Wellhead and Source Water Protection – Part 2: Wellhead Protection Plan Amendment

Prepared for
City of Fridley

January 2019

4300 MarketPointe Drive, Suite 200
Minneapolis, MN 55435
Phone: 952.832.2600

Wellhead and Source Water Protection – Part 2: Wellhead Protection Plan Amendment

January 2019

Contents

List of Tables

List of Figures

List of Appendices

Public Water Supply Profile

The following persons are the contacts for the Fridley Wellhead Protection Plan:

Public Water Supply Contact

Jason Wiehle
Lead Water Operator
7071 University Avenue NE
Fridley, Minnesota 55432
Telephone: 763-238-8074
email: jason.wiehle@fridleymn.gov

Wellhead Protection Manager

Jim Kosluchar
Public Works Director/City Engineer
7071 University Avenue NE
Fridley, Minnesota 55432
Telephone: 763-572-3550
email: jim.kosluchar@fridleymn.gov

Wellhead Protection Consultant

John Greer, PG
Barr Engineering Company
4300 MarketPointe Drive
Suite 200
Minneapolis, Minnesota 55435
Telephone: 952-832-2600
Fax: 952-832-2601
email: jgreer@barr.com

General Information

UNIQUE WELL NUMBER(S) 206674, 206670, 201158, 206675, 206673, 206678, 206669, 206672, 206658, 206657, 209207

SIZE OF POPULATION SERVED 27,208 (2010 Census)

COUNTY Anoka

Documentation List

Step	Date Performed
Scoping Meeting 2 Held (4720.5340, subp. 1)	September 4, 2018
Scoping 2 Decision Notice Received (4720.5340, subp. 2)	September 26, 2018
Remaining Portion of Plan Submitted to Local Units of Government (LUGs) (4720.5350)	November 28, 2018
Review Received From Local Units of Government (4720.5350, subp. 2)	November 28, 2018 to January 27, 2019
Review Comments Considered (4720.5350, subp. 3)	November 29, 2018 to January 28, 2019
Public Hearing Conducted (4720.5350, subp.4)	January 28, 2019
Remaining Portion WHP Plan Submitted (4720.5360, subp. 1)	January 31, 2019
Final WHP Plan Review Received (4720.5360, subp. 4)	

Certification

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.

	January 31, 2019
John C. Greer PG #: 30347	Date

Acronyms

Acronym	Description
DWSMA	Drinking Water Supply Management Area
MGD	Million Gallons per Day
MGY	Million Gallons per Year
MDH	Minnesota Department of Health
MDNR	Minnesota Department of Natural Resources
MGS	Minnesota Geological Survey
MnOPS	Minnesota Office of Pipeline Safety
MPCA	Minnesota Pollution Control Agency
PCSI	Potential Contaminant Source Inventory
WHPA	Wellhead Protection Area
WHPP	Wellhead Protection Plan

Executive Summary

The Wellhead and Source Water Protection Plan (the Plan) for the City of Fridley (the City) addresses the 11 primary municipal water supply wells operated by the City. The City received final Minnesota Department of Health approval of the previous Wellhead Protection Plan in 2008. This Plan amendment was prepared in accordance with the applicable portions of the State of Minnesota Wellhead Protection Rules (Minnesota Rules 4720.5100 through 4720.5590) due to the age of the Plan.

The City's municipal water supply system includes 11 primary water supply wells (Wells 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, and 12), two standby wells (Wells 1 and 13), and interconnections with neighboring cities. In total, these wells pump from five different aquifers: the Mt. Simon Sandstone aquifer, the Tunnel City Group-Wonewoc Sandstone aquifer, the Jordan Sandstone aquifer, the Prairie du Chien Group aquifer, and an unconsolidated Quaternary-age sand and gravel aquifer. In accordance with Minnesota Rules 4720.5550, Wells 6, 7, 8, 9, 10, 11, and 12 are classified as vulnerable to contamination from the surface and Wells 2, 3, 4, and 5 are classified as not vulnerable to contamination.

This Plan amendment consists of two parts. In Part 1 of the Plan amendment, wellhead protection areas (WHPAs) for the City's water supply wells were delineated as was the associated drinking water supply management area (DWSMA). The DWSMA extends east of the Fridley city limits into New Brighton and Mounds View and north into Spring Lake Park (see Figure 1).

In Part 1 of this Plan amendment, assessment of geologic conditions in and around the City's DWSMA and available water quality data for the City's wells was done to determine the vulnerability to contamination of the uppermost source water aquifer. The aquifer vulnerability in approximately 5.4 percent of the area encompassed by the DWSMA was classified as High. Aquifer vulnerability in approximately 93 percent of the area in the DWSMA was classified as Moderate. The aquifer vulnerability in approximately 1.6 percent of the area in the DWSMA was classified as Low.

This document comprises Part 2 of the Plan amendment and includes the following information:

- A review of data elements identified by the Minnesota Department of Health as applicable to the DWSMA.
- Results of an inventory of potential contaminant sources within the DWSMA.
- A review of changes, issues, problems, and opportunities related to the public water supply and the identified potential contaminant sources.
- A discussion of potential contaminant source management strategies and the goals, objectives, and action plans associated with these management strategies.
- A review of the Wellhead and Source Water Protection evaluation program
- Fridley's alternative water supply contingency strategy specified in the City's Water Supply Plan (incorporated by reference).

The types of potential contaminant sources that must be inventoried depends on the vulnerability classification within the DWSMA. Potential contaminant sources identified in the DWSMA include non-municipal wells, potential Class V well locations, properties with storage tanks, chemical storage sites, a

wastewater treatment and disposal site, old dump sites, properties where contaminants were or may have been released, and hazardous waste generators. In addition, one petroleum pipeline crosses the eastern portion of the DWSMA.

The goals and objectives of this WHPP will focus on reducing the potential contaminant pathways to the source water aquifers that may be provided by private wells and educating property owners and water supply users to ensure proper management of the portions of the DWSMA.

The following goals have been identified for implementation of this WHPP:

- The City will work to maintain or improve the current level of water quality so that the municipal water supply will continue to meet or exceed all applicable state and federal water quality standards.
- Work with the cities of Mounds View, New Brighton, and Spring Lake Park to protect the source water aquifers.
- The City will provide information and promote activities that protect the source water aquifers that provide water to the municipal system. This will include increasing public awareness of the Wellhead and Source Water Protection Program and groundwater-related issues, and management of the identified potential contaminant sources within the DWSMA.
- The City will continue to collect data to support future wellhead and source water protection efforts.

