Part II Wellhead Protection Plan

Potential Contaminant Inventory, Goals, and Management Strategy

City of Brownton, Minnesota

BROTN 152972 | June 20,2020

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City of Brownton, Minnesota

SEH No. BROTN 152972

June 20, 2020

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Glossary of Terms

Data Element

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

Drinking Water Supply Management Area (DWSMA)

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

Drinking Water Supply Management Area Vulnerability

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

Emergency Response Area (ERA)

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

Inner Wellhead Management Zone (IWMZ)

The land that is within 200 feet of a public water supply well (Minnesota Rules, part 4720.5100, subPart I9). The public water supplier must manage the IWMZ to help protect it from sources of pathogen or chemical contamination that may cause an acute health effect.

Potential Contaminant Source Inventory (PCSI)

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

Surface Water Contribution Area (SWCA)

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

Wellhead Protection (WHP)

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

Wellhead Protection Area (WHPA)

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

Well Vulnerability

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

Acronyms

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

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Part II Wellhead Protection Plan

Potential Contaminant Inventory, Goals, and Management Strategy

Prepared for the City of Brownton

1 Introduction

The wellhead protection (WHP) plan for the City of Brownton was prepared in cooperation with the Minnesota Department of Health (MDH). It contains specific actions that the city will take to fulfill WHP requirements that are specified under Minnesota Rules, part 4720.5100 to 4720.5590. Also, the support that federal, state, and local agencies will provide is presented to identify their roles in protecting the city's drinking water supply. The Plan was developed for the City's municipal wells identified in **Table 1** and is effective for 10 years after the approval date specified by MDH. The city is responsible for implementing its WHP plan of action as described in **Table 13** of this report. Furthermore, the city will evaluate the status of plan implementation at least every two and one half years to identify whether its WHP plan is being implemented on schedule.

1.1 Report Contents

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

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

1.2 Content of Appendices

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

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

Appendix B contains the final Part I of the Plan completed in 2019 by the MDH. Part I of the Plan is summarized in **Section 3**. In Part I of the Plan, the WHPA and DWSMA were delineated, and vulnerability assessments of the wells and corresponding DWSMA were based on data available on the source water aquifer used by the municipal wells.

Appendix C contains the inventory of potential contamination sources that may present a risk to the city's drinking water. This part of the Plan is discussed in **Section 3** in terms of assigning risk

to the city's water supply and is discussed as issues, problems or opportunities summarized in **Section 6**.

Appendix D contains the water contingency strategy for the City of Brownton. This is a resource compiling equipment, contractors, alternative water sources and other emergency strategies.

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

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

1.3 General Information

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

Public Water Supply

- Name: City of Brownton PWSID # ***1640002***
- Address: 335 3rd Street South, City of Brownton, MN 55312

Wellhead Protection Manager

- Chad Draeger, Water Distribution Operator
- Address: 335 3rd Street South, City of Brownton, MN 55312
- Telephone: Office: (320)583-6264

Wellhead Protection Member

- Lori Cacka, City Clerk
- Address: 335 3rd Street South, City of Brownton, MN 55312
- Telephone: Office: (320)328-5318
- Email: cityclerk@cityofbrownton.com

Minnesota Department of Health – Source Water Protection Planner

- Karen Voz, Principal Planner
- Address: 3333 W Division District Office, Suite 212, St Cloud, MN 56301-4557
- Telephone: Office: (320)223-7322 Ext 800 | Fax: (320)252-0567
- Email: Karen.s.voz@state.mn.us | Web: https://www.health.state.mn.us/communities/environment/water/swp/index.htm

Wellhead Protection Consultant

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- Telephone: Office: (651)490.2000 | Fax: (888)908-8166
- Email: msherrill@sehinc.com & mniday@sehinc.com | Web: www.sehinc.com

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

2.1 WHPA and DWSMA Delineation

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

The WHPAs are defined by a 10-year time of travel, furthermore the DWSMA is defined by correlating the WHPAs to the outer extent of geographically identifiable features or administrative boundaries. The WHPAs and DWSMA are shown on **Figure 1**. Additionally, **Figure 1** shows the emergency response areas (ERAs), which are defined by a 1-year time of travel and the IWMZ, which are defined by the area within a 200-foot radius around each well. Definitions of rule-specific terms that are used are provided in the "Glossary of Terms."

2.2 DWSMA Vulnerability Assessment

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

An assessment of DWSMA vulnerability was completed in Part I. Boring logs available for wells within the DWSMA were reviewed for the presence of confining units such as clay thicknesses. Geologic cross-sections were developed and used to evaluate and interpret the extent of confining layers to act as a protective layer within tertiary sediment and bedrock aquifers.

MDH guidance (MDH, 1997) was followed in determining the DWSMA vulnerability. L-scores were calculated based upon geologic sensitivity guidelines developed by the Minnesota DNR for wells within the DWSMA (Geologic Sensitivity Project Workgroup, 1991). Boring logs for the wells within the DWSMA were reviewed for total depth and soil and bedrock classification. Geologic Sensitivities were then determined for each of the wells and the results were used for assessing vulnerability during the Part I WHPP.

From this assessment the DWSMA was assigned low vulnerability. **Figure 2** shows vulnerability for the DWSMAs.

MDH has determined the following definitions for the Low vulnerabilities found within the DWSMA:

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

3 Data Elements and Assessment

3.1 Required Data Elements

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

The first scoping meeting, held on March 13th, 2018, addressed the data elements that were needed to support the delineation of the WHPA, the DWSMA, and the well and DWSMA vulnerability assessments. The second scoping meeting, held on October 29th, 2019, discussed the data elements required to 1) identify potential risks to the public water supply and 2) develop effective management strategies to protect the public water supply in relation to the well and DWSMA vulnerability. The results of each meeting were communicated to the city by MDH through a formal scoping decision notice. The formal scoping decision notice for the Part II WHPP is included in **Appendix A**.

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

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

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

3.2 Physical Environment

3.2.1 Geology

Geology is a required data element and was described in the Wellhead Protection Plan Part I prepared by the MDH (August, 2019), which is included in **Appendix B**, and is also summarized below.

The City of Brownton draws groundwater from a Quaternary Buried Artesian Aquifer approximately 210 feet below the land surface. Throughout McLeod County, bedrock is overlain by unconsolidated Quaternary sediments deposited by several glacial ice advances during the Pleistocene Epoch. Sand and gravel beds, laid down by meltwater flowing from these glaciers, form most of the aquifers in McLeod County. Unsorted sediment deposited directly from the ice, termed till, and fine-grained clay- and silt-rich bedded sediment deposited in ponded meltwater in front of the glaciers, form confining layers that enclose the aquifers (Lusardi, 2009). The till

layers left by each ice sheet tend to be more laterally persistent than the sand layers because ice typically spread across the entire county, whereas meltwater streams that deposited the sand and gravel were generally confined to drainages at the lower elevations (Lusardi, 2009). As glacial ice and meltwater deposited sediments, it also eroded older, underlying sediments. The net effect of this depositional and erosional activity is that sand and gravel bodies that provide water to wells in McLeod County tend to be laterally discontinuous (Lusardi, 2009).

At Brownton's municipal wells, the aquifer is approximately 85 feet thick, and the wells are screened over 20-30 feet of this thickness. The continuity of this unit is not well-defined locally, as there are a minimal number of wells completed at that same depth as the city's wells. Groundwater in the aquifer is generally flowing southeast towards the Minnesota River. The aquifer is overlain by 200 feet of fine-grained material (clay, sandy clay) and is underlain by at least six feet of clay.

3.2.2 Water Resources

An existing map showing those areas delineated as floodplain is required to be discussed in this plan. Floodplains can help identify areas where surface water may directly enter the source water aquifer by recharge through submerging the top of private and municipal well locations. This direct infiltration of surface water can bring surface material directly to the source water aquifer and may adversely impact water quality. The Federal Emergency Management Agency (FEMA) provides a map of 100-year FIRM (Flood Insurance Rate Map) and are depicted on **Figure 7**. Some areas of 100-year floodplain, 500 year flood-plain and a Floodway is depicted within the DWSMA. Locally, within the City of Brownton no flood zones or areas of standing water are typical around the well field. This is largely due to the fact that a railroad runs along the north side of town. The tracks are elevated on a Berm, which helps to prevent flood waters reaching the city. Additionally, City staff are not aware of the City of Brownton ever recording flood water within City streets.

3.3 Land Use

3.3.1 Parcels & Other Boundaries

Figure 3 shows the parcel, nearby political boundaries including township section range within and around the DWSMA for the City of Brownton. Detailed parcel information can be accessed by visiting the McLeod County Interactive mapping software. Parts of the DWSMA are located outside of the City's municipal boundaries, falling within the Township of Sumter and Collins and McLeod County. Portions of sections 16, 15, 21, and 22 within Township 111 and Range 34 intersect the DWSMA. Management of the entire DWSMA must reflect what is known about parcel and municipal boundaries.

3.3.2 Land Cover, Zoning and Land Use

Zoning for the DWSMA is under the ordinances, planning, and jurisdiction of the City of Brownton, McLeod County and the Townships of Sumter and Collins. Zoning for McLeod County and the City of Brownton are included as part of this plan. A detailed breakdown of City of Brownton Zoning, McLeod County Zoning, and Land Cover (NLCD 2016) are depicted in **Figures 4, 5 and 6**, and are summarized in **Tables 3, 4, and 5**. Land use changes over the lifetime of this plan are expected to be minimal and no changes in land use controls within the DWSMA are expected. Therefore, the existing zoning exhibit also depict future land use and future zoning for the purpose of this plan, and fulfills the data element requirement for submitting an existing

comprehensive land-use map. Land use over the course of this plan is not expected to affect the quality or quantity of water for the source water aquifer.

3.3.3 Public Utility Services

Management of the entire DWSMA shall consider the following data elements:

- An existing record of construction, maintenance, and use of the public water supply well(s) and other wells within the drinking water supply management area.
  - The public water supply system utilizes two municipal wells. These two active wells, Brownton Well 1 (#210336) and Brownton Well 2 (#105587) were constructed in 1959 and 1977, respectively. Only routine maintenance on the wells have been conducted over the lifespan of the wells. Construction information for Well #2 meets current state Well Code specifications (Minnesota Rules, part 4725), meaning that the wells themselves should not provide a pathway for contaminants to enter the aquifer used by the public water supplier.
  - One old municipal wells at the creamery is recorded as being sealed. This record is included in **Appendix F**.
  - Other test wells and private wells are located throughout the City of Brownton and the surrounding DWSMA. The City of Brownton prefers that all private owners connect properties to the water supply system; however, such activity is not mandated by the City at this time.

  All wells that are within the DWSMA are discussed in **Section 4**, depicted in **Figure 6** and listed in **Appendix C**. Detailed information on old municipal wells are included in **Appendix F**.

3.3.4 Potential Contaminant Sources

Mapping and an inventory of the current and historical agricultural, residential, commercial, industrial, recreational, institutional land uses, potential contaminant sources, and Inner Wellhead Management Zone Survey (IWMZ) have been completed**.** Potential Contaminant Sources are described in detail in **Section 4**. The inventory, mapping and management of land uses and potential sources of contamination for the DWSMA reflect what is known about these data elements, as follows:

Low Vulnerability

2. All potential contaminant sources as listed on Low Vulnerability PCSI Requirements. [Inventory wells 200 feet in depth to the bottom of the well and deeper; and wells of undocumented or unknown depths].
   - Detailed in **Appendix C** and depicted on **Figure 8**.
3. A land use/land cover map and table
   - Depicted on **Figures 4, 5 and 6** and detailed in **Tables 3, 4 and 5**.
4. Inventory of the Inner Wellhead Management Zone (IWMZ)
   - Detailed in **Appendix E** and listed on **Table 6**.

3.4 Water Quantity

3.4.1 Groundwater Quantity

Management of the entire DWSMA shall consider the following data elements:

- An existing list of wells covered by state appropriation permits, including amounts of water appropriated, type of use, and aquifer source.
  - High capacity wells are provided from the MNDNR Permitting and Reporting System (MPARS). Five high capacity well permits are listed within a two mile radius of the DWSMA for groundwater resources. Three of these permits are for the City of Brownton's municipal supply. The other two are listed for the Brownton Coop and Tongen Farm. There is no record for water quantity used for these wells. High capacity wells have the potential to adversely affect water quantity in the source water aquifer.
- An existing description of known well interference problems and water use conflicts are required as part of this plan.
  - At the time of this plan's implementation there were no currently known well interference problems or water use conflicts. Little information is known about the water quantity in this region. Continued measurements of the City of Brownton's static and pumped water levels should be monitored for any such problem.
- An existing list of State Environmental bore holes, including unique well number, aquifer measured, years of record, and average monthly levels.
  - The MDH tracks wells and bore holes information through the Minnesota Well Index (MWI). Information from the MWI are included in **Appendix C** and detailed in the PCSI part of this plan.

3.5 Water Quality

3.5.1 Groundwater Quality

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

- An existing summary of water quality data, including: 1) bacteriological contamination indicators; 2) Inorganic chemicals; and 3) organic chemicals. Samples from the City of Brownton water supply system are routinely collected and analyzed by the MDH as required under the Minnesota Public Water Supply Program and the federal *Safe Drinking Water Act*.
  - The samples from the water supply system distribution are tested for microorganisms, inorganic compounds, organic chemicals, pesticides and herbicides, and radioactive contaminants. No contaminants were detected at levels that exceed federal drinking water standards or the Minnesota Department of Health: Health Based Guidelines. There are currently no known issues related to the quality of the water obtained by the public water supply wells.
- An existing list of water chemistry and isotopic data from wells, springs, or other groundwater sampling points isotopic and water chemistry data.
  - Water samples were collected from Well #1 (210336) and Well #2 (105587) and were analyzed for tritium, nitrate, chloride, and bromide. No tritium or nitrate was detected in the samples, confirming the non-vilnerable nature of the wells. In addition, the chloride and bromide results confirm that the wells have not been impacted by land-use activities.
- An existing report of groundwater tracer studies.

- At the time of this plan's implementation no known tracer studies have been conducted.

4 Assigning Potential Contamination Sources

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

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

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

4.1.1 Aquifers

The source water aquifers were found in the WHPP Part I (**Appendix B**) to have low vulnerability. As described in **Section 3.2.2**, the City utilizes a Quaternary Buried Artesian Aquifer (QBAA). Due to the abundance of confining units overlaying the source water aquifers, there is limited connection for contaminated surface water to directly recharge the source water aquifers. Additional water chemistry and isotope analysis discussed in the Part I WHPP supports that the confining units help to prevent surface contamination from reaching the source water aquifers. There is no known water quantity issues, however the amount of subsurface data is limited to support any such claims. The City should continue to monitor static and pumped water levels in the wells and submit this data to the MDH. Additionally, the Minnesota Department of Health has requested that an Aquifer Test be completed. Description for this test is listed in Table 13 measure of this plan. Lastly, the potential contaminant sources identified as part of this plan can help identify, manage, limit, and prevent future anthropogenic alteration to the drinking water quality and quantity.

4.1.2 Land Use

Zoning for the DWSMA is under the ordinances, planning, and jurisdiction of the City of Brownton, McLeod County, and the Townships of Sumter and Collins. Changes in land use have the potential to introduce pathways or sources of contamination to the source water aquifers. Industrial or agricultural land uses may also use large quantities of water and require a MnDNR appropriations permit. If so, such water users may increase the water consumption in the source water aquifer. Overuse of water, where losses outpace the recharge of new water, from the source water aquifer may lead to drawdowns in the aquifer and depletion of potable water. Many of the properties within the City of Brownton limits within the DWSMA are developed with

commercial and residential land-uses. Although residential and business properties may continue to develop, no major changes in land use are anticipated for the areas including the municipal wells and DWSMA in the next 10 years. Land use/zoning and future zoning within the DWSMA is depicted on **Figures 4, 5 and 6**. The City of Brownton is unaware of any proposed large-scale land use changes within the DWSMA that could potentially impact the municipal wells or source water aquifers.

4.1.3 Well Water

This Plan is primarily concerned with potential contaminant sources near the public water supply wells and within the DWSMA that pose a risk for causing groundwater contamination that could viably impact the source water aquifers and/or public water supply wells. Private and public wells can both impact the quality or quantity of the source water aquifer. Wells that penetrate confining layers can act as a preferential pathway, or conduit, for potential contaminant sources to reach the source water aquifer. Additionally, wells that draw large quantity of water from the source water aquifer has the possibility to adversely affect source water quantity.

This wellhead protection plan is also concerned with other unsealed water supply wells at depth greater than 200 feet that is located within the DWSMA. The MDH provides a database with indexed wells known as the Minnesota Well Index (MWI) within the DWSMA to be included as part of this PCSI. Wells within the DWSMA may extend into the source water aquifer and if improperly constructed or maintained could transmit contaminants into the aquifer. The City of Brownton helped to verified locations of all unknown or unverified well locations. Multiple properties within the DWSMA were identified as having wells that are not included within the MWI. These locations are presumed to be on the correct county parcel. Wells inventoried as part of this plan are included in **Appendix C** and depicted on **Figure 8**.

At the time of this plans creation, The City of Brownton and The Minnesota Department of Health verified that previous wellhead protection efforts sealed an old City well listed at the creamery. These records can be obtained from the Source Water Protection department of the Minnesota Department of Health and are also attached in **Appendix F**. Other old municipal wells may be present within the City of Brownton. If any such wells are found and are unused and unsealed these locations should be pursued to be sealed. The Minnesota Department of Health provides the Old Municipal well data from the Minnesota Department of Health to aid in locating and identifying old municipal wells. Old Municipal well data is included as part of the MDH Public Water Supply Sources Report - OMW summary **Appendix F**.

The placement of additional high-capacity wells, increased pumping from existing wells, or significant changes in current groundwater appropriations within the DWSMA may have an impact on groundwater availability to all users, or increased risk that contamination may enter the part of the aquifer used by the public water supply wells. At this time there are no known high capacity wells within the DWSMA.

4.2 Inventory Results and Risk Assessment

A map and description of the locations of potential contamination sources are presented in **Appendix C** and depicted on **Figure 8** as described in detail under **Section 4.1**. Inventory results also considered the following: 1) a summary of the results for the IWMZ (listed in **Table 6**), and 2) for the remainder of the DWSMA (**Table 7**).

The priority assigned to each type of potential contamination source addresses each of the following: 1) the number inventoried; 2) its proximity to a City well; 3) the capability of local

geologic conditions to absorb a contaminant; 4) the effectiveness of existing regulatory controls; and 5) the time required for the City of Brownton to obtain cooperation from governmental agencies that regulate it.

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

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

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

4.2.1 Data Accuracy and Limitations

For this plan, the City of Brownton has attempted to identify and specifically locate as many potential contaminant sources as possible and feasible given the current level of information and available resources. However, some potential contaminant sources may exist within the DWSMA that have not yet been identified or accurately located. Multiple private wells are presumed to be located within the DWSMA but not included within the MWI.

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

The City of Brownton anticipates minimal changes to the physical environment, land use, surface water, and groundwater may occur over the ten-year period that the WHP plan is in effect. Any changes must be considered to determine whether new potential sources of contamination may be introduced in the future and to identify future actions for addressing these anticipated sources. Land and water use changes may introduce new contamination sources or result in changes to groundwater use and quality. The anticipated changes may occur within the jurisdictional authority of the City of Brownton; however, some anticipated changes may occur outside the jurisdictional authority of the City of Brownton because the DWSMA extends into neighboring local government units jurisdiction.

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

6 Issues, Problems and Opportunities

6.1 Identification of Issues, Problems and Opportunities

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

The City assessed each of the following parameters: 1) input from public meetings and written comments that it received; 2) the data elements identified by MDH during the scoping meetings; and 3) and the status and adequacy of the city's official controls and plans on land use and water

uses, as well as those of local, state, and federal government programs. The results of this effort are presented in the **Table 9** which defines the nature and magnitude of contaminant source management issues in the city's DWSMA. Identifying the issues, problems and opportunities as well as resource needs enables the city to: 1) take advantage of opportunities that may be available to make effective use of existing resources; 2) set meaningful priorities for source management; and 3) solicit support for implementing specific source management strategies.

6.2 Comments Received

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

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

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

7.1 Existing City of Brownton Controls and Programs

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

7.2 Local Government Controls and Programs

Table 11 details departments or programs within the County that may be able to assist the city with issues relating to potential contamination sources that: 1) have been inventoried; or 2) may result from changes in land and water use within the DWSMA.

7.3 State Agency and Federal Agency Support

MDH will serve as the contact for enlisting the support of other state agencies on a case-by-case basis regarding technical or regulatory support that may be applied to the management of potential contamination sources. Participation by other state agencies and the federal government is based on legal authority granted to them and resource availability. Furthermore, MDH services include: 1) administration of state regulations that affect specific potential sources of contamination and 2) can provide technical assistance for property owners to comply with these regulations.

Table 12 identifies specific regulatory programs or technical assistance that state and federal agencies may provide to the City of Brownton to support implementation of its WHP plan. It is

likely that other opportunities for assistance may be available over the ten-year period that the Plan is in effect due to changes in legal authority or increases in funding granted to state and federal agencies. Therefore, the table references opportunities available when the city's WHP plan was first approved by MDH.

7.4 Support Provided by Nonprofit Organizations

A number of existing organizations work to support water management programs. One Watershed, One Plan (1W1P) a program through the Board of Water and Soil Resources (BWSR) was developed by the Local Government Water Roundtable (Association of Minnesota Counties, and the Minnesota Associations of Watershed Districts and Soil and Water Conservation Districts) which charges local governments with water management responsibilities to organize and develop focused implementation plans on a watershed scale. Other programs and strategies that can provide support are the Watershed Restoration and Protection Strategies (WRAPS) and Groundwater Restoration and Protection Strategies (GRAPS). The City of Brownton falls within the Buffalo Creek Watershed District and is under the jurisdiction of the Mcleod Water Conservation District which can provide assistance in education and outreach, monitoring, and cost-share opportunities. Similarly, Minnesota Rural Water Association also provides reference education and outreach materials for landowners.

8 Goals

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

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

9 Objectives and Plan of Action

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

Both the objectives and the wellhead protection measures (actions) that support them are based on assessing each of the following: 1) the data elements (**Section 3**, and **Appendix B**; 2) the PCSI (**Section 4 and Appendix C**); 3) the impacts that changes in land and water use present (**Section 5**); and 4) issues, problems, and opportunities related to administrative, financial, and technical considerations (**Section 6**).

9.1 Objectives

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

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

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

C. Support ongoing data collection efforts to enhance future WHP activities.

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

E. Manage the IWMZ to prevent contamination.

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

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

9.2 WHP Measures and Action Plan

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

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

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

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

The objective that each measure supports is noted as well as the following: lead party and any cooperators and the year or years in which it will be implemented. **Table 13** lists each measure that it will implement over the ten-year period that the city's WHP plan is in effect, as well as the priority that it has assigned to each measure.

10 Evaluation Program

Plan evaluation is specified under **Section 9.1** and provides the mechanism for determining whether WHP action items are achieving the intended result or whether they need to be modified to address changing administrative, technical, or financial resource conditions within the DWSMA. Evaluation is used to support plan implementation and is required under Minnesota

Rules, part 4720.5270, and prior to amending the city's WHP plan. The City has identified the following procedures that it will use to evaluate the success of implementing its WHP plan:

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

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

11 Contingency Strategy

The City of Brownton with the help of the Minnesota Department of Health developed a Conservation Plan in the case of emergency. The contingency strategy is a resource compiling equipment, contractors, alternative water sources and other emergency strategies. This plan is included in **Attachment D**.

12 References

City of Brownton Ordnances and Zoning Map

National Flood Hazard Layer (NFHL) GIS Services. Accessed 2020.

Minnesota Department of Health (MDH), County Well Index, www.health.state.mn.us/divs/eh/cwi/

Minnesota Geospatial Information Orthophotography, WMS service, *2018 Color FSA,* 2018.

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McLeod County Parcel and Zoning files. Accessed 2020.

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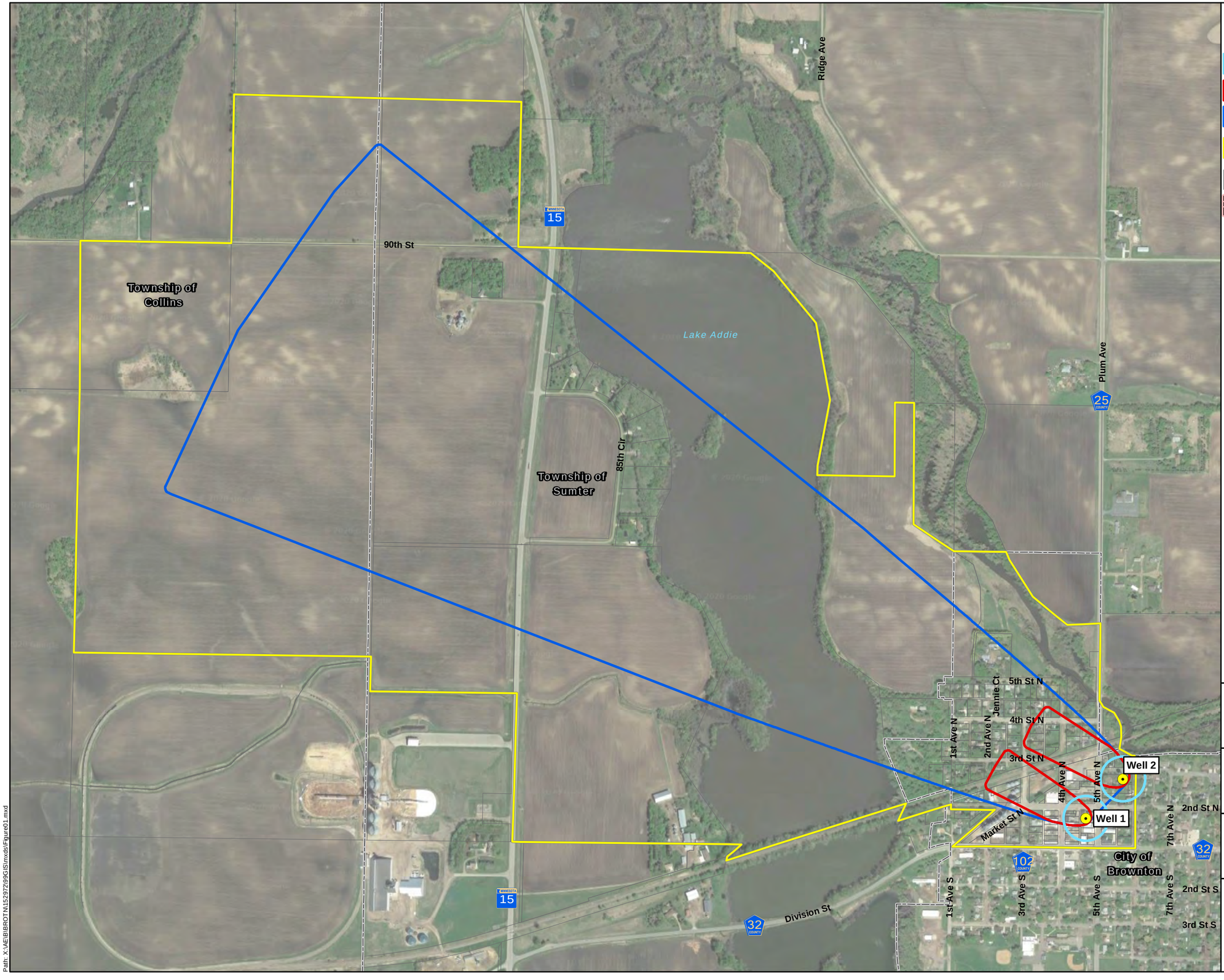

Legend

- Public Water Supply Well (Primary Well)
- Inner Wellhead Management Zone (IWMZ)
- Emergency Response Area (ERA)
- Wellhead Protection Area (WHPA)
- Drinking Water Supply Management Area (DWSMA)
- McLeod County Parcels
- Municipal & Township Boundary

Note: DWSMA intersects two Townships

0 350 700 1,050 Feet

Drinking Water Supply Management Area

Wellhead Protection Plan Part II
City of Brownton
McLeod County, Minnesota

SEH

Project: BROTN 152972
Print Date: 2/4/2020
Map by: Mark Sherrill
Projection: UTM Zone 15N
Source: SEH Digi, McLeod County, ESRI City of Brownton, MDH

Figure 1

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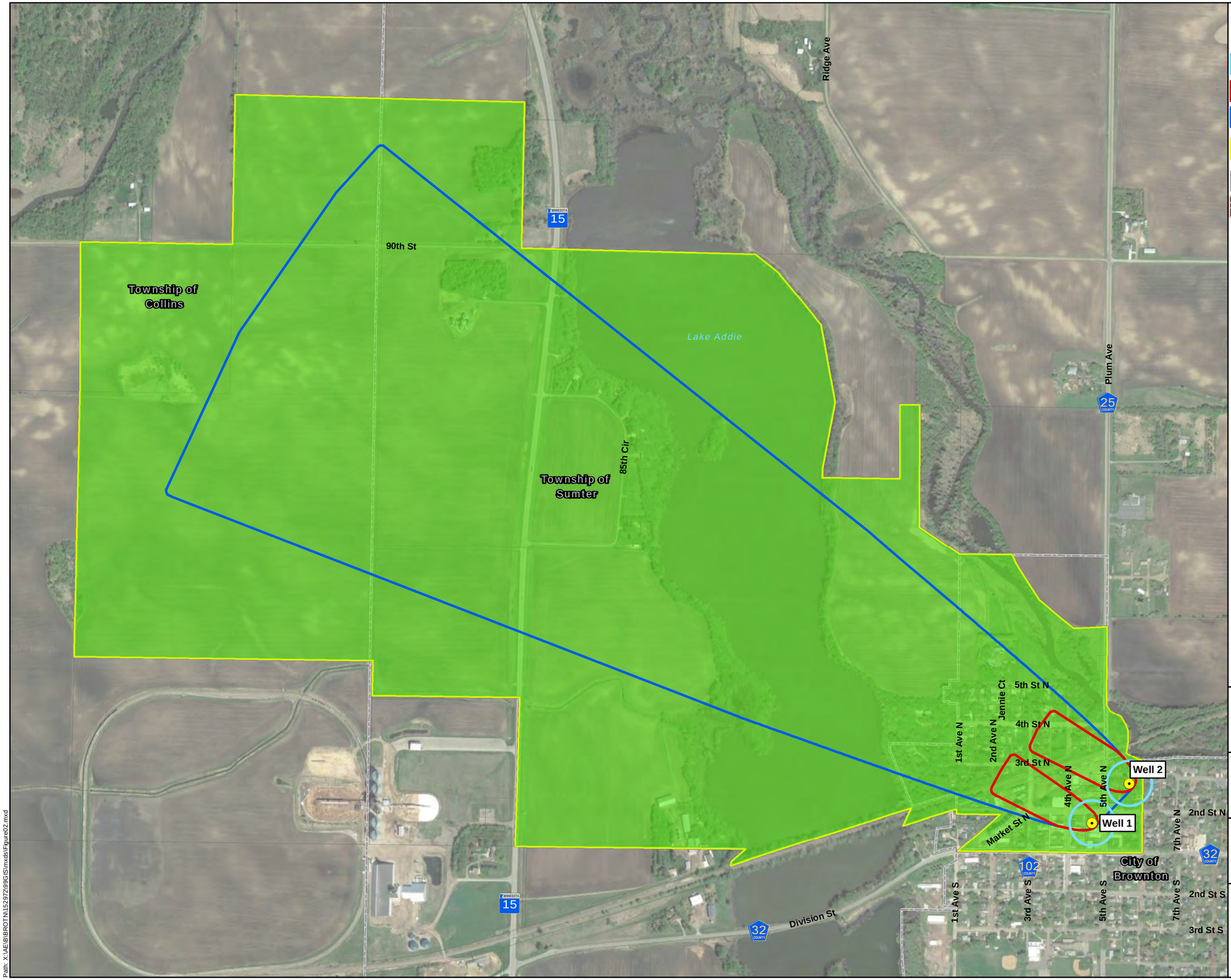

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Note: DWSMA intersects two Townships

DWSMA Vulnerability

- Low Vulnerability

0 350 700 1,050 Feet

DWSMA Vulnerability

Wellhead Protection Plan Part II
City of Brownton
McLeod County, Minnesota

SEH

Project: BROTN 152972
Print Date: 2/4/2020
Map by: Mark Sherrill
Projection: UTM Zone 15N
Source: SEH Digi, McLeod County, ESRI City of Brownton, MDH

Figure 2

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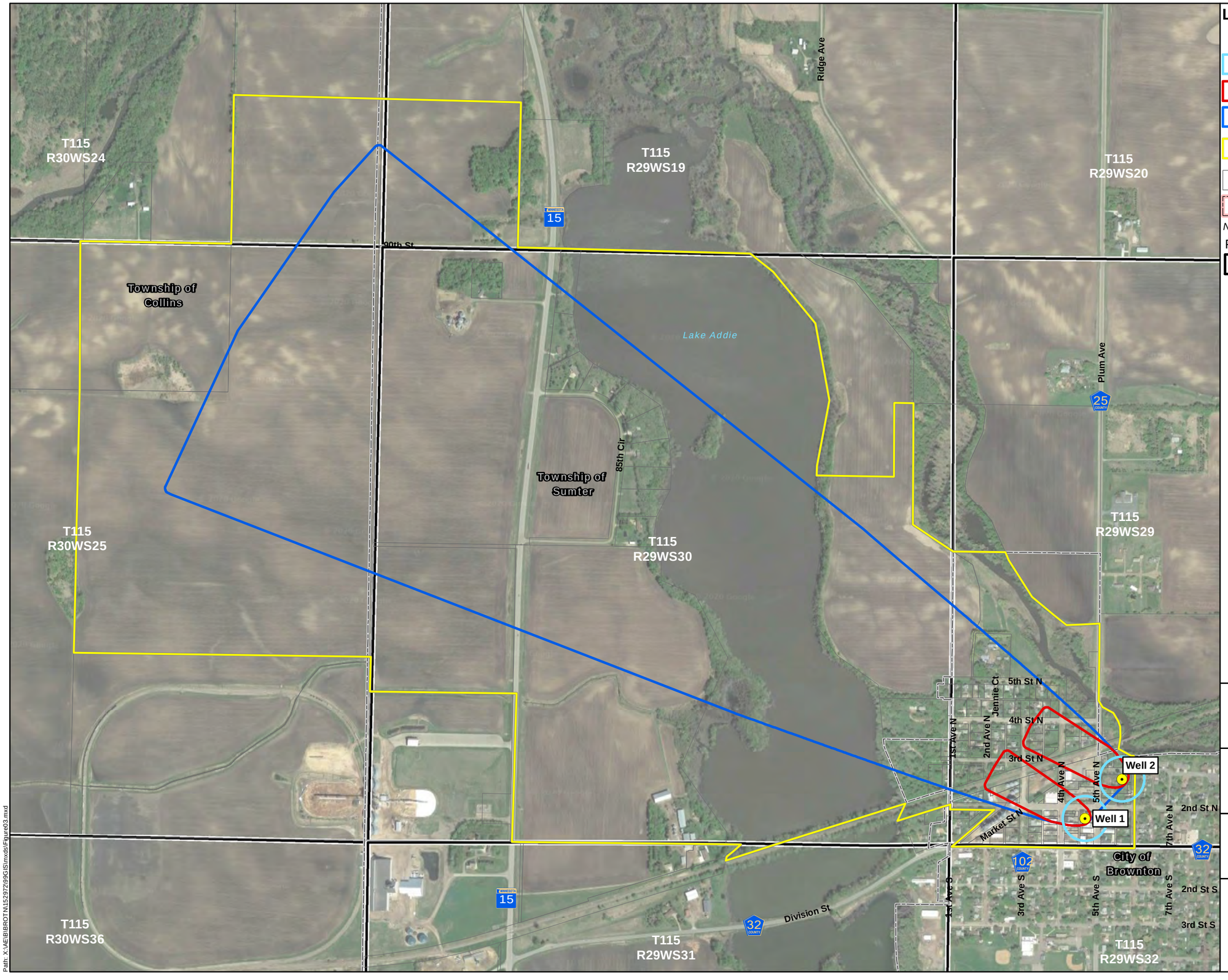

