed
280 **ft.**	280 **ft.**	05/13/1995

Drilling Method Non-specified Rotary

Well Address
24205 LAREDO AV
BELLE PLAINE MN 56011

Drilling Fluid Water

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

Use Domestic

Geological Material	Color	Hardness	From	To
CLAY	YELLOW	MEDIUM	0	23
STONY CLAY	GRAY	HARD	23	104
ROCKS & GRAVEL	GRAY	HARD	104	171
CLAY	GRAY	HARD	171	173
HARDPAN	GRAY	HARD	173	213
SAND	GRAY	HARD	213	280

Casing Type Steel (black or low carbon) **Joint** Threaded **Drive Shoe?** ☑ Yes ☐ No **Above/Below** **ft.**

Casing Diameter	Weight	Hole Diameter
4 in. to 275 ft.	11 lbs./ft.	6.75 in. to 270 ft.

Open Hole from ft. to ft.

Screen YES **Make** JOHNSON **Type** stainless steel

Diameter	Slot/Gauze	Length	Set Between
4	10	4	275 ft. and 280 ft.

Static Water Level
228 ft. from Land surface Date Measured 05/13/1995

PUMPING LEVEL (below land surface)
230 ft. after 1 hrs. pumping 25 g.p.m.

Well Head Completion
Pitless adapter manufacturer MONITOR Model 6PS45
☐ Casing Protection ☐ 12 in. above grade
☐ At-grade (Environmental Wells and Borings ONLY)

NO REMARKS

Located by: Minnesota Geological Survey **Method:** Digitization (Screen) - Map (1:24,000)

Unique Number Verification: Address verification **Input Date:** 11/16/2004

System: *UTM - Nad83, Zone15, Meters* **X:** 440354 **Y:** 4938788

Grouting Information Well Grouted? ☑ Yes ☐ No ☐ Not Specified

Grout Material: Cuttings from to ft.
Grout Material: Bentonite from to ft.

Nearest Known Source of Contamination
120 feet S direction Septic tank/drain field type
Well disinfected upon completion? ☐ Yes ☐ No

Pump ☐ Not Installed Date Installed
Manufacturer's name F & W Model number 1BA10 HP 1 Volts 220
Length of drop Pipe 260 ft. Capacity 12 g.p.m Type Submersible Material

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

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

First Bedrock
Last Strat sand-gray
Aquifer Quat. Buried Unconf. Aquife
Depth to Bedrock **ft.**

Well Contractor Certification

Geib Well Co.	72027	GEIB, S
License Business Name	Lic. Or Reg. No.	Name of Driller

County Well Index Online Report **552206** Printed 3/18/2015
HE-01205-07

Minnesota Unique Well No.

625572

County Scott
Quad Belle Plaine South
Quad ID 91D

MINNESOTA DEPARTMENT OF HEALTH

WELL AND BORING RECORD

Minnesota Statutes Chapter 103I

Entry Date 06/07/1999
Update Date 02/18/2005
Received Date

Well Name BUEGENS, LESLIE

Township Range Dir Section Subsections Elevation 989 ft.

113 24 W 18 ABCBCA **Elevation Method** CALC FROM 2-FOOT COUNTY DEM

Well Depth	Depth Completed	Date Well Completed
358 ft.	358 ft.	02/18/1999

Drilling Method Non-specified Rotary

Well Address
24135 LAREDO AV
BELLE PLAINE MN

Drilling Fluid Water

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

Use Domestic

Geological Material	Color	Hardness	From	To
CLAY	BROWN	SOFT	0	19
CLAY	GRAY	MEDIUM	19	125
CLAY, SAND	GRAY	MEDIUM	125	171
CLAY	GRAY	MEDIUM	171	195
SAND, GRAVEL, CLAY	GRAY	MEDIUM	195	244
SAND	BROWN	MEDIUM	244	265
DIRTY SAND	BROWN	MEDIUM	265	345
SAND	BROWN	SOFT	345	358

Casing Type Steel (black or low carbon) **Joint** Threaded **Drive Shoe?** ☑ Yes ☐ No **Above/Below** ft.

Casing Diameter	Weight	Hole Diameter
4 in. to 353 ft.	11 lbs./ft.	6 in. to 252 ft.

Open Hole from ft. to ft.