Actions identified to accomplish these goals include the following:

- Wells
    - Promoting proper management of existing active wells in the DWSMA
    - Encouraging the proper sealing of all unused wells within the DWSMA
    - Identification of new high capacity wells in or near the DWSMA
    - Maintaining current IWMZ potential contaminant source inventories for the City's water supply wells
- Potential contaminant source properties
    - Notifying owners of potential Class V well properties of requirements related to Class V wells
    - Encouraging proper handling of chemicals/wastes
    - Encouraging proper operation and maintenance of storage tanks
    - Tracking the status of identified brownfields sites and other properties where contaminant releases may have occurred in the DWSMA
    - Periodically obtaining updated information on potential contaminant sources in the DWSMA from the regulating agencies to maintain an up-to-date potential contaminant source database for the DWSMA and allow timely recognition of potential issues that could affect the Fridley municipal water supply or DWSMA.

- Public education
    - Distribution of the Fridley Annual Water Quality Report for the water supply system,
    - Posting Wellhead Protection Program information on the City of Fridley website http://www.ci.fridley.mn.us/ and provide a link to the *Know the Flow* website (http://www.knowtheflow.us/)
    - Using the City's newsletter to distribute information related to wellhead protection
    - Inclusion of wellhead and source water protection in the City's planning process,
- Continued data collection
    - Recording static and pumping water levels in the Fridley municipal wells,
    - Collection of additional local geologic and hydrogeologic data as it becomes available from public sources or from City-sponsored projects.
    - Sampling the City's municipal wells for tritium and the stable isotopes along with sampling of surface water bodies in Fridley for stable isotopes.

1.0 Introduction

1.1 Background

The City of Fridley (City) currently has 11 municipal water supply wells. All the wells are classified as primary water supply wells. In total, these wells pump from five different aquifers: the Mt. Simon Sandstone aquifer, the Tunnel City Group-Wonewoc Sandstone aquifer, the Jordan Sandstone aquifer, the Prairie du Chien Group aquifer, and an unconsolidated Quaternary-age sand and gravel aquifer. In addition to the primary water supply wells, the City's water supply system also includes two standby wells (Wells 1 and 13), and interconnections with neighboring cities. Minnesota unique well number along with well construction, well status, aquifer(s), and well vulnerability classification for each of Fridley's primary municipal water supply wells is presented in Table 1. Well locations, the Fridley Drinking Water Supply Management Area (DWSMA), along with the portions of the Brooklyn Center, Mounds View, New Brighton, St. Anthony Village, and Spring Lake Park DWSMAs that overlap the Fridley DWSMA are shown on Figure 1. Minnesota Department of Health (MDH) well records for all the Fridley municipal wells are presented in Appendix A.

The previous Fridley Wellhead Protection Plan (WHPP) Parts 1 and 2 were prepared in 2002 and 2008, respectively. The MDH issued final approval of the previous Part 2 WHPP in 2008. In accordance with the Minnesota Wellhead Protection Rules (Minnesota Rules 4720.5100 through 4720.5590), amendment of the City's WHPP was initiated based on the age of the Plan. In the Part 1 WHPP amendment, one DWSMA was delineated for Fridley that encompasses the wellhead protection areas (WHPAs) delineated for the Fridley primary water supply wells. In addition to the delineation of the WHPAs and DWSMA, Part 1 of the WHPP amendment includes an assessment of the vulnerability to contamination of the Fridley municipal wells and the vulnerability of the source water aquifers in the DWSMA. In accordance with Minnesota Rules 4720.5550, Wells 6, 7, 8, 9, 10, 11, and 12 are classified as vulnerable to contamination from the surface and Wells 2, 3, 4, and 5 are classified as not vulnerable to contamination (see Table 1 and Appendix A). In the Part 1 amendment report, the vulnerability to contamination of the uppermost source water aquifer within the DWSMA was identified as ranging from Low to High (Barr, 2018). Figure 1 shows the aquifer vulnerability zones in the Fridley DWSMA. The Fridley Part 1 WHPP amendment is presented in Appendix B. The Part 1 WHPP amendment (Barr, 2018) was approved by the Minnesota Department of Health (MDH) in July 2018 (MDH, 2018a). A public information meeting on the Part 1 WHPP amendment was held on August 28, 2018.

1.2 Description of the Public Water Supply System

Fridley is located in Anoka County. The City currently has 11 primary water supply wells in the municipal water supply and distribution system for Public Water Supply #1020031. Locations of the wells are shown on Figure 1 and general construction details for the Fridley municipal wells are summarized in Table 1. Copies of the MDH well records for the Fridley municipal wells are presented in Appendix A.

The 2010 census counted 27,208 people in Fridley. The Metropolitan Council estimated the 2017 population of Fridley to be 28,667 (Metropolitan Council, 2018a). As of January 2018, the Metropolitan Council has projected Fridley's population to reach 29,300 in 2020 and 31,600 in 2030 (Metropolitan Council, 2018b).

The City's current daily water demand (based on the period 2013-2017) averages approximately 3.0 MGD (see Barr, 2018). Maximum day demand (the largest daily water use in a given year) ranged from approximately 5.9 MGD to 9.0 MGD in the period 2013-2017. The City's permitted annual appropriation volume is 2.4 billion gallons per year (BGY). The City's draft Water Supply Plan (Fridley, 2016) projects the daily average water demand in 2030 will be approximately 3.8 MGD (approximately 2,600 gpm). The draft Water System Plan also projects the 2030 maximum day water demand will be 7.6 MGD (approximately 5,300). The City currently has no plans to construct any additional water supply wells to meet projected future water demand.

The City has three water treatment plants that treats water from the City's wells. Total treatment capacity in these three plants is 17.2 million gallons per day (MGD). Iron and manganese are removed from the raw water in all three plants. The Commons Park Water Treatment Plant also removes radionuclides from the raw water. In all three treatment plants, the water is fluoridated and disinfected with chlorine before it enters the distribution system.