Legend

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- Municipal & Township Boundary

Note: DWSMA intersects two Townships

Public Land Survey

- Township Range Section

0 350 700 1,050 Feet

Political Boundaries

Wellhead Protection Plan Part II
City of Brownton
McLeod County, Minnesota

SEH

Project: BROTN 152972
Print Date: 2/4/2020
Map by: Mark Sherrill
Projection: UTM Zone 15N
Source: SEH Digi, McLeod County, ESRI City of Brownton, MDH

Figure 3

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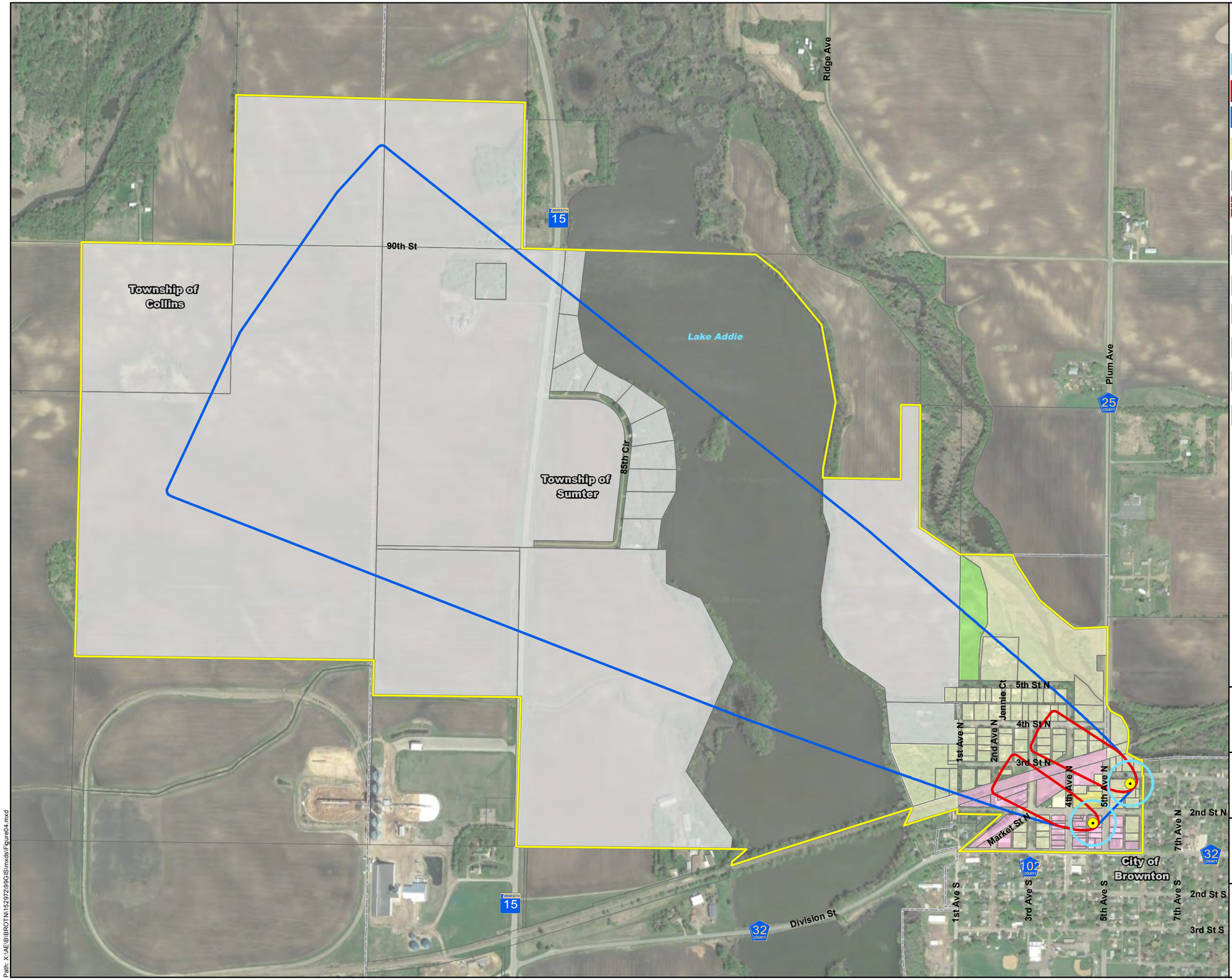

Legend

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- Municipal & Township Boundary

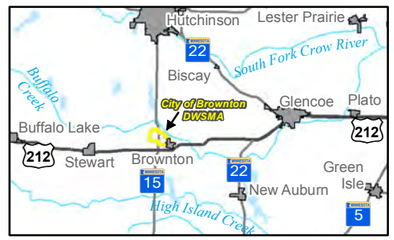
Note: DWSMA intersects two Townships

- County Zoned (Figure 5)

Brownton Zoning

- AG District - Agricultural District
- C-1 District - Retail & Light Commercial District
- R-I District - One Family Residential District
- R-2 District - Multi-family Residential District
- R-3 District - Multi-level, Multi-family Building Unit District

0 350 700 1,050 Feet



City Zoning

Wellhead Protection Plan Part II
City of Brownton
McLeod County, Minnesota

SEH

Project: BROTN 152972
Print Date: 3/2/2020
Map by: Mark Sherrill
Projection: UTM Zone 15N
Source: SEH Digi, McLeod County, ESRI City of Brownton, MDH

Figure 4

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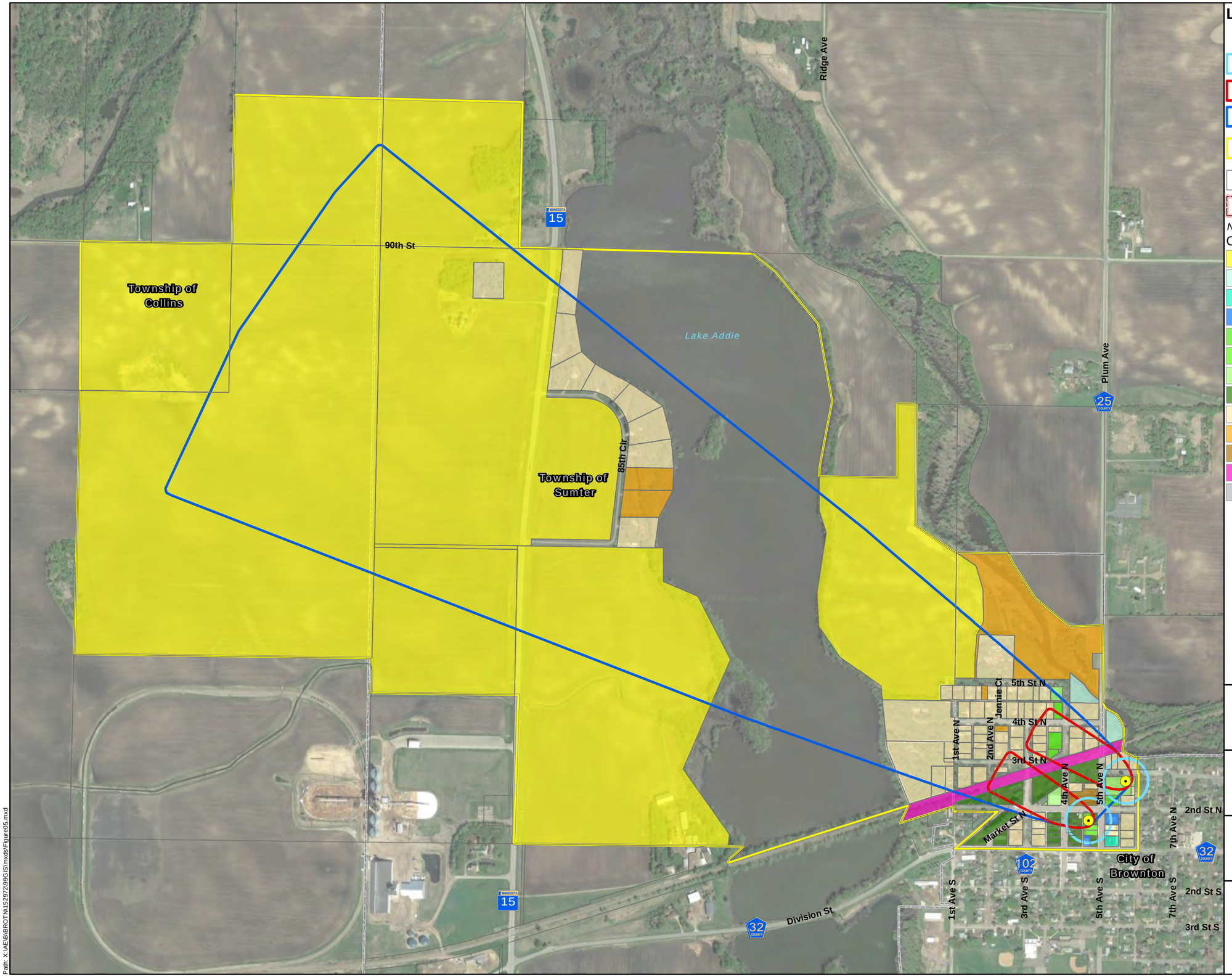

Legend

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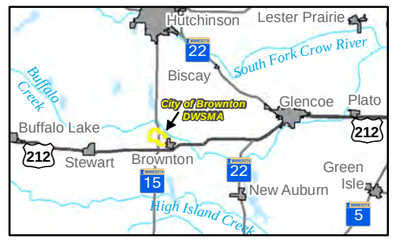
- McLeod County Parcels
- Municipal & Township Boundary

Note: DWSMA intersects two Townships

County Land Use

- AGRICULTURAL
- CEMETERY-PUBLIC
- CHURCH
- INDS LAND & BLDGS
- MUN LENFRC,FIRE,ADM
- MUNICIPAL PUB SERV
- MUNICIPAL PUB-OTHER
- COMM LAND & BLDGS
- RESIDENTIAL
- RES 1-3 UNIMPR LAND
- 4D 4 OR MORE UNITS
- RR LAND & BLDGS
- Tax Forfeit

0 350 700 1,050 Feet



McLeod County Land Use

Wellhead Protection Plan Part II
City of Brownton
McLeod County, Minnesota

SEH

Project: BROTN 152972
Print Date: 2/4/2020
Map by: Mark Sherrill
Projection: UTM Zone 15N
Source: SEH Digi, McLeod County, ESRI City of Brownton, MDH

Figure 5

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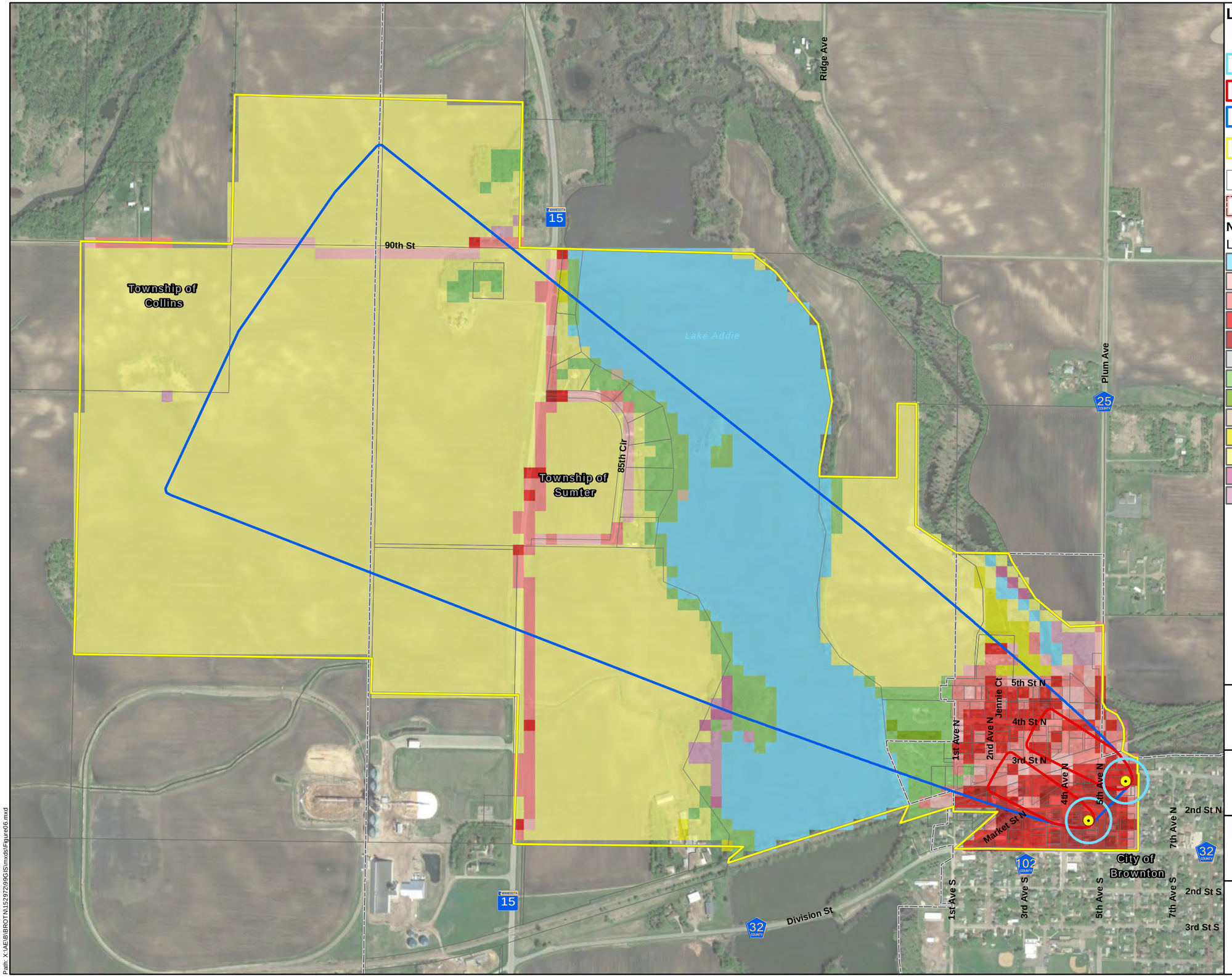

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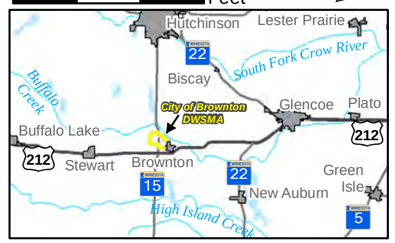
NLCD 2016 - Land Cover

Land Cover Class

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

0 350 700 1,050 Feet



2016 National Land Cover Database

Wellhead Protection Plan Part II
City of Brownton
McLeod County, Minnesota

SEH

Project: BROTN 152972

Print Date: 2/4/2020

Map by: Mark Sherrill
Projection: UTM Zone 15N
Source: SEH Digi, McLeod County, ESRI
City of Brownton, MDH

Figure 6

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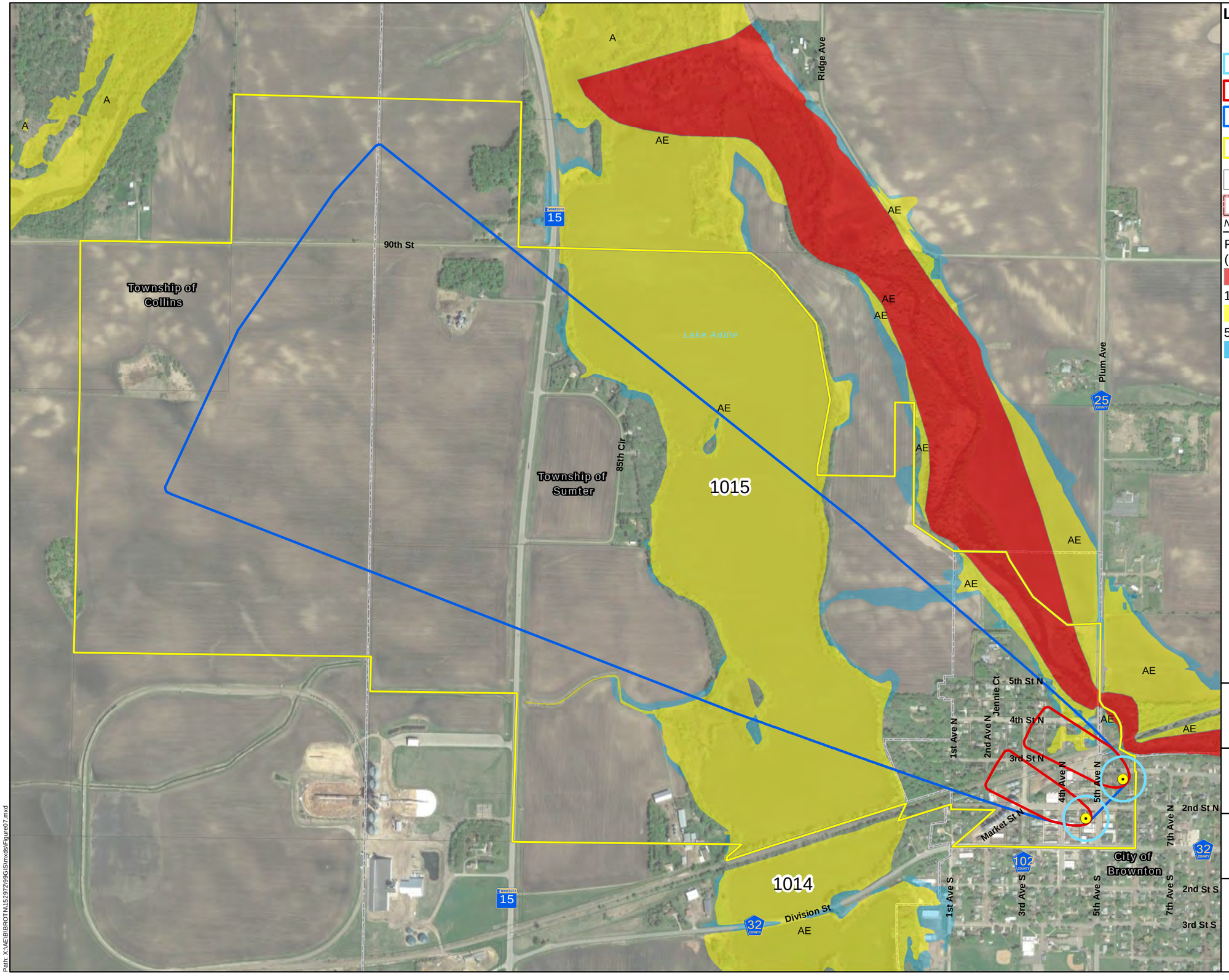

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Note: DWSMA intersects two Townships

Federal Emergency Management Agency (FEMA) Flood Zones

- FLOODWAY

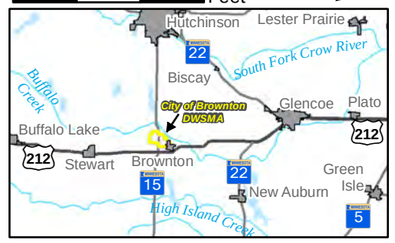
100 Year Floodplain

- 1% Annual Chance Flood Hazard

500 Year Floodplain

- 0.2 % Annual Chance Flood Hazard

0 350 700 1,050 Feet



FEMA Flood Zones

Wellhead Protection Plan Part II
City of Brownton
McLeod County, Minnesota

SEH

Project: BROTN 152972
Print Date: 2/4/2020
Map by: Mark Sherrill
Projection: UTM Zone 15N
Source: SEH Digi, McLeod County, ESRI City of Brownton, MDH

Figure 7

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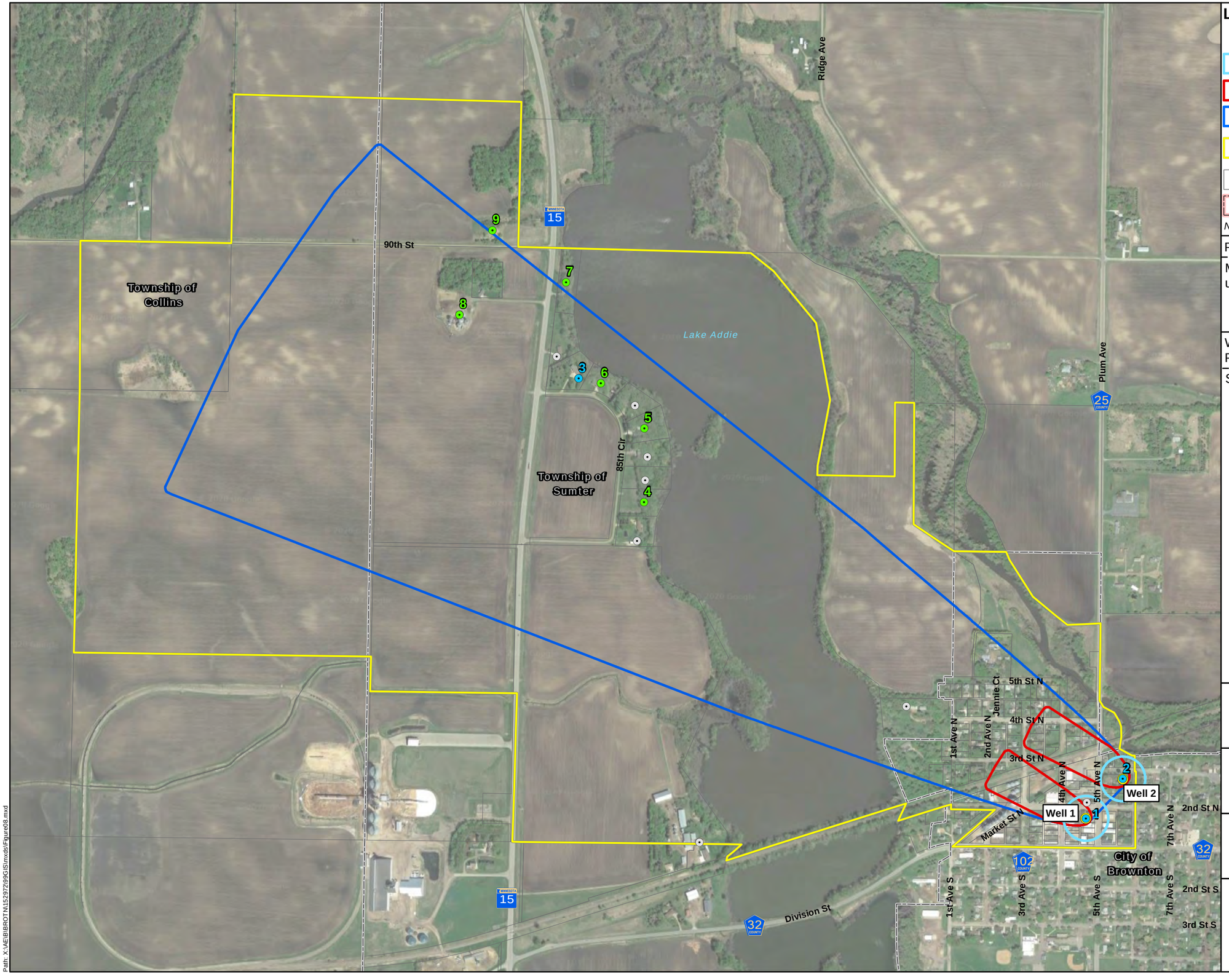

Legend

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Note: DWSMA intersects two Townships

Potential Contaminant Source Inventory

Minnesota Department of Health unsealed Wells at depth > 200 ft
- Well Location
- Presumed Well Location to unkown depth

Wells not included in Potential Contaminant Source Inventory

Sealed Wells or Wells at depth < 200 ft
- Well Location

0 350 700 1,050 Feet

Potential Contaminant Source Inventory

Wellhead Protection Plan Part II
City of Brownton
McLeod County, Minnesota

SEH

Project: BROTN 152972
Print Date: 2/14/2020
Map by: Mark Sherrill
Projection: UTM Zone 15N
Source: SEH Digi, McLeod County, ESRI City of Brownton, MDH

Figure 8

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Tables

Table 1 – Water Supply Wells Included in WHP

Well No.	Unique Well No.	Well Status
1	210336	Active, Primary
2	105587	Active, Primary

Table 2 – Water Supply Well Data

Well No.	Unique Well No.	Date Constructed	Aquifer	Total Depth (ft)	Casing Depth (ft)	Casing Diameter (in)	Vulnerability
1	210336	1971	Quaternary Buried Artesian Aquifer (QBAA)	237	217	8	Not Vulnerable
2	105587	8/1/2007	Quaternary Buried Artesian Aquifer (QBAA)	250	220	10	Not Vulnerable

Table 3 – City of Brownton Zoning

Land Use Category	Brownton DWSMA Zoning in Acres
R-l District - One Family Residential District	48.76
R-2 District - Multi-family Residential District	.83
C-1 District - Retail & Light Commercial District	11.64
AG District - Agricultural District	5.05
A-1 Rural Service District	3.51

Source: City of Brownton Zoning

Table 4 – McLeod County Zoning

Land Use Category	Brownton DWSMA Zoning in Acres
AGRICULTURAL	606.73
CEMETERY-PUBLIC	1.74
CHURCH	0.28
COMM LAND & BLDGS	7.01
INDS LAND & BLDGS	0.42
MUN LENFRC,FIRE,ADM	0.41
MUNICIPAL PUB SERV	1.11
MUNICIPAL PUB-OTHER	1.69
RES 1-3 UNIMPR LAND	21.11
RESIDENTIAL	49.30
RR LAND & BLDGS	4.94
4D 4 OR MORE UNITS	0.83
Tax Forfeit	0.02

Source: McLeod County

Table 5 – National Land Cover Dataset (NLCD, 2016)

Land Use Category	Brownton DWSMA Land Cover in Acres
Barren Land	0.22
Cultivated Crops	593.58
Deciduous Forest	43.37
Developed, High Intensity	10.90
Developed, Low Intensity	36.03
Developed, Medium Intensity	24.91
Developed, Open Space	18.01
Emergent Herbaceuous Wetlands	6.00
Hay/Pasture	6.45
Herbaceuous	0.44
Mixed Forest	1.11
Open Water	172.58
Woody Wetlands	2.45

Source: NLCD 2016

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

Potential Contaminant Source Type	Status	Number of Sites Within DWSMA	Assigned Risk
Well 1			
Sewer, buried, collector, municipal, serving a facility handling infectious or pathological wastes, open-jointed or unapproved materials	A	1	Low
Petroleum tank or container, 1100 gal. or more, with safeguards	A	1	Low
Hazardous substance storage or prep. area, > 25 gals., or 100 lbs. dry weight	A	1	Low
Fire or flushing hydrant	A	1	Low
Well 2			
Sewer, buried, collector, municipal, serving a facility handling infectious or pathological wastes, open-jointed or unapproved materials	A	2	Low
Notes: Sites were inventoried based off the 2020 MDH survey.			

Table 7 – Potential Point Contamination Source Type and Assigned Risk

Potential Contaminant Source Type	Status	Number of Sites Within DWSMA	Assigned Risk
Non-Municipal Wells	Active	1	Moderate
Municipal Wells	Active	2	Moderate
Presumed Well Location (Non-Municipal Well)	Active	6	High
Notes: Sites were inventoried based off the 2019 MDH scoping notice for a Low Vulnerability DWSMA			

Table 8 – Expected Land and Water Use Changes

Expected Change (Physical Environment, Land Use, Surface Water, Ground Water)	Impact of the Expected Change on the Source Water Aquifer	Influence of Existing Government Programs and Regulations on the Expected Change	Administrative, Technical, and Financial Considerations due to the Expected Change
Land use changes within the DWSMA that are outside the jurisdiction of the City of Brownton.	No negative changes are currently expected within the next 10 years or life of this plan.	McLeod County and Townships of Sumter and Collins should consider the City of Brownton DWSMAs in their plans and ordinances.	The updated comprehensive plans should consider the WHPP issues especially for areas within the DWSMA.
No changes to the physical makeup of the aquifer are expected.	No changes, therefore, no impact.	No changes, therefore, existing programs or regulations are adequate.	Because there are no expected changes to the physical makeup of the aquifer no additional administrative, technical or financial considerations required.
The City of Brownton should remain aware of any land use changes over the course of the WHPP that may impact the source water aquifer.	Potential for water quality, quantity leading to unforeseen water supply changes.	EPA, MPCA, and DNR related programs and regulations will be updated in correspondence to new activity.	The City of Brownton will need to review permits and activities as well as work cooperatively with MPCA, MDH, and Minnesota DNR to prevent or minimize impacts from any land use or remedial activity if it deemed applicable.
Anticipated increase of groundwater use.	Increase in WHPA.	Updating of DNR appropriation permits and revision of WHPP.	Staff time working with DNR on appropriation permits. Revaluation of WHPA.
Construction of private wells within DWSMA is a possible change in groundwater source.	Private wells have the potential to impact existing public wells and can become a source of contamination.	The MDH establishes best management practices for wells and may assist with permitting, sealing and locating of improperly managed wells.	City will need to monitor data for private wells constructed with the DWSMA, which are deeper than 112 feet.

Table 9 – Issues, Problems and Opportunities

Issue Identified	Impacted Feature	Problem Associated with the Identified Issue	Opportunity Associated with the Identified Issue	Adequacy of Existing Controls to Address the Issue
The geology and aquifer supply of the area is not well understood.	Aquifer Water Quality, Geology	Water Quality and Water Quantity	The City of Brownton should work on monitoring water levels and recording locations of new wells within 2 miles of the city.	The 2019 scoping notice as part of this plan recommends this measure. MDH will provide support as part of this plan.
DWSMA extends beyond city boundaries	Aquifer, Well Water Quality, DWSMA	Water is recharging the city's aquifer from lands outside the city limits. The city has no land use controls or authority over these areas.	The city will need to work cooperatively with other local government units	McLeod County currently zones parcels outside the City boundary. No changes are expected in the next 10 years.
The MDH has compiled historical information, the Old Municipal Well Report, for use in the planning process.	Aquifer, Well Water Quality	Wells which have not been sealed according to MDH standards may provide a pathway for pollutants to enter into the aquifer.	With the assistance of MDH the city can locate, assess and seal the wells if they pose a threat to the city's drinking water supply.	MDH Well Management has the ability to require the city to properly address unused improperly sealed wells.
It is always difficult to foresee or plan for every threat or potential contaminant source which may affect the City of Brownton in the future	Aquifer, Well Water Quality, DWSMA	The City of Brownton may not be prepared technically or financially to address potential threats unknown to them at this time	If a critical issue or potential contaminant threat becomes an issue in the future for the City, the City can ask for assistance from the various state agencies	Not applicable
Wellhead protection principles may not be incorporated into other plans developed by the City of Brownton or other local government units	Aquifer	Discrepancies may arise between planning efforts	Cooperate with other local government units to incorporate wellhead protection principles into other planning efforts to insure all DWSMA are included in local government planning.	Local ordinances and controls may not adequately incorporate the City of Brownton DWSMA.
At present, there are no exceedences of the Federal Safe Drinking Requirements or the MDH health based guidance.	Aquifer, Well Water Quality	Water recharging the city's aquifer is not well understood.	Cooperate with MDH on water quality monitoring.	Contingent on funding and assistance from the MDH, the City should collect and ship samples to the MDH to analyze for the standard assessment monitoring package.

Table 10 – Controls and Programs of the City of Brownton

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

Table 11 – Local Agency Controls and Programs

Government Unit	Name of Control/Program	Program Description
McLeod County Environmental Services	Planning and Zoning	Environmental Services are responsible for administrative, public education and inspection work in coordination with Zoning, Solid Waste and Household Hazardous Waste with enforcement of land use, ordinances, codes and regulations.
	Solid Waste Authority	
McLeod County Emergency Management Division	CodeRed System	System to notify residents in specific geographic locations of hazardous material incidents, floods, drinking water emergencies, missing children notices and other incidents that threatens our communities.
McLeod County Soil & Water Conservation District	Water Planning	Manage and protect land and water resources on all private land and also assist with a variety of natural resource concerns.
Buffalo Creek Watershed District	Water Planning	1) help alleviate water problems, 2) Enhance the living conditions of the area and 3) Maintain or improve the economic wellbeing of the residents of the District.