Screen YES **Make** JOHNSON **Type** stainless steel

Diameter	Slot/Gauze	Length	Set Between
3.5	12	5	353 ft. and 358 ft.

Static Water Level
250 ft. from No Information Date Measured 01/29/1999

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

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

NO REMARKS

Grouting Information Well Grouted? ☑ Yes ☐ No ☐ Not Specified

Grout Material: High solids bentonite from 0 to 252 ft. 6 bags

Located by: Minnesota Geological Survey
Method: Digitization (Screen) - Map (1:24,000)
Unique Number Verification: Address verification
Input Date: 11/16/2004
System: *UTM - Nad83, Zone15, Meters*
X: 439964 **Y:** 4938642

Nearest Known Source of Contamination
50 feet N direction Septic tank/drain field type
Well disinfected upon completion? ☑ Yes ☐ No

Pump ☐ Not Installed Date Installed 02/18/1999
Manufacturer's name AERMOTOR Model number A12-50 HP 1.5 Volts 230
Length of drop Pipe 273 ft. Capacity 12 g.p.m Type Submersible Material

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

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

First Bedrock
Last Strat sand-brown
Aquifer Quat. Buried Unconf. Aquife
Depth to Bedrock ft.

Well Contractor Certification

Hartmann Well Co.	40174	HARTMANN, B.
License Business Name	Lic. Or Reg. No.	Name of Driller

County Well Index Online Report **625572** Printed 3/18/2015
HE-01205-07

Minnesota Unique Well No.

647239

County Scott
Quad Belle Plaine South
Quad ID 91D

MINNESOTA DEPARTMENT OF HEALTH

WELL AND BORING RECORD

Minnesota Statutes Chapter 103I

Entry Date 08/24/2001
Update Date 03/11/2005
Received Date

Well Name STIER, DALE

Township Range Dir Section Subsections Elevation 971 ft.

113 24 W 18 BAADAD **Elevation Method** CALC FROM 2-FOOT COUNTY DEM

Well Depth	Depth Completed	Date Well Completed
291 ft.	291 ft.	12/28/2000

Drilling Method Non-specified Rotary

Well Address
11510 SUSAN LA
BELLE PLAINE MN 56011

Drilling Fluid Water

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

Use Domestic

Geological Material	Color	Hardness	From	To
CLAY	TAN	MEDIUM	0	21
CLAY	GRAY	MEDIUM	21	93
STONEY CLAY	GRAY	HARD	93	193
HARDPAN	GRAY	V.HARD	193	243
SAND	GRAY	MEDIUM	243	291

Casing Type Steel (black or low carbon) **Joint** Threaded **Drive Shoe?** ☑ Yes ☐ No **Above/Below** ft.

Casing Diameter	Weight	Hole Diameter
4 in. to 283 ft.	11 lbs./ft.	6.75 in. to 280 ft.

Open Hole from ft. to ft.

Screen YES **Make** JOHNSON **Type** stainless steel

Diameter	Slot/Gauze	Length	Set Between
4	12	8	283 ft. and 291 ft.

Static Water Level
246 ft. from Land surface Date Measured 12/28/2000

PUMPING LEVEL (below land surface)
ft. after 1 hrs. pumping 25 g.p.m.

Well Head Completion
Pitless adapter manufacturer MONITOR Model 6PS45
☐ Casing Protection ☐ 12 in. above grade
☐ At-grade (Environmental Wells and Borings ONLY)

NO REMARKS

Grouting Information Well Grouted? ☑ Yes ☐ No ☐ Not Specified

Grout Material: High solids bentonite from 0 to 150 ft. 8 bags

Located by: Minnesota Geological Survey
Method: Digitization (Screen) - Map (1:24,000)
Unique Number Verification: Address verification
Input Date: 11/16/2004
System: *UTM - Nad83, Zone15, Meters*
X: 439914 **Y:** 4938784

Nearest Known Source of Contamination
60 feet South West direction Septic tank/drain field type
Well disinfected upon completion? ☐ Yes ☐ No

Pump ☐ Not Installed Date Installed
Manufacturer's name FLINT & WALLING Model number 1BA10 HP 1 Volts 220
Length of drop Pipe 266 ft. Capacity 15 g.p.m Type Submersible Material

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

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

Well Contractor Certification

License Business Name	Lic. Or Reg. No.	Name of Driller
Geib Well Co.	72027	GEIB, S.