Fridley currently has four water storage facilities consisting of two elevated towers and two ground storage tanks. These facilities have a combined storage capacity of 6.5 million gallons.

As discussed by Barr (2018), pumping information from the City for the period 2013 through 2017 and City water use projections were used to develop pumping rate projections for use in delineating the WHPA. Annual volume of water pumped by each of the City's municipal water supply wells during the period 2013 through 2017 is shown in Table 2.

1.3 DWSMA

The DWSMA delineated in the Part 1 WHPP amendment encompasses the 10-year groundwater time of travel WHPA around the City's wells. As shown on Figure 1, the DWSMA includes all or parts of Township 30N, Range 23W, Sections 6, 7, 8, 17, 18, and 19 and Township 30N, Range 24W, Sections 1, 2, 10, 11, 12, 13, 14, 15 22, 23, and 24. As shown on Figure 1, the DWSMA extends east of the Fridley city limits into New Brighton and Mounds View and north into Spring Lake Park. The DWSMA overlaps DWSMAs from the cities of Brooklyn Center, Mounds View, New Brighton, St. Anthony Village, and Spring Lake Park (Figure 1).

In the Part 1 amendment report, the aquifer vulnerability in approximately 5.4 percent of the area encompassed by the DWSMA was classified as High. Aquifer vulnerability in approximately 93 percent of the area in the DWSMA was classified as Moderate. The aquifer vulnerability in approximately 1.6 percent of the area in the DWSMA was classified as Low.

2.0 Identification and Assessment of Data Elements

The Minnesota Wellhead Protection Rules specify data elements that must be addressed in wellhead protection plans. For the WHPP amendment, MDH staff met with City staff on two occasions to discuss the data elements that are specified in the Minnesota Rules 4720.5400. Results of these scoping meetings were transmitted to the City via two Scoping Decisions dated August 17, 2016 (MDH, 2016) and September 25, 2018 (MDH, 2018b).

The first Scoping Meeting was held on August 9, 2016. At this meeting, the data elements related to delineation of the WHPA and DWSMA and assessment of well and aquifer vulnerability were discussed. The second Scoping Meeting was held on September 4, 2018. At this meeting, the data elements required to support development of Part 2 of the WHPP amendment (this document) which identifies potential contaminant sources within the DWSMA and identifies management strategies to help safeguard the municipal water supply from identified potential contaminants were discussed. An assessment of these data elements, as required by the Minnesota Wellhead Protection Rules, is presented in Appendix C.

3.0 Inventory of Potential Contaminant Sources

In Part 1 of this WHPP amendment, the WHPA and the DWSMA were delineated. The DWSMA encompasses the WHPA around the City's 11 primary water supply wells (Barr, 2018). The DWSMA extends east of the Fridley city limits into New Brighton and Mounds View and north into Spring Lake Park (Figure 1).

Current land use (i.e., year 2010 data from the Metropolitan Council) is shown on Figure 2 and in Appendix C. As shown on Figure 2, numerous land uses are found within the DWSMA. Land uses in the DWSMA that cover 1 percent or more of the area in the DWSMA include Residential of various types, Park/Recreational or Preserve, Industrial and Utility, Institutional, Major Highway, Retail and Other Commercial, Open Water, Undeveloped land, Office, and Golf Course.

The City performed a Potential Contaminant Source Inventory (PCSI) within the DWSMA per the requirements outlined in the September 25, 2018 Scoping 2 Decision Notice No. 2.

3.1 Inventory Process

At Scoping Meeting No. 2, the types of potential contaminant sources that must be inventoried in the Fridley DWSMA Area were discussed. As discussed in Appendix C, sources of data accessed for the PCSI include Anoka County, Minnesota Department of Agriculture (MDA), Minnesota Department of Health (MDH), Minnesota Department of Natural Resources (MDNR), Minnesota Department of Public Safety (MnDPS), Minnesota Geological Survey (MGS), Minnesota Office of Pipeline Safety (MnOPS), Minnesota Pollution Control Agency (MPCA), Metropolitan Council, Minnesota Geospatial Information Office (MGIO), and U.S. Environmental Protection Agency (USEPA) databases.

Aquifer vulnerability in the Fridley DWSMA varies with location and includes the following classifications: Low, Moderate, and High (Figure 1). Approximately 5.4 percent of the area encompassed by the DWSMA has an aquifer vulnerability classification of High. Aquifer vulnerability in approximately 93 percent of the area in the DWSMA is classified as Moderate. The aquifer vulnerability in approximately 1.6 percent of the area in the DWSMA is classified as Low.

The types of potential contaminant sources that must be inventoried vary by vulnerability classification. The September 25, 2018 Scoping 2 Decision Notice identifies the types of potential contaminant sources that must be inventoried for each vulnerability classification in the DWSMA.

The first step in the inventory was to determine if there were any potential contaminant sources in the Inner Wellhead Management Zone (IWMZ) or the Emergency Response Zone (ERZ) around each of the Fridley wells. The IWMZ is defined as the area within a 200 foot radius of each municipal well. The most recent IWMZ inventory for each of the Fridley municipal wells is presented in Appendix C. The ERZ is defined as the area within which the travel time of groundwater to a municipal well is one year or less. The inventory was then expanded out to the boundaries of the DWSMA.

As shown in Table 3, identified potential contaminant sources have been assigned a priority based on the relative risk they pose to the public water supply. The evaluation of risk related to a potential contaminant source type is based on the locations of potential contaminant sources of that type and the aquifer vulnerability classification. Higher priority was assigned to those potential contaminant sources that would pose the highest risk to the municipal water supply should a contaminant release occur.

3.2 Inventory Results

A more detailed discussion of the potential contaminant sources within the DWSMA is presented in Appendix C. The inventory results are summarized in Table 3.

The Wellhead Protection rules require that at least 25 locations of each type of potential contaminant source identified during the PCSI be verified during preparation of the plan. The rules also require that if there are fewer than 25 of a particular potential contaminant source type that all locations of that type be verified. For WHPP amendments, MDH policy modifies this requirement by applying the "25 rule" only to those portions of the new DWSMA that are outside the limits of the original DWSMA. In addition, MDH requires that potential contaminant source locations identified within the original DWSMA limits during preparation of the original plan be verified prior to submittal of the Part 2 WHPP amendment to MDH for approval.