Table 12 – State and Federal Agency Controls and Programs

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

Table 13 – Management Strategies

Measure	Priority	Public Education and Outreach	Object Addressed	City Measure Unless Cooperation is Noted	Implementation Time Frame										
					2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031
1	High	The City of Brownton will notify the residents and businesses in The City of Brownton that the City has an approved WHPP through the City website.	A	MDH	•										
2	High	The City of Brownton will provide WHP educational materials and a copy of the WHP through the City website. Materials will address general WHP principles and practice and provide best management practices for private wells.	A	MDH, MPCA, DNR,	•										

Table 13 (Continued) – Management Strategies

Measure	Priority	Potential Contaminant Source Management	Object Addressed	City Measure Unless Cooperation is Noted	Implementation Time Frame										
					2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031
3	High	Locate wells in the Old Municipal Well Report and assess for sealing potential.	B	MDH	As Needed										
4	High	Obtain a cost estimate and apply for MDH SWP Grant or MDH Well Management funds to seal Old Municipal Wells if feasible and restore site as necessary.	B	MDH	As Needed										
5	Moderate	Locate and determine the status of wells that are listed as presumed (unknown or unverified) in Appendix C of this report (Potential Contaminant Source List). Work with property owners and the MDH to locate these wells. Seek a MDH SWP grant for additional cost support or consultant support.	B	MDH, or Consultant	As Needed										
6	High	As unsealed wells are identified, apply for a MDH SWP Grant to seal the high priority or unused unsealed wells identified in the DWSMA. (If the land owner is willing) Have a certified contractor seal the wells if the grant funds are awarded.	B	MDH Landowners	As Needed										
7	Moderate	Periodically, check the County Well Index for records of new wells constructed within the DWSMA	B	MDH				•				•			
8	Moderate	If a Class V Well is identified within the DWSMA, work with MDH Planner to provide the Class V owner information regarding regulations to Class V Wells.	B	MDH, EPA	As Needed										
9	Moderate	Update PCSI database to include or remove potential contaminants if grant funding is provided. (Grant funding is eligible for updating the PCSI once during the lifetime of the plan.)	B	MDH, Consultant						•					

Table 13 (Continued) – Management Strategies

Measure	Priority	Land Use Management Strategies	Object Addressed	City Measure Unless Cooperation is Noted	Implementation Time Frame										
					2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031
10	High	As opportunities become available during updates of planning efforts, integrate wellhead protection principles into planning efforts, including 1W1P, local planning efforts, and comprehensive plans.	A, G	1W1P, City Township, City	As Needed										
11	Moderate	The City will request that McLeod County review their existing land use plan and work cooperatively to consider if appropriate measures are in place to protect the City's drinking water source.	A, G	McLeod County		•									
12	High	The City of Brownton will include the updated DWSMA in their zoning or comprehensive land use updates.	A, G	The City of Brownton	During Plan Updates										

Table 13 (Continued) – Management Strategies

Measure	Priority	Data Collection	Object Addressed	City Measure Unless Cooperation is Noted	Implementation Time Frame										
					2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031
13	High	Well Locating: New wells constructed within two-miles of the city should have their locations verified to better support geologic studies.	D	MDH, City							•	•			
14	High	Provide information to educate the public on water conservation practices they can implement to reduce water use. Apply for a MDH SWP Implementation grant to help pay for education supplies.	D	MDH, City, MRWA		•		•		•		•		•	
15	High	Water Quality Monitoring. Sample Wells 1 and 2 (or primary wells) for vulnerability parameters in year six of plan development, determined in consultation with MDH (likely tritium, chloride, bromide, nitrate, and ammonia) and dependent on available funding.	D	MDH				•							
16	High	Aquifer Testing: The aquifer properties used in this delineation are based on specific capacity data collected at the city wells and other nearby wells completed within the aquifer. To refine the delineation, aquifer test data should be collected from one, or both, of the primary city wells at some time between years five and sever of the Wellhead Protection Plan, with assistance from MDH and depending on any limitations that may exist for sustained well use, water storage, or disposal.	D	MDH					•		•				
17	Moderate	Maintain a record of static water level readings and pursue a MDH SWP Implementation grant to assist with additional data collection of static water level readings. Suggestions include working with Thein Well to collect more frequent water levels, or to purchase data loggers. Submit water level data to MDH as it becomes available.	D	MDH	As Needed										

Table 13 (Continued) – Management Strategies

Measure	Priority	IWMZ Management Measures	Object Addressed	City Measure Unless Cooperation is Noted	Implementation Time Frame										
					2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031
18	High	Assist MDH staff in completing future Inner Wellhead Management Zone (IWMZ) Inventories for the public water supply wells.	E	MDH					•				•		
19	High	Implement the WHP Measures Findings in the IWMZ Inventories (also listed below)	E	MDH	As needed										
20	High	Work with MDH to ensure that setback distances for new potential contamination sources are met.	E	MDH	On-going										
21	High	Any sewer lines that are observed to be leaking, cracked, or deteriorated, should be replaced.	E	MDH	On-going										
22	High	The location of the buried sewer line should be located and documented. Knowing the location of the buried sewer line will determine whether the buried sewer line meets the setback requirements of the well code and will help to assess the line for deterioration and/or leakage.	E	MDH	On-going										
23	High	Others within 200 feet of the well could be encouraged to properly handle, store, and dispose of hazardous materials. Information is available from the Minnesota Pollution Control Agency (www.pca.state.mn.us/programs/bau_p.html or 1-800-657-3864)	E	MDH	On-going										
24	High	Tanks should be monitored, or regularly inspected, for leakage. See: http://www.pca.state.mn.us/waste/undergroundstorage-tank-systems for information, or call the Minnesota Pollution Control Agency at 1-800-657-3864.	E	MDH	On-going										

Table 13 (Continued) – Management Strategies

Measure	Priority	Planning and Reporting	Object Addressed	City Measure Unless Cooperation is Noted	Implementation Time Frame										
					2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031
25	Medium	Maintain a "WHP folder" that contains documentation of WHP activities you have completed.	D	MDH	•	•	•	•	•	•	•	•	•	•	•
26	High	<u>WHP Program Evaluation Plan Reporting:</u> Complete an Evaluation Report every 2.5 years that evaluates the progress of plan of action. This evaluation form is available on the MDH website, and the MDH Planner can assist with conducting and completing the Evaluation. City will contact MDH Planner upon 2.5 year review completion and will submit on year 8 of the Plan.	D	MDH			•			•				•	
27	High	City to annually convene wellhead protection meetings to evaluate and assess needs and grant opportunities.	D	MDH		•		•		•		•		•	

Appendix A

Scoping Decision Notice and Assessment of Data Elements

DEPARTMENT OF HEALTH

Protecting, Maintaining and Improving the Health of All Minnesotans

October 31, 2019

Mr. Chad Draeger, Public Works Supervisor
City of Brownton
P.O. Box 238
Brownton, Minnesota 55312-0238

Subject: Scoping 2 Decision Notice and Meeting Summary – City of Brownton – PWSID 1430002

Dear Mr. Draeger:

This letter provides notice of the results of a scoping meeting held with you and Lori Cacka (city of Brownton) and me on October 29, 2019, at Brownton City Hall regarding wellhead protection (WHP) planning. During the meeting, we discussed the data elements that must be compiled and assessed to prepare the part of the WHP plan related to the management of potential contaminants in the approved drinking water supply management area. The enclosed Scoping 2 Decision Notice lists the data elements discussed at the meeting. We also discussed a summary of planning issues and recommendations that were identified during the Part 1 WHP Plan development process which should be considered for inclusion in your Part 2 WHP Plan.

The city of Brownton has met the requirements to distribute copies of the first part of the WHP plan to local units of government and hold an informational meeting for the public. The city of Brownton will have until June 1, 2021, to complete its WHP plan. The city of Brownton was given additional time due to Minnesota Rules, part 4720.5130, subpart 4, item D.

MDH understands SEH will be working with you to develop a draft of the remainder of the WHP plan. I will be contacting you to review the progress of the development of Part 2 of your plan. Upon request, the Technical Assistance Planner can provide a glossary of terminology, identification of information sources for the required Data Elements, and other technical assistance documents. I will be contacting you to review the progress of the development of Part II of your plan. If you have any questions regarding the enclosed notice, contact me by email at karen.s.voz@state.mn.us or by phone at 320-223-7322.

Sincerely,

Karen S. Voz

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

KSV:ds-b
Enclosures
cc: Jon Groethe, MDH Engineer, St. Cloud District Office
Luke Stuewe, Minnesota Department of Agriculture

Scoping 2 Decision Notice Attachment
Potential Contaminant Source Inventory Requirements

Low Vulnerable DWSMA

The following current and historical potential contaminant sources and related codes and activity status and related codes are required to be included in the potential contaminant source inventory. All potential contaminant sources must be assigned an activity status and related code using state program descriptors or local knowledge.

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

Activity Status; Codes; and Descriptions

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

Date: October 31, 2019

Name of Public Water Supply: City of Brownton

PWSID: 1430002

Name of the Wellhead Protection Manager: Mr. Chad Draeger, Public Works Supervisor

Address: P.O. Box 238

City: Brownton

Zip: 55312-0238

Phone: 320-328-5318

Primary Unique Well Numbers: 210336 (Well #1), 105527 (Well #2)

DWSMA Vulnerability: ☒ Low

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

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

Scoping 2 Data Elements Needed for the Part 2

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

Submit –

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

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

DATA ELEMENTS ABOUT THE LAND USE –

Land Use

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

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

- A map and an inventory of the current and historical agricultural, residential, commercial, industrial, recreational, and institutional land uses and potential contaminant sources.
  - ☐ *The Potential Contaminant Source Inventory (PCSI) data in both a table and map format must be created and included in the Part 2. Include potential contaminant sources as listed on the PCSI attachment provided for each existing vulnerability within the DWSMA.
    - Inventory wells greater than 200 feet in depth. Also inventory wells of undocumented or unknown depths.
    - The inventory should include your community wells but not include any wells that are known to have been sealed according to the Minnesota Well Code (MN Rules 4725).
  - ☐ *A land use/land cover map and table. SWP Planner can provide a land cover map and data/table from federal sources. This data set should be used unless an alternative electronic data set that is more current and detailed is available. Assess and discuss changes in land use that could impact management of the DWSMA.

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

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

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

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

Required to be discussed in plan -

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

DATA ELEMENTS ABOUT THE PHYSICAL ENVIRONMENT –

Water Resources

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

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

DATA ELEMENTS ABOUT THE LAND USE –

Land Use

- An existing map of parcel boundaries.

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

Part 1 -

The following information was reviewed and assessed in Part 1. The Part 1 should be used as a data source for the Part 2. The technical assistance comments provide the requirements for how this information must be discussed and/or included in the Part 2. Include relevant excerpts or summaries from the Part 1 where indicated. Or if the Part 1 is included in the appendix that can be referenced.

DATA ELEMENTS ABOUT THE PHYSICAL ENVIRONMENT –

- An existing geologic map and a description of the geology, including aquifers, confining layers, recharge areas, discharge areas, sensitive areas as defined in Minnesota Statutes, section 103H.005, subdivision 13, and groundwater flow characteristics.
- Existing records of the geologic materials penetrated by wells, borings, exploration test holes, or excavations, including those submitted to the department.
- Existing borehole geophysical records from wells, borings, and exploration test holes.
- Existing surface geophysical studies.

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

DATA ELEMENTS ABOUT THE LAND USE –

Public Utility Services

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

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

DATA ELEMENTS ABOUT WATER QUANTITY –

Groundwater Quantity

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

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

DATA ELEMENTS ABOUT WATER QUALITY –

Groundwater Quality

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

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

Revision Date: 04/01/2019

City of Brownton Scoping 2 Meeting

Wellhead Protection (WHP) Planning Issues Summary

NOTE: 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.

Drinking Water Protection Issues Identified to Date:

Well construction at Well #2 (105587) meets current State Well Code specifications (Minnesota Rules, part 4725), meaning that the wells themselves should not provide a pathway for contaminants to enter the aquifer used by the public water supplier.

The geologic conditions at the well sites include a cover of clay-rich geologic materials over the aquifer that is sufficient to retard or prevent the vertical movement of contaminants.

None of the human-caused contaminants regulated under the federal Safe Drinking Water Act have been detected at or above regulatory levels.

Water samples were collected from Well #1 (210336) and Well #2 (105587) and were analyzed for tritium, nitrate, chloride and bromide. No tritium or nitrate was detected in the samples, confirming the non-vulnerable nature of the wells. In addition, the chloride and bromide results confirm that the wells have not been impacted by land-use activities.

Water Quality Detections and Implications:

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

Old Municipal Well Information:

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

Sanborn Maps:

☐ Sanborn Maps are available for this area.

☒ Sanborn Maps are not available for this area.

Recommended WHP Measures:

1. The geologic conditions and the unknown for the recharge to the aquifer, it is recommended to include water conservation measures.
2. Well Locating: This delineation is based on very little well data. If wells are constructed within two-miles of the city or one mile of the DWSMA, their locations should be verified. This information may allow a better understanding of the extent and thickness of the city's aquifers and the overlying clay confining units and result in a more refined WHPA in the future.
3. Water Quality Monitoring: Sample Wells 1 and 2 (or whatever primary wells exist at that time) for vulnerability parameters in year six of plan development, determined in consultation with MDH (likely tritium, chloride, bromide, nitrate and ammonia) and dependent on available funding. The city may need to collect the samples and ship them to MDH. Information generated by this sampling will be used to refine vulnerability assessments for the next amendment.
4. Aquifer Testing: The aquifer properties used in this delineation are based on specific capacity data collected at the city wells and other nearby wells completed within the aquifer. To refine the delineation, aquifer test data should be collected from one, or both, of the primary city wells at some time between years five and seven of the Wellhead Protection Plan, with assistance from MDH and depending on any limitations that may exist for sustained well use, water storage, or disposal.

Other: None

Appendix B

Part I Wellhead Protection Plan

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

DELINEATIONS – WELLHEAD PROTECTION AREA AND DRINKING WATER SUPPLY MANAGEMENT AREA

VULNERABILITY ASSESSMENTS – WELLS AND DRINKING WATER SUPPLY MANAGEMENT AREA

August 15, 2019

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

Public Water Supply ID: 1430002

City of Brownton
P.O. Box 238
Brownton, Minnesota 55312-0238
320-328-5318

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

Signature:  _____ Date: 08/25/2019

Printed Name: John Woodside License Number: 55398

Contact Information

Wellhead Protection Plan Manager

Chad Draeger, Water Operator
320-328-5318

State and Local Technical Assistance Planning Staff

Karen S. Voz, Minnesota Department of Health Source Water Protection Planner
320-223-7322
Karen.S.Voz@state.mn.us

Licensed Hydrologist

John Woodside, Minnesota Department of Health Source Water Protection Hydrologist
651-201-4658
John.Woodside@state.mn.us

Glossary of Terms

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

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

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

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

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

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

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

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

Acronyms

CWI - County Well Index

DNR - Minnesota Department of Natural Resources

EPA - United States Environmental Protection Agency

FSA - Farm Security Administration

MDA - Minnesota Department of Agriculture

MDH - Minnesota Department of Health

MGS - Minnesota Geological Survey

MnDOT - Minnesota Department of Transportation

MnGEO - Minnesota Geospatial Information Office

MODFLOW - Three-Dimensional Finite-Difference Groundwater Model

MPCA - Minnesota Pollution Control Agency

NRCS - Natural Resource Conservation Service

SWCD - Soil and Water Conservation District

UMN - University of Minnesota

USDA - United States Department of Agriculture

USGS - United States Geological Survey

Summary

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

Geology and Groundwater Flow – The city of Brownton has two primary wells screened in a sand and gravel aquifer that is buried beneath a layer of clay-rich sediment. Such aquifers are known generically as Quaternary Buried Artesian Aquifers (QBAA). The wells are approximately 250 feet deep (Table 1). Regionally, groundwater flow is to the southeast, towards the Minnesota River.

Table 1 - Water Supply Well Information

Local Well ID	Unique Number	Use/ Status	Casing Diameter (inches)	Casing Depth (feet)	Well Depth (feet)	Date Constructed/ Reconstructed	Aquifer	Well Vulnerability
Well #1	210336	Primary	8	217	237	5/25/1959	QBAA	Not Vulnerable
Well #2	105587	Primary	10	220	250	1977	QBAA	Not Vulnerable

Well Vulnerability - The vulnerability of each well has been assessed based on 1) well construction details, especially conformance with standards required by the state well code, 2) the geologic sensitivity of the aquifer, and 3) past monitoring results. The wells meet construction standards and draw from an aquifer that is geologically protected. Water samples from the wells also lacked detectable tritium (detection indicates the presence of young water), so they are not considered vulnerable at this time (Table 2). This is reinforced by the low chloride/bromide ratios presented below.

Table 2 - Isotope and Water Quality Results

Unique Number (Well Name)	Tritium	Nitrate (mg/L)	Chloride (mg/L)	Bromide (mg/L)	Chloride/ Bromide Ratio
210336 Well #1	<0.8 (06/26/2012)	<0.05 (04/30/2014)	2.95 (07/01/2013)	0.04 (07/01/2013)	74 (07/01/2013)
105587 Well# 2	<0.8 (09/02/2005)	<0.05 (04/30/2014)	2.26 (07/01/2013)	0.04 (07/01/2013)	57 (07/01/2013)

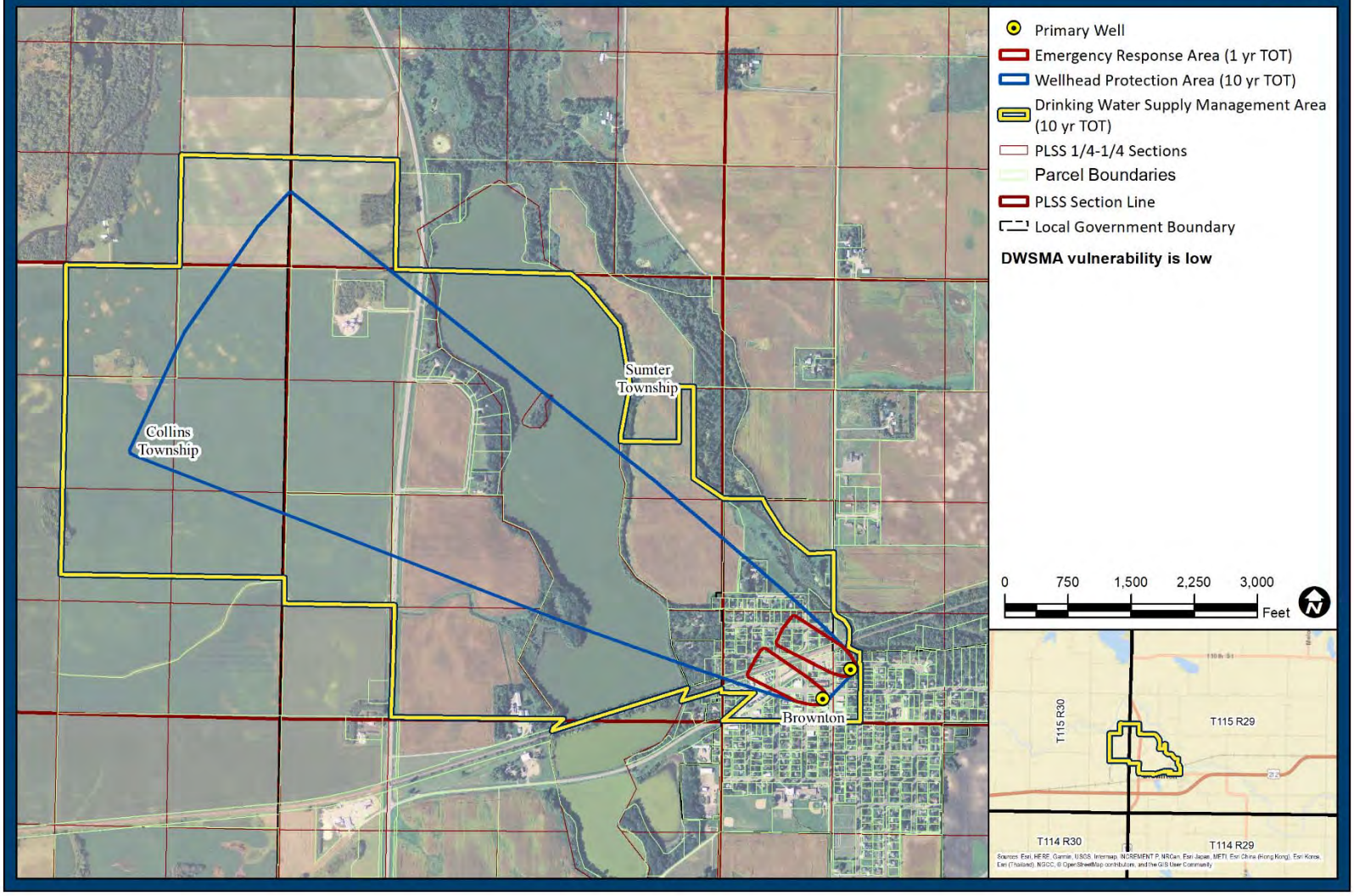
DWSMA Vulnerability -The vulnerability of the city's aquifer throughout the DWSMA is based on the geologic sensitivity ratings of wells and their monitoring data. Based on this information, MDH has assigned a low vulnerability to the DWSMA. This suggests that the clay-rich sediments that overlie the city's aquifer prevent water and contaminants from moving quickly from the land surface into the city's aquifer and implies a time of travel of decades or longer. The principal threats to this aquifer are unsealed abandoned wells that penetrate through this clay layer. Such wells are 200 feet or greater in depth in the Brownton area.

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

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

McLeod County
Minnesota

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



Technical Report

Discussion

The Minnesota Department of Health (MDH) developed Part I of the wellhead protection (WHP) plan at the request of the city of Brownton (PWSID 1430002). The work was performed in accordance with the Minnesota Wellhead Protection Rule, parts 4720.5100 to 4720.5590.

This report presents delineations of the wellhead protection area (WHPA) and drinking water supply management area (DWSMA), and the vulnerability assessments for the public water supply wells and DWSMA. Figure 1 shows the boundaries for the WHPA and the DWSMA. The WHPA is defined by a 10-year time of travel. Figure 1 also shows the emergency response area (ERA), which is defined by a one-year time of travel. Definitions of rule-specific terms used are provided in the "Glossary of Terms."

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

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

Assessment of the Data Elements

MDH staff met with representatives of the city of Brownton on March 13, 2018, for a scoping meeting that identified the data elements required to prepare Part I of the WHP plan. Appendix A presents the assessment of these data elements relative to the present and future implications of planning items specified in Minnesota Rules, part 4720.5210.

General Descriptions

Description of the Water Supply System

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

Description of the Hydrogeologic Setting

The city of Brownton draws groundwater from a Quaternary Buried Artesian Aquifer approximately 210 feet below the land surface. Throughout McLeod County, bedrock is overlain by unconsolidated Quaternary sediments deposited by several glacial ice advances during the Pleistocene Epoch. Sand and gravel beds, laid down by meltwater flowing from

these glaciers, form most of the aquifers in McLeod County. Unsorted sediment deposited directly from the ice, termed till, and fine-grained clay- and silt-rich bedded sediment deposited in ponded meltwater in front of the glaciers, form confining layers that enclose the aquifers (Lusardi, 2009). The till layers left by each ice sheet tend to be more laterally persistent than the sand layers because ice typically spread across the entire county, whereas meltwater streams that deposited the sand and gravel were generally confined to drainages at the lower elevations (Lusardi, 2009). As glacial ice and meltwater deposited sediments, it also eroded older, underlying sediments. The net effect of this depositional and erosional activity is that sand and gravel bodies that provide water to wells in McLeod County tend to be laterally discontinuous (Lusardi, 2009).

At Brownton's municipal wells, the aquifer is approximately 85 feet thick, and the wells are screened over 20-30 feet of this thickness. The continuity of this unit is not well-defined locally, as there are a minimal number of wells completed at that same depth as the city's wells. Groundwater in the aquifer is generally flowing southeast towards the Minnesota River. The aquifer is overlain by 200 feet of fine-grained material (clay, sandy clay) and is underlain by at least six feet of clay. A description of the hydrogeologic setting for the aquifer used to supply drinking water is presented in Table 3.

Table 3 - Description of the Local Hydrogeologic Setting

Attribute	Descriptor	Data Source
Aquifer Material	Sand	CWI
Porosity Type and Value	Primary, 20 percent	Fetter, 1988
Aquifer Thickness	85 feet	CWI
Stratigraphic Top Elevation	818 Feet Above Mean Sea Level	CWI
Stratigraphic Bottom Elevation	733 Feet Above Mean Sea Level	CWI
Hydraulic Confinement	Confined	CWI

Attribute	Descriptor	Data Source
Transmissivity	Range of Values: 7,165 – 19,762 ft^2/day	A range of transmissivity values was used to reflect changes in aquifer composition and uncertainties related to the quality of existing aquifer test data. See Table 4 for the reference value.
Hydraulic Conductivity	Range of Values: 84 – 232 ft/day	The range of values was derived using specific capacity data obtained from well records and from additional aquifer test results listed in the "Selected References" section of this report.
Groundwater Flow Field	Groundwater flow is southeast, with an approximate compass direction of 120° and gradient of 0.002 (Figure 2).	Defined by using static water level elevations from well records in the CWI database and documents listed in the "Selected References" section of this report.

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

Delineation of the Wellhead Protection Area

Delineation Criteria

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

Table 4 - Description of WHPA Delineation Criteria

Criterion	Description	How the Criterion was Addressed
Flow Boundary	None	There are no flow boundaries close enough to the public water supply wells that may have an impact on their capture areas.
Flow Boundary	Other High-Capacity Wells	No known high-capacity wells exist within two miles of the city of Brownton's wells.
Daily Volume of Water Pumped	See Table 5	Pumping information was obtained from the DNR, Appropriations Permit Number 1980-4021, and was converted to a daily volume pumped by a well.
Groundwater Flow Field	Groundwater flow is southeast, with an approximate compass direction of 120° and gradient of 0.002 (Figure 2).	The groundwater flow field was determined from local well data and input explicitly into MODFLOW and capture zones were calculated based on the flow field.
Aquifer Transmissivity (T)	Reference Value: 12,779 ft^2/day	The aquifer test plan was approved on June 21, 2019, and T was determined from specific capacity values at wells completed in the same aquifer within 10 miles of the PWS well. Uncertainty regarding aquifer transmissivity was addressed as described in Addressing Model Uncertainty section.
Time of Travel	10 years	The public water supplier selected a 10-year time of travel.

Pumping data was obtained from the DNR Permit and Reporting System (MPARS) for the public water supply's Appropriations Permit Number 1980-4021. These values, confirmed by the public water supplier, were used to identify the maximum volume of water pumped annually by each well over the previous five-year period, as shown in Table 5. An estimate of the pumping for the next five years is also shown. The maximum daily volume of discharge used as an input parameter in the model was calculated by dividing the greatest annual pumping volume by 365 days.

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

Well Name	Unique Number	2014	2015	2016	2017	2018	2022	Daily Volume (cubic meters)
Well #1	210336	**10.733**	8.501	8.276	8.455	8.445	10.733	111
Well #2	105587	**13.609**	9.068	10.055	10.527	10.011	13.609	141

(Expressed as millions of gallons, unless noted. **Bolding** indicates greatest annual pumping volume.)

Method Used to Delineate the Wellhead Protection Area

The WHPA for the city of Brownton's wells utilized a groundwater flow model created using the software code MODFLOW (McDonald and Harbaugh, 1988). The input files and related information are available at MDH upon request.

MODFLOW Model: MODFLOW was developed by the United States Geological Survey and is publically available. The specific software code used for this delineation was MODFLOW2000 version 1.15.01 (Hill et al., 2000). The program has been thoroughly documented, is widely used by consultants, government agencies and researchers and consistently accepted in regulatory proceedings. MODFLOW is also an extremely versatile program capable of simulating groundwater flow in up to three dimensions while offering a variety of boundary condition options, confined or unconfined aquifer conditions and allowing for vertical discretization through the use of layering.

The numerical groundwater model that was constructed consisted of 734 rows, 715 columns, and one layer. The model incorporates a variable areal grid spacing ranging from four meters near the city's wells and grading to 120 meters at the boundaries of the model domain. The one layer model uses a constant head at the top and bottom of the model domain, which is derived from the observed gradient, to simulate simple groundwater flow through a confined aquifer. No recharge is applied to the groundwater model.

To determine the WHPA, the MODFLOW model was used with a particle tracking program called MODPATH (Pollock, 1994). MODPATH was used to evaluate advective transport of simulated particles moving through the simulated flow system. A series of 36 particles were launched at each well. A porosity of 20 percent was used for the aquifer used by the city and a 10-year reverse time of travel was calculated. Nine different iterations of the model were required, as is discussed in the uncertainty analysis section of this report. The combined output from the MODFLOW model was composited to create the final WHPA (Figure 1).

Results of Model Calibration and Sensitivity Analysis

Model calibration is a procedure that compares the results of a model based on estimated input values to measured or known values. This procedure can be used to define model validity over a range of input values, or it helps determine the level of confidence with which model results may be used. As a matter of practice, groundwater flow models are usually calibrated using water elevation or flux. In this case, calibration was not performed because the observed groundwater flow field was simulated explicitly in the model.

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

- The pumping rate directly affects the volume of the aquifer that contributes water to the well. An increase in pumping rate leads to an equivalent increase in the volume of aquifer within the capture zone, proportional to the porosity of the aquifer materials. However, the pumping rate is based on the results presented in Table 5 and, therefore, is not a variable factor that will influence the delineation of the WHPA.
- The direction of groundwater flow determines the orientation of the capture area. Variations in the direction of groundwater flow will not affect the size of the capture zone but are important for defining the areas that are the source of water to the well. The ambient groundwater flow field defined in Figure 2 provides the basis for determining the extent to which each model run reflects the conceptual understanding of the orientation of the capture area for a well.
- A hydraulic gradient of zero produces a circular capture zone, centered on the well. As the hydraulic gradient increases, the capture zone changes into an elliptical shape, with the well centered on the down-gradient focal point. The hydraulic gradient was determined by using water level elevations that were taken from wells that have verified locations (Figure 2). Generally, the accuracy of the hydraulic gradient determination is directly proportional to the amount of available data that describes the distribution of hydraulic head in the aquifer.
- The aquifer thickness, hydraulic conductivity, and porosity influence the size and shape of the capture zone. A decrease in porosity causes a linear, proportional increase in the areal extent of the capture zone; whereas thickness and hydraulic conductivity each factor into the transmissivity, which defines the relative proportions of the capture zone width to length. A decrease in thickness or hydraulic conductivity decreases the length of the capture zone and increases the distance to the stagnation point, making the capture zone more circular in shape and centered on the well.

Addressing Model Uncertainty

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

The steps employed for this delineation to address model uncertainty were:

1. Pumping Rate - For each well, a maximum historical (five-year) pumping rate or an engineering estimate of future pumping, whichever is greater (Minnesota Rules, part 4720.5510, subpart 4).
2. Ambient Flow Field - A composite of capture zones created from angles of flow that are 10 degrees greater and 10 degrees lesser than the representative angle of ambient flow (Minnesota Rules, part 4720.5510, subpart 5, B(2).
3. Hydraulic Conductivity - A range of hydraulic conductivity values was used to address variability in aquifer composition that may affect the dimensions of the capture zone.

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

Table 6 - Model Parameters Used in MODFLOW Base Case and Uncertainty Runs

File Name	Total PWS Discharge (cubic meters per day)	Hydraulic Conductivity (meters per day)	Gradient	Flow Angle	Porosity (%)	Aquifer Thickness (meters)
Brownton_K26_base.gwv	252	26	0.002	120	20	25.9
Brownton_K26_m10.gwv	252	26	0.002	110	20	25.9
Brownton_K26_p10.gwv	252	26	0.002	130	20	25.9
Brownton_K46_base.gwv	252	46	0.002	120	20	25.9

File Name	Total PWS Discharge (cubic meters per day)	Hydraulic Conductivity (meters per day)	Gradient	Flow Angle	Porosity (%)	Aquifer Thickness (meters)
Brownton_K46_m10.gwv	252	46	0.002	110	20	25.9
Brownton_K46_p10.gwv	252	46	0.002	130	20	25.9
Brownton_K71_base.gwv	252	71	0.002	120	20	25.9
Brownton_K71_m10.gwv	252	71	0.002	110	20	25.9
Brownton_K71_p10.gwv	252	71	0.002	130	20	25.9

Delineation of the Drinking Water Supply Management Area

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

- Center-lines of highways, streets, roads, or railroad rights-of-ways
- Public Land Survey coordinates
- Property or fence lines
- Center-lines of public drainage systems
- Political boundaries

Vulnerability Assessments

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

Assessment of Well Vulnerability

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

1. Well construction at Well #2 (105587) meets current State Well Code specifications (Minnesota Rules, part 4725), meaning that the wells themselves should not provide a pathway for contaminants to enter the aquifer used by the public water supplier.
2. The geologic conditions at the well sites include a cover of clay-rich geologic materials over the aquifer that is sufficient to retard or prevent the vertical movement of contaminants.
3. None of the human-caused contaminants regulated under the federal Safe Drinking Water Act have been detected at or above regulatory levels.
4. Water samples were collected from well #1 (210336) and Well #2 (105587) and were analyzed for tritium, nitrate, chloride and bromide (Table 2). No tritium or nitrate was detected in the samples, confirming the non-vulnerable nature of the wells (Alexander and Alexander, 1989). In addition, the chloride and bromide results confirm that the wells have not been impacted by land-use activities (Mullaney et. al, 2009).

Assessment of Drinking Water Supply Management Area Vulnerability

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

1. Isotopic and water chemistry data from wells located within the DWSMA indicate that the aquifer contains water that has no detectable levels of tritium or human-caused contamination.
2. Review of the geologic logs contained in the CWI database, geological maps, and reports indicate the aquifer exhibits a low geologic sensitivity throughout the DWSMA and is isolated from the direct vertical recharge of surface water.
3. Arsenic, which is a naturally-occurring contaminant, has been detected in the water from Well #1 (210336) at a concentration of 1.11 µg/L. The presence of a naturally-occurring contaminant does not indicate that there is a direct pathway between the aquifer and potential contamination sources that occur at or near the land surface.

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

Recommendations

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

1. Well Locating: This delineation is based on very little well data. If wells are constructed within two-miles of the city or one mile of the DWSMA, their locations should be verified. This information may allow a better understanding of the extent and thickness of the city's aquifers and the overlying clay confining units and result in a more refined WHPA in the future.
2. Water Quality Monitoring: Sample Wells 1 and 2 (or whatever primary wells exist at that time) for vulnerability parameters in year six of plan development, determined in consultation with MDH (likely tritium, chloride, bromide, nitrate and ammonia) and

dependent on available funding. The city may need to collect the samples and ship them to MDH. Information generated by this sampling will be used to refine vulnerability assessments for the next amendment.

3. Aquifer Testing: The aquifer properties used in this delineation are based on specific capacity data collected at the city wells and other nearby wells completed within the aquifer. To refine the delineation, aquifer test data should be collected from one, or both, of the primary city wells at some time between years five and seven of the Wellhead Protection Plan, with assistance from MDH and depending on any limitations that may exist for sustained well use, water storage, or disposal.