First Bedrock
Last Strat sand-gray
Aquifer Quat. Buried Unconf. Aquife
Depth to Bedrock ft.

County Well Index Online Report **647239** Printed 3/18/2015
HE-01205-07

Minnesota Unique Well No.

666275

County Scott
Quad Belle Plaine South
Quad ID 91D

MINNESOTA DEPARTMENT OF HEALTH

WELL AND BORING RECORD

Minnesota Statutes Chapter 103I

Entry Date 05/30/2002
Update Date 03/11/2005
Received Date

Well Name HARTMANN, JOE

Township	Range	Dir	Section	Subsections	Elevation	Elevation Method
113	24	W	18	BADABA	989 ft.	CALC FROM 2-FOOT COUNTY DEM

Well Depth	Depth Completed	Date Well Completed
320 ft.	320 ft.	03/18/2002

Drilling Method Non-specified Rotary

Well Address
11525 SUSAN LA
BELLE PLAINE MN 56011

Drilling Fluid Bentonite

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

Use Domestic

Geological Material	Color	Hardness	From	To
CLAY	YELLOW		0	23
CLAY SAND	GRAY		23	250
SAND	BRN/GRY		250	295
SAND	BROWN		295	320

Casing Type Steel (black or low carbon) **Joint** Threaded **Drive Shoe?** ☑ Yes ☐ No **Above/Below** ft.

Casing Diameter	Weight	Hole Diameter
4 in. to 287 ft.	11 lbs./ft.	6.25 in. to 287 ft.

Open Hole from 0 ft. to 0 ft.

Screen YES **Make** JOHNSON **Type** stainless steel

Diameter	Slot/Gauze	Length	Set Between
3	10	34	287 ft. and 320 ft.

Static Water Level
250 ft. from Land surface Date Measured 03/18/2002

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

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

NO REMARKS

Located by: Minnesota Geological Survey
Method: Digitization (Screen) - Map (1:24,000)
Unique Number Verification: Address verification
Input Date: 11/16/2004
System: *UTM - Nad83, Zone15, Meters*
X: 439843 **Y:** 4938714

Grouting Information Well Grouted? ☑ Yes ☐ No ☐ Not Specified

Grout Material: High solids bentonite from 10 to 40 ft. 2 bags

Nearest Known Source of Contamination
35 feet North West direction Storage areas type
Well disinfected upon completion? ☑ Yes ☐ No

Pump ☐ Not Installed Date Installed 03/26/2002
Manufacturer's name F&W Model number ___ HP 0.5 Volts 220
Length of drop Pipe 273 ft. Capacity 19 g.p.m Type Submersible Material

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

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

First Bedrock
Last Strat sand-brown
Aquifer Quat. Buried Artes. Aquifer
Depth to Bedrock ft.

Well Contractor Certification

License Business Name	Lic. Or Reg. No.	Name of Driller
Bohn Well Co.	70350	VON BANK, B.

County Well Index Online Report **666275** Printed 3/18/2015
HE-01205-07

Minnesota Unique Well No.

676895

County Scott
Quad Belle Plaine South
Quad ID 91D

MINNESOTA DEPARTMENT OF HEALTH

WELL AND BORING RECORD

Minnesota Statutes Chapter 103I

Entry Date 12/12/2002
Update Date 02/18/2005
Received Date

Well Name HAGEN, SCOTT

Township	Range	Dir	Section	Subsections	Elevation	Elevation Method
113	24	W	18	BADAAC	992 ft.	CALC FROM 2-FOOT COUNTY DEM

Well Depth	Depth Completed	Date Well Completed
358 ft.	358 ft.	08/27/2002

Drilling Method Non-specified Rotary

Well Address
11505 SUSAN LA
BELLE PLAINE MN

Drilling Fluid Water

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

Use Domestic

Geological Material	Color	Hardness	From	To
CLAY	BLUE	SOFT	0	60
CLAY	BLUE	MEDIUM	60	180
CLAY & SAND LAYERS	BLUE	MEDIUM	180	258
CLAY	WHT/GRY	HARD	258	350
SAND	BROWN	MEDIUM	350	358

Casing Type Steel (black or low carbon) **Joint** Threaded **Drive Shoe?** ☑ Yes ☐ No **Above/Below** ft.

Casing Diameter	Weight	Hole Diameter
4 in. to 353 ft.	11 lbs./ft.	6 in. to 352 ft.