The old Fridley DWSMA (delineated in 2002) extends beyond the boundaries of the new DWSMA. During the preparation of this Plan amendment, all identified potential contaminant source locations within the new DWSMA limits were verified to the extent possible (see Appendix C). Location verification procedures used included matching mapped locations with addresses on MDH Well Records or State/County-issued permits or in County/State/Federal databases, published business addresses, property parcel addresses, local knowledge of City staff, or information from City files (note that not all verification procedures were used for each type of potential contaminant source). New information developed on contaminant sources in the future will be verified as they are discovered as part of the WHPP implementation.

4.0 Impact of Changes to the Public Water Supply Wells

In accordance with the requirements of Minnesota Rules 4720.5220, anticipated changes in the physical environment, land use, surface water, and groundwater in the DWSMA within the next ten years and the impact of these changes on the source water aquifers are discussed in this section.

4.1 Potential Changes Identified

4.1.1 Physical Environment

Currently, significant or large-scale changes in the physical environment that might affect the DWSMA, are not anticipated in the next ten years. Any changes are expected to be the result of development/redevelopment of properties or localized infrastructure rehabilitation or changes. Such changes would not be expected to significantly affect the source water aquifers. Any minor changes to the physical environment will likely not affect the management strategies for the Fridley DWSMA presented in this WHPP.

The City's draft Water Supply Plan (Fridley, 2018) does not anticipate the addition of new wells to meet projected future water demand.

As discussed in the Part 1 amendment (Barr, 2018) and noted above, the DWSMA extends east of the Fridley city limits into New Brighton and Mounds View and north into Spring Lake Park.

4.1.2 Land Use

The Metropolitan Council's 2015 System Statement indicates that Fridley has the planning designation Urban (Metropolitan Council, 2015). Current land uses in the Fridley DWSMA include Residential of various types, Park/Recreational or Preserve, Industrial and Utility, Institutional, Major Highway, Retail and Other Commercial, Open Water, Undeveloped land, Office, and Golf Course. Approximately 3 percent of the land in the DWSMA is currently undeveloped (Figure 2). Projected future land uses within the City are anticipated to include many of the land uses currently present within the DWSMA.

A current land use map (year 2010 data from the Metropolitan Council) and a projected year 2030 land use map are shown on Figure 2 and Figure 3, respectively. Projected land use in Fridley in 2030 is expected to be consistent with the City's current growth planning. Comparison of the year 2010 land use with the projected future land use indicates that the currently undeveloped properties within the Fridley DWSMA will be developed in the future.

Land uses anticipated during the next ten years within the DWSMA are currently present in the areas covered by this WHPP. As a result, adjustments in the land use within the DWSMA such as those projected for the year 2030 will be adequately addressed by the management strategies put forth in this WHPP.

4.1.3 Surface Water

There are surface water bodies and wetlands within the Fridley DWSMA. The City's Surface Water Management Plan, City ordinances, and zoning address these surface water bodies and wetlands. Fridley's management of surface water bodies and wetlands is not expected to adversely affect the management strategies for the DWSMA. Rather, the City's management of surface water bodies and wetlands is consistent with the objectives of this Plan.

The City is not aware of any plans to alter the course or location of any surface water bodies currently present within the DWSMA in the next ten years. Chapter 215 of the City Code requires a permit for any alteration of the surface water bodies identified in the chapter.

4.1.4 Groundwater

Population growth of approximately 10 percent by 2030 projected for Fridley (e.g., Fridley, 2016). Water demand is projected to increase by up to approximately 25 percent by 2030. As indicated in the City's draft Water Supply Plan (Fridley, 2018), it is not anticipated that additional municipal wells will need to be installed to meet projected future demand.

City staff inspect the municipal wells regularly. The MDH inspects all wells annually. This annual inspection includes sampling of the wells to ensure that water pumped from the wells complies with applicable regulatory standards. In addition, Fridley uses a SCADA system to measure the volume of water pumped from a well, the instantaneous pumping rate for each well, and the water level (static or pumping) in each well.

Groundwater level data from the City's water supply wells (see Fridley, 2018) indicate generally steady to slowly increasing piezometric level trends in the past 10 years in the source water aquifers above the Mt. Simon. The data indicate there were generally steady piezometric surface trends in the City's Mt. Simon wells until Spring 2015 when decreasing trends appeared. The decreasing trends persisted until late 2016. The decreasing trends appear to coincide with increased pumping from the Mt. Simon in nearby city of New Brighton wells that occurred in response to the identification of 1,4-dioxane in water pumped from New Brighton's Prairie du Chien-Jordan wells. Since early 2017 the static piezometric levels in the City's Mt. Simon wells have shown generally steady to slowly increasing trends. Modifications to the New Brighton water treatment plant implemented in response to the presence of 1,4-dioxane were completed in Fall 2018 and New Brighton began providing water to Fridley once again. At the time this Plan was prepared, it was anticipated that New Brighton would reduce pumping in their Mt. Simon aquifer wells which would likely result in a rise in piezometric levels in Fridley's Mt. Simon wells.

The City supports water conservation. The City periodically disseminates water conservation information via various vehicles (e.g., in the annual Water Quality Report). The City's water conservation program includes a tiered water rate structure. Under Section 402.33 of the City Code the City Council may establish water conservation guidelines. Outdoor water use restrictions would be instituted only during a declared water emergency.

In the next ten years it is possible that new business developments in or near the Fridley DWSMA may seek to construct privately-owned high capacity wells completed in one of the City's source water aquifers. Such wells could potentially affect the DWSMA boundaries, depending on their location and pumping rate. At the time this Plan was prepared, the City was not aware of any proposed developments with plans for privately-owned high capacity wells within or near the DWSMA.

Available information from the MPARS database indicates that there are 57 high capacity wells within a zone that includes the Fridley DWSMA and extends one mile beyond the DWSMA boundaries (this number does not include the 11 Fridley primary municipal water supply wells). High capacity wells are defined as wells that pump more than 1,000,000 gallons per year or more than 10,000 gallons per day. Owners of these wells are required to obtain a groundwater appropriation permit from the MDNR. High capacity wells outside of the DWSMA were identified because changes in operation of these wells could, potentially, affect the DWSMA boundaries. Of these 57 wells, 26 are used for municipal water supply (two of these wells are Fridley emergency supply wells 1 and 13), 20 are used for pollution containment, five are used for some type of irrigation, (Table 4). Additional information on these wells can be found in Appendix C.