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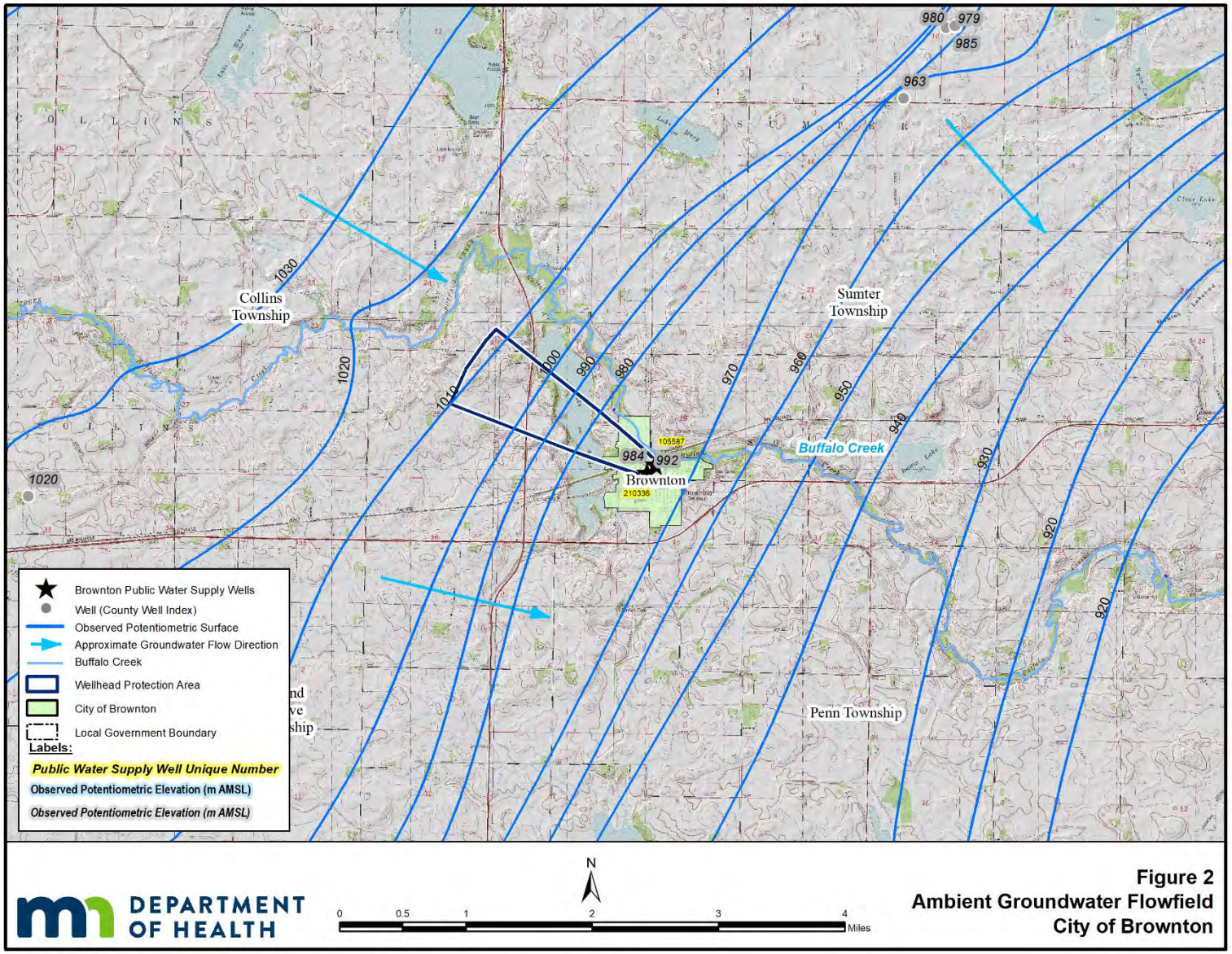
Figures



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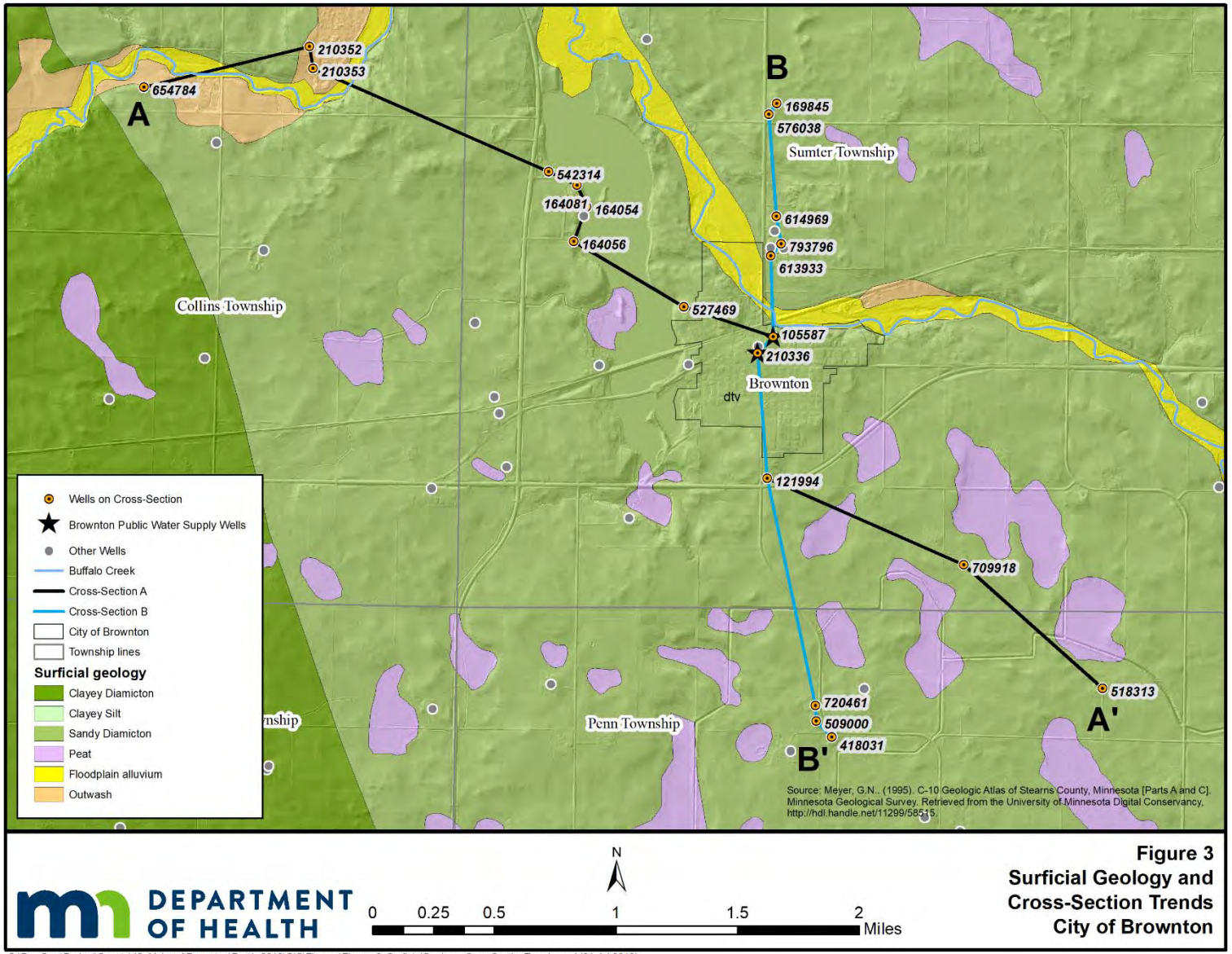
210352
210353
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A
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210336
Brownton
dtv
121994
709918
518313
A'
720461
509000
418031
B'
Penn Township
Collins Township
Wells on Cross-Section
Brownton Public Water Supply Wells
Other Wells
Buffalo Creek
Cross-Section A
Cross-Section B
City of Brownton
Township lines
Surficial geology
Clayey Diamicton
Clayey Silt
Sandy Diamicton
Peat
Floodplain alluvium
Outwash
Source: Meyer, G.N., (1995). C-10 Geologic Atlas of Stearns County, Minnesota [Parts A and C]. Minnesota Geological Survey. Retrieved from the University of Minnesota Digital Conservancy, http://hdl.handle.net/11299/58515.
DEPARTMENT OF HEALTH
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Figure 3
Surficial Geology and
Cross-Section Trends
City of Brownton
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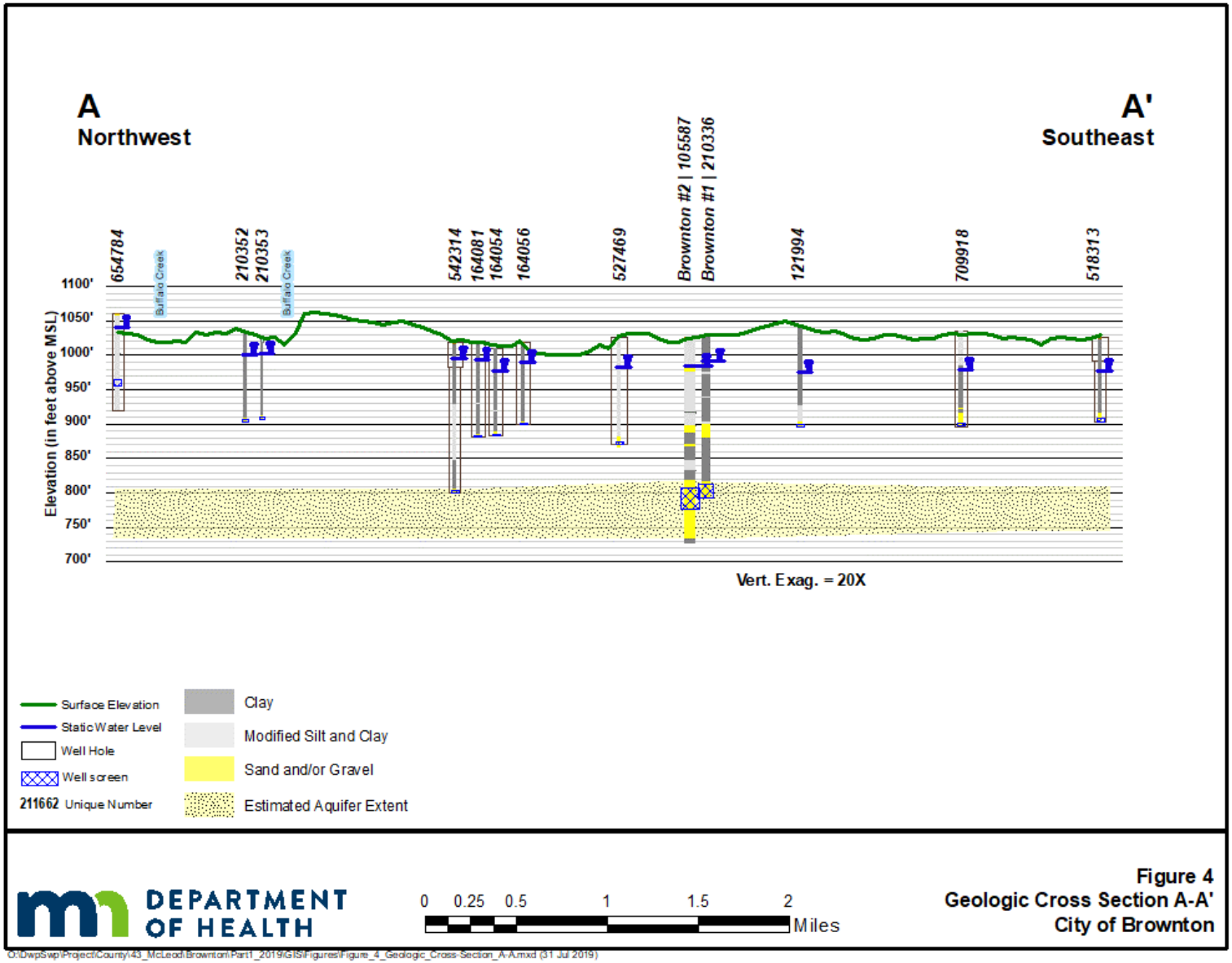

Figure 4
Geologic Cross Section A-A'
City of Brownton

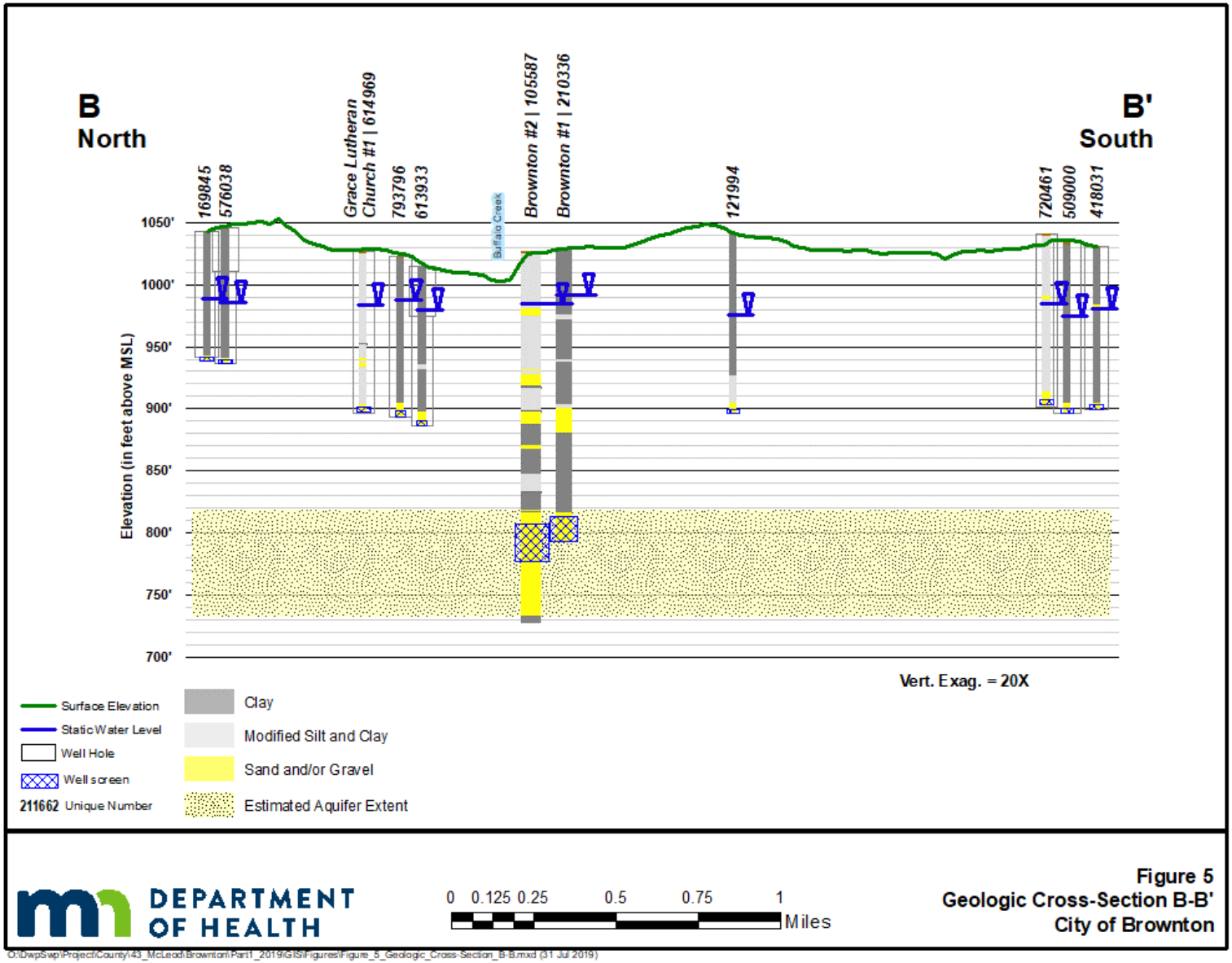

Figure 5
Geologic Cross-Section B-B'
City of Brownton

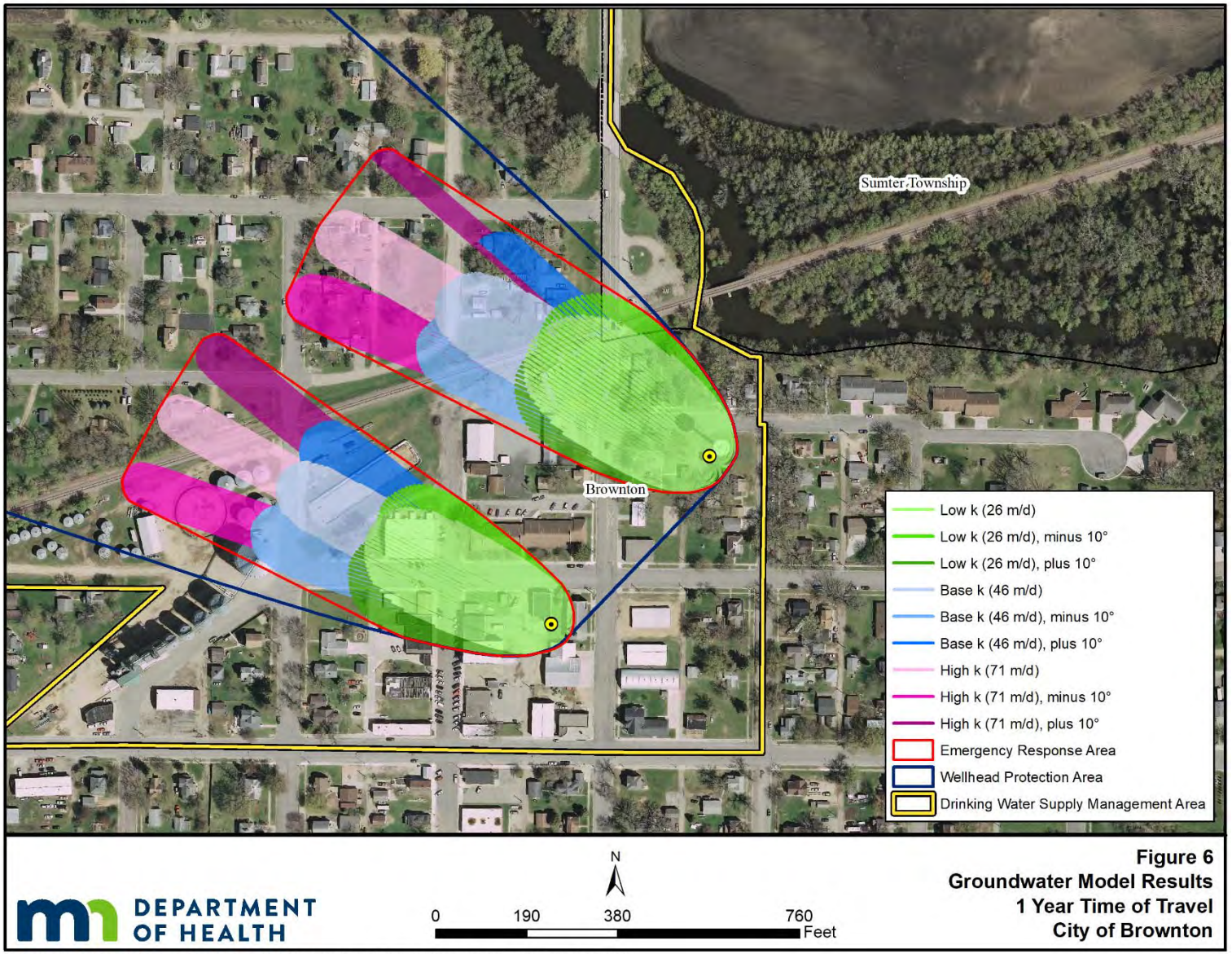

Figure 6
Groundwater Model Results
1 Year Time of Travel
City of Brownton

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Appendix A: Data Elements Assessment

Data Type	Data Element	Use of the Well(s)	Delineation Criteria	Quality and Quantity of Well Water	Land and Groundwater Use in DWSMA	Data Source
Climate	Precipitation					
Geology	Maps and geologic descriptions	M	H	H	H	MGS
Geology	Subsurface data	M	H	H	H	MGS, MDH
Geology	Borehole geophysics	M	H	H	H	Not Available
Geology	Surface geophysics	L	L	L	L	Not Available
Soils	Maps and soil descriptions					
Soils	Eroding lands					
Water Resources	Watershed units					
Water Resources	List of public waters					
Water Resources	Shoreland classifications					
Water Resources	Wetlands map					
Water Resources	Floodplain map					
Land Use	Parcel boundaries map	L	H	L	L	McLeod County
Land Use	Political boundaries map	L	H	L	L	MnGEO, Brownton
Land Use	Public Land Survey map	L	H	L	L	MnGEO
Land Use	Land use map and inventory					
Land Use	Comprehensive land use map					
Land Use	Zoning map					
Public Utility Services	Transportation routes and corridors	L	L	L	L	MnDOT, MnGEO
Public Utility Services	Storm/sanitary sewers and PWS system map					
Public Utility Services	Oil and gas pipelines map					
Public Utility Services	Public drainage systems map or list					
Public Utility Services	Records of well construction, maintenance, and use	H	H	H	H	Brownton, CWI, MDH
Surface Water Quantity	Stream flow data					
Surface Water Quantity	Ordinary high water mark data					
Surface Water Quantity	Permitted withdrawals					

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

Definitions Used for Assessing Data Elements

- High (H): the data element has a direct impact
- Moderate (M): the data element has an indirect or marginal impact
- Low (L): the data element has little if any impact
- Shaded: the data element was not required by MDH for preparing this delineation

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

Appendix C

Potential Contaminant Source Inventory Data

Appendix C

Potential Contaminant Source Index

Part II Wellhead Protection Plan

City of Brownton, Minnesota

Drinking Water Supply ID 1430002

PCSI ID	PIN	Facility Name	Program ID	Address	City	Zip Code	PCSI Code	Status	Material	Total	Groundwater Vunerability	Comment
Minnesota Well Index Well												
1	160500730	BROWNTON 1	00210336	427 2ND ST N	City of Brownton	55312	WEL	A	-	1	Low	MDH Located well file. Drilled to 237 ft below ground surface.
2	160560090	BROWNTON 2	00105587	217 5TH AVE N	City of Brownton	55312	WEL	A	-	1	Low	MDH Located well file. Drilled to 300 ft below ground surface.
3	130520030	MESSNER, JEFF	00542314	18856 85TH CIR	Township of Sumter	55312	WEL	A	-	1	Low	MDH Located well file. Drilled to 218 ft below ground surface.
4	130520090	ANTHONY & L R SEIDENKRANZ TRST	-	-	Township of Sumter	55312	WEL	U	-	1	Low	Presumed well location to unknown depth.
5	130520060	ROBERT W & KAREN TORDSEN	-	18696 85TH CIR	Township of Sumter	55312	WEL	U	-	1	Low	Presumed well location to unknown depth.
6	130520040	PAUL E SCHWING	-	18784 85TH CIR	Township of Sumter	55312	WEL	U	-	1	Low	Presumed well location to unknown depth.
7	130520010	DAWN L IVERSON	-	8978 HWY 15	Township of Sumter	55312	WEL	U	-	1	Low	Presumed well location to unknown depth.
8	130301125	Pat Waller	-	8907 HWY 15	Township of Sumter	55312	WEL	U	-	1	Low	Presumed well location to unknown depth.
9	130190800	JOEL D GRIEBIE REVOC TRUST &	-	-	Township of Sumter	55312	WEL	U	-	1	Low	Presumed well location to unknown depth.

Notes:

Items listed are depicted on Figure 8.

PCSI - Potential Contaminant Source Iventory

A- Active

I - Inactive

U - Unknown

S - Sealed

Appendix D

Contingency Plan

Appendix D

WATER SUPPLY CONTINGENCY PLAN (4720.5280)

WATER SUPPLY CONTINGENCY PLAN

City of Brownton

Table of Contents

Periodic Plan Review

Date Reviewed	*Reviewer*	*Comments*
February, 2020	City of Brownton / SEH / MDH	

Plan Distribution

Person	*Organization*	*Plan Location*
Chad Draeger / Lori Cacka	City of Brownton	Civic Center

Prepared By: City of Brownton/SEH/MDH

A. PURPOSE

The purpose of this Contingency Plan is to establish, provide and keep updated, certain emergency response procedures and information for the City of Brownton that may become vital in the event of a partial or total loss of public water supply services.

B. PUBLIC WATER SUPPLY CHARACTERISTICS

1. Current Supply Source - The City obtains their water supply from two municipal Wells listed below. Both wells are completed in a quaternary sediment aquifer. Additional information for the PWS is described below.

Table C-1 -Water Supply Well s

	Well #1	Well #2
Unique Well #	210336	105587
Supply Source	Quaternary Buried Artesian Aquifer	Quaternary Buried Artesian Aquifer
Well Depth (ft.)	237 feet (ft.)	300 feet
Well Diameter (in.)	8”	10”
Well Capacity(gpm)	165	400

3. Treatment - The City of Brownton adds both chlorine and fluoride Chemicals.

4. Storage and Distribution – 100,000 gallon water tower / system

5. Maps/Plans –Maps of the water distribution system and valving are on file at the Civic Center.

C. PRIORITY OF WATER USERS DURING WATER SUPPLY EMERGENCY

Table C-1 -Water Use Priority Grouping

Priority Group and Rank	Maximum Daily Use (gpd)	Minimum Daily Use (gpd)
Residential--#1	-	-
Institutional--#2	-	-
Business--#3	-	-
Commercial--#4	-	-

Triggers for implementing water supply reduction/allocation procedures:

- Water exceeds State Safe Drinking Water Standards
- Water demand increase or treatment / storage capacity reduction
- Main system break or production loss

In the event of a major system disruption, failure or an emergency, conservation procedures would be enacted by the Wellhead Protection Manager.

D. ALTERNATIVE WATER SUPPLY OPTIONS

1. Surface water sources, treatment needs, and bottled water supplies:
    - Walmart: Hutchinson, MN (320-587-1020)
    - Tri County Water: Hutchinson, MN (800-879-2220)

2. Emergency treatment of water system.
    - City has generators, which could supply power for the City and provide emergency treatment of water.

E. INVENTORY OF AVAILABLE EMERGENCY EQUIPMENT AND MATERIALS

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

Table E-1 Emergency Equipment & Materials Contacts

Description	Owner	Telephone	Location	Acquisition Time
Well Repair	Thein Well	320-796-2111	Spicer	1.5 hours
Pump Repair	Thein Well	320-796-2111	Spicer	1.5 hours
Electrician	Quade's	320-587-3030	Hutchinson	1 hour
Plumber	-	-	-	-
Backhoe / Excavator	Hjerpe	320-234-8305	Hutchinson	1 hour
Chemical Feed	Hawkins	612-331-6910	Roseville	3 hours
Meter Repair	Core & Main	952-893-9130	Eden Prairie	1.5 hours
Valves Pipe & Fittings	Core & Main	952-893-9130	Eden Prairie	1.5 hours
Generator	-	-	-	-

F. EMERGENCY IDENTIFICATION PROCEDURES

Table F-1 Procedural Operations

Incident	Response Procedure and Comments
Identify Disruption	Person identifying disruption contacts Wellhead Protection Manager
Notify Response Coordinator	Wellhead Protection Manager is the Response Coordinator or Alternate
Identify Incident Direction and Control	Wellhead Protection Manager / Response Coordinator or Alternate assesses situation and determine incident direction and control, begin solving problem
Identify Internal Communication	Wellhead Protection Manager contacts City Hall and / or Administrator/Clerk to inform of situation
Inform Public	Public relations personnel contacts appropriate organizations to inform public of problem
Assess Incident on Continual Basis	Wellhead Protection Manager or Alternate continues to monitor/solve problem
Assess Contamination Disruption	Wellhead Protection Manager or Alternate and MDH determine if water supply is contaminated. Monitor/solve problem as needed
Assess Mechanical Disruption	Wellhead Protection Manager or Alternate assesses mechanical disruption. Monitor and solve disruption as needed.
Provide Alternate Water Supply	If needed, alternate water supply is located and provided
Impose Water Use Restrictions	Wellhead Protection Manager, Administrator/Clerk and/or Mayor may impose water use restrictions.

G. NOTIFICATION PROCEDURES

1. Agency Notification

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

Table G-1. Agency Emergency Contact Listing

Personnel	Name	Home Telephone	Work Telephone
Wellhead Protection Manager	Chad Draeger	320-583-6264	-
Mayor/Board Chair	Norman Schwarze	320-583-3401	-
Council Members	Doug Block	320-328-5356	-
Council Members	Jesse Messner	320-583-6750	-
Council Members	Lori Copler	320-583-7222	-
Council Members	Curt Carrigan	718-688-9133	-
Response Coordinator	Chad Draeger	320-583-6264	-
Alt. Response Coordinator	Lori Cacka	320-510-1356	-
State Incident Duty Officer	Minnesota Duty Officer	-	1-800-422-0798
Emergency Director	Kevin Mathews	-	320-864-1339
County Emergency Director	Kevin Mathews	-	911
Fire Chief	Chris Hansch	-	320-583-7051
Sheriff	Scott Rehmann	-	320-864-1350
Police Chief	Ken Bauer	612-756-1254	320-328-5226
Water Operator	Chad Draeger	320-583-6264	-
School Superintendent	Chris Sonju	-	320-864-2498
Ambulance	911	-	911
Hospital	Hutch Health	-	320-587-2020
Power Company	City of Brownton	320-583-6264	-
Highway Department	John Brunkhorst	-	320-484-0234
Telephone Company	Century Link	-	-
Neighboring Water System		-	-
MRWA Technical Advisor	Jeff Dale	320-760-0552	1-800-367-6792
MRWA Circuit Rider Contact	Jeff Dale	320-760-0552	1-800-367-6792
MDH District Engineer	Amy Lynch	-	507-990-2159 507-344-2713
MDH Source Water Protection	Karen Voz	-	320-223-7322

2. Critical Response Personnel

Table G-2 Critical Response Personnel

Title	Name	Response Assignment
Response Coordinator	Chad Draeger	Coordinate actions to address emergency
Alternate Response Coordinator	Lori Cacka	Coordinate actions to address emergency
Water Operator	Chad Draeger	Direct or contact firms to resolve issue
Alternate Water Operator	Spencer Glaeser	Direct or contact firms to resolve issue
Public Relations	Lori Cacka	Contact media to inform citizens/businesses of emergency
Alternate Public Relations	Diana Klabunde	Contact media to inform citizens/businesses of emergency
Public Health/Medical	County Sheriff	Assist City as needed to address emergency
Alternate Public Health/Medical	Police Chief Bauer	Assist City as needed to address emergency

3. Public Information Plan

a) Public relations center and core spokesperson:

Name: Lori Cacka
Title: City Clerk
Address: 335 3rd St S Brownton MN 55312
Phone: 320-328-5318

b) Information checklist to be conveyed to the public and media:

- Name of water system
- Contaminant of concern and date
- Source of contamination
- Public health hazard
- Steps the public can take
- Steps the water system is taking
- Other information

c) Media contacts

Media	Name	Telephone	Location
Newspaper	McLeod County Chronicle	320-864-5518	Glencoe
Television	-	-	-
Radio	KDUZ/KARP	320-587-2140	Hutchinson

H. MITIGATION AND CONSERVATION PLAN

1. Mitigation
   a. Infrastructure maintenance/upgrades/maps:

      Keep on file in City office

   b. Regular inspection of tower, well(s), pump house:

      All are inspected daily. Building and water are key entry and locked.

   c. Staff emergency training:

      Receives training annually from Minnesota Rural Water Association and OSHA training.

   d. System security analysis:

      All systems are locked.

   e. Site new backup well(s):

      No new well planned.

   f. System valving to isolate problems:

      Valves are easily accessible. Map of valves available at City office.

   g. Sanitation procedures for construction/repairs:

      Shock chlorination is done when needed.

2. Conservation
   a. Water meters:
      All connections are metered and read monthly by City staff.
   b. Public education:
      Post-Consumer Confidence Report (CCR) in office and in paper.
   c. Rate structure:
      Flat Fee/Base Charge: $15.00 + $4.30 per 1000

Appendix E

Inner Well Management Zone

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

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

PUBLIC WATER SYSTEM INFORMATION

PWS ID	1430002 **COMMUNITY**
NAME	Brownton
ADDRESS	Water Superintendent, Brownton City Hall, 335 3rd Street South, P. O. Box 238, Brownton, MN 553120238

FACILITY (WELL) INFORMATION

NAME	Well #1
FACILITY ID	S01
UNIQUE WELL NO.	210336
COUNTY	McLeod

IS THERE A WELL LOG OR ADDITIONAL CONSTRUCTION INFORMATION AVAILABLE?

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

PWS ID / FACILITY ID	1430002 S01	**UNIQUE WELL NO.**	210336

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

PWS ID / FACILITY ID	1430002 S01	UNIQUE WELL NO.	210336

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

PWS ID / FACILITY ID	1430002 S01	UNIQUE WELL NO.	210336

PCSI CODE	ACTUAL OR POTENTIAL CONTAMINATION SOURCE	ISOLATION DISTANCES (FEET)				LOCATION	
		Minimum Distances		Sensitive Well[1]	Within 200 Ft. Y / N / U	Dist. from Well	Est. (?)
		Community	Non-community				
IWD	Industrial waste disposal well (Class V well)[2]	illegal[3]	illegal[3]		N		
IWS	Interceptor, including a flammable waste or sediment	50	50		N		
OH1	Ordinary high water level of a stream, river, pond, lake, reservoir, or drainage ditch (holds water six months or more)	50	35		N		
*PP1	Petroleum buried piping	50	50		N		
*PP2	Petroleum or crude oil pipeline to a refinery or distribution center	100	100		N		
PT1	Petroleum tank or container, 1100 gal. or more, without safeguards	150	150		N		
PT2	Petroleum tank or container, 1100 gal. or more, with safeguards	100	100		Y	175	Y
PT3	Petroleum tank or container, buried, between 56 and 1100 gal.	50	50		N		
PT4	Petroleum tank or container, not buried, between 56 and 1100 gal.	50[5]	20		N		
PU1	Pit or unfilled space more than four feet in depth	20	20		N		
PC1	Pollutant or contaminant that may drain into the soil	50	50	100	N		
SP1	Swimming pool, in-ground	20	20		N		
*VH1	Vertical heat exchanger, horizontal piping conforming to rule	50	10		N		
*VH2	Vertical heat exchanger (vertical) piping, conforming to rule	50	35		N		
*WR1	Wastewater rapid infiltration basin, municipal or industrial	300	300	600	N		
*WA1	Wastewater spray irrigation area, municipal or industrial	150	150	300	N		
*WS1	Wastewater stabilization pond, industrial	150	150	300	N		
*WS2	Wastewater stabilization pond, municipal, 500 or more gal./acre/day of leakage	300	300	600	N		
*WS3	Wastewater stabilization pond, municipal, less than 500 gal./acre/day of leakage	150	150	300	N		
*WT1	Wastewater treatment unit tanks, vessels and components (Package plant)	100	100		N		
*WT2	Water treatment backwash disposal area	50	50	100	N		
Additional Sources (If there is more than one source listed above, please indicate here).							
Potential Contamination Sources and Codes Based on Previous Versions of this Form							
HSP	Hazardous substance storage or prep. area, > 25 gals., or 100 lbs. dry weight	150	150		Y	165	N
FFH	Fire or flushing hydrant	10	N/A		Y	131	N**

* New potential contaminant source.

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

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

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

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

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

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

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

PWS ID / FACILITY ID	1430002 S01	UNIQUE WELL NO.	210336

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

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

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

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

INSPECTOR	Voz, Karen (SWP)	DATE	2 - 11 - 2020

PWS ID / FACILITY ID	1430002 S01	UNIQUE WELL NO.	210336

RECOMMENDED WELLHEAD PROTECTION (WHP) MEASURES	WHP MEASURE IMPLEMENTED? Y or N	DATE VERIFIED
Any sewer lines that are observed to be leaking, cracked, or deteriorated, should be replaced.		
Others within 200 feet of the well could be encouraged to properly handle, store, and dispose of hazardous materials. Information is available from the Minnesota Pollution Control Agency (https://www.pca.state.mn.us/waste/hazardous-waste-and-problem-materials) or 1-800-657-3864).		
Tanks should be monitored, or regularly inspected, for leakage. See: http://www.pca.state.mn.us/waste/underground-storage-tank-systems for information, or call the Minnesota Pollution Control Agency at 1-800-657-3864.		