Open Hole from ft. to ft.

Screen YES **Make** JOHNSON **Type** stainless steel

Diameter	Slot/Gauze	Length	Set Between
3.5	12	5	353 ft. and 358 ft.

Static Water Level
250 ft. from Land surface Date Measured 08/14/2002

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

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

NO REMARKS

Grouting Information Well Grouted? ☑ Yes ☐ No ☐ Not Specified

Grout Material: High solids bentonite from 0 to 352 ft. 4 bags

Located by: Minnesota Geological Survey
Method: Digitization (Screen) - Map (1:24,000)
Unique Number Verification: Address verification
Input Date: 11/16/2004
System: *UTM - Nad83, Zone15, Meters*
X: 439881 **Y:** 4938687

Nearest Known Source of Contamination
61 feet S direction Septic tank/drain field type
Well disinfected upon completion? ☑ Yes ☐ No

Pump ☐ Not Installed Date Installed 08/27/2002
Manufacturer's name AERMOTOR Model number S12-150 HP 1.5 Volts 230
Length of drop Pipe 270 ft. Capacity 12 g.p.m Type Submersible Material

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

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

First Bedrock
Last Strat sand-brown
Aquifer Quat. Buried Artes. Aquifer
Depth to Bedrock ft.

Well Contractor Certification

License Business Name	Lic. Or Reg. No.	Name of Driller
Hartmann Well Co.	40174	PETERSON, D

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HE-01205-07

Minnesota Unique Well No.

677931

County Scott
Quad Belle Plaine South
Quad ID 91D

MINNESOTA DEPARTMENT OF HEALTH

WELL AND BORING RECORD

Minnesota Statutes Chapter 103I

Entry Date 01/16/2003
Update Date 09/29/2005
Received Date

Well Name KYES, CORY

Township Range Dir Section Subsections Elevation 978 **ft.**

113	24	W	18	BAADAC	**Elevation Method**	7.5 minute topographic map (+/- 5 feet)

Well Depth	Depth Completed	Date Well Completed
288 **ft.**	288 **ft.**	11/05/2002

Drilling Method Non-specified Rotary

Well Address
11520 SUSAN LA
BELLE PLAINE MN

Geological Material	Color	Hardness	From	To
CLAY	TAN	MEDIUM	0	24
CLAY	GRAY	MEDIUM	24	124
CLAY - STONY ROCKY	GRAY	M.HARD	124	224
CLAY - SAND	TAN	HARD	224	280
SAND	TAN	SOFT	280	288

Drilling Fluid Bentonite

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

Use Domestic

Casing Type Steel (black or low carbon) **Joint** Threaded **Drive Shoe?** ☑ Yes ☐ No **Above/Below** **ft.**

Casing Diameter	Weight	Hole Diameter
4 in. to 282 ft.	lbs./ft.	6.5 in. to 282 ft.

Open Hole from ft. to ft.

Screen YES **Make** JOHNSON **Type** stainless steel

Diameter	Slot/Gauze	Length	Set Between
4	12	7	282 ft. and 288 ft.

Static Water Level
248 ft. from Land surface Date Measured 11/05/2002

PUMPING LEVEL (below land surface)
250 ft. after 1 hrs. pumping 15 g.p.m.

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

NO REMARKS

Located by: Minnesota Geological Survey
Method: Digitization (Screen) - Map (1:24,000)
Unique Number Verification: Address verification
Input Date: 07/19/2005
System: *UTM - Nad83, Zone15, Meters*
X: 439882 **Y:** 4938782

Grouting Information Well Grouted? ☑ Yes ☐ No ☐ Not Specified

Grout Material: High solids bentonite from 0 to 110 ft. 6 bags

Nearest Known Source of Contamination
54 feet N direction Septic tank/drain field type
Well disinfected upon completion? ☑ Yes ☐ No

Pump ☐ Not Installed Date Installed
Manufacturer's name Model number HP Volts
Length of drop Pipe ft. Capacity g.p.m Type Material

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

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

First Bedrock
Last Strat sand-brown
Aquifer Quat. Buried Artes. Aquifer
Depth to Bedrock **ft.**

Well Contractor Certification

Geib Well Co.	72027	GEIB, S
License Business Name	Lic. Or Reg. No.	Name of Driller

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HE-01205-07