Beyond the possible installation/operation of additional high capacity wells in the vicinity of the Fridley DWSMA, no significant changes regarding groundwater use within or near the DWSMA are anticipated to occur within the next ten years.

4.2 Impact of Changes

4.2.1 Water Use

The City's water distribution system is currently supplied with water from 11 wells. The City's draft Water Supply Plan (Fridley, 2016) projects the daily average water demand in 2030 will be approximately 3.8 MGD (approximately 2,600 gpm). Current daily water demand (based on the period 2013-2017) averages approximately 3.0 MGD. The City's draft Water Supply Plan projects the City's 2030 maximum day demand will be approximately 7.6 MGD (approximately 5,300 gpm). Maximum day demand (the largest daily water use in a given year) ranged from approximately 5.9 MGD to 9.0 MGD in the period 2013-2017.

Based on current projections, the City does not anticipate the need to install additional wells to meet future water demand. If it would become necessary to install additional wells in the future, the City would have to review and, likely, update their WHPAs and DWSMA to take into account the effects of pumping from the new wells.

The placement of an additional high capacity well in or near the DWSMA or significant changes in current groundwater appropriations by existing wells could have an impact on the source water aquifers and local water supplies. Such changes could also affect the WHPAs and DWSMA identified for the existing City of Fridley wells or change the static water levels in the wells. The City will work with the MDH Source Water Protection Unit and the MDNR to identify proposed high capacity wells in the vicinity of the Fridley DWSMA and provide interaction, to the extent practicable, with the proposed well owner to minimize potential problems, should the potential for adverse well interference be identified.

To conserve valuable water resources and to mitigate, to the extent possible, drought impacts, the City limits use of water from the municipal water supply system for lawn and garden sprinkling and irrigation to between May 1 and September 30. In addition, The City Code allows the City Council to establish water conservation measures as needed.

4.2.2 Influence of Existing Water and Land Government Programs and Regulations

As noted above, the City has a tiered billing structure for water use. In addition, the City periodically disseminates water conservation information.

The City has a storm water management program. The goals of the program include maintaining or improving water quality in surface water bodies in the City. The City believes that the current program is sufficient to meet the objectives of this wellhead protection plan.

County and city ordinances, the MDNR Division of Waters' appropriations permitting program, the MPCA's storage tank permitting program, the MPCA's Voluntary Investigation and Cleanup program, the MPCA's superfund program, the MDH's Well Management and Drinking Water Supply Programs, Anoka County's hazardous waste generator licensing program, State rules regarding chemical handling and storage, and the U.S. EPA's rules regarding Class V wells will be relied upon for assistance in regulating the installation of new wells, the operation of wells, water appropriation permitting, the proper sealing of unused wells, proper maintenance and operation of storage tanks, proper storage of chemicals, proper handling of hazardous wastes, proper response to sites with soil and groundwater contamination, and addressing Class V wells. The City believes that the current level of regulations and oversight by various governmental entities are adequate to address these issues. In addition, the City is aware of and supports the low interest loan program offered by Anoka County Community Development that can be used for maintenance and sealing of wells.

Land use control and land disturbing activities outside of the City of Fridley will be governed by the local unit of government with jurisdiction in a particular area. This WHPP has been developed to protect the interests of the City of Fridley and, to the extent practicable, to have no adverse effect on the plans and strategies developed for adjacent areas. The Metropolitan Council jurisdiction overlaps the Fridley DWSMA as do the jurisdictions of the Coon Creek Watershed District, the Rice Creek Watershed District, and the Mississippi Watershed Management Organization. The Fridley DWSMA also extends east into New Brighton and Mounds View and north into Spring Lake Park. This Plan will be provided to these other governmental units as a resource for future land development planning. Local ordinances and plans related to land use will be relied upon for the management of the portions of the City's DWSMA that extend into surrounding cities. The Wellhead Protection Manager will, to the extent feasible and practicable, communicate the goals and objectives of this Plan to the other local governmental units whose jurisdictions overlap the Fridley DWSMA.

The City of Fridley will continue to rely on Federal, State, County, and local agencies and regulations and programs to handle issues outside of the City's boundaries regarding water conservation, water appropriations, water quality, and well drilling. City staff will look to the MDH for continued regulation of

the installation of wells and proper sealing and abandonment of old wells. In addition, the City recognizes that the MDNR plays a role in the approval of applications for construction of new high capacity wells as well as administering water appropriations.

The programs identified above have proven to be effective. City staff will cooperate with the appropriate agencies, to the extent practicable, if issues arise in the future.

4.2.3 Administrative, Technical, and Financial Considerations

The City expects to have adequate resources available over a multi-year period to manage their source water aquifers within their DWSMA. Funds to support ongoing wellhead and source water protection efforts will come from the City's water utilities budget. Wellhead and source water protection activities will be evaluated periodically per MDH requirements and any changes in the focus of the tasks will also be evaluated to determine if additional funding will be necessary to accommodate the changes. When appropriate and to assist in funding of activities, the City may apply for grants from the MDH Source Water Protection Grant Program to fund implementation of management activities described later in this Plan.

For this WHPP to be effective, the City will need to keep the public aware of the issues affecting the public water supply. Therefore, the wellhead and source water protection actions described later in this Plan include public education. Routine administrative duties will be directed or performed by the Wellhead Protection Manager. Specific tasks and strategies will be performed by the Wellhead Protection Manager or delegated by the Manager to City staff or outside resources.

The City believes that the current water supply system is sufficient to meet projected future water demands. The City has an ongoing maintenance program to ensure that the water supply system will continue to be sufficient to meet water demand in the future.

The installation and operation of any additional high capacity wells in the source water aquifers in or near the DWSMA would have the potential to affect the size and shape of the Fridley WHPAs and DWSMA. At a minimum, the City will update its Wellhead Protection Plan every 10 years as required by the Wellhead Protection Rules. If new high capacity wells are installed in the area, the City will evaluate if operation of such new wells would make it necessary to update the WHPA and DWSMA delineations.

5.0 Issues, Problems, and Opportunities

In accordance with Minnesota Rules chapter 4720.5230, this section discusses issues, problems, and opportunities related to land use, comments from local units of government and the general public, the data elements and local, state, and federal programs and regulations.