COMMENTS

For further information, please contact:

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

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

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

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

PUBLIC WATER SYSTEM INFORMATION

PWS ID	1430002 **COMMUNITY**
NAME	Brownton
ADDRESS	Water Superintendent, Brownton City Hall, 335 3rd Street South, P. O. Box 238, Brownton, MN 553120238

FACILITY (WELL) INFORMATION

NAME	Well #2
FACILITY ID	S02
UNIQUE WELL NO.	105587
COUNTY	McLeod

IS THERE A WELL LOG OR ADDITIONAL CONSTRUCTION INFORMATION AVAILABLE?

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

PWS ID / FACILITY ID	1430002 S02	**UNIQUE WELL NO.**	105587

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

PWS ID / FACILITY ID	1430002 S02	UNIQUE WELL NO.	105587

PCSI CODE	ACTUAL OR POTENTIAL CONTAMINATION SOURCE	ISOLATION DISTANCES (FEET)				LOCATION	
		Minimum Distances		Sensitive Well[1]	Within 200 Ft. Y / N / U	Dist. from Well	Est. (?)
		Community	Non-community				
*GW1	Gray-water dispersal area	50	50	100	N		
LC1	Large capacity cesspools (Class V well - illegal)[2]	75	75	150	N		
MVW	Motor vehicle waste disposal (Class V well - illegal)[2]	illegal	illegal		N		
PR1	Privy, nonportable	50	50	100	N		
PR2	Portable (privy) or toilet	50	20		N		
*SF1	Watertight sand filter; peat filter; or constructed wetland	50	50		N		
SET	Septic tank	50	50		N		
HTK	Sewage holding tank, watertight	50	50		N		
SS1	Sewage sump capacity 100 gal. or more	50	50		N		
SS2	Sewage sump capacity less than 100 gal., tested, conforming to rule	50	20		N		
*ST1	Sewage treatment device, watertight	50	50		N		
SB1	Sewer, buried, approved materials, tested, serving one building, or two or less single-family residences	50	20		N		
SB2	Sewer, buried, collector, municipal, serving a facility handling infectious or pathological wastes, open-jointed or unapproved materials	50	50		Y	70	N
SB2	Sewer, buried, collector, municipal, serving a facility handling infectious or pathological wastes, open-jointed or unapproved materials	50	50		Y	180	N
*WB1	Water treatment backwash holding basin, reclaim basin, or surge tank with a direct sewer connection	50	50		N		
*WB2	Water treatment backwash holding basin, reclaim basin, or surge tank with a backflow protected sewer connection	20	20		N		
Land Application							
SPT	Land spreading area for sewage, septage, or sludge	50	50	100	N		
Solid Waste Related							
COS	Commercial compost site	50	50		N		
CD1	Construction or demolition debris disposal area	50	50	100	N		
*HW1	Household solid waste disposal area, single residence	50	50	100	N		
LF1	Landfill, permitted demolition debris, dump, or mixed municipal solid waste from multiple persons	300	300	600	N		
SVY	Scrap yard	50	50		N		
SWT	Solid waste transfer station	50	50		N		
Storm Water Related							
SD1	Storm water drain pipe, 8 inches or greater in diameter	50	20		N		
SWI	Storm water drainage well[2] (Class V well - illegal[3])	50	50		N		
SM1	Storm water pond greater than 5000 gal.	50	35		N		
Wells and Borings							
*EB1	Elevator boring, not conforming to rule	50	50		N		
*EB2	Elevator boring, conforming to rule	20	20		N		
MON	Monitoring well	record dist.	record dist.		N		
WEL	Operating well	record dist.	record dist.		N		
UUW	Unused, unsealed well or boring	50	50		N		
General							
*CR1	Cistern or reservoir, buried, nonpressurized water supply	20	20		N		
PLM	Contaminant plume	50	50		N		
*CW1	Cooling water pond, industrial	50	50	100	N		
DC1	Deicing chemicals, bulk road	50	50	100	N		
*ET1	Electrical transformer storage area, oil-filled	50	50		N		
GRV	Grave or mausoleum	50	50		N		
GP1	Gravel pocket or French drain for clear water drainage only	20	20		N		
*HS1	Hazardous substance buried piping	50	50		N		
HS2	Hazardous substance tank or container, above ground or underground, 56 gal. or more, or 100 lbs. or more dry weight, without safeguards	150	150		N		
HS3	Hazardous substance tank or container, above ground or underground, 56 gal. or more, or 100 lbs. or more dry weight with safeguards	100	100		N		
HS4	Hazardous substance multiple storage tanks or containers for residential retail sale or use, no single tank or container exceeding 56 gal. or 100 lbs., but aggregate volume exceeding	50	50		N		
HWF	Highest water or flood level	50	N/A		N		
*HG1	Horizontal ground source closed loop heat exchanger buried piping	50	50		N		

PWS ID / FACILITY ID	1430002 S02	UNIQUE WELL NO.	105587

PCSI CODE	ACTUAL OR POTENTIAL CONTAMINATION SOURCE	ISOLATION DISTANCES (FEET)				LOCATION	
		Minimum Distances		Sensitive Well[1]	Within 200 Ft. Y / N / U	Dist. from Well	Est. (?)
		Community	Non-community				
*HG2	Horizontal ground source closed loop heat exchanger buried piping and horizontal piping, approved materials and heat transfer fluid	50	10		N		
IWD	Industrial waste disposal well (Class V well)[2]	illegal[3]	illegal[3]		N		
IWS	Interceptor, including a flammable waste or sediment	50	50		N		
OH1	Ordinary high water level of a stream, river, pond, lake, reservoir, or drainage ditch (holds water six months or more)	50	35		N		
*PP1	Petroleum buried piping	50	50		N		
*PP2	Petroleum or crude oil pipeline to a refinery or distribution center	100	100		N		
PT1	Petroleum tank or container, 1100 gal. or more, without safeguards	150	150		N		
PT2	Petroleum tank or container, 1100 gal. or more, with safeguards	100	100		N		
PT3	Petroleum tank or container, buried, between 56 and 1100 gal.	50	50		N		
PT4	Petroleum tank or container, not buried, between 56 and 1100 gal.	50[5]	20		N		
PU1	Pit or unfilled space more than four feet in depth	20	20		N		
PC1	Pollutant or contaminant that may drain into the soil	50	50	100	N		
SP1	Swimming pool, in-ground	20	20		N		
*VH1	Vertical heat exchanger, horizontal piping conforming to rule	50	10		N		
*VH2	Vertical heat exchanger (vertical) piping, conforming to rule	50	35		N		
*WR1	Wastewater rapid infiltration basin, municipal or industrial	300	300	600	N		
*WA1	Wastewater spray irrigation area, municipal or industrial	150	150	300	N		
*WS1	Wastewater stabilization pond, industrial	150	150	300	N		
*WS2	Wastewater stabilization pond, municipal, 500 or more gal./acre/day of leakage	300	300	600	N		
*WS3	Wastewater stabilization pond, municipal, less than 500 gal./acre/day of leakage	150	150	300	N		
*WT1	Wastewater treatment unit tanks, vessels and components (Package plant)	100	100		N		
*WT2	Water treatment backwash disposal area	50	50	100	N		
Additional Sources (If there is more than one source listed above, please indicate here).							
Potential Contamination Sources and Codes Based on Previous Versions of this Form							
	none found within 200' of this well.						

* New potential contaminant source.

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

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

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

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

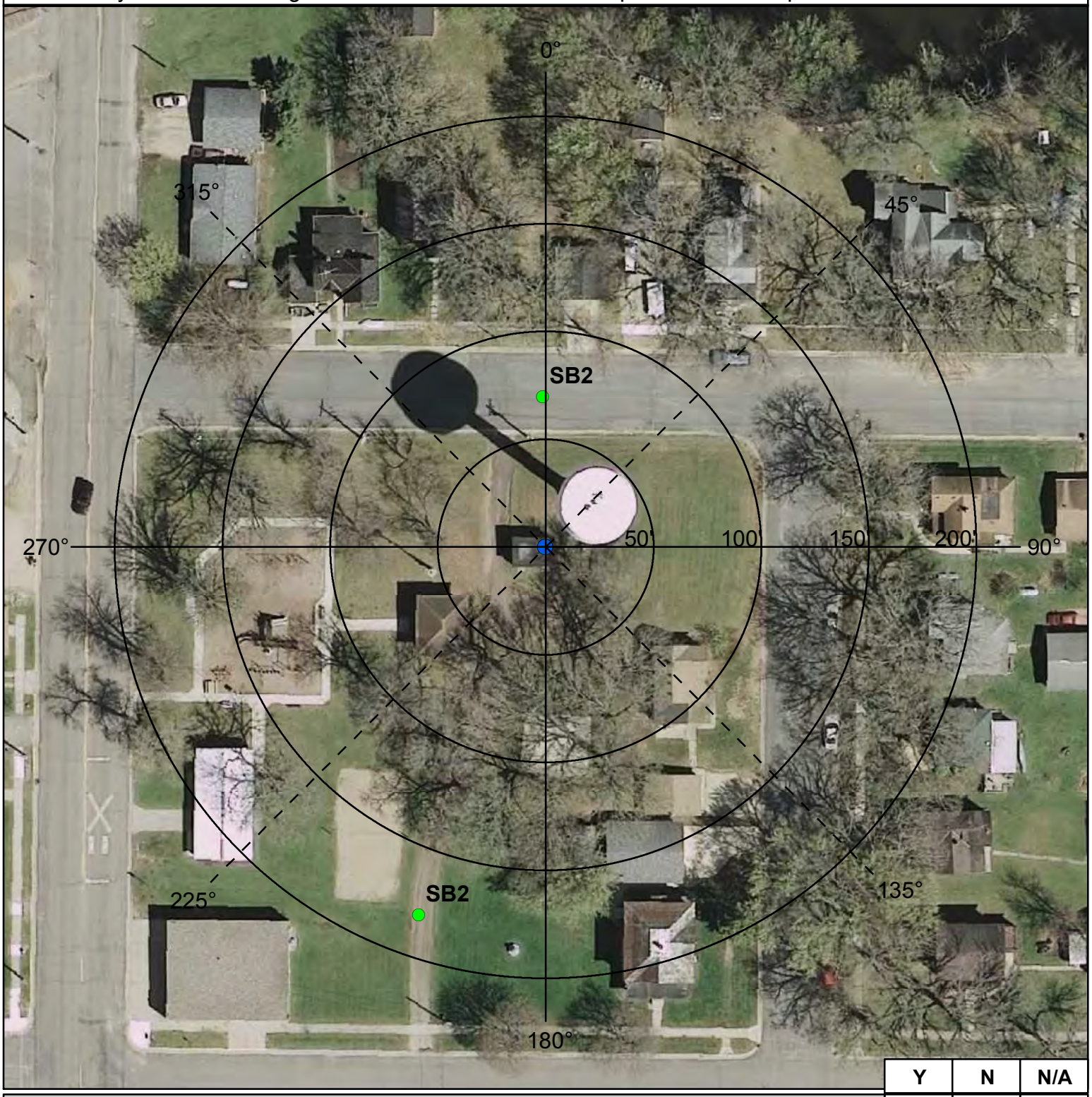
[5] A community public water-supply well must be a minimum of 50 feet from a petroleum tank or container, unless the tank or container is used for emergency pumping and is located in a room or building separate from the community well; and is of double-wall construction with leak detection between walls;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

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

PWS ID / FACILITY ID	1430002 S02	UNIQUE WELL NO.	105587

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

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



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

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

INSPECTOR	Voz, Karen (SWP)	DATE	2 - 11 - 2020

PWS ID / FACILITY ID	1430002 S02	UNIQUE WELL NO.	105587

RECOMMENDED WELLHEAD PROTECTION (WHP) MEASURES	WHP MEASURE IMPLEMENTED? Y or N	DATE VERIFIED
Any sewer lines that are observed to be leaking, cracked, or deteriorated, should be replaced.		
The location of the buried sewer line should be located and documented. Knowing the location of the buried sewer line will determine whether the buried sewer line meets the setback requirements of the well code and will help to assess the line for deterioration and/or leakage.		

COMMENTS

For further information, please contact:

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

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

Appendix F

Old Municipal Well Report

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

Minnesota Well and Boring Sealing No: H 317699
Minnesota Unique Well No or W-series No (Leave blank if not known): 210336

WELL OR BORING LOCATION

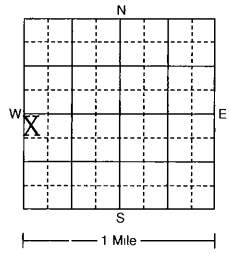
County Name: MCLEOD

Township Name	Township No	Range No	Section No	Fraction (sm → lg)
BROWNTON	115N	29W	29	SW SW SW

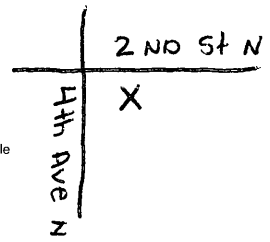
GPS LOCATION – decimal degrees (to four decimal places)
Latitude N44 43.59 Longitude W94 21.4

Numerical Street Address or Fire Number and City of Well or Boring Location
424 2ND ST. N. BROWNTON

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



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



PROPERTY OWNER'S NAME/COMPANY NAME
CITY OF BROWNTON

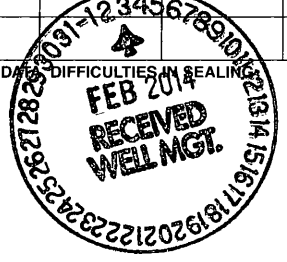
Property owner's mailing address if different than well location address indicated above
P.O. BOX 238
BROWNTON, MN 55312

WELL OWNER'S NAME/COMPANY NAME
SAME

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

GEOLOGICAL MATERIAL	COLOR	HARDNESS OR FORMATION	FROM	TO
If not known, indicate estimated formation log from nearby well or boring				
EARTH	BLK		0	2
CLAY	YLW		2	22
CLAY	BLU		22	54
CLAY-SANDY CLAY	BLU		54	92
CLAY	BLU		92	127
SAND W/ CLAY			127	130
MED SAND			130	150
TOUGH CLAY	GRY	HARD	150	214
GOOD SAND			214	237

REMARKS, SOURCE OF DATA, DIFFICULTIES IN SEALING



MINN. DEPT OF HEALTH COPY H 317699

Date Sealed: 11-15-13
Date Well or Boring Constructed: 5-25-59

Depth Before Sealing 237 ft
Original Depth 237 ft

AQUIFER(S)
[X] Single Aquifer [ ] Multiaquifer

WELL/BORING
[X] Water-Supply Well [ ] Monit Well
[ ] Env Bore Hole [ ] Other

STATIC WATER LEVEL
[X] Measured [ ] Estimated Date Measured 11-15-13
42 ft [X] below [ ] above land surface

CASING TYPE(S)
[X] Steel [ ] Plastic [ ] Tile [ ] Other

WELLHEAD COMPLETION
Outside: [ ] Well House [ ] At Grade [X] Pitless Adapter/Unit [ ] Buried [ ] Well Pit [ ] Other
Inside: [ ] Basement Offset [ ] Well Pit [ ] Buried [ ] Other

CASING(S)

Diameter	Depth	Set in oversize hole?	Annular space initially grouted?
8 in from 0 to 217 ft		[ ] Yes [X] No	[ ] Yes [ ] No [X] Unknown
in from to ft		[ ] Yes [ ] No	[ ] Yes [ ] No [ ] Unknown
in from to ft		[ ] Yes [ ] No	[ ] Yes [ ] No [ ] Unknown

SCREEN/OPEN HOLE
Screen from 217 to 237 ft Open Hole from to ft

OBSTRUCTIONS
[ ] Rods/Drop Pipe [ ] Check Valve(s) [ ] Debris [ ] Fill [X] No Obstruction
Type of Obstructions (Describe)
Obstructions removed? [ ] Yes [X] No Describe

PUMP
Type SUBMERSABLE
[X] Removed [ ] Not Present [ ] Other

METHOD USED TO SEAL ANNULAR SPACE BETWEEN 2 CASINGS, OR CASING AND BORE HOLE:
[ ] No Annular Space Exists [X] Annular Space Grouted with Tremie Pipe [ ] Casing Perforation/Removal
in from to ft [ ] Perforated [ ] Removed
in from to ft [ ] Perforated [ ] Removed
Type of Perforator

VARIANCE
Was a variance granted from the MDH for this well? [ ] Yes [X] No TN#

GROUTING MATERIAL(S) (One bag of cement = 94 lbs., one bag of bentonite = 50 lbs.)
Grouting Material NEAT CEMENT from 0 to 237 ft 3 yards bags
from to ft yards bags
from to ft yards bags

OTHER WELLS AND BORINGS
Other unsealed and unused well or boring on property? [ ] Yes [X] No How many?

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

THEIN WELL CO. 1337
Licensee Business Name *License or Registration No*

Certified Representative Signature 576 *Certified Rep No* 1/23/14 *Date*

JIM CLARK
Name of Person Sealing Well or Boring

HE-01434-14 IC# 140-0423 5/13R

****** REVISED 2/28/14 ******

WELL AND BORING SEALING RECORD

MINNESOTA DEPARTMENT OF HEALTH

Minnesota Statutes Chapter 103I

Minnesota Well and Boring Sealing No: H 317699

Minnesota Unique Well No or W-series No (Leave blank if not known): 210323

WELL OR BORING LOCATION

County Name: DODGE

Township Name	Township No	Range No	Section No	Fraction (sm → lg)
BROWNTON	115N	29W	29	SW SW SW

Date Sealed: 11-13-13

Date Well or Boring Constructed: 5-25-59

GPS LOCATION – decimal degrees (to four decimal places)

Latitude: 044 43.59 Longitude: 094 21.4

Depth Before Sealing: 237 ft Original Depth: 237 ft

Numerical Street Address or Fire Number and City of Well or Boring Location: 424 2ND ST. N. BROWNTON

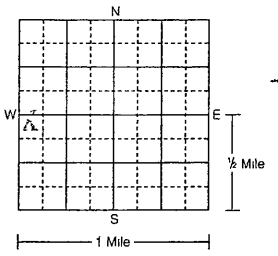
AQUIFER(S): [X] Single Aquifer [ ] Multiaquifer

WELL/BORING: [X] Water-Supply Well [ ] Monit Well [ ] Env Bore Hole [ ] Other

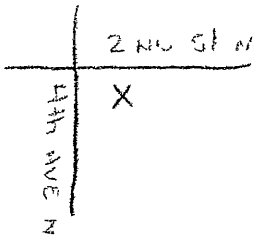
STATIC WATER LEVEL: [X] Measured [ ] Estimated Date Measured 11-15-13

42 ft [X] below [ ] above land surface

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



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



CASING TYPE(S): [X] Steel [ ] Plastic [ ] Tile [ ] Other

WELLHEAD COMPLETION

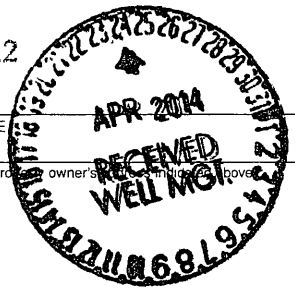
Outside: [ ] Well House [ ] At Grade [X] Pitless Adapter/Unit [ ] Buried [ ] Well Pit [ ] Other

Inside: [ ] Basement Offset [ ] Well Pit [ ] Buried [ ] Other

PROPERTY OWNER'S NAME/COMPANY NAME: CITY OF BROWNTON

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

P.O. BOX 238
BROWNTON, MN 55312



WELL OWNER'S NAME/COMPANY NAME: SAME

Well owner's mailing address if different than property owner's (or mailing address above):

SAME

CASING(S)

Diameter	Depth	Set in oversize hole?	Annular space initially grouted?
8 in from 0	to 217 ft	[ ] Yes [X] No	[ ] Yes [ ] No [X] Unknown
in from	to ft	[ ] Yes [ ] No	[ ] Yes [ ] No [ ] Unknown
in from	to ft	[ ] Yes [ ] No	[ ] Yes [ ] No [ ] Unknown

SCREEN/OPEN HOLE: Screen from 217 to 237 ft Open Hole from to ft

OBSTRUCTIONS: [ ] Rods/Drop Pipe [ ] Check Valve(s) [ ] Debris [ ] Fill [X] No Obstruction

Type of Obstructions (Describe):

Obstructions removed? [ ] Yes [X] No Describe:

PUMP

Type: SUBMERSABLE

[X] Removed [ ] Not Present [ ] Other

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

[X] No Annular Space Exists [X] Annular Space Grouted with Tremie Pipe [ ] Casing Perforation/Removal

in from to ft [ ] Perforated [ ] Removed

in from to ft [ ] Perforated [ ] Removed

Type of Perforator:

VARIANCE

Was a variance granted from the MDH for this well? [ ] Yes [X] No TN#

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

Grouting Material: NEAT CEMENT from 0 to 237 ft 3 yards bags

from to ft yards bags

from to ft yards bags

GEOLOGICAL MATERIAL	COLOR	HARDNESS OR FORMATION	FROM	TO
If not known, indicate estimated formation log from nearby well or boring				
EARTH	BLK		0	2
CLAY	YLW		2	22
CLAY	BLU		22	54
CLAY-SANDY CLAY	BLU		54	92
CLAY	BLU		92	127
SAND W/ CLAY			127	130
MED SAND			130	150
TOUGH CLAY	GRY	HARD	150	214
GOOD SAND			214	237

OTHER WELLS AND BORINGS

Other unsealed and unused well or boring on property? [ ] Yes [X] No How many?

REMARKS, SOURCE OF DATA, DIFFICULTIES IN SEALING

**** REVISED 2/28/14 ****

LICENSED OR REGISTERED CONTRACTOR CERTIFICATION

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

THEIN WELL CO. — Licensee Business Name — 1337 — License or Registration No

Certified Representative Signature — 576 — Certified Rep No — 1/23/14 — Date

JIM CLARK — Name of Person Sealing Well or Boring

LOCAL COPY H 317699

HE-01434-14 IC# 140-0423 5/13R

REVISED 10/31/2109

**** REVISED 2/28/14 ****

MINNESOTA DEPARTMENT OF HEALTH
WELL AND BORING SEALING RECORD

Minnesota Statutes, Chapter 103I

Minnesota Well and Boring Sealing No: H 317699

Minnesota Unique Well No or W-series No (Leave blank if not known): 241974

WELL OR BORING LOCATION

County Name: MCLEOD

Township Name	Township No	Range No.	Section No.	Fraction (sm → lg.)
Brownton	115	29	29	SW SW SW

Date Sealed: 11-15-13

Date Well or Boring Constructed: 1954

GPS LOCATION – decimal degrees (to four decimal places)

Latitude: 44 43.95 Longitude: 94 21.

Depth Before Sealing: ~~247~~ 247 ft

Original Depth: ~~247~~ 247 ft

AQUIFER(S) ☐ Single Aquifer ☐ Multiaquifer

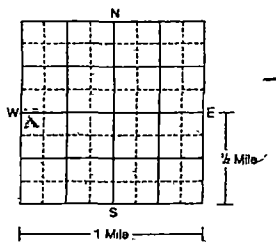
WELL/BORING ☒ Water-Supply Well ☐ Monit Well ☐ Env Bore Hole ☐ Other

STATIC WATER LEVEL ☒ Measured ☐ Estimated Date Measured 11-15-13

40 ft ☐ below ☐ above land surface

424 2nd St N Brownton

In section grid with ... lines, roads, and buildings



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

WELLHEAD COMPLETION

Outside: ☐ Well House ☐ At Grade ☒ Pitless Adapter/Unit ☐ Buried ☐ Well Pit ☐ Other

Inside: ☐ Basement Offset ☐ Well Pit ☐ Buried ☐ Other

PROPERTY OWNER'S NAME/COMPANY NAME: CITY OF BROWNTON

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

P.O. BOX 238
BROWNTON, MN 55312

CASING(S)

Diameter		Depth		Set in oversize hole?		Annular space initially grouted?		
8 in.	from 0	to ~~217~~	ft	☐ Yes	☒ No	☐ Yes	☐ No	☒ Unknown
in.	from	to	ft.	☐ Yes	☐ No	☐ Yes	☐ No	☐ Unknown
in.	from	to	ft.	☐ Yes	☐ No	☐ Yes	☐ No	☐ Unknown

WELL OWNER'S NAME/COMPANY NAME: SAME

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

SAME

SCREEN/OPEN HOLE 230 247

Screen from ~~217~~ to ~~237~~ ft. Open Hole from to ft.

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

ADDITIONAL DATA ADDED TO THIS DOCUMENT

Type of Obstructions (Describe):

Obstructions removed? ☐ Yes ☒ No Describe

PUMP

Type: SUBMERSABLE

☒ Removed ☐ Not Present ☐ Other From. DAIRY Thesing Well DG

GEOLOGICAL MATERIAL	COLOR	HARDNESS OR FORMATION	FROM	TO
If not known, indicate estimated formation log from nearby well or boring				
EARTH	BLK		0	2
CLAY	YLW		2	22
CLAY	BLU		22	54
CLAY-SANDY CLAY	BLU		54	92
CLAY	BLU		92	127
SAND W/ CLAY			127	130
MED SAND			130	150
TOUGH CLAY	GRY	HARD	150	214
GOOD SAND			214	237
NO RECORD			0	247

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

☒ No Annular Space Exists ☐ Annular Space Grouted with Tremie Pipe ☐ Casing Perforation/Removal

in from to ft. ☐ Perforated ☐ Removed

in from to ft ☐ Perforated ☐ Removed

Type of Perforator

VARIANCE

Was a variance granted from the MDH for this well? ☐ Yes ☒ No TN#

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

Grouting Material NEAT CEMENT from 0 to ~~237~~ 247 ft. 3.2 yards bags

from to ft. yards bags

from to ft. yards bags

OTHER WELLS AND BORINGS

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

REMARKS, SOURCE OF DATA, DIFFICULTIES IN SEALING

****REVISED 2/28/14****

REVISED 10/31/19

LICENSED OR REGISTERED CONTRACTOR CERTIFICATION

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

THEIN WELL CO. 1337

Licensee Business Name *License or Registration No*

Certified Representative Signature 575 *Certified Rep No* 1/23/14 *Date*

JIM CLARK

Name of Person Sealing Well or Boring

LOCAL COPY H 317699

HE-01434-14 IC# 140-0423 5/13R

REVISED 10/31/2109

**** REVISED 2/28/14 ****

MINNESOTA DEPARTMENT OF HEALTH
WELL AND BORING SEALING RECORD

Minnesota Statutes, Chapter 1031

Minnesota Well and Boring Sealing No: H 317699

Minnesota Unique Well No or W-series No (if leave blank if not known): ------241974

WELL OR BORING LOCATION

County Name: MCLEOD

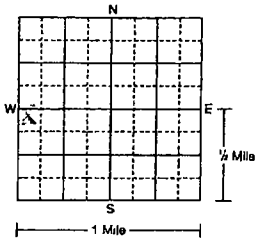
Township Name	Township No	Range No	Section No.	Fraction (sm → lg)
Brownton	115	29	29	SWSWSW

GPS LOCATION – decimal degrees (to four decimal places)

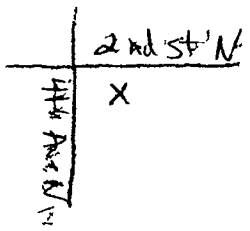
Latitude: 44.43.6 Longitude: 94 11.

Numerical Street Address or Fire Number and City of Well or Boring Location: 428 2nd St. N. Brownton

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



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



Date Sealed: 11-15-13

Date Well or Boring Constructed: ------- 1954

Depth Before Sealing: ---247 ft

Original Depth: ---247 ft

AQUIFER(S): [X] Single Aquifer [ ] Multiaquifer

WELL/BORING: [X] Water-Supply Well [ ] Monit Well [ ] Env Bore Hole [ ] Other

STATIC WATER LEVEL: [X] Measured [ ] Estimated Date Measured 11-15-13

42 ft [ ] below [ ] above land surface

CASING TYPE(S): [X] Steel [ ] Plastic [ ] Tile [ ] Other

WELLHEAD COMPLETION

Outside: [ ] Well House [ ] At Grade [X] Pitless Adapter/Unit [ ] Buried [ ] Well Pit [ ] Other

Inside: [ ] Basement Offset [ ] Well Pit [ ] Buried [ ] Other

PROPERTY OWNER'S NAME/COMPANY NAME: CITY OF BROWNTON

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

P.O. BOX 238
BROWNTON, MN 55312

CASING(S)

Diameter		Depth		Set in oversize hole?	Annular space initially grouted?
8 in	from 0	to ---217 ft		[ ] Yes [X] No	[ ] Yes [ ] No [X] Unknown
____ in	from ____	to ____ ft		[ ] Yes [ ] No	[ ] Yes [ ] No [ ] Unknown
____ in	from ____	to ____ ft		[ ] Yes [ ] No	[ ] Yes [ ] No [ ] Unknown

WELL OWNER'S NAME/COMPANY NAME: SAME

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

SAME

SCREEN/OPEN HOLE 230 247

Screen from ---217 to ---237 ft. Open Hole from ____ to ____ ft

OBSTRUCTIONS: [ ] Rods/Drop Pipe [ ] Check Valve(s) [ ] Debris [ ] Fill [X] No Obstruction

Type of Obstructions (Describe): ____

Obstructions removed? [ ] Yes [X] No Describe: ____

If not known, indicate estimated formation log from nearby well or boring

GEOLOGICAL MATERIAL	COLOR	HARDNESS OR FORMATION	FROM	TO
EARTH	BLK		0	2
CLAY	YLW		2	22
CLAY	BLU		22	54
CLAY-SANDY CLAY	BLU		54	92
CLAY	BLU		92	127
SAND W/ CLAY			127	130
MED SAND			130	150
TOUGH CLAY	GRY	HARD	150	214
GOOD SAND			214	237
NO RECORD			0	247

PUMP

Type: SUBMERSABLE

[X] Removed [ ] Not Present [ ] Other

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

[X] No Annular Space Exists [ ] Annular Space Grouted with Tremie Pipe [ ] Casing Perforation/Removal

____ in from ____ to ____ ft. [ ] Perforated [ ] Removed

____ in from ____ to ____ ft [ ] Perforated [ ] Removed

Type of Perforator: ____

VARIANCE

Was a variance granted from the MDH for this well? [ ] Yes [X] No TN#: ____

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

Grouting Material: NEAT CEMENT from 0 to ---237 247 ft ---3 3.2 yards ____ bags

____ from ____ to ____ ft. ____ yards ____ bags

____ from ____ to ____ ft. ____ yards ____ bags

OTHER WELLS AND BORINGS

Other unsealed and unused well or boring on property? [ ] Yes [X] No How many? ____

REMARKS, SOURCE OF DATA, DIFFICULTIES IN SEALING

****REVISED 2/28/14****

REVISED 10/31/19

LICENSED OR REGISTERED CONTRACTOR CERTIFICATION

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

THEIN WELL CO. — 1337

Licensee Business Name — *License or Registration No*

Certified Representative Signature — 575 (*Certified Rep No*) — 1/23/14 (*Date*)

JIM CLARK

Name of Person Sealing Well or Boring

LOCAL COPY H 317699

HE-01434-14 IC# 140-0423 5/13R

Grundtner, Debbie (MDH)

From: Grundtner, Debbie (MDH)
Sent: Friday, November 01, 2019 9:32 AM
To: Voz, Karen.S (MDH); cityclerk@cityofbrownton.com
Subject: Correction for Well 241974
Attachments: 241974.pdf

241974,

Good Morning,

I have attached the corrected Well Sealing Record for 241974. MN Unique Well Number 210336 was put on H317699 by Thein Well, by mistake. The Well Sealing Record has been changed to reflect MN Unique Well Number 241974 per Thein Well Co.

If you have any questions, please contact me.