5.1 Land Use Issues, Problems, and Opportunities

5.1.1 Source Water Aquifers

As shown on Figure 1, the aquifer vulnerability classification in the City's DWSMA ranges from Low to High. The aquifer vulnerability in approximately 5.4 percent of the area encompassed by the DWSMA is classified as High. Aquifer vulnerability in approximately 93 percent of the area in the DWSMA is classified as Moderate. The aquifer vulnerability in approximately 1.6 percent of the area in the DWSMA is classified as Low.

The City currently has 11 primary water supply wells (Table 1). All seven of these wells are primary water supply wells.

The addition of high capacity wells within or near the DWSMA (either municipal wells or private wells) could produce changes in the groundwater flow system (e.g., flow direction or static water level) which could result in changes to the shape and extent of the WHPAs and DWSMA delineated for this WHPP. The City will work with the Wellhead Protection Consultant and MDH to evaluate the WHPA and DWSMA delineations and amend this WHPP as necessary if and when additional high capacity wells are installed within or near the DWSMA.

As discussed elsewhere in this Plan amendment, potential sources of contamination that could affect the source water aquifer were identified during the PCSI. These potential contaminant sources include wells, properties where Class V wells may be or may have been present, storage tanks, chemical storage locations, wastewater treatment and disposal sites, properties where hazardous waste generators are located, old dump sites, and sites where contaminant releases have occurred. Table 3 indicates there are three chemical storage sites located within the IWMZs around the City's water supply wells. As indicated in Appendix C, these storage sites are associated with the City's water treatment plants. As such, the City maintains control over these sites and manage them appropriately. Table 3 also indicates there is one well within the IWMZs around City water supply wells. There are potential contaminant source locations within the Emergency Response Zones (ERZs) around the municipal wells (Table 3).

Fridley is a member of the Anoka County Municipal Wellhead Protection Group (ACMWPG). As such, the City has a vehicle established for working with surrounding communities in Anoka County and the County to protect the source water aquifers, when mutually beneficial. The City's DWSMA extends into Spring Lake Park. The DWSMA also extends into Mounds View and New Brighton in Ramsey County. The fact that the DWSMA extends beyond the City's borders provides the City with an opportunity to work with Spring Lake Park, Mounds View, and New Brighton to protect the source water aquifers, when mutually

beneficial. Anoka County regulates some of the potential contaminant sources identified in the City's DWSMA. Anoka County and Ramsey County provide household hazardous waste management services to residents to help prevent residential pollution of source water aquifers.

The entities in the various potential contaminant source categories are regulated and tracked by County, State, or Federal programs. The lack of City jurisdiction over the potential contaminant source entities poses a potential problem for protection of the source water aquifers. However, the jurisdictional issues also provide the City of Fridley with an opportunity to develop or strengthen working relationships with County and State agencies that regulate and track the potential contaminant source entities. Therefore, the City will work with the appropriate County and State programs, to the extent practicable, to address the potential contaminant sources within the DWSMA.

Fridley has plans in place that include policies for managing growth of the City, the allowable land uses, and water supplies. Policies identified in these plans will protect the City's source water aquifers.

5.1.2 Groundwater Quality

Fridley has always placed a high priority on the safety of the municipal water supply system. In order to safeguard the municipal water supply system, Fridley strictly limits access to their wells and associated infrastructure to Fridley staff.

Groundwater pumped from the source water aquifers by the Fridley wells is currently free of pathogens and disease-causing organisms. In addition, no contaminants have been reported in water samples from the Fridley wells at concentrations that exceed applicable Federal health-related standards. Current system operations ensure that the water Fridley supplies to its customers meets or exceeds the water quality requirements of the Federal Safe Drinking Water Act as documented in the City's annual Consumer Confidence Reports. The 2017 Consumer Confidence Report is presented in Appendix D. A link to the current Consumer Confidence Report from the past several years can be found on the City's website at http://www.ci.fridley.mn.us/620/Water-Quality-Reports.

In recent years, the presence of perfluoroalkyl substances (PFAS) in drinking water has entered the public discussion. Wells 10 and 11 are located near where fire training using PFAS-containing foams had been done in the past. Wells 10 and 11 were sampled for PFAS compounds several times between 2009 and 2018. No PFAS compounds were reported in the samples collected from Well 11. Beginning with the 2016 sampling event, up to six different PFAS compounds including PFOA, PFBA, PFPeA, PFHxA, PFBS, and PFHxS have been reported at low concentrations in samples collected from Well 10. Not all the PFAS compounds were reported in all the samples from Well 10. Well 10 was taken out of service immediately after the 2016 sampling results became available. At the time this Plan was prepared the City was working in conjunction with the MDH to assess the options for addressing the presence of PFAS compounds in Well 10.

As discussed in Appendix C, there are several sites in the DWSMA where contaminants were released. The release contaminants included petroleum products and chlorinated solvents. While trichloroethylene had been detected in some of the City's wells in the past, as noted in the City's 2017 Drinking Water Report

(see Appendix D), this compound was reported in only one well in 2017 at a concentration below established drinking water standards and health risk guidelines but was not detected in the treated water distributed to customers. The 2017 Drinking Water Report also notes that 1,4-dioxane was reported several of the City's wells in 2017 at concentrations well below the applicable drinking water standards.

In addition, water distributed from the City's water treatment plants was sampled for PFAS compounds in 2013 and 2014. No PFAS compounds were reported at concentrations above the applicable laboratory reporting limits.

As discussed in Appendix C, potential contaminant sources identified in the Fridley DWSMA include wells, properties where Class V wells may be or may have been present, storage tanks, chemical storage locations, wastewater treatment and disposal sites, properties where hazardous waste generators are located, old dump sites, and sites where contaminant releases have occurred. Table 3 provides a summary of the numbers of these potential contaminant sources identified in the DWSMA during development of this Plan amendment. Development of this Plan amendment provides Fridley with an opportunity to prepare and implement a program to track potential contaminant source locations within the DWSMA and educate the public regarding source water protection.

5.1.3 DWSMA

Current land uses within the DWSMA include Residential of various types, Park/Recreational or Preserve, Industrial and Utility, Institutional, Major Highway, Retail and Other Commercial, Open Water, Undeveloped land, Office, and Golf Course. As indicated in Table 1, Fridley Wells 6, 7, 8, 9, 10, 11, and 12 have been classified as vulnerable to contamination. The vulnerability to contamination of the source water aquifers within the DWSMA is classified as ranging from Low to High. Current and future land uses could potentially affect the management strategies for Fridley's DWSMA.

As noted above, Fridley is a member of the ACMWPG. As a member of the ACMWPG, the City participates in an advisory group along with neighboring public water suppliers to address and collaborate on common elements of wellhead protection plans.

No other issues, problems, or opportunities, beyond those discussed herein, have been identified regarding land uses in the DWSMA.

Information gathered for this WHPP amendment provides the City with the basis for tracking potential contaminant sources within the DWSMA. Thus, the City has an opportunity to catalog and track potential contaminant sources and stay informed of land use changes or potential future threats to the source water aquifers.

The presence of privately owned wells within the DWSMA provides potential pathways for contaminants to reach the source water aquifers if the wells are not properly constructed, maintained, or, if unused, properly sealed. Locations of wells identified within the DWSMA during the PCSI are shown in Appendix C.

5.2 Issues, Problems, and Opportunities Disclosed at Public Meetings and in Written Comments

At the beginning of this wellhead protection planning process, the City of Fridley sent a notification to surrounding local units of government of its intention to initiate work on an amendment to its wellhead and source water protection plan. After approval by the MDH in July 2018 (MDH, 2018a), Fridley sent information on the WHPAs, DWSMA, and aquifer and well vulnerability to the local units of government whose jurisdictions overlay some portion of the Fridley DWSMA.

The City of Fridley held a public information meeting on August 28, 2018 to receive comments from the general public regarding Part 1 of the WHPP. The local units of government whose jurisdictions overlay the DWSMA were notified of the public information meeting. No comments on the Part 1 Wellhead Protection Plan were received from the local units of government or the general public at the Public Information Meeting.

As required by the Wellhead Protection Rules, the City provided local units of government whose jurisdictions overlap the DWSMA with a copy of the draft Part 2 Wellhead Protection Plan amendment. Written responses received from Rice Creek Watershed District and Metropolitan Council included no comments that required modifications to the draft plan. Copies of the written responses/comments received from the local units of government are presented in Appendix E.

The City of Fridley held a Public Hearing on the WHPP amendment on January 28, 2019. The local units of government whose jurisdictions overlap the DWSMA were notified of the Public Hearing date, time, and location. No comments on the WHPP amendment were received at the public hearing.

5.3 Issues, Problems, and Opportunities Related to the Data Elements

Beginning with the delineation of WHPAs and DWSMA (i.e., Part 1 of the WHPP) and continuing in this document, the required data elements have been addressed. As discussed in Appendix C, available local and regional information was used in compiling and assessing the data elements. No issues or problems related to the data elements were identified. Fridley intends to continue collecting data from the municipal wells as well as other applicable information from public data sources, as it becomes available, during the life of this Plan. At a minimum, this Plan will be revised/updated in ten years, as required by the Wellhead Protection Rules. Each time this Plan is revised/updated the most recent and accurate data available will be used.

5.4 Issues, Problems, and Opportunities Related to Local, State, and Federal Programs and Regulations

The State of Minnesota and local units of government currently enforce land use ordinances, zoning laws, sewer ordinances, well permitting regulations, hazardous waste regulations, chemical storage regulations, and groundwater appropriation permit regulations. Fridley will work to promote the use of best management practices for potential contaminant source properties within the DWSMA. It is anticipated

that local issues will be adequately addressed through these existing processes and adoption of best management practices.

6.0 Wellhead Protection Goals

In accordance with Minnesota Rules chapter 4720.5240, this section discusses the goals for present and future water use and land use to provide a framework for WHPP objectives and related actions.

Goals presented in this section were selected based on the information gathered and compiled from the data elements, delineations of the WHPAs and DWSMA, results of the vulnerability assessments, results of the PCSI, expected changes in land and water uses, identified issues, problems, and opportunities, and evaluation of this information.

Through the years, the City has met water demands with a sufficient and safe water supply. Fridley intends to continue providing a safe water supply to its residents and businesses and other customers into the future by implementing this WHPP. Implementation of this WHPP will help ensure that the City will meet this goal.

As shown in Table 1, Fridley Wells 6, 7, 8, 9, 10, 11, and 12 are classified as being vulnerable to contamination. Figure 1 shows the aquifer vulnerability classifications of the uppermost source water aquifer within the Fridley DWSMA range from Low to High.

The goals and objectives of this WHPP will focus on reducing the potential contaminant pathways to the source water aquifers that may be provided by private wells, educating property owners and water supply users, and working with the LGUs whose jurisdictions overlap the DWSMA, to the extent practicable, to ensure proper management of the DWSMA.

Fridley has identified the following goals for implementation of this WHPP:

- The City will work to maintain or improve the current level of water quality so that the municipal water supply will continue to meet or exceed all applicable state and federal water quality standards.
- Work with the cities of Mounds View, New Brighton, and Spring Lake Park to protect the source water aquifers.
- The City will provide information and promote activities that protect the source water aquifers that provide water to the municipal system. This will include increasing public awareness of the Wellhead and Source Water Protection Program and groundwater-related issues, and management of the identified potential contaminant sources within the DWSMA.
- The City will continue to collect data to support future wellhead and source water protection efforts.

7.0 Objectives and Plans of Action

In accordance with Minnesota Rules chapter 4720.5250, this section discusses the objectives and plans of action to goals for Fridley's Wellhead and Source Water Protection Program.

7.1 Establishing Priorities

Within the DWSMA, the vulnerability to contamination of the source water aquifers from which the City of Fridley wells draw their water ranges from Low to High (Barr, 2018). The September 25, 2018 Scoping 2 Decision Notice from the MDH required Fridley to perform a PCSI to evaluate the types of potential contaminant sources present in the DWSMA. The potential contaminant source types identified in the DWSMA are summarized in Table 3 and discussed in Appendix C.