Deb Grundtner
Well Management Section, Minnesota Department of Health
625 Robert Street North
PO Box 64975
St. Paul, Minnesota 55164-0975

Minnesota Department of Health
Office: 651-201-4588, Fax: 651-201-4599
www.health.state.mn.us/wells
debbie.grundtner@state.mn.us

DEPARTMENT OF HEALTH

1

Minnesota Department of Health
Environmental Health in Minnesota

MDH Public Water Supply Sources Report

PWSID: **1430002**
PWS Name: **Brownton**
PWS Type: **Community**
PWS Status: **Active**

Public Water Supply Sources: Information from MNDWIS and CWI (sorted by Sample Point ID)

Source Type Codes: **GW** = Ground water; **SW** = Surface water; **GUI** = Ground water under influence
Location Source: **MGS** = digitized by the MN Geological Survey; ***** indicates imcomplete records
O* = duplicate in Unverified Well Data; **R*** = duplicate in MNDWIS PWS Sources Removed from Flow; **S*** = duplicate in MNDWIS PWS Sources in Flow;

MNDWIS PWS SOURCES IN FLOW

Source Info							MNDWIS Data				CWI Data			
Sample Point ID	Name	Type	Availability	Status	Well No. (link to Well Log(s))	Location Info (link to Map)	Drill Year	Depth (in feet)	Case Depth (in feet)	Case Diam. (in inches)	Drill Date	Depth Completed (in feet)	Case Depth (in feet)	Case Diam. (in inches)
S01	**Well #1**	GW	Primary	Active	210336 **O***	04/05/1993 (M. Sweers)	1959	237	217	8	05-25-1959	237.00	217.00	8.00
S02	**Well #2**	GW	Primary	Active	105587 **O***	04/05/1993 (M. Sweers)	1977	250	220	10	00-00-1977	250.00	220.00	10.00
S03	**Well #3**	GW	Emergency	Out Long Term	241974 **O***	04/05/1993 (M. Sweers)	1954	247	230	5	00-00-1954	247.00	230.00	5.00

Unverified Wells

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

UNVERIFIED Well Data

Reference in Record	Name(s)	Unique Well Number	Drilled Depth (ft.)	Completed Depth (ft.)	Depth Cased (ft.)	Casing Diameter (in.)	Year Constructed	Construction Type	Year Out of Service	Sealing Record?	Year Sealed	Location Info	Comments
A	Well No. 1		173.0	173.0		8.0	Before 1924	Cable Tool/Bored				In pump station, center of village.	Ref.: 1924 MDH San. Rpt.
B	Well No. 2		304.0	304.0		8.0	Before 1931	Cable Tool/Bored				In pump station, center of village.	Ref.: 1931 MDH San. Rpt.
C	Well No. 3		145.0	145.0	129.0	10.0	Before 1942	Cable Tool/Bored	1959			SE corner of pump station.	Ref.: 1942 MDH San. Rpt. 1959-Abandoned/filled with earth.
D	Creamery Well		130.0	130.0			Before 1944	Cable Tool/Bored					Ref.: 1947 MDH San. Rpt. Inter-connection with city water supply. 1944 MGS Bulletin gives depth as 130 ft.
E	Well No. 1	210336 **S***	237.0	237.0	217.0	8.0	1959	Cable Tool/Bored					Ref.: 1959 MDH San. Rpt.
F	Well No. 2	105587 **S***	300.0	250.0	220.0	10.0	1977	Rotary/Drilled					Ref.: 1978 MDH San. Rpt.
G	Well No. 3	241974 **S***	247.0	247.0	230.0	5.0	1954	Cable Tool/Bored					Ref.: 1984 MDH San. Rpt.
Databases Searched					**Remarks**								

2

UNVERIFIED Well Data													
Reference in Record	**Name(s)**	**Unique Well Number**	**Drilled Depth (ft.)**	**Completed Depth (ft.)**	**Depth Cased (ft.)**	**Casing Diameter (in.)**	**Year Constructed**	**Construction Type**	**Year Out of Service**	**Sealing Record?**	**Year Sealed**	**Location Info**	**Comments**
County Well Index (1-mile radius); MDH DWP Microfiche; MDH 1Suite; Lakesnwoods.com; Biennial Report of the MN State Dairy and Food Commissioner-1907; Minnesota Geological Survey City Well File Folders; MGS Bulletin (27, 31, or 32); MNBrew.com (breweries); MDH DWP MNDWIS; Past and Present MN Railroad Stations; MDH WELLS					This Unverified Municipal Well Inventory is as complete and thorough as possible, given available documentation. However, MDH Planners and Hydros, as well as City representatives should feel free to add or subtract from this report as necessary. A 130-foot deep creamery well was mentioned in the 1944 MGS Bulletin 31. The creamery well had an inter-connection with the city's water supply. The MGS Bulletin mentions a Village Well from 1895. It is not known whether this well is the same "A" on this list or an earlier city well. The town reportedly had a station of the Chicago, Milwaukee, & St. Paul Railway, as well as at least one creamery. No breweries are reported to have operated here. No pertinent city well sealing records were found in the MDH's Wells database. An historical photograph shows a water tower, circa 1900, possibly north of Division Street. Based on the results of this report, there are four unverified public water supply wells to be located and sealed.							
Unverified Well Data Compiled By: **Geoffery Nash** Compiled Date: **7/22/2013**													

Source: MN Dep't. of Health - 7/23/2013

3

Use of MDH Public Water Supply Sources Report

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

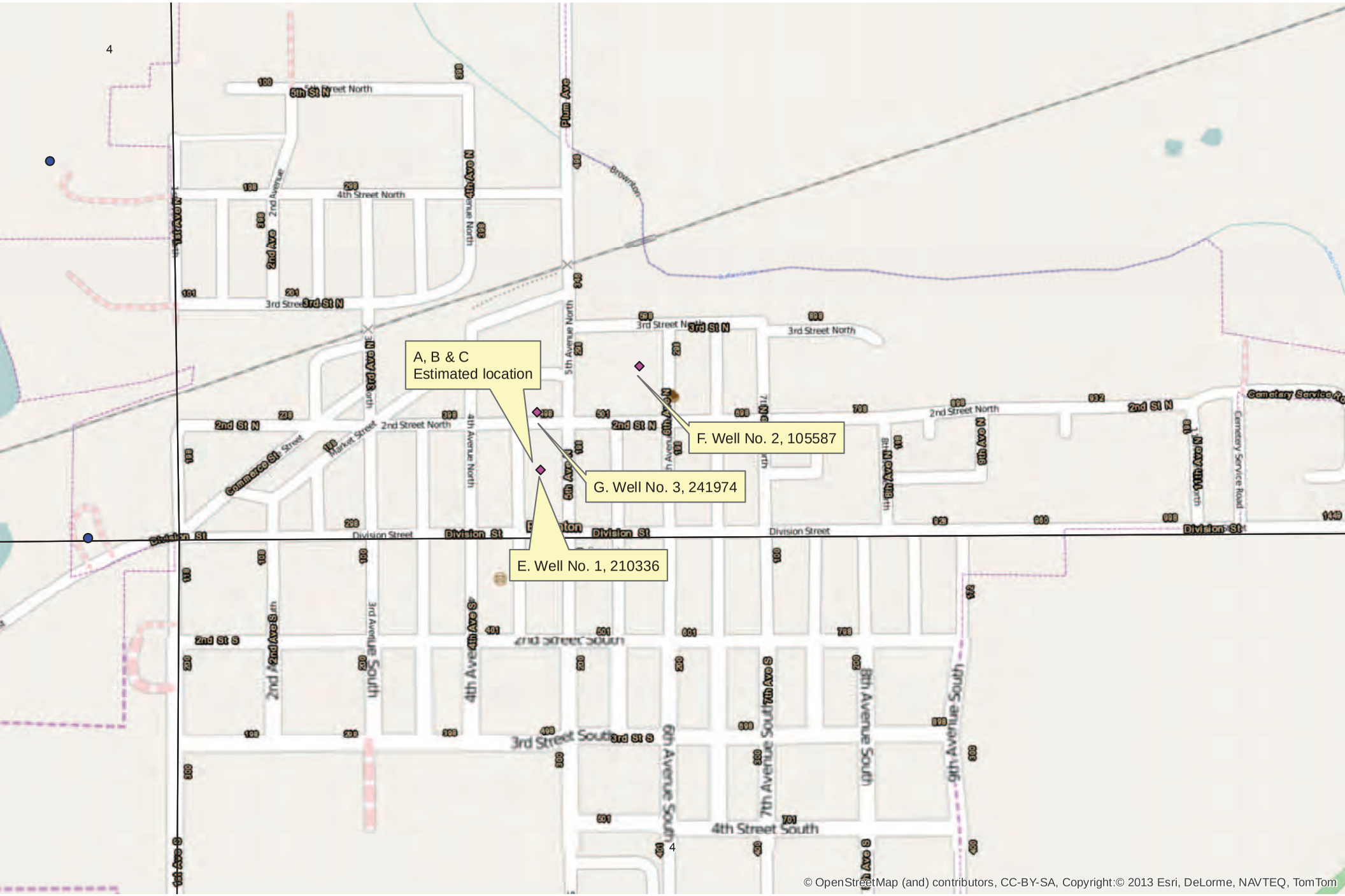
- In Use (actively used)
- Removed From Flow (for back-up or emergency use; may be disconnected from PWS)
- **Unverified Wells (unused wells with no documented location, unique ID number, and/or well sealing record)**

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

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

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

Restart


A, B & C
Estimated location
F. Well No. 2, 105587
G. Well No. 3, 241974
E. Well No. 1, 210336
5th St N
5th Street North
Plum Ave
Brewerton
4th Street North
2nd Ave
4th Avenue North
3rd Street North
3rd St N
3rd Ave N
5th Avenue North
2nd St N
2nd Street North
Commerce St
Market Street
6th Ave N
8th Ave N
Cemetery Service Road
Division St
Division Street
2nd St S
2nd Street South
3rd Avenue South
4th Ave S
3rd Street South
3rd St S
6th Avenue South
7th Avenue South
8th Avenue South
9th Avenue South
4th Street South
© OpenStreetMap (and) contributors, CC-BY-SA, Copyright:© 2013 Esri, DeLorme, NAVTEQ, TomTom

Historical Photographs
Brownton, Minnesota

Water tower in background, possibly Division St. in foreground, Brownton, 1900s. Courtesy of LakesnWoods.com.

1944 MGS Bulletin 31

		DEPTH (feet)	THICKNESS (feet)
	Gravelly clay	148–187	39
	Uniform sand with streaks of clay	187–225	38
	Gravel and sand	225–280	55
	Blue shale	280–290	10
	Gray sandy shale	290–310	20
	Gray uniform sand	310–353	43
	A drift conglomerate	353–354	1
Dresbach	Gray shale, grading into red	354–410	56
	White sand	410–544	134
	Pink sand, grading nearly to white and showing evidence of consolidation	544–578	34
	White sand, grading into pink	578–592	14
	Light-gray sand	592–602	10
Hinckley (from 760 feet)	Pink sand, toward the bottom becoming highly colored	602–820	218
	White sandstone varying to pink	820–874	54
	Pink sandstone	874–936	62
Fond du Lac	Red shale and sandstone of uniformly persistent color	936–1075	139
	Red to pink shale and sandstone, with little variation (no samples)	1075–1640	565

Hutchinson

The public supply and nearly all the domestic and industrial supplies of water at Hutchinson are obtained from a strong artesian layer in the drift that occurs at a depth of about 200 feet. The city has two wells, each 14 inches in diameter and 200 feet deep. They are located below the dam on the bank of the South Fork of the Crow River, at an elevation of 1025 feet. The water level in the river below the dam is at about 1018 feet, and that above the dam is about 1032 feet above sea level. The wells flowed with a high head when first completed, but the static level is now 15 feet below the surface. When pumped at the rate of 300 gallons per minute there is no appreciable drawdown.

Many private artesian wells in the city tap the same aquifer, but only a few flow to the surface at the present time. The Farmers' Produce Company and the Coca Cola Company each have wells that yield copiously.

Brownton

B

C

The village of Brownton is located on a thick mantle of glacial drift, at an elevation of 1015 feet. The old village well was 6 inches in diameter and 304 feet deep. It did not penetrate the base of the drift. The well had a static level 24 feet below the surface and showed little drawdown when pumped at the rate of 95 gallons per minute. Another well 10 inches in diameter and only 145 feet deep was drilled in 1933. This well has a static level 40 feet below the surface and a drawdown of 20 feet when pumped at the rate of 150 gallons per minute. The creamery well is 130 feet deep, with a static level 22 feet below the surface.

Stewart

The village well at Stewart penetrates 320 feet of boulder clay, with

D. creamery well "130 feet deep"

interbedded layers of sand and gravel. The best yield is from a seam 265 feet below the surface. The well is 8 inches in diameter, and its static level is 28 feet below the surface. It is pumped at the rate of only 50 gallons per minute and shows considerable drawdown. There are many private wells for domestic supplies.

Lester Prairie

The village of Lester Prairie is located on the north side of Crow River, on a level terrace underlaid by alluvial sand and gravel, which extends to a depth of about 30 feet and is saturated with water nearly to the surface. Beneath the alluvium is the ordinary glacial drift, consisting of blue clay and sandy seams from which the water rises virtually to the surface, or 980 feet above sea level. North of the village, at a somewhat higher altitude, stretches the gently undulating drift plain that comprises most of the county.

The public water works were formerly supplied from a well 20 feet in diameter, which ends in the alluvial deposits at a depth of 22 feet. In 1907 the water stood 8 feet below the surface, and pumping at the rate of 200 gallons per minute was reported to empty the well in about one hour. The water is rather hard, as is shown in the analysis given in Table 78. The village now has a well 200 feet deep, in which the static level is 9 feet below the surface, or about the same as in the old dug well. When pumped at the rate of 250 gallons per minute this well shows a drawdown of 10 feet. Many shallow driven wells are used for domestic supplies.

Silver Lake

This village formerly used water from the lake for the public supply system. It now has a well 6 inches in diameter and 160 feet deep. Its static level is 30 feet below the surface. The creamery has two wells, one 53 feet deep and another 140 feet deep. The deeper well yields abundantly.

Winsted

The water supply for this village comes from private wells driven or drilled in the drift.

Sumter

This village has no public water supply system. The creamery has a dug well 50 feet deep, in which the water level is 30 feet below the surface.

Plato

The creamery well in this village is 130 feet deep, with a static level 30 feet below the surface. The well shows no appreciable drawdown when pumped at the rate of 100 gallons per minute.

Biscay

The creamery in this village has a flowing well about 180 feet deep

which has a head 15 feet above the surface, or 1035 feet above sea level. The well at the grain elevator and several at private dwellings also flow.

Koniska

This village also has a number of flowing wells. The one at the creamery is 164 feet deep. It penetrated a hardpan layer about 1 foot thick immediately above the sand layer that serves as the aquifer. The well flows 90 gallons per minute, with a head 32 feet above the surface, or 1037 feet above sea level.

FARM WATER SUPPLIES

There are many shallow dug or bored farm wells in this county, but drilled wells in the drift are the most common type. The latter vary from 75 to 300 feet in depth. A few penetrate the drift completely and draw from the underlying sandstones. The following well sections are typical of this group.

Farm Well Half a Mile North of Glencoe. William Warnke, Owner
Elevation 1030 ft.

		DEPTH (feet)	THICKNESS (feet)
Drift	Unclassified	0–250	250
Cretaceous	White sandy clay	250–260	10
Cambrian	Blue-green and red shales	260–438	178
	White sandstone	438–460	22

Farm Well, Sec. 29, T. 115 N., R. 27 W., F. Groupman, Owner

		DEPTH (feet)	THICKNESS (feet)
Drift	Unclassified	0–280	280
Dresbach	Blue, green, and red shales	280–410	130
Eau Claire	Red shale	410–430	20
	Red and green shale	430–437	7
	Red shale	437–445	8
Mt. Simon	White sandstone	445–480	35

Farm Well, Sec. 8, T. 115 N., R. 27 W., North of Plato. Elevation 975 ft.

		DEPTH (feet)	THICKNESS (feet)
Drift	Unclassified	0–320	320
Dresbach			
Eau Claire	Blue, green, and red shales	320–380	60
Mt. Simon	White and gray sandstone	380–400	20

TABLE 78. — ANALYSES OF WATERS OF MCLEOD COUNTY *

	1	2	3	4	5	6
Depth (feet)	600	1640	193	197	318	140
Hardness	380	328	393	385	350	435
Alkalinity	380	384	448	450	380	488
Iron	0.35	0.4	0	...	3.6	0.5
Manganese	0	...	...	0.1	...	...
Chlorine	7.6	29	1	...	6.5	1
Fluorine	0.1	...	...	0.1	...	...

TABLE 78.—*Continued*

SO_4 radical	130	...	...	...	...	...
Turbidity	6	5	30	10	10	15
Color	27	28	80	20	80	20
Odor	...	e-l	e-l	...	e-l	0
pH value	8	...	...	...	...	...

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

1. City well at Glencoe. July 16, 1937.
2. City well at Glencoe. May 21, 1917.
3. Flowing well at Hutchinson. June 26, 1918.
4. Village well at Lester Prairie. December 31, 1930.
5. Village well at Stewart. December 6, 1915.
6. Village well at Winsted. September 12, 1923.

TABLE 79.—MINERAL ANALYSES OF WATERS OF McLEOD COUNTY
(Analyses in parts per million)

	Surface Deposits (Glacial Drift, etc.)										
	1	2	3	4	5	6	7	8	9	10	11
Depth (feet)	21	22	22	28	39	40	112	115	120	172	180
Diameter of well (inches)	120	...	240	144	144	84	2	...	...	3	10
Silica (SiO_2)	...	28	31	...	...	...	...	...	...	..	22
Iron (Fe)	...	tr.	0.2	...	...	...	...	...	...	...	5
Aluminum (Al)	...	...	...	...	...	...	...	...	...	...	...
Iron and aluminum oxides ($Fe_2O_3 + Al_2O_3$)	3.3	8	0.8	4.7	6.2	7	8.4	7.4	6.4	12	5
Calcium (Ca)	78	149	136	113	112	76	96	88	96	117	103
Magnesium (Mg)	24	50	44	46	49	24	43	38	42	42	39
Sodium and potassium (Na + K)	5	37	61	10	20	5	54	45	56	39	29
Carbonate radical (CO_3)	...	0	0.0	...	...	...	...	...	...	...	0
Bicarbonate radical (HCO_3)	330	547	415	484	516	307	540	572	560	628	512
Sulphate radical (SO_4)	27	117	110	65	61	41	79	10	71	28	67
Chlorine (Cl)	3.2	54	130	19	27	3.6	4	1.5	3	2	2
Nitrate radical (NO_3)	...	12	4.2	...	...	...	...	..	...	...	0
Total solids	303	740	731	496	529	308	550	467	550	549	531

	Surface Deposits (Glacial Drifts, etc.)							Paleozoic Sandstones		
	12	13	14	15	16	17	18	19	20	21
Depth (feet)	226	230	230	260	304	304	320	1640	1640	1640
Diameter of well (inches)	...	3	2	...	6	6	8	Sand 6	Sand 6	Sand 6
Silica (SiO_2)	24	...	...	...	29	...	26	...	8.8	...
Iron (Fe)	2.8	...	...	...	...	...	...	...	0.5	...
Aluminum (Al)	4.9	...	...	...	...	...	...	...	4.7	...
Iron and aluminum oxides ($Fe_2O_3 + Al_2O_3$)	...	8	3	1.2	0.8	3.1	3.2	1.7	...	1.2
Calcium (Ca)	99	117	120	40	71	75	42	78	77	75
Magnesium (Mg)	53	48	51	23	33	34	10	40	43	33
Sodium and potassium (Na + K)	28	51	51	106	74	75	113	80	85	209
Carbonate radical (CO_3)	0	...	...	...	0	...	0	...	0	...
Bicarbonate radical (HCO_3)	508	647	686	503	512	588	410	456	429	464
Sulphate radical (SO_4)	98	65	54	...	20	...	24	107	116	158
Chlorine (Cl)	6	1	1	8	6	5	9	35	37	165
Nitrate radical (NO_3)	0	...	...	...	0	...	1.3	...	0	...
Total solids	568	609	622	425	491	481	449	565	600	870

1. Well at Hutchinson. November 24, 1897.
2. Well of Lee Arnold at Brownton. September 17, 1907.
3. Village well at Lester Prairie. September 19, 1907.
4. Well at Glencoe. September 3, 1888.
5. Well at Glencoe. May 3, 1888.
6. Well at Hutchinson. October 13, 1888.
7. Well at the flouring mill at Brownton. December 5, 1894.
8. Well at Brownton. December 5, 1894.
9. Bullick's well at Brownton. December 5, 1894.
10. Mr. Hayden's well at Glencoe. April 22, 1895.
11. Flowing well at the flour mill at Hutchinson. This well furnishes the public supply. September 18, 1907.
12. Flowing well on the farm of William Conrad, NE 1/4, Sec. 31, T. 116 N., R. 28 W. One and one-half miles east of Biscay. September 18, 1907.
13. Creamery well at Glencoe. May 9, 1895.
14. Bretchet's well at Glencoe. May 9, 1895.
15. Well at Stewart. March 3, 1896.
16. Village well at Brownton. September 17, 1907.
17. Village well at Brownton. October 3, 1895.
18. Village well at Stewart. September 14, 1907.
19. City well at Glencoe. July 21, 1898.
20. City well at Glencoe. September 17, 1907.
21. City well at Glencoe. July 17, 1897.

Analyses 2, 3, 11, 12, 16, 18, and 20 were made for the United States Geological Survey by H. A. Whittaker, chemist, Minnesota State Board of Health. Analyses 1, 4, 5, 6, 7, 8, 9, 10, 13, 14, 15, 17, 19, and 21 were furnished by G. N. Prentiss, chemist, Chicago, Milwaukee and St. Paul Railway Company.

MEEKER COUNTY

SURFACE FEATURES

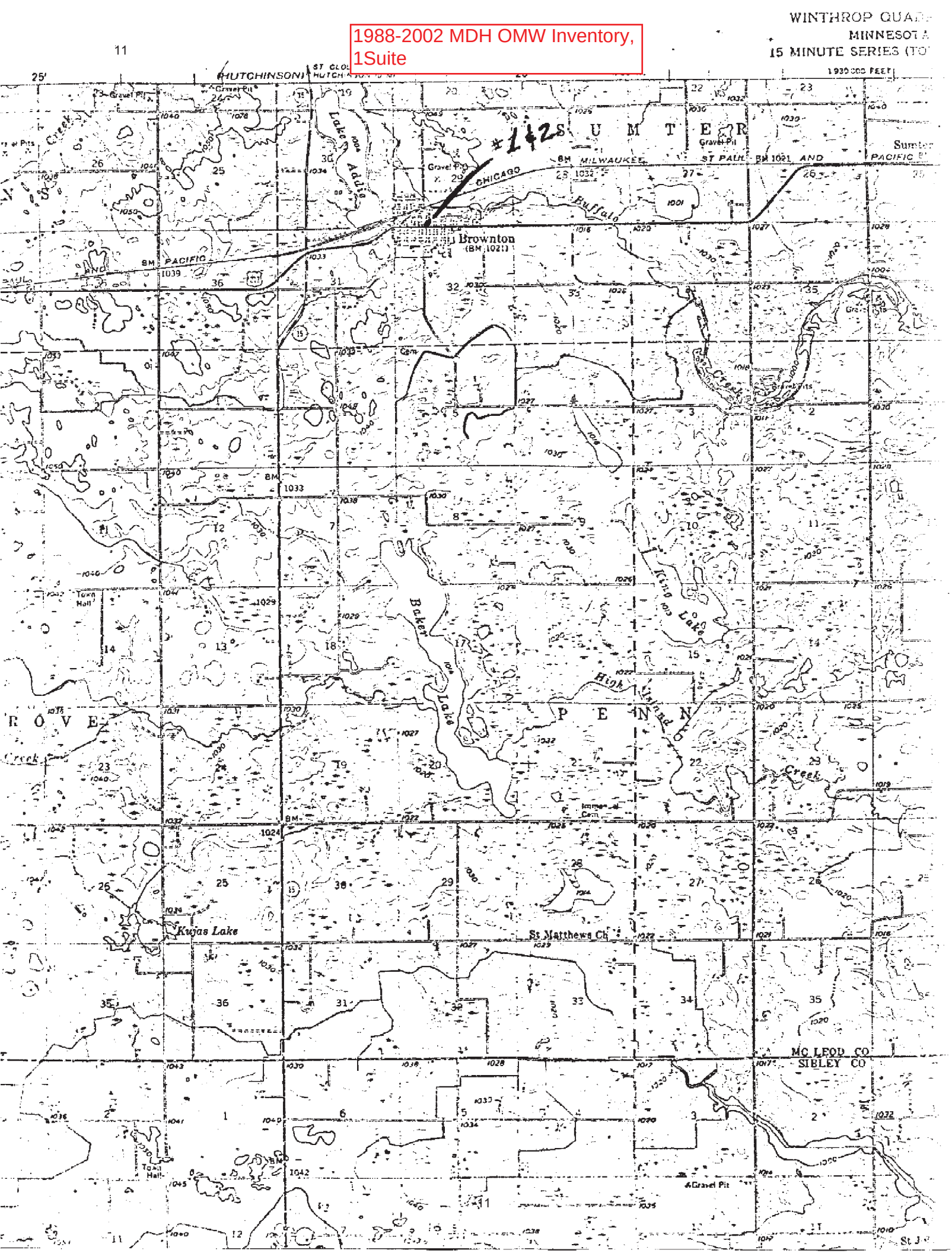
The surface of Meeker County is characterized by three types of topography that influence underground water conditions: (1) a large outwash plain in the center of the county with associated glacial lake sands and silt; (2) irregular moraines, which unite a few miles west of the county to form one of the great morainic systems that developed on the eastern side of the Late Wisconsin (Mankato) ice sheet; and (3) the gently undulating topography of the southwestern part of the county. The drainage is almost entirely eastward through the two forks of the Crow River to the Mississippi River. A small area near Eden Valley drains northward to the Sauk River.

UNCONSOLIDATED SURFACE MANTLE

Glacial drift covers the entire county. No outcrops of older rocks are known. The drift is mainly boulder clay, but sands and gravel are prominent in the outwash area of the central part of the county. An area of sandy moraine occurs from Washington Lake northward toward Kingston, and gravelly knolls and ridges occur along the outer edge of each moraine next to the outwash plains.

The average thickness of the drift is about 250 feet. Where wells have penetrated the base, it is found resting on either gritty white clays that represent residual products of decay of granite or on bluish-gray shales

1988-2002 MDH OMW Inventory, 1Suite



Brownton

1988-2002 MDH OMW Inventory, 1Suite

Below are descriptions of your municipal wells according to our records. On the opposite side of this sheet is a map of your municipality, and the location of your municipal wells, located as accurately as possible using our present records. Please confirm or correct the location and numbering of your wells and include any wells that are not shown.

Well No.	Well Depth	Casing Dia.	Casing Depth	Drop Pipe Length	Year Installed	Status
E 1	237'	8"	217'	100'	1959	STANDBY
F 2	250'	10"	220'	120'	1977	ACTIVE

BROWNTON (688)-MC LEOD

BROWNTON BULLETIN — Brownton 55312
Charles H Warner — Publisher — 612-328-4184
N/A 1892 100-249 — I-8 — Loc
2711 Newspaper
2711 Job Printing

NO

BROWNTON CO-OP CREAMERY ASSN
Box 188 — Brownton 55312
Dave Goebel — Mgr — 612-328-5211
Coop 500-999 — I-8 — Loc
2021 Butter
2026 Whole Milk
2048 Feeds
2875 Bulk Blend Fertilizers

yes
well owned By City now

Thank you for your cooperation!

E

13

115-29-29 ccdd DCDC

RECEIVED
JUN 19 1959

210336

MINNESOTA CONSERVATION DEPARTMENT
DIVISION OF WATERS
WELL LOG STATEMENT

sample # 601258

elev. 1030

File No. 93A

Well No. 115-29-29 ccdd No. 1

MAIL REPORT PROPERTY TO DIRECTOR, DIVISION OF WATERS, STATE OFFICE BLDG., ST. PAUL 1, MINN.

Location of Well 80' West & 55' South of NE. Corner Block 14 Browton Townsite

McLeod County — Village of Browton City or Town — Minn.

Lot 4 Block 14 Browton Townsite, Nelson Street
Describe Further by Lot, Block, Nearest Highway, Street and Number

Locate Well on Plat of Section

SE¼ SW¼ SW¼

Sec. 29

Twp. 115

Range 29

Drilled for: Village of Browton

Address Browton, Minn.

Driller Clarence E. Heil

Address Browton, Minn.

90

Date of Completion May 25,1959

Site upland
Upland, Valley, Hillside, Etc.

Type of Well Drilled
Dug, Driven, Bored, Drilled

Drill Rig Used Solid Tool
Solid Tool, Jet, Rotary

Diameter: Top 8 inches Bottom 8 inches

Depth of Well 237 feet

Ground Elevation 1030' above Sea level
Sea Level Datum or Give Distance Above or Below R. R., Highway, Lake, Etc.

Height of Casing Above Ground 2 feet

Quality of Water Medium hard
(Hard or Soft, Fresh or Salty, Etc.)

Temperature of Water 50

Was Laboratory Analysis Made? No

For What Purpose Will Water Be Used? Village

Is Well Pumped? Yes Pump Capacity 125 GPM

Was Well Sealed on Completion? Yes

Does Well Overflow Without Pumping? No
Yes or No

Natural Flow _____ GPM

REPORT OF FINAL PUMPING TEST

Date of Test May 23,1959

Duration of Test 6 Hrs. _____ Min.

Rate of Pumping 337 GPM

Static Water Level 38 Ft.

Water Level While Pumping 43 Ft.

Drawdown 4 Ft.

Time Required for Recovery None

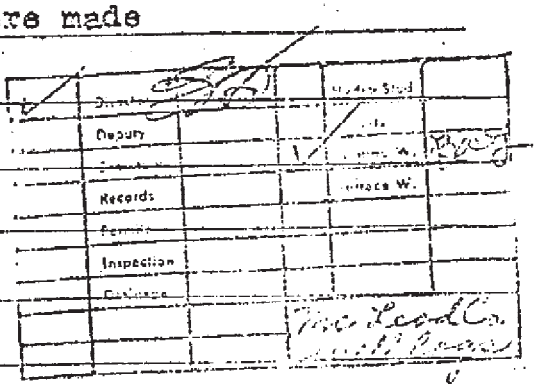
Expected Average Yield 489,600 Gal. per day

If Other Tests were Made, Give Details on Another Sheet.

Were Measurements Made of Effect on Other Nearby Wells During Test? Give Details.

None were made

ACKNOWLEDGED 6/19/59



THE DATA CONTAINED HEREIN

13

WELL LOG

Geologic Formations Kind, Color, Hard or Soft	Thickness of Formation	Depth in Feet From	Depth in Feet To	Casing Diam.	Water Conditions Found
Black earth	3ft	0	3	8"	QUUU SOIL, ORGD None
Yellow clay	20	3	23	8"	QTUU CLAY None
Blue clay	32	22	54	8"	QTUU CLAY None
sandy clay	4	54	58	8"	QFUU CLAY, SAND small amount
Blue clay	32	58	90	8"	QTUU CLAY None
Sandy clay	2	90	92	8"	QFUU CLAY, SAND small amount
Blue clay	35	92	127	8"	QTUU CLAY None
sand with clay	3	127	130	8"	QFUU SAND, CLAY some water
Medium sand	20	130	150	8"	QFUU SAND fair water supply
Tough hard gray clay	64	150	214	8"	QTUU CLAY None
Good sand	23	214	237	8"	QFUU SAND More sand, plentiful
		Aquifer		0BOW-0BOW	

8 inch screen 20 foot in length Johnson Everdur at 237 foot level.

Well put into continuous use May 25, 1959

Indicate Size, Type, & Location of Any Screens, Gravel Packs, Grouting, or Other Development

I hereby certify that, to the best of my knowledge, the data presented in this statement is a true and correct representation of conditions encountered in the construction of this well.

Dated at Browntop this 28th day of May, 19 59

(Firm Name) Heil Well Co.

15

1988-2002 MDH OMW Inventory, 1Suite

F

STATE OF MINNESOTA
DEPARTMENT OF HEALTH

115-29-29 cdcbcb
elev. 1025±5

WATER WELL RECORD

Minnesota Statutes 156A.01-.08

MINNESOTA UNIQUE WELL NO. for Water Sample: (C) 105587

1. LOCATION OF WELL

County Name	Fraction	Section Number	Township Number	Range Number
McLeod	SW SE SW	29	115N (N. or S.)	29W (E. or W.)

Distance and Direction from Road Intersections or Street Address and City of Well Location

Show exact location of well in section grid with "X." Sketch map of well location.

N / W / E / S — ½ mi. — 1 mile

BEST ONE

3. PROPERTY OWNER'S NAME
well #2
Address: City
Brownton, Minnesota

89

4. WELL DEPTH (completed) ___ ft. Date of Completion (93A)

5. 1 Cable tool, 2 Hollow rod, 3 [X] Rotary, 4 Reverse, 5 Air, 6 Jetted, 7 Driven, 8 Bored, 9 Power Auger, 10 Dug, 11 ___

6. USE: 1 Domestic, 2 Irrigation, 3 Test Well, 4 [X] Public Supply, 5 Air Conditioning, 6 ___, 7 Industry, 8 Commercial

2. FORMATION LOG	COLOR	HARDNESS OF FORMATION	FROM	TO
Black dirt — QUUU SOIL, ORG D			0	2
Sandy yellow clay — QFUU CLAY, SAND			2	8
Sandy blue clay — QFUU CLAY, SAND			8	20
Sand — QFUU SAND			46	52
Sandy blue clay — QFUU CLAY, SAND			52	96
Sand — QFUU SAND			96	97
Sandy blue clay — QFUU CLAY, SAND			97	100
Sandy shale — QFUU CLAY, SAND			100	109
Clay — QTUU CLAY			109	110
Rock — QFUU BLDR			110	111
Sandy blue clay — QFUU CLAY, SAND			111	117
Sand (clay) — QFUU SAND, CLAY			117	129
Rock — QFUU BLDR			129	
Boulders rock sand — QFUU BLDR, SAND			129	140
Blue clay — QTUU CLAY			140	157
Sand — QFUU SAND			157	160
Hard blue clay — QTUU CLAY			160	180
Sandy blue clay — QFUU CLAY, SAND			180	194
Rock — QFUU BLDR			194	
Soft blue clay — QTUU CLAY			194	209
Sand — QFUU SAND			209	
Hard — QFUU BLDR			210	
Sand — QFUU SAND			211	294
Clay — QTUU CLAY			294	300

Use a second sheet, if needed.

REMARKS, ELEVATION, SOURCE OF DATA, etc.

7. CASING DIAM.: Threaded ☐1, Welded [X]3, Black [X]2, Galv. ☐4
10 in. to 220 ft. depth
___ in. to ___ ft. depth
___ in. to ___ ft. depth
HEIGHT: Above/Below Surface ___ ft. Weight ___ lbs./ft. Drive Shoe? Yes ___ No ___

8. SCREEN: Make Johnson; Type Stainless Steel; Dia. 10 tele; Slot/Gauze 50; Length ___
Set between 220 ft. and 250 ft.; ___ ft. and ___ ft.; ___ ft. and ___ ft. FITTINGS:
Or open hole from ___ ft. to ___ ft.

9. STATIC WATER LEVEL: 42'6" ft. [X] below ☐ above land surface. Date Measured ___

10. PUMPING LEVEL (below land surface): 65'11" ft. after 9½ hrs. pumping 610 g.p.m.; ___ ft. after ___ hrs. pumping ___ g.p.m.

11. WELL HEAD COMPLETION: 1 Pitless adapter, 2 Basement offset, 3 [X] At least 12" above grade

12. Well grouted? [X] Yes ☐ No. 1 Neat cement, 2 Bentonite, 3 ___ Cu. Yds. ___
Depth: from ___ ft. to ___ ft.; from ___ ft. to ___ ft.

13. Nearest source of possible contamination: ___ feet ___ direction ___ type
Well disinfected upon completion? Yes [X] No ☐

14. PUMP: Date installed ___ ☐ Not installed
Manufacturer's Name Jacuzzi
Model Number 10MSD HP 30 Volts 230
Length of drop pipe 120 ft. capacity ___ g.p.m.
Material of drop pipe Steel
Type: 1 Submersible, 2 [X] L.S. Turbine, 3 Reciprocating, 4 Jet, 5 Centrifugal, 6 ___

16. WATER WELL CONTRACTOR'S CERTIFICATION
This well was drilled under my jurisdiction and this report is true to the best of my knowledge and belief.

Thein Well Co., Inc. 12013
Licensed Business Name / License No.

E

Minnesota Unique Well No.
210336

County McLeod
Quad Brownton
Quad ID 93A

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

Entry Date 04/11/1988
Update Date 02/06/2012
Received Date

Well Name BROWNTON 1

Township Range Dir Section Subsections Elevation 1026 ft.

115 29 W 29 CCDDAC Elevation Method 7.5 minute topographic map (+/- 5 feet)

Well Depth	Depth Completed	Date Well Completed
237 ft.	237 ft.	05/25/1959

Drilling Method --

Well Address

BROWNTON MN

Geological Material	Color	Hardness	From	To
EARTH	BLACK		0	2
CLAY	YELLOW		2	22
CLAY	BLUE		22	54
SANDY CLAY			54	58
CLAY	BLUE		58	90
SANDY CLAY			90	92
CLAY	BLUE		92	127
SAND WITH CLAY			127	130
MEDIUM SAND			130	150
TOUGH CLAY	GRAY	HARD	150	214
GOOD SAND			214	237

Drilling Fluid --

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

Use Community Supply PWS ID 1430002 Source S01

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

Casing Diameter	Weight	Hole Diameter
8 in. to 217 ft.	lbs./ft.	

Open Hole from ft. to ft.

Screen YES Make JOHNSON Type stainless steel

Diameter	Slot/Gauze	Length	Set Between
8	50	20	217 ft. and 237 ft.