The City of Fridley has identified the objectives and corresponding actions described in the following sections for accomplishing the wellhead and source water protection goals discussed above in Section 6. These goals for the City of Fridley's Wellhead and Source Water Protection Program will be achieved through the following existing and planned programs:

- Wells
    - Promoting proper management of existing active wells in the DWSMA
    - Encouraging the proper sealing of all unused wells within the DWSMA
    - Identification of new high capacity wells in or near the DWSMA
    - Maintaining current IWMZ potential contaminant source inventories for the City's water supply wells
- Potential contaminant source properties
    - Notifying owners of potential Class V well properties of requirements related to Class V wells
    - Encouraging proper handling of chemicals/wastes
    - Encouraging proper operation and maintenance of storage tanks
    - Tracking the status of identified brownfields sites and other properties where contaminant releases may have occurred in the DWSMA
    - Periodically obtaining updated information on potential contaminant sources in the DWSMA from the regulating agencies to maintain an up-to-date potential contaminant source database for the DWSMA and allow timely recognition of potential issues that could affect the Fridley municipal water supply or DWSMA.
- Public education
    - Distribution of the Fridley Annual Water Quality Report for the water supply system,
    - Posting Wellhead Protection Program information on the City of Fridley website http://www.ci.fridley.mn.us/ and provide a link to the *Know the Flow* website (http://www.knowtheflow.us/)
    - Using the City's newsletter to distribute information related to wellhead protection
    - Inclusion of wellhead and source water protection in the City's planning process,
- Continued data collection

- Recording static and pumping water levels in the Fridley municipal wells,
- Collection of additional local geologic and hydrogeologic data as it becomes available from public sources or from City-sponsored projects.
- Sampling the City's municipal wells for tritium and the stable isotopes along with sampling of surface water bodies in Fridley for stable isotopes.

7.2 Well Management

The well management objectives outlined in this section consist of promoting the proper sealing of any unused, unmaintained, damaged, or abandoned wells, promoting proper management of active wells within the DWSMA, and identification of new high capacity wells in or near the DWSMA.

7.2.1 Distribution of Well Operation and Maintenance Information

The MDH has developed a handbook of information on proper well construction, operation, and maintenance titled "Well Owner's Handbook – A Consumer's Guide to Water Wells in Minnesota". This handbook is available at http://www.health.state.mn.us/divs/eh/wells/construction/handbook.pdf. Fridley will provide the handbook information to all owners of active wells within the DWSMA. To accomplish this, a link to the MDH website page where the handbook can be found will be added to the City's website and the City will notify well owners within the DWSMA via mail and/or via the City's news and events e-mail service that the information is available through the City's website. Fridley staff will track the number of well owners to whom they provide information regarding the Well Owner's Handbook.

7.2.1.1 Source of Action

Fridley staff will obtain the website information for the handbook from the MDH. City staff will then mail the website information to appropriate addresses within the DWSMA, include a link to the MDH website on the City's website, send out a notification on how to obtain the Well Owner's Handbook, and have a copy of the handbook available in a publicly accessible location in the Fridley City offices.

7.2.1.2 Cooperators

None.

7.2.1.3 Time Frame

Distribution of the information to owners of will be done within one year after approval of this WHPP.

7.2.1.4 Estimated Cost

Approximately $500 - $1,000. Costs will include City staff time, mailer printing and postage costs, and handbook printing costs.

7.2.1.5 Goals Achieved

Through the MDH handbook, well owners will be educated concerning the proper operation and maintenance of wells. Proper operation and maintenance of wells will reduce the potential risk of these wells becoming pathways for contaminants to travel from the ground surface to the source water aquifer.

Success criterion: Notification of well owners in the DWSMA by mail and/or via the City's news and events e-mail service that information on the proper operation and maintenance of private wells is available through the City's website will be completed within one year of MDH approval of the WHPP and tracking of the number of well owners to whom the notification is sent.

7.2.2 Promote the Proper Sealing of Unused, Unmaintained, Damaged, or Abandoned Wells within the DWSMA

City staff will promote the proper sealing of unused, privately owned wells within the DWSMA. As indicated in Table 3, the highest priority will be placed on those wells that are completed in or penetrate one of the source water aquifers from which the Fridley municipal wells pump.

Proper sealing of unused wells can be promoted by periodically mailing a reminder to owners of wells that unused wells should be properly sealed, by posting a reminder on the City's website, in the *Fridley Community Connection* newsletter, and working with the ACMWPG and ACCHESD to post reminders on the *Know the Flow* website. The reminder will include a notification of the Ramsey County well sealing cost share program and the Anoka County low interest loan program for the sealing of unused wells (https://www.anokacounty.us/2023/Well-and-Septic-Repair-Low-Interest-Loan) and a link to the section of the *Know the Flow* website that has information related to sealing of unused wells. Proper sealing of unused wells at properties on which new developments are built or as properties are redeveloped can be promoted as part of the City's development approval process.

7.2.2.1 Source of Action

City of Fridley staff.

7.2.2.2 Cooperators

ACMWPG, ACCHESD, Ramsey County

7.2.2.3 Time Frame

The first reminders to owners of wells identified as high priority will occur within two years of approval of this Plan.

7.2.2.4 Estimated Cost

Approximately $1,000-$2,000 for each well sealing reminder mailing event. City staff time and costs for preparing and mailing reminders to well owners and for preparing reminders to be included in the City's newsletter, on the City's website, or on the *Know the Flow* website.

7.2.2.5 Goals Achieved

As this action is implemented, the City's goal of eliminating potential pathways for contaminants to travel from the ground surface to the source water aquifer will be realized.

Success criterion: The first reminder distributed to well owners in the DWSMA within two years of MDH approval of this WHPP and subsequent reminders distributed every three years thereafter for the life of the Plan and tracking of the number of reminders distributed.

7.2.3 Identify New High-Capacity Wells Within or Near the DWSMA

With assistance from the MDH and MDNR and, possibly, the Wellhead Protection Consultant, City staff will identify new high capacity wells that are proposed for construction in or near Fridley's DWSMA, and/or major changes to groundwater appropriations for existing high-capacity wells, to determine whether the pumping of said wells will affect the groundwater flow direction, static water level, or groundwater availability within the DWSMA or alter the current boundaries of the DWSMA delineation or other portions of the City's WHPP.

7.2.3.1 Source of Action

City staff will request, or direct the Wellhead Protection Consultant to request, from the MDH and Regional MDNR office