Static Water Level
38 ft. from Land surface Date Measured 1959053

PUMPING LEVEL (below land surface)
42 ft. after 6 hrs. pumping 337 g.p.m.

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

REMARKS
80' W. AND 56' S. OF N.E. CORNER; LOT 4, BLK. 14, BROWNTON TOWNSITE. NELSON ST.

Grouting Information Well Grouted? ☑ Yes ☐ No

Located by: Minnesota Department of Health
Method: GPS Differentially Corrected
Unique Number Verification: N/A
Input Date: 04/05/1993
System: *UTM - Nad83, Zone15, Meters*
X: 393014 Y: 4954141

Nearest Known Source of Contamination
__feet __direction __type

Well disinfected upon completion? ☑ Yes ☐ No

Pump ☑ Not Installed Date Installed
Manufacturer's name JACUZZI Model number 10 MSD HP 30 Volts 230
Length of drop Pipe 120 ft. Capacity __g.p.m Type Turbine Material Steel (black or low carbon)

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
Heil Well Co.	43085	KOBE, M.

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

County Well Index Online Report **210336** Printed 7/23/2013
HE-01205-07

F

Minnesota Unique Well No.
105587

County McLeod
Quad Brownton
Quad ID 93A

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

Entry Date 04/11/1988
Update Date 02/06/2012
Received Date

Well Name BROWNTON 2
Township Range Dir Section Subsections Elevation 1026 ft.
115 29 W 29 CDCBAC Elevation Method 7.5 minute topographic map (+/- 5 feet)

Well Depth	Depth Completed	Date Well Completed
300 ft.	250 ft.	00/00/1977

Drilling Method Non-specified Rotary

Well Address
BROWNTON MN

Geological Material	Color	Hardness	From	To
DIRT	BLACK		0	2
SANDY CLAY	YELLOW		2	8
SANDY CLAY	BLUE		8	46
SAND			46	52
SANDY CLAY	BLUE		52	96
SAND			96	97
SANDY CLAY	BLUE		97	100
SANDY SHALE			100	109
CLAY			109	110
ROCK			110	111
SANDY CLAY	BLUE		111	117
SAND (CLAY)			117	129
ROCK			129	130
BOULDERS ROCK SAND			130	140
CLAY	BLUE		140	157
SAND			157	160
HARD CLAY	BLUE		160	180
SANDY CLAY	BLUE		180	194
ROCK			194	195
CLAY	BLUE	SOFT	195	209
SAND			209	210
HARD		HARD	210	211
SAND			211	294
CLAY			294	300

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

Use Community Supply PWS ID 1430002 Source S02

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

Casing Diameter	Weight	Hole Diameter
10 in. to 220 ft.	lbs./ft.	

Open Hole from ft. to ft.

Screen YES Make JOHNSON Type stainless steel

Diameter	Slot/Gauze	Length	Set Between
10	50		220 ft. and 250 ft.

Static Water Level
42.5 ft. from Land surface Date Measured 00/00/1977

PUMPING LEVEL (below land surface)
65.87 ft. after 9.5 hrs. pumping 610 g.p.m.

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

N *M*

Located by: Minnesota Department of Health
Method: GPS Differentially Corrected
Unique Number Verification: N/A
Input Date: 04/05/1993
System: *UTM - Nad83, Zone15, Meters*
X: 393117 Y: 4954245

Grouting Information Well Grouted? ☑ Yes ☐ No
Grout Material: Well grouted, type unknown from to ft.

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

Pump ☑ Not Installed Date Installed
Manufacturer's name JACUZZI Model number 10MSD HP 30 Volts 230
Length of drop Pipe 120 ft. Capacity __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

Well Contractor Certification

Thein Well Co.	34050	KOBE, M
License Business Name	Lic. Or Reg. No.	Name of Driller

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

County Well Index Online Report

105587

Printed 7/23/2013
HE-01205-07

G

Minnesota Unique Well No.
241974

County McLeod
Quad Brownton
Quad ID 93A

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

Entry Date 08/06/1992
Update Date 11/03/2009
Received Date

Well Name BROWNTON 3
Township Range Dir Section Subsections Elevation 1028 ft.
115 29 W 29 CCDADB Elevation Method 7.5 minute topographic map (+/- 5 feet)

Well Depth	Depth Completed	Date Well Completed
247 ft.	247 ft.	00/00/1954

Drilling Method --

Geological Material	Color	Hardness	From	To
NO RECORD			0	247

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

Use Community Supply PWS ID 1430002 Source S03

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

Casing Diameter	Weight	Hole Diameter
5 in. to 230 ft.	lbs./ft.	

Open Hole from ft. to ft.

Screen YES Make Type

Diameter	Slot/Gauze	Length	Set Between
		17	230 ft. and 247 ft.

Static Water Level
ft. from Date Measured

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

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

REMARKS
NO GEOLOGIC RECORD AVAILABLE.

Grouting Information Well Grouted? ☐ Yes ☐ No

Located by: Minnesota Department of Health
Method: GPS Differentially Corrected
Unique Number Verification: Info/GPS from data source
Input Date: 04/05/1993
System: *UTM - Nad83, Zone15, Meters*
X: 393012 Y: 4954200

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 Submersible Material

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

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

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

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

County Well Index Online Report **241974** Printed 7/23/2013 HE-01205-07

Brownton

6/16/24

to

~~3/17/82~~

6/9/1987

This water supply is obtained from a drilled well. The water is lifted by air to a low receiving reservoir and from there is pumped to a steel pressure tank from which it is distributed for public consumption.

A The well is located in the pump station in the center of the village. It is 173 feet in depth and cased with 8 inch pipe. The water is lifted by air to a concrete reservoir 28ft x 20ft x 15ft. deep located in the rear of the building. The top of this reservoir is level with the surface of the ground. The vent pipe is covered with a loose piece of pipe. The manhole opening is made of a removable section of concrete setting flush with the surface of the reservoir cover. This reservoir is connected to one around the well inside the station. The cover to this inside reservoir is made of wood with a hole through it for the passage of valve stems. The cooling water from the air compressor is returned to the reservoir. The water is drawn from the reservoir by means of a small motor driven pump and also a motor driven duplex pump, and pumped into a steel pressure tank of approximately 19,000 gallon capacity from which it is distributed for public consumption. There are approximately 100 connections on the system.

The sanitary aspect of the supply is unsatisfactory because of the possibility of contamination entering the reservoir through the openings in the covers, vents and by way of the cooling water return.

Analytical Data: See analytical sheet attached. Samples

MINNESOTA STATE BOARD OF HEALTH
Division of Sanitation
REPORT ON WATER SUPPLY AT BROWNTON, MINN.
February 7, 1925

A This water supply is obtained from a drilled well. The water is lifted by air to a low receiving reservoir and from there is pumped to a steel pressure tank from which it is distributed for public consumption. Data relative to this supply are contained in the reports of previous investigations made by this Division. The last investigation was undertaken June 16, 1924 at which time the sanitary aspect of the supply was considered unsatisfactory. The report of that date contains recommendations for correcting the unsatisfactory condition. These recommendations have not been entirely complied with. The vent and cover on the reservoir have been satisfactorily constructed. The openings around the valve stem and the open cooling water return have not been remedied.

The sanitary aspect of this supply is unsatisfactory because contamination may enter the cistern around the well.

Analytical Data: See analytical sheet attached. Samples Nos. 23438 and 23439 represent water collected from the pump station and the distribution system. The bacteriological examination of these samples shows indications of contamination as indicated by both high and very high bacterial counts. These results corroborate the field survey which shows avenues through which contamination can enter the supply.

Recommendations

1. The cooling water should not be returned to the reservoir around the well but run to waste, and the opening now carrying this

MINNESOTA DEPARTMENT OF HEALTH
Division of Sanitation

Report on the Water Supply of
Brownton, Minnesota.
April 28, 1931

B This water supply is obtained from a drilled located in a pump house in the central part of the village. The well is 304 feet in depth and is cased with 8-inch pipe. The water is lifted by air to a concrete reservoir 28 feet x 20 feet x 15 feet deep located in the rear of the building. The top of the reservoir is level with the surface of the ground. The water is drawn from the reservoir by means of a motor-driven duplex pump and is pumped into a steel pressure tank of approximately 23,000 gallons capacity, from which it is distributed for public consumption.

The distribution system consists of approximately 14,000 feet of water main which distribute to 200 service connections and 14 fire hydrants.

Repairs were made recently on the distribution system following which the supply was not disinfected.

Analytical Data: (See attached sheet) Samples Nos. 35677, 35678, and 35679 represent water collected at the pump station and various points on the distribution system. The bacteriological examination of these samples showed indications of contamination in the water as evidenced by both high and very high bacterial counts. These indications of contamination probably introduced during the process of repairing the distribution system. Contamination should be removed by disinfecting the well, after which the supply may be considered safe.

Recommendations

1. The system should be disinfected by introducing into each reservoir five pounds of chlorinated lime, after which they should be filled

MINNESOTA DEPARTMENT OF HEALTH
Division of Sanitation

Report on the Water Supply of
Brownton, Minnesota
June 24, 1942

This water supply is obtained from a drilled well located in the central part of the village. The water is pumped into a steel pressure tank from which it is distributed for public consumption without treatment.

Location of Source

C The well is located in the southeast corner of the pump station. The earth formation is clay. There is a sanitary sewer about ten feet from the well. The filtration of contaminated water through the soil for this distance is not considered sufficient to remove the contamination before the water reaches the well. The pumproom floor drain which is connected to the sanitary sewer is less than ten feet from the well.

Well, Pump and Pumphouse

C The well is drilled to a depth of 145 feet and is cased with ten-inch iron pipe. Sixteen feet of well screen is provided. A stratigraphic section of this well shows the following formation: clay to a depth of 123 feet, and sand from 123 feet to 145 feet. The normal water level in the well is 43 feet below the ground surface. The draw-down when the pump is in operation is from six to eight feet.

The pumproom floor, which is constructed of concrete, is about three inches above the level of the surrounding surface of the ground, and six inches above the main floor of the pur station.

Water is drawn from the well by means of a vertical turbine pump having a rated capacity of 185 gallons per minute. The pump head is of the combination belted type and is set directly over the well casing on a concrete base twelve inches above the floor. The discharge tee is located about eighteen inches above the floor of the pumproom. Standby equipment consists of a gasoline engine which is belt-connected to the pump.

bacteriological examination of these samples showed the water to be of good sanitary quality as evidenced by the fact that organisms of the coli-aerogenes group were not found in 100 ml. portions of the samples examined.

The absence of indications of contamination in the water does not mean that the supply is safe as the field survey showed avenues through which contamination can enter the supply at any time.

The sanitary aspects of this supply is not entirely satisfactory because of the following defects:

1. Floor drains are four feet from the well and are directly connected to the sanitary sewer.

2. A direct connection exists between the pressure tank and the sewer by way of the Diesel Engine cooling jacket.

3. At least one cross connection is maintained between the public supply and an unsafe source of water supply. see later refer. to creamery well

4. There is a sanitary sewer about ten feet from the well and the reservoir.

5. Roof water from the pumphouse drains directly into the sanitary sewer too close to the well.

6. The air vents on the well and discharge pipe are carried less than 24 inches above the floor and are not properly screened.

A or B?

7. The old well is not properly sealed.

8. There is a privy less than 50 feet from the reservoir.

9. The top of Reservoir No. 1 is not properly protected against trespassers and the walls extend only six inches above the adjacent ground surface.

10. The top of Reservoir No. 2 is flush with the floor of the pump station and the manhole is raised three inches and provided with a flush wooden cover.

11. There are places where the water main crosses less than five feet above the sewer and no special protection against leakage has been provided.

7. If there is a possibility of placing the old well in service at some future date, the casing should be properly capped. If the well is to be abandoned, the casing should be plugged with cement grout or other impervious material as described in Paragraph 425, Section IV of the Manual.

8. The abandoned privy located west of the alley 25 feet from Reservoir No. 1 should be removed and the pit filled in with clean earth. See Paragraph 408 - B, Section IV of the Manual.

9. The top of Reservoir No. 1 at the rear of the pumping station should be protected against trespass by an adequate fence as described in Paragraph 422, Section IV of the Manual. The walls of the reservoir should project at least one foot above the surrounding ground surface as described in Paragraph 1230 (e) Section XII of the Manual.

10. Because of the numerous sources of contamination nearby and ease of access through the flush wooden cover, Reservoir No. 2 located under the floor of the pump station should be disconnected from the water supply and filled in. The loss of its relatively small storage capacity would be small compared to the increased sanitary protection obtained by its elimination.

11. Hereafter where new water mains cross below sewers or less than five feet above them, all the joints on the water main lying within ten feet of the sewer, measured horizontally, should be provided with bell-joint clamps with rubber gaskets in addition to the usual leaded joint. Consideration should be given to providing these additional safeguards on existing construction where water and sewer pipes are laid close together, whenever a favorable opportunity occurs. See Paragraph 1208 and Figure 1208, Section XII of the Manual.

12. The installation of all new plumbing should be made in accordance with the provision of the State Plumbing Code and all existing plumbing which is not properly designed or properly installed, or both should be changed to conform with the State Plumbing Code as soon as the opportunity to do so presents itself.

MINNESOTA DEPARTMENT OF HEALTH
Division of Municipal Water Supply and Plumbing

Report on Water Supply of
Brownton, Minnesota
August 19, 1947

The water supply for the village of Brownton is obtained from a drilled well.

Data relative to this supply are contained in the reports of previous investigations made by this Division. The last investigation was undertaken on June 24, 1942 at which time the sanitary aspect of the supply was not entirely satisfactory. The report of that date contains recommendations for correcting the unsatisfactory condition. These recommendations have not been entirely complied with.

The small reservoir has been abandoned, however, the valves in this reservoir were submerged with water. Since no concern is given to the sanitary aspects of this reservoir, the water may in time become contaminated, and enter the city water if any vacuums develop in this water line.

The floor drains are directly connected to the sanitary sewer system. The storm sewers are not in use, however, they are also directly connected to the sanitary sewer system. Sewage may back up when sewers become clogged or flooded and consequently, sewage may enter the pump station or enter the ground at a point nearer than 50 feet to the well.

A cross connection is maintained with the water supply of the Brownton Creamery Co. taken from the well.

Analytical Data (See attached sheet)

Samples Nos. 87811, 87812, 87813 and 87814 represent water collected from the well and from various points on the distribution system. The bacteriological examination of these samples showed the water to be of good sanitary quality as evidenced by the fact that organisms of the coliform group were not found in 100 ml. portions of the samples examined.

The physical examination of sample No. 87811 showed a water with very low turbidity and low color. The chemical examination showed a moderately hard water with a high iron content.

Sanitary Defects

The sanitary aspect of this supply is not entirely satisfactory because of the following defects:

1. There was water standing in the small reservoir which submerged the valves.

2. The floor drains are directly connected to the sanitary sewer.

3. There are plumbing fixtures which are faulty in design and installation.

4. A cross connection is maintained with the creamery.

Recommendations

1. The bottom of the small reservoir should be broken-through to allow the leaking water to seep into the ground.

2. The floor drains should be disconnected from the sanitary sewer at a distance of 50 feet from the well and relaid to discharge into a gravel pocket or absorption pit located at least 50 feet from the well. The storm sewer coming from the pumphouse should also be disconnected from the sanitary sewer at a distance of 50 feet from the well and sealed.

3. All cross connections to supplies that are not safe for domestic use should be removed in accordance with Regulation 201 of the State Board of Health. If the creamery desires to use the municipal water supply in conjunction with its own supply, it will be necessary to break the cross connection and discharge the city water into a tank or a reservoir at a point at least 6 inches above the spill line of the tank. (See Figure 1202 of the Manual of Water Supply Sanitation.)

Creamery inter-connection with city supply

7488 4-23-47 5M

MINNESOTA DEPARTMENT OF HEALTH
SECTION OF ENVIRONMENTAL SANITATION

Analytical Examination of Water

NO.	TOWN, ETC.	MAP LOCATION	SPECIFIC LOCATION	SOURCE
87811	Brownton	McLeod County	Pumphouse tap	Well C
87812	"	" "	Pure Oil Station Lav. tap	Public supply
87813	"	" "	Mobil Oil Station Lav. tap	Public supply
87814	"	" "	Cities Service Sta. Lav. tap	Public supply

	87811	87812	87813	87814
Specimen Number				
Station Number				
Collected by	FCL	FCL	FCL	FCL
Date Collected	8/19/47	8/19/47	8/19/47	8/19/47
Date Rec'd by Lab.	8/19/47	8/19/47	8/19/47	8/19/47
BACTERIAL: Exam. by	FCL	FCL	FCL	FCL
Bacteria per c.c. 37° C. 24 hours				
Coliform group organisms (100 ml. / M.P.N. per 100 ml.)	0	0	0	0
PHYSICAL: Exam. by				
Turbidity	5.			
Color	18.			
Total Solids				
Total suspended solids				
Settleable solids c.c. per liter				
CHEMICAL: Exam. by (parts per million except as noted)				
Total hardness	160.			
Alkalinity (Me Oe)	450.			
pH value	7.6			
Iron	.9			
Manganese	.025			
Chlorides	0			
Residual Chlorine				
Sulphates	62.			
Fluorides	.23			
Dissolved Oxygen				
Biochemical Oxygen Demand (P. p.m. / 5-day)				
Nitrate Nitrogen	.15			

Inter-conn. w/ creamery discontinued

MINNESOTA DEPARTMENT OF HEALTH
District No.2
Mankato Minnesota

Report on Investigation of Water Supply, Brownton, Minn.
October 27, 1948

1. Ownership - Municipal

2. Date of Last Investigation: August 19, 1947

3. Changes Since Last Investigation:

1. The floor drain has been disconnected from the sanitary sewer to which it was formerly connected, and rerouted to discharge into the City Hall building sewer above the spill line of the basement floor drain. The section of sewer under the pump station has been abandoned.

2. The cross connection with the creamery water supply has been discontinued.

4. Analytical Results (See attached sheet)

Samples Nos. 93861 through 93864 represent water collected at a tap on the pressure tank and at various points on the distribution system. The bacteriological examination of these samples showed water to be of good sanitary quality as evidenced by the fact that organisms of the coliform group were not found in the portions of the samples examined.

5. Defects Remaining on the System:

1. The suction pipe from the outside reservoir to the duplex pump is less than 10 feet below the ground surface and passes through the pit formed by former small reservoir under the pump station. The valve on the suction pipe is located in this pit.

2. There are places, such as at street intersections where water mains cross less than six feet above the sewers, and extra protection against leakage has not been provided.

3. There are plumbing fixtures that are faulty in design and installation.

Recommendations

1. The suction pipe and valve to the outside reservoir should be raised above floor level; the bottom of the pit broken up and the pit filled with compact earth.

2. In the future, where water mains cross below sewers on less than six feet above them, all the joints on the water main lying within ten feet of the sewer measur-

MINNESOTA DEPARTMENT OF HEALTH
District No.2
Mankato, Minnesota

Report on Investigation of Water Supply, Brownton, Minnesota

August 4, 1949

I. Ownership - Municipal

II. Date of Last Previous Investigation: October 27, 1948

III. Rating of Supply at Last Previous Investigation: 85

IV. Changes Since Last Investigation:

1. The valve on the suction pipe near the duplex pump has been relocated to a position above the floor level. The pit in which the valve was formerly located has been filled with compact earth.

V. Analytical Results (See attached sheet)

Samples Nos.98203 - 98206, inclusive, represent water collected at the well and at various points on the distribution system. The bacteriological examination of these samples showed the water to be of a good sanitary quality as evidenced by the fact that organisms of the coliform group were not found in the portion of the samples examined.

VI. Defects Remaining on the System:

1. The suction pipe from the outside reservoir to the duplex pump is less than 10 feet below the ground surface, and passes too near to the buried sewer in the basement of the store building west of the fire hall.
2. The vent on the outside reservoir is not screened. The screen on the intake to the air compressor has rusted away.
3. Extra protection against leakage has not been provided where water mains cross under railroad tracks or where water mains cross less than six feet above sewers.
4. There are plumbing fixtures that are faulty in design and installation.

Recommendations

1. The suction pipe to the outside reservoir should be raised above ground level. (See Arrangement No.1 in Figure 806 of Section VIII, Manual of Water Supply Sanitation)

MINNESOTA DEPARTMENT OF HEALTH
District No. 2
Mankato, Minnesota

Report on Investigation of Water Supply,
Brownton, Minnesota,
August 3, 1950

I. Ownership: Municipal

II. Date of Last Previous Investigation: August 4, 1949

III. Rating of Supply at Last Previous Investigation: 85

IV. Changes Since Last Investigation:

The air compressor intake and the reservoir vent have both been screened in a satisfactory manner.

V. Analytical Results (See attached sheet)

Samples Nos. 3479-3482, inclusive, represent water collected at the well, and at various points on the distribution system. The bacteriological examination of these samples showed the water to be of a good sanitary quality as evidenced by the fact that organisms of the coliform group were not found in the 100 ml. portions of the samples examined.

VI. Defects Remaining on the System:

1. The suction pipe from the outside reservoir to the duplex pump is less than 10 feet below the ground surface, and passes too near to the buried sewer in the basement of the store building west of the fire hall.
2. Extra protection against leakage has not been provided where water mains cross under the railroad tracks or where water mains cross less than six feet above sewers.
3. There are plumbing fixtures that are faulty in design and installation.

Recommendations

1. The suction pipe to the outside reservoir should be raised above ground level. (See Arrangement No. 1 in Figure 806 of Section VIII, Manual of Water Supply Sanitation)
2. All future water mains crossing under railroad tracks should

MINNESOTA DEPARTMENT OF HEALTH
District No. 2
Mankato, Minnesota

Report on Investigation of Water Supply,
Brownton, Minnesota,
June 12, 1951

I. Ownership: Municipal

II. Date of Last Previous Investigation: August 3, 1951

III. Rating of Supply at Last Previous Investigation: 85

IV. Changes Since Last Investigation: None

V. Analytical Results (See attached sheet)

Samples Nos. 7685-7687, inclusive, represent water collected at the well, and at two points on the distribution system. The bacteriological examination of these samples showed the water to be of a good sanitary quality as evidenced by the fact that organisms of the coliform group were not found in the 100 ml. portions of the samples examined.

VI. Defects Remaining on the System:

1. The suction pipe from the outside reservoir to the duplex pump is less than 10 feet below the ground surface, and passes too near to the buried sewer in the basement of the store building west of the fire hall.
2. Extra protection against leakage has not been provided where water mains cross under the railroad tracks or where water mains cross less than six feet above sewers.
3. There are plumbing fixtures that are faulty in design and installation.

Recommendations

1. The suction pipe to the outside reservoir should be raised above ground level. (See Arrangement No. 1 in Figure 806 of Section VIII, Manual of Water Supply Sanitation)
2. All future water mains crossing under railroad tracks should be constructed so that the pipe joints may have a reasonable degree of flexibility and remain water-tight under the loadings and vibrations to which they are subjected. Mechanical joints with rubber gaskets

8-22-52

MINNESOTA DEPARTMENT OF HEALTH
District No. 2
Mankato, Minnesota

Report on Water Supply
Brownton, Minnesota
May 26, 1952

1. Date of Last Investigation - June 12, 1951

2. Rating at Last Investigation - 86

3. Changes Since Last Investigation -

The distribution system has been enlarged through the addition of approximately 1200 feet of four inch mechanically jointed cast iron pipe.

4. Analytical Results (See attached sheet)

Samples Nos. 3877-3880, inclusive, represent water collected at the pump station and from three points on the distribution system. The bacteriological examination of these samples showed the water to be of a good sanitary quality as evidenced by the fact that organisms of the coliform group were not found in the 100 ml. portions of the samples examined. A chemical examination of a sample collected from the distribution system showed the water to be very hard, moderately high in iron, and very low in chlorides and sulphates.

5. Recommendations -

a. The suction pipe from the outside reservoir should be raised above ground level. (See arrangement No. 1 in Figure 806, Section VIII of the Manual of Water Supply Sanitation.) As an alternate, the belt driven duplex pump may be abandoned and replaced by a new pump set either on or adjacent to the reservoir, thus eliminating the present suction pipe.

b. All future water mains crossing under railroad tracks should be constructed so that the pipe joints may have a reasonable degree of flexibility and remain water-tight under the loadings and vibrations to which they are subjected. Mechanical joints with rubber gaskets are suitable for such conditions. Future water mains crossing under or less than 6 feet above sewers should be provided with extra protection against leakage at all joints

1-6-54

MINNESOTA DEPARTMENT OF HEALTH
District No. 2
Mankato, Minnesota

Report on Water Supply

Brownton, Minnesota
August 13, 1953

1. Date of Last Investigation: May 26, 1952

2. Rating at Last Investigation: 86

3. Changes Since Last Investigation:

It was determined that a sanitary sewer passes within 39 feet of the low level reservoir.

4. Analytical Results: (See attached sheet)

Samples Nos. 1086-1089, inclusive, represent water collected from a tap on the pressure tank and from three points on the distribution system. The bacteriological examination of Samples Nos. 1087, 1088, and 1089 showed the water to be of a good sanitary quality as evidenced by the fact that organisms of the coliform group were not found in the portions of the samples examined. The examination of Sample No.1086 showed indications of slight contamination which may have been due to one or more of the defects listed below.

5. Defects Remaining on the System:

a. The drainage system from the pump station discharges just below the surface of the ground into a manhole west of the village hall. The outlet drain from this manhole passes under the basement floor of the hall, and connects to a combined sewer in the street east of the hall. The floor drain in the city hall basement discharges to the outlet drain. The manhole is 40 feet from the well and it is believed that the section of the outlet drain under the basement floor is constructed of cast-iron pipe. The east side of the hall is considerably over 50 feet from the well and reservoir. This arrangement was installed to replace the former pumphouse drain which was directly connected to the combined sewer, the thought being that if the combined sewer should become overloaded or clogged at a point below the pump station, the sewage would have to fill the basement of the city hall almost to ground level

10-8-54

MINNESOTA DEPARTMENT OF HEALTH
District No. 2
Mankato, Minnesota

Report on Water Supply
Brownton, Minnesota
August 12, 1954

1. Date of Last Investigation: August 13, 1953

2. Rating at Last Investigation: 81

3. Changes Since Last Investigation:

   a. An appropriate air-gap has been provided in the line from the diesel engine cooling system.

   b. The suction pipe from the reservoir to the booster pump has been reconstructed, and is now entirely above grade.

4. Analytical Data (See attached sheet)

   Samples Nos. 6736-6739, and 6742 represent water obtained from the pressure tank, and from three points on the distribution system. The bacteriological examination of these showed the water to be of a good sanitary quality as evidenced by the fact that organisms of the coliform group were not found in the portions of the samples examined.

5. Defects Remaining on the System:

   a. The drainage system from the pump station discharges just below the surface of the ground into a manhole west of the village hall. The outlet drain from this manhole passes under the basement floor of the hall, and connects to a combined sewer in the street east of the hall. The floor drain in the city hall basement discharges to the outlet drain. The manhole is 40 feet from the well and it is believed that the section of the outlet drain under the basement floor is constructed of cast-iron pipe. The east side of the hall is considerably over 50 feet from the well and reservoir. This arrangement was installed to replace the former pumphouse drain which was directly connected to the combined sewer, the thought being that if the combined sewer should become overloaded or clogged at a point below the pump station, the sewage would have to fill the basement of the city hall almost to ground level

1-11-54

MINNESOTA DEPARTMENT OF HEALTH
District No. 2
Mankato, Minnesota

Report on Water Supply
Brownton, Minnesota
September 2, 1955

1. Date of Last Investigation: August 12, 1954

2. Rating at Last Investigation: 85

3. Changes Since Last Investigation: None

4. Analytical Data (See attached sheet)

Samples Nos. 2768-2771, inclusive, represent water obtained from the pressure tank and from three points on the water distribution system. The bacteriological examination of these samples showed the water to be of a good sanitary quality as evidenced by the fact that organisms of the coliform group were not found in the portions of the samples examined.

5. Defects Remaining on the System:

a. The drainage system from the pump station discharges just below the surface of the ground into a manhole east of the village hall. The outlet drain from this manhole passes under the basement floor of the hall, and connects to a combined sewer in the street east of the hall. The floor drain in the city hall basement discharges to the outlet drain. The manhole is 40 feet from the well and it is believed that the section of the outlet drain under the basement floor is constructed of cast-iron pipe. The east side of the hall is considerably over 50 feet from the well and reservoir. This arrangement was installed to replace the former pumphouse drain which was directly connected to the combined sewer, the thought being that if the combined sewer should become overloaded or clogged at a point below the pump station, the sewage would have to fill the basement of the city hall almost to ground level before any sewage would back up the drains leading from the pump station. The degree of safety provided by this arrangement is not as great as would have been provided by an above grade air gap discharge into the combined sewer if ground elevations had permitted such construction.

12-7-57

MINNESOTA DEPARTMENT OF HEALTH
District No. II
Mankato, Minnesota

Report on Investigation of the Municipal Water Supply
Brownton, Minnesota
November 6, 1957

Date of Last Investigation: September 2, 1955

Rating at Last Investigation: 85

Changes Since Last Investigation: None

Analytical Data (See attached sheet)

Samples Nos. 3827 through 3831, inclusive, represent water obtained from the pressure tank and from three points on the water distribution system. The bacteriological examination of these samples showed the water to be of a satisfactory sanitary quality as evidenced by the fact that organisms of the coliform group were not found in the portions of the samples examined.

Sanitary Defects

1. The drainage system from the pump station discharges just below the surface of the ground into a manhole east of the village hall. The outlet drain from this manhole passes under the basement floor of the hall, and connects to a combined sewer in the street east of the hall. The floor drain in the city hall basement discharges to the outlet drain. The manhole is 40 feet from the well and it is believed that the section of the outlet drain under the basement floor is constructed of cast-iron pipe. The east side of the hall is considerably over 50 feet from the well and reservoir. This arrangement was installed to replace the former pumphouse drain which was directly connected to the combined sewer, the thought being that if the combinsd sewer should become overloaded or clogged at a point below the pump station, the sewage would have to fill the basement of the city hall almost to ground level before any sewage would back up the drains leading from the pump station. The degree of safety provided by this arrangement is not as great as would have been provided by an above grade air gap discharge into the combined sewer if ground elevations had permitted such construction.

1-6-59

MINNESOTA DEPARTMENT OF HEALTH
District No. II
Mankato Minnesota

Report on Investigation of the Municipal Water Supply
Brownton, Minnesota
December 23, 1958

Date of last investigation: November 6, 1957

Rating at last investigation: 85

Changes since last investigation: None

Analytical Data: (See attached sheet)

Samples Nos. 165 through 168, inclusive, represent water obtained from the pressure tank and from three points on the water distribution system. The bacteriological examination of these samples showed the water to be of a satisfactory sanitary quality as evidenced by the fact that organisms of the coliform group were not found in the portions of the samples examined.

Sanitary Defects:

1. The drainage system from the pump station discharges just below the surface of the ground into a manhole west of the village hall. The outlet drain from this manhole passes under the basement floor of the hall, and connects to a combined sewer in the street east of the hall. The floor drain in the city hall basement discharges to the outlet drain. The manhole is 40 feet from the well and it is believed that the section of the outlet drain under the basement floor is constructed of cast-iron pipe. The east side of the hall is considerably over 50 feet from the well and reservoir. This arrangement was installed to replace the former pumphouse drain which was directly connected to the combined sewer, the thought being that if the combined sewer should become overloaded or clogged at a point below the pump station, the sewage would have to fill the basement of the city hall almost to ground level before any sewage would back up the drains leading from the pump station. The degree of safety provided by this arrangement is not as great as would have been provided by an above grade

12-23-59

MINNESOTA DEPARTMENT OF HEALTH
District II
Mankato Minnesota

Report on Investigation of the Municipal Water Supply
Brownton, Minnesota
November 23, 1959

Date of last investigation: December 23, 1958

Rating at last investigation: 85

Changes since last investigation:

1. A new well has been developed and is located 80 feet west and 56 feet south of the northeast corner of Block 14, Brownton town site. The well is approximately ten feet southeast of the old well.

E 2. The well is about 237 feet in depth and is cased with 8-inch diameter steel pipe to a depth of 217 feet. A screen 20 feet in length has been provided. Water is drawn from the well by means of a vertical turbine pump having a rated capacity of 125 gallons per minute. The static water level is 38 feet. The casing vent is adequately sized and is properly screened.

E The log of the well is as follows:

Formation	Depth Feet		Feet	Thickness Feet
Black earth	0	to	2	2
Yellow clay	2	--	22	20
Blue clay	22	--	54	32
Sandy clay	54	--	58	4
Blue clay	58	--	90	32
Sandy clay	90	--	92	2
Blue clay	92	--	127	35
Sand with clay	127	--	130	3
Medium sand	130	--	150	20
Gray clay	150	--	214	64
Sand	214	--	237	23

3. The existing pumphouse has been enlarged to enclose the new well and pumping equipment. Construction had not been completed at the time of the investigation.

tested

C

4. The old well has been abandoned and has been filled throughout its entire depth with earth.

Analytical Data: (See attached sheet)

Samples Nos. 45 through 47 inclusive, represent water obtained from the pressure tank and from two points on the water distribution system. The bacteriological examination of these samples showed the water to be of a satisfactory sanitary quality as evidenced by the fact that organisms of the coliform group were not found in the samples examined.

The chemical examination of Sample No. 1857, which was obtained from the new well, showed the water to be very hard, very high in iron, and very low in manganese, sulphates, chlorides, fluorides, and nitrate nitrogen. Iron in excessive amounts may cause tastes and odors in the water, and the staining of plumbing fixtures. The hydrogen -ion concentration (pH) for this water was above neutral or in the alkaline range.

Sanitary Defects:

1. The drainage system from the pump station discharges just below the surface of the ground into a manhole which is located between the pumping station and the Village Hall. The drain line from this manhole is laid under the basement floor of the hall, and discharges to a combined sewer in the street east of the hall. The manhole is 40 feet from the well and available information indicates that the section of the outlet drain under the basement floor is constructed of cast-iron pipe. The floor drain in the village hall basement also discharges to this drain. The east side of the Village Hall is considerably over 50 feet from the well and reservoir. This arrangement was installed to replace the former pumphouse drain which was directly connected to the combined sewer. The degree of safety provided by this arrangement is not as great as that provided by an above grade air gap discharge to the

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MINNESOTA DEPARTMENT OF HEALTH
DIVISION OF ENVIRONMENTAL SANITATION
ANALYTICAL DATA

Samples Collected By Dean L. Hahn

Field Number		Town, County, Etc.	Sampling Point and Source of Sample	
45	a	Brownton	Municipal Pumphouse	Pressure Tank
46	b	"	High School	Lavatory Tap
	c	"	Ratzenmieier Res.	Lavatory Tap
1857	d	"	New Well E	Pump Discharge
	e			
	f			

Sample Number	45 a	46 b	47 c	1857 d	e	f
Date Collected 11-23-59						
Time Collected						
Temperature °F						
Date Received by Lab. ~~11-24-59~~ D.L.H.				7-9-59		
BACTERIAL: Exam. by						
Bacteria per ml. 35° C. 24 hours						
Coliform group / organisms — 100 ml. / M.P.N. per 100 ml.	0	0	0			
PHYSICAL & CHEMICAL: Exam. by						
Settleable solids ml. per liter						
Total Solids						
Total Volatile Matter						
Suspended Solids						
Suspended Volatile Matter						
Turbidity						
Color						
Total hardness as $CaCO_3$				330		
Alkalinity as $CaCO_3$				460		
pH value				7.8		
Iron				1.2		
Manganese				< .02		
Chlorides				3.0		
Residual Chlorine						
Sulphates				5.		
Fluorides				.34		
Dissolved Oxygen						
Biochemical Oxygen Demand — five-day						
Phosphorus						
Ammonia Nitrogen						
Organic Nitrogen						
Nitrite Nitrogen						
Nitrate Nitrogen				1.2		

*Membrane Filter

* Results are in milligrams per liter except as noted.

P

5/9/61

MINNESOTA DEPARTMENT OF HEALTH
District II
Mankato Minnesota

Report on Investigation of Municipal Water Supply
Brownton, Minnesota
April 20, 1961

Date of last investigation - November 23, 1959

Rating at last investigation - 85

Changes since last investigation - None

Analytical data - (See attached sheet)

Samples Nos. 623 - 625 inclusive, represent water obtained from the well, pressure tank, and from one point on the distribution system. The bacteriological examination of these samples showed the water to be of satisfactory sanitary quality as evidenced by the fact that organisms of the coliform group were not found in the samples examined.

The chemical examination of Sample No. 2753, which was obtained from the new well, showed the water to be very hard, very high in iron, and very low in manganese, sulphates, chlorides, fluorides, and nitrate nitrogen. Iron in excessive amounts may cause tastes and odors in the water, and the staining of plumbing fixtures. Surfactant, a constituent of household detergents, was not present in determinable concentrations.

Sanitary defects -

1. The drainage system from the pump station discharges just below the surface of the ground into a manhole which is located between the pumping station and the Village Hall. The drain line from this manhole is laid under the basement floor of the hall, and discharges to a combined sewer in the street east of the hall. The manhole is 40 feet from the well and available information indicates that the section of the outlet drain under the basement floor is constructed of cast-iron pipe. The floor drain in the village hall basement also discharges to this drain. The east side of the Village Hall is

considerably over 50 feet from the well and reservoir. This arrangement was installed to replace the former pumphouse drain which was directly connected to the combined sewer. The degree of safety provided by this arrangement is not as great as that provided by an above grade air gap discharge to the sewer. Ground elevations, however, do not permit this type of installation.

2. A sanitary sewer is laid within 39 feet of the southside of the reservoir.

3. Extra protection against leakage has not been provided where water mains cross under the railroad tracks or where water mains cross less than six feet above sewers.

4. There are plumbing fixtures connected to the distribution system that are faulty in design and installation.

Recommendations -

1. In order to assure the community of an adequate and dependable water supply, a second well should be developed. A site should be selected which is outside the built-up portion of the village.

2. Chlorination equipment should be installed and a chlorine residual of at least 0.5 part per million should be maintained for the control of iron bacteria, and to increase the sanitary safety of the water in the distribution system.

3. The sanitary sewer south of the reservoir should be rerouted so as to be at least 50 feet from the reservoir. (See Paragraph 1230, Section XII, Manual of Water Supply Sanitation).

4. Samples should be collected from the wells and the distribution system for bacteriological control on the basis of at least one series of samples per month.

20.6

MINNESOTA DEPARTMENT OF HEALTH
DIVISION OF ENVIRONMENTAL SANITATION

ANALYTICAL DATA

Samples Collected By Dean L. Hahn

Field Number	Town, County, Etc.	Sampling Point and Source of Sample	
1 [a]	Brownton	New Well	Sample Tap
2 [b]	"	New Well	" "
3 [c]	"	Pressure Tank	Hose Bibb
4 [d]	"	Public School	Lavatory Tap
[e]			
[f]			

Sample Number	2753 [a]	623 [b]	624 [c]	625 [d]	[e]	[f]
Date Collected	1-26-61	4-20-61	4-20-61	4-20-61		
Time Collected						
Temperature °F						
Date Received by Lab.						
BACTERIAL: Exam. by						
Bacteria per ml. 35° C. 24 hours						
Coliform group / organisms — 100 ml. / M.P.N. per 100 ml.		0	0	0		
PHYSICAL & CHEMICAL: Exam. by						
Settleable solids ml. per liter						
Total Solids						
Total Volatile Matter						
Suspended Solids						
Suspended Volatile Matter						
Turbidity						
Color						
Total hardness as $CaCO_3$	310.					
Alkalinity as $CaCO_3$	450.					
pH value						
Iron	.86					
Manganese	.06					
Chlorides	2.1					
Residual Chlorine						
Sulphates	5.0					
Fluorides	.33					
Dissolved Oxygen						
Biochemical Oxygen Demand — five-day						
Phosphorus						
Ammonia Nitrogen						
Organic Nitrogen						
Nitrite Nitrogen						
Nitrate Nitrogen	< 1					
Surfactant	< .05					
*Membrane Filter						

* Results are in milligrams per liter except as noted.

5-13-63

MINNESOTA DEPARTMENT OF HEALTH
District II
Mankato Minnesota

Report on Investigation of Municipal Water Supply
Brownton, Minnesota
April 29, 1963

Date of last investigation - April 17, 1962

Rating at last investigation - 85

Changes since last investigation - None

Analytical data - (See attached sheet)

Samples Nos. 136 - 139 inclusive, represent water obtained from the well, pressure tank, and from two points on the distribution system. The bacteriological examination showed the water to be of satisfactory sanitary quality as evidenced by the fact that organisms of the coliform group were not found in the samples examined.

Sanitary defects -

1. The drainage system from the pump station discharges just below the surface of the ground into a manhole which is located between the pumping station and the Village Hall. The drain line from this manhole is laid under the basement floor of the hall, and discharges to a combined sewer in the street east of the hall. The manhole is 40 feet from the well and available information indicates that the section of the outlet drain under the basement floor is constructed of cast-iron pipe. The floor drain in the village hall basement also discharges to this drain. The east side of the Village Hall is considerably over 50 feet from the well and reservoir. This arrangement was installed to replace the former pumphouse drain which was directly connected to the combined sewer. The degree of safety provided by this arrangement is not as great as that provided by an above grade air gap discharge to the sewer. Ground elevations, however, do not permit this type of installation.

2. A sanitary sewer is laid within 39 feet of the southside of the reservoir.

3. Extra protection against leakage has not been provided where water mains cross under the railroad tracks or where water mains cross less than six feet above sewers.

4. There are plumbing fixtures connected to the distribution system that are faulty in design and installation.

Recommendations -

1. In order to assure the community of an adequate and dependable water supply, a second well should be developed. A site should be selected which is outside the developed area of the village.

2. Chlorination equipment should be installed and a chlorine residual of at least 0.5 part per million should be maintained at all points on the distribution system. This chlorine residual will also aid in the control of iron bacteria.

3. The sanitary sewer south of the reservoir should be relocated so that it will be at least 50 feet from the reservoir.

4. Samples should be collected from the wells and the distribution system for bacteriological control on the basis of at least one series of samples per month.

5. Water mains crossing under railroad tracks should be constructed that the pipe joints may have a reasonable degree of flexibility and remain water-tight under the loadings and vibrations to which they are subjected.

6. Consideration should be given to the adoption and enforcement of the Minnesota Plumbing Code as a local ordinance.

7. The water superintendent should further qualify himself by attending the water works operators school. This school is held in March each year in the Center for Continuation Study at the University of Minnesota.

MINNESOTA DEPARTMENT OF HEALTH
District 2
Mankato, Minnesota

Report on Investigation of Municipal Water Supply
Brownton, Minnesota

1. Name of Water Supply System Brownton Municipal			2. Plant Classification D
3. Telephone Number Clerk (office) 612-328-5318 Clerk (home) 612-328-5352		Water Supt. (office) 612-328-5318 Water Supt. (home) 612-328-5318	
4. Location (city, county) Brownton, McLeod		5. Person Contacted Ray Alsben	
6. Water Superintendent and Classification Ray Alsben		7. Population 688	8. Date of Survey 8/24/73
9. Date of Previous Survey April 29, 1963	10. Population Served 688	11. Service Connections 270	12. Ownership Municipal
13. Source 1 drilled well	14. Plumbing Code ☐ Adopted ☐ Adopted with permits and inspections ☒ Not adopted		

15. Storage (list separately, indicating capacity of each)

67,000 gallon ground storage reservoir --

50,000 gallon hydropneumatic pressure tank 9' x 36'

16. Maximum Daily Consumption 67,500	17. Average Daily Consumption 45,000

18. Treatment Used

- ☒ Disinfection Gas Chlorine
- ☐ Aeration
- ☐ Filtration
- ☐ Coagulation
- ☐ Taste and Odor
- ☐ Recarbonation
- ☐ Ammoniation
- ☐ Softening
- ☐ Sedimentation
- ☒ Fluoridation Hydrofluosilicic Acid
- ☒ Corrosion Control "Triplus" and Stabilization
- ☐ Other (describe)

E

19. Well Data*

a) Well Number	1												
b) Year Installed	1959												
c) Casing Diameter	8"												
d) Casing Depth													
e) Well Depth	237												
f) Screen Length	20'												
g) Static Level	38												
h) Drawdown	4												
i) Pump (type & cap.)	V.T. 125												

*Report well logs on separate sheet, if available.

E

Well Log Municipal Well Brownton, Minnesota

Black Earth	0 - 2
Yellow Clay	2 - 22
Blue Clay	22 - 54
Sandy Clay	54 - 58
Blue Clay	58 - 90
Sandy Clay	90 - 92
Blue Clay	92 - 127
Sand with clay	127 - 130
Medium Sand	130 - 150
Tough hard gray clay	150 - 214
Good sand	214 - 237

MINNESOTA DEPARTMENT OF HEALTH
DIVISION OF ENVIRONMENTAL HEALTH

ANALYTICAL DATA

Samples Collected By Rodney Church Report To District 2, Mankato

Field Number	Town, County, Etc.	Sampling Point and Source of Sample	
[a] W	Brownton, McLeod	Municipal Well No. 1 E	P.D.
[b] 2-198	Brownton, McLeod	Gulf Station	L.T.
[c] 2-199	Brownton, McLeod	School Fountain	
[d] 2-200	Brownton, McLeod	Fire Hall	L.T.
[e]			
[f]			

This line for Lab. use only.	[a]	[b]	[c]	[d]	[e]	[f]
Sample Number	6345	2-198	2-199	2-200		
Date Collected	3/26/73	8/25/73	8/25/73	8/25/73		
Time Collected						
Temperature °F						
Date Received by Lab.	3/26/73					
Coliform group organisms — M.P.N. per 100 ml.						
Con. ☐ Comp. ☐	2-92	2-198	2-199	2-200		
M.F.C. per 100 ml. Field	0	0	0	0		
Total Solids	480					
Turbidity						
Color						
Total hardness as $CaCO_3$	290-300					
Alkalinity as $CaCO_3$	460					
pH value						
Iron	0.46					
Manganese	0.03					
Chloride	3					
Residual Chlorine		0	0	Trace		
Sulphate	3.9					
Fluoride	0.4					
Total Phosphorus						
Nitrite Nitrogen						
Nitrate Nitrogen	< .1					
Methylene Blue Active Sub. as ABS	< .1					
Calcium as $CaCO_3$	230					
Sodium						
Potassium	4					
Spec. Cond. µmhos/cm @ 25 °C.	920					
ds @ 50 °F						

* *Results are in milligrams per liter except as noted.*

MINNESOTA DEPARTMENT OF HEALTH
District South Central
Mankato, Minnesota

Report on Investigation of Municipal Water Supply
Brownton, Minnesota

1. Name of Water Supply System	2. Plant Classification
Brownton Municipal	D

3. Telephone Number

Clerk (office) 612-328-5318 — Water Supt. (office) 612-328-5318

Clerk (home) 612-328-5352 — Water Supt. (home) 612-879-4922

4. Location (city, county)	5. Person Contacted	
Brownton, McLeod	Mrs. Martin Winterfeldt, Clerk	
6. Water Superintendent and Classification	**7. Population**	**8. Date of Survey**
Bob Carter D	688	March 6, 1975

9. Date of Previous Survey	10. Population Served	11. Service Connections	12. Ownership
August 24, 1973	688	275	Municipal

13. Source: 1 drilled well

14. Plumbing Code: ☐ Adopted ☐ Adopted with permits and inspections ☒ Not adopted

15. Storage (list separately, indicating capacity of each)

67,000 gallon ground storage reservoir

50,000 gallon hydropneumatic pressure tank (9'x36')

16. Maximum Daily Consumption	17. Average Daily Consumption
75,000	55,000

18. Treatment Used

- ☒ Disinfection — Gas chlorine
- ☐ Aeration
- ☐ Filtration
- ☐ Coagulation
- ☐ Taste and Odor
- ☐ Recarbonation
- ☐ Ammoniation
- ☐ Softening
- ☐ Sedimentation
- ☒ Fluoridation — Hydrofluosilicic Acid
- ☒ Corrosion Control and Stabilization — "Triplus"
- ☐ Other (describe)

E

19. Well Data*

a) Well Number	1
b) Year Installed	1959
c) Casing Diameter	8"
d) Casing Depth	
e) Well Depth	237'
f) Screen Length	20'
g) Static Level	38'
h) Drawdown	4'
i) Pump (type & cap.)	V.T. 125

*Report well logs on separate sheet, if available.

E

Well Log Municipal Well Brownton, Minnesota

Black Earth	0 - 2
Yellow Clay	2 - 22
Blue Clay	22 - 54
Sandy Clay	54 - 58
Blue Clay	58 - 90
Sandy Clay	90 - 92
Blue Clay	92 - 127
Sand with clay	127 - 130
Medium Sand	130 - 150
Tough hard gray clay	150 - 214
Good sand	214 - 237

MINNESOTA DEPARTMENT OF HEALTH
District South Central
Mankato, Minnesota

Report on Investigation of Municipal Water Supply
Brownton, Minnesota

1. Name of Water Supply System			2. Plant Classification
Brownton Municipal			D
3. Telephone Number			
Clerk (office) 612-328-5318		Water Supt. (office) 612-328-5227	
Clerk (home)		Water Supt. (home)	
4. Location (city, county)		5. Person Contacted	
Brownton, McLeod County		G. Jamke	
6. Water Superintendent and Classification	7. Population	8. Date of Survey	
Steve Mashuga, Not certified	688	September 11, 1978	
9. Date of Previous Survey	10. Population Served	11. Service Connections	12. Ownership
March 6, 1975	688	303 (0)**	Municipal
13. Source	14. Plumbing Code		
2 drilled sells	☐ Adopted ☐ Adopted with permits and inspections ☒ Not adopted		

15. Storage (list separately, indicating capacity of each)

100,000 gallon elevated

16. Maximum Daily Consumption	17. Average Daily Consumption
75,000	55,000

18. Treatment Used

- ☒ Disinfection (Chlorine Gas)
- ☐ Aeration
- ☐ Filtration
- ☐ Coagulation
- ☐ Taste and Odor
- ☐ Recarbonation
- ☐ Ammoniation
- ☐ Softening
- ☐ Sedimentation
- ☒ Fluoridation (Hydrofluosilicic Acid)
- ☒ Corrosion Control (Triplus) and Stabilization
- ☐ Other (describe)

E F

19. Well Data*

	1	2											
a) Well Number	1	2											
b) Year Installed	1959	1977											
c) Casing Diameter	8"	10"											
d) Casing Depth		220'											
e) Well Depth	237'	250'											
f) Screen Length	20'	30'											
g) Static Level	38'	42'6"											
h) Drawdown	4'	23'5"											
i) Pump (type & cap.)	V.T. 125	V.T. 610											

*Report well logs on separate sheet, if available.
** Number of lead services

MINNESOTA DEPARTMENT OF HEALTH
DIVISION OF ENVIRONMENTAL HEALTH

ANALYTICAL DATA

Samples Collected By Mark D. Sweers Report To South Central District

Field Number	Town, County, Etc	Sampling Point and Source of Simple
a 63354	Brownton, McLeod County	Well No. 2, PD F
b 702	Brownton, McLeod County	Remington Tire, LT
c 703	Brownton, McLeod County	Public School, Fn
d 704	Brownton, McLeod County	Municipal Liquor Store, LT
e 15761	Brownton, McLeod County	Wastewater Treatment Plant, LT
f		

This line for Lab. use only. Sample Number	a 63354	b 702	c 703	d 704	e 15761	f
Date Collected	September 11, 1978					
Time Collected	1:30 p.m.					
Temperature °F						
Date Received by Lab.						
Coliform group organisms — M. P. N. per 100 ml. Con. □ Comp. □ Field	0.0	0.0	0.0	0.0	0.0	
M. F. C. per 100 ml.						
Total Solids						
Turbidity						
Color						
Total hardness as $CaCO_3$	360					
Alkalinity as $CaCO_3$	446					
pH value	7.2					
Iron	1.1					
Manganese	.065					
Chloride	3.14					
Residual Chlorine Field		0.0	0.0	0.0	0.0	
Sulphate	13.1					
Fluoride	0.28				1.7	
Total Phosphorus						
Nitrite Nitrogen						
Nitrate Nitrogen	3.1				< .4	
Methylene Blue Active Sub. as ABS						
Calcium as $CaCO_3$	200					
Sodium	49					
Potassium	3.7					
Spec. Cond. µmhos/cm @ 25°C.	690					
pH @ 50 °C.						

< = Less Than

* Results are in milligrams per liter except as noted.

MINNESOTA DEPARTMENT OF HEALTH
DIVISION OF ENVIRONMENTAL HEALTH

SUPPLEMENTAL SHEET

ANALYTICAL DATA

Samples Collected By Mark D. Sweers Report To South Central District

Field Number	705	702	703	704	642	
Sample Number	63354				15761	
Date Rec. by Lab						
Magnesium as $CaCO_3$	160					
Arsenic ug/l	< 50				< 50	
Barium ug/l	< 1000				< 1000	
Chromium ug/l	< 50				< 50	
Cadmium ug/l	< 10				< 10	
Lead ug/l	< 50				< 50	
Mercury ug/l	.134				.18	
Selenium ug/l	< 10				< 10	
Silver ug/l	< 50				< 50	
Zinc ug/l						
Copper ug/l						
Nickel ug/l						
Total Organic Carbon						
Ammonia Nitrogen						
Organic Nitrogen						
Phenol ug/l						
Oil & Grease						
Endrin ug/l						
Lindane ug/l						
Methoxychlor ug/l						
Toxaphene ug/l						
2,4-D ug/l						
2,4,5-TP (Silvex) ug/l						

< = Less Than

*Results are in milligrams per liter except as noted.

MINNESOTA DEPARTMENT OF HEALTH
District South Central
Mankato, Minnesota

Report on Investigation of Municipal Water Supply
Brownton, Minnesota

1. Name of Water Supply System: Brownton Municipal
2. Plant Classification: D
3. Telephone Number
Clerk (office) 612-328-5318 Water Supt. (office) 612-328-5227
Clerk (home) Water Supt. (home)
4. Location (city, county): Brownton, McLeod County
5. Person Contacted: Steve Mashuga
6. Water Superintendent and Classification: Steve Mashuga, Not Certified
7. Population: 638
8. Date of Survey: August 13, 1979
9. Date of Previous Survey: September 11, 1978
10. Population Served: 638
11. Service Connections: 300 (0)**
12. Ownership: Municipal
13. Source: 2 drilled wells
14. Plumbing Code: ☐ Adopted ☒ Adopted with permits and inspections ☐ Not adopted
15. Storage (list separately, indicating capacity of each)

100,000 gallon elevated

16. Maximum Daily Consumption: 110,000 gallons
17. Average Daily Consumption: 90,000 gallons
18. Treatment Used
- ☒ Disinfection (Chlorine Gas)
- ☐ Aeration
- ☐ Filtration
- ☐ Coagulation
- ☐ Taste and Odor
- ☐ Recarbonation
- ☐ Ammoniation
- ☐ Softening
- ☐ Sedimentation
- ☒ Fluoridation (Hydrofluosilicic Acid)
- ☒ Corrosion Control and Stabilization (Triplus)
- ☐ Other (describe)

E F

19. Well Data*

	1	2
a) Well Number	1	2
b) Year Installed	1959	1977
c) Casing Diameter	8"	10"
d) Casing Depth		220'
e) Well Depth	237'	250'
f) Screen Length	20'	30'
g) Static Level	38'	42'6"
h) Drawdown	4'	23'5"
i) Pump (type & cap.)	V.T. 125	V.T. 610

*Report well logs on separate sheet, if available.
**Number of Lead Services

MINNESOTA DEPARTMENT OF HEALTH

REPORT ON INVESTIGATION OF PUBLIC WATER SUPPLY

Name of Water Supply: Brownton Municipal Water Supply	PWS ID Number: 1430002
Street: c/o City Hall	Telephone Numbers: City: 612/328-5318
City: Brownton	State: MN; Zip Code: 55312; Operator: 612-328-5227
County: McLeod	District: South Central; Engineer: ; Other:
Water Superintendent: Steve Mashuga	Classification: Not Certified
Other Operators	Classification
City Engineer	
Plant Classification: Class D	Owner Type: Municipal
Plant Type: Community	Plumbing Permits and Inspections Required: [X] Yes [ ] No
Previous Survey: August 13, 1979	Date of Survey: November 24, 1980

SERVICE AREA CHARACTERISTICS:

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

Population Served: 669	Service Connections: 300	Storage Capacity: (List Separately) 100,000 Gallon Steel Elevated
Design Capacity (gal/day): 650,000	Average Daily Production (gal/day): 70,000	
Emergency Capacity (gal/day):	Highest Daily Production (gal/day): 200,000	Total: 100,000 Gallons

Source Name	Source Code	Availability	TREATMENT: Disinfection	Aeration	Coagulation	Sedimentation	Filtration	Corrosion Con. Stabilization	Softening	Taste & Odor	Ammoniation	Fluoridation	Other	WELL DATA: Year Installed	Casing Diameter	Casing Depth	Screen Length	Well Depth	Water Bearing Formation	Static Level	Drawdown	Pump Type
Well No. 1	G	R	Dc	E										1959	8"	217'	20'	237'		38'	4'	VT 125
Well No. 2	G	P	Dc		F			Kc			Va			1977	10"	220'	30'	250'		42'6"	23'5"	VT 610

Remarks:

Surveyed by: Mark D. Sweers

Approved by: Larry W. Mierau

HE-00842-02

MINNESOTA DEPARTMENT OF HEALTH

REPORT ON INVESTIGATION OF PUBLIC WATER SUPPLY

Name of Water Supply: Brownton Municipal Water Supply	PWS ID Number: 1430002
Street: c/o City Hall	Telephone Numbers: City: 612/328-5318
City: Brownton; State: MN; Zip Code: 55312	Operator: 612/328-4029
County: McLeod; District: South Central	Engineer: ; Other: 612/328-5391 Operator Home #
Water Superintendent: Robert Hauer, Jr.; Classification: Class C	Plant Classification: Class D; Owner Type: Municipal
Other Operators; Classification	Plant Type: Community; Plumbing Permits and Inspections Required: [X] Yes [ ] No
	Date of Previous Survey: November 24, 1980; Date of Survey: March 17, 1982
City Engineer	

SERVICE AREA CHARACTERISTICS:

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

Population Served: 697	Service Connections: 300	Storage Capacity: (List Separately) 100,000 Gal. Steel Elevated
Design Capacity (gal/day): 650,000	Average Daily Production (gal/day): 70,000	
Emergency Capacity (gal/day):	Highest Daily Production (gal/day): 150,000	Total: 100,000 Gallons

Source Name	Source Co:	Availability	TREATMENT: Disinfection	Aeration	Coagulation	Sedimentation	Filtration	Corrosion Con. Stabilization	Softening	Taste & Odor	Ammoniation	Fluoridation	Other	WELL DATA: Year Installed	Casing Diameter	Casing Depth	Screen Length	Well Depth	Water Bearing Formation	Static Level	Drawdown	Pump Type
Well #1	G	R	Dc	E										1959	8"	217'	20'	237'		38'	4'	VT 125
Well #2	G	P	Dc		F			Kc			Ya			1977	10"	220'	30'	250'		42' 6"	23' 5"	VT 610

Remarks:

Surveyed by: Mark D. Sweers

Approved by: Larry W. Mierau, R.S.

HE-00842-02

MINNESOTA DEPARTMENT OF HEALTH

REPORT ON INVESTIGATION OF PUBLIC WATER SUPPLY

Name of Water Supply: Brownton Municipal Water Supply
PWS ID Number: 1430002
Street: c/o City Hall
Telephone Numbers: City: (612) 328-5318
City: Brownton | State: MN | Zip Code: 55312 | Operator: (612) 328-4029
County: McLeod | District: South Central | Engineer:
Other: (612) 328-5391 Operator Home #
Water Superintendent: Robert Hauer, Jr. | Classification: Class C | Plant Classification: Class D | Owner Type: Municipal
Other Operators | Classification | Plant Type: Community | Plumbing Permits and Inspections Required: [X] Yes [ ] No
Date of Previous Survey: March 17, 1982 | Date of Survey: May 9, 1983
City Engineer

SERVICE AREA CHARACTERISTICS:

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

Population Served: 697
Service Connections: 300
Storage Capacity: (List Seperately) 100,000 Gal. Steel Elevated
Design Capacity (gal/day): 650,000
Average Daily Production (gal/day): 65,000
Emergency Capacity (gal/day):
Highest Daily Production (gal/day): 135,000
Total: 100,000 Gallons

Source Name	Source Code	Availability	TREATMENT: Disinfection	Aeration	Coagulation	Sedimentation	Filtration	Corrosion Con. Stabilization	Softening	Taste & Odor	Ammoniation	Fluoridation	Other	WELL DATA: Year Installed	Casing Diameter	Casing Depth	Screen Length	Well Depth	Water Bearing Formation	Static Level	Drawdown	Pump Type
Well #1	G	R	Dc		E									1959	8"	217'	20'	237'		38'	4'	VT 125
Well #2	G	P	Dc			F		Kc			Va			1977	10"	220'	30'	250'		42' 6"	23' 5"	VT 610

Remarks:

Surveyed by: Mark D. Sweers
Approved by: Larry W. Mierau

HE-00842-02

MINNESOTA DEPARTMENT OF HEALTH

REPORT ON INVESTIGATION OF PUBLIC WATER SUPPLY

Name of Water Supply: Brownton Municipal Water Supply	PWS ID Number: 1430002
Street: c/o City Hall	Telephone Numbers: City: (612) 328-5318
City: Brownton; State: MN; Zip Code: 55312	Operator: (612) 328-4029
County: McLeod; District: South Central	Engineer:
	Other: (612) 328-5391 Operator Home #
Water Superintendent: Robert Hauer, Jr.; Classification: Class C	Plant Classification: Class D; Owner Type: Municipal
Other Operators; Classification	Plant Type: Community; Plumbing Permits and Inspections Required: [X] Yes [ ] No
	Date of Previous Survey: May 9, 1983; Date of Survey: August 2, 1984
City Engineer	

SERVICE AREA CHARACTERISTICS:

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

Population Served: 697	Service Connections: 300	Storage Capacity: (List Separately) 100,000 Gal. Steel Elevated
Design Capacity (gal/day): 650,000	Average Daily Production (gal/day): 65,000	
Emergency Capacity (gal/day):	Highest Daily Production (gal/day): 135,000	Total: 100,000 Gallons

Source Name	Source Code	Availability	TREATMENT: Disinfection	Aeration	Coagulation	Sedimentation	Filtration	Corrosion Con. Stabilization	Softening	Taste & Odor	Ammoniation	Fluoridation	Other	WELL DATA: Year Installed	Casing Diameter	Casing Depth	Screen Length	Well Depth	Water Bearing Formation	Static Level	Drawdown	Pump Type
Well #1	G	R	Dc	E										1959	8"	217'	20'	237'		38'	4'	VT
Well #2	G	P	Dc		F			Kc			Va			1977	10"	220'	30'	250'		42' 6"	23' 5"	VT
Well #3	G	E		G										1954	5"	230'	17'	247'				SUB

Remarks:

Surveyed by: Mark D. Sweers

Approved by: Larry W. Mierau

HE-00842-02

MINNESOTA DEPARTMENT OF HEALTH
DIVISION OF ENVIRONMENTAL HEALTH

ANALYTICAL DATA

Samples Collected By Mark D. Sweers Report To South Central District

Field Number	Town, County, Etc.	Sampling Point and Source of Sample
a 11130	Brownton, McLeod County	Well No. 3 G
b		
c		
d		
e		
f		

This line for Lab. use only. Sample Number	a 11130	b	c	d	e	f
Date Collected	Oct. 9, 1984					
Time Collected	10:30 a.m.					
Temperature °F						
Date Received by Lab.						
Coliform group organisms — M. P. N. per 100 ml.						
Con. ☐ Comp. ☐						
M. F. C. per 100 ml.						
Total Solids	520					
Turbidity						
Color						
Total hardness as $CaCO_3$	320					
Alkalinity as $CaCO_3$						
pH value	7.6					
Iron	1.4					
Manganese	0.05					
Chloride	2.9					
Residual Chlorine						
Sulphate	<5.0					
Fluoride						
Total Phosphorus						
Nitrite Nitrogen						
Nitrate Nitrogen						
Methylene Blue Active Sub. as ABS						
Calcium as $CaCO_3$	190					
Sodium						
Potassium	3.8					
Spec. Cond. µmhos/cm @ 25°C.	820					
pHs @ 50 °C.						
Magnesium as $CaCO_3$	130					
< = Less Than						

* Results are in milligrams per liter except as noted.

MINNESOTA DEPARTMENT OF HEALTH
DIVISION OF ENVIRONMENTAL HEALTH

ANALYTICAL DATA

Samples Collected By Mark D. Sweers Report To South Central District

Field Number	Town, County, Etc.	Sampling Point and Source of Sample
[a] 11130	Brownton, McLeod County	Well No. 3 G
[b]		
[c]		
[d]		
[e]		
[f]		

This line for lab use only. Sample Number		[a] 11130	[b]	[c]	[d]	[e]	[f]
Date Collected 10-9-86							
Time Collected							
Date Received by Lab							
Coliform group organisms	M.P.N./100 mL						
	Con.☐ Comp.☐						
	M.F.C./100 mL						
Arsenic	µg/l	< 5.0					
Barium	µg/l	340					
Cadmium	µg/l	< 1.0					
Chromium	µg/l	< 5.0					
Fluoride	mg/l	0.26					
Lead	µg/l	17.0					
Mercury	µg/l	0.11					
Nitrate Nitrogen	mg/l	< 0.4					
Residual Chlorine							
Selenium	µg/l	< 5.0					
Silver	µg/l	< 5.0					
Sodium	mg/l						
Gross Alpha							
Radium Alpha							
Uranium Alpha							
Radium-228							

< = Less Than

HE-00843-02

MINNESOTA DEPARTMENT OF HEALTH

REPORT ON INVESTIGATION OF PUBLIC WATER SUPPLY

Name of Water Supply: Brownton Municipal Water Supply
PWS ID Number: 1430002
Street: c/o City Hall
Telephone Numbers: City: (612)328-5318; Operator: (612)328-4029; Engineer: ; Other: (612)328-5391 Operator Home
City: Brownton
State: MN
Zip Code: 55312
County: McLeod
District: South Central
Water Superintendent: Robert Hauer, Jr.
Classification: Class C
Plant Classification: Class D
Owner Type: Municipal
Other Operators
Classification
Plant Type: Community
Plumbing Permits and Inspections Required: ☐ Yes ☒ No
Date of Previous Survey: 8-2-84
Date of Survey: 12-17-85
City Engineer: Wood, Gorover & Associates

SERVICE AREA CHARACTERISTICS:

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

Population Served: 697
Service Connections: 300
Storage Capacity: (List Separately) 100,000 gal. steel elevated
Design Capacity (gal/day): 650,000
Average Daily Production (gal/day): 65,000
Emergency Capacity (gal/day):
Highest Daily Production (gal/day): 135,000
Total: 100,000 gallons

Source Name	Source Code	Availability	TREATMENT: Disinfection	Aeration	Coagulation	Sedimentation	Filtration	Corrosion Con. Stabilization	Softening	Taste & Odor	Ammoniation	Fluoridation	Other	WELL DATA: Year Installed	Casing Diameter	Casing Depth	Screen Length	Well Depth	Water Bearing Formation	Static Level	Drawdown	Pump Type
Well #1	G	R	Dc		E									1959	8"	217'	20'	237'		38'	4'	VT 100
Well #2	G	P	Dc			F		Kc			Va			1977	10"	220'	30'	250'		38'5"	8'5"	VT 210
Well #3	G	E			G									1954	5"	230'	17'	247'				SUB

Remarks:

Surveyed by: David M. Schultz
Approved by: James A. Feddema

HE-00842-02

MINNESOTA DEPARTMENT OF HEALTH

REPORT ON INVESTIGATION OF PUBLIC WATER SUPPLY

Name of Water Supply: Brownton Municipal Water Supply

PWS ID Number: 1430002

Street: c/o Mrs. Martin Winterfeldt, Clerk, City Hall

Telephone Numbers: City: 612-328-5318; Operator: 612-328-4029; Engineer: ; Other: 612-328-5391 Operator Home

City: Brownton | State: MN | Zip Code: 55312

County: McLeod | District: Central

Water Superintendent: Robert Hauer | Classification: C | Plant Classification: D | Owner Type: Municipal

Other Operators: Jerry Janke | Classification: None | Plant Type: Community | Plumbing Permits and Inspections Required: [X] Yes [ ] No

Date of Previous Survey: 12-17-85 | Date of Survey: 6-9-87

City Engineer:

SERVICE AREA CHARACTERISTICS:

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

Population Served: 697 | Service Connections: 300 | Storage Capacity (List Separately): 100,000 gal. steel elevated

Design Capacity (gal/day): | Average Daily Production (gal/day): 75,000 | Total: 100,000 gallons

Emergency Capacity (gal/day): | Highest Daily Production (gal/day): 135,000

Source Name	Source Code	Availability	TREATMENT: Disinfection	Aeration	Coagulation	Sedimentation	Filtration	Corrosion Con. S.abilization	Softening	Taste & Odor	Ammoniation	Fluoridation	Other	WELL DATA: Year Installed	Casing Diameter	Casing Depth	Screen Length	Well Depth	Water Bearing Formation	Static Level	Drawdown	Pump Type
Well #1	G	R	Dc	E										1959	8"	217'	20'	237'	Drift	38'	4'	VT 100
Well #2	G	P	Dc		F			Kc			Va			1977	10"	220'	30'	250'	Drift	40'11"	13'	VT 210
Well #3	G	R		G										1954	5"	230'	17'	247'	Drift			Sub

Remarks:

Surveyed by: David M. Schultz

Approved by: James A. Feddema

HE-00842-02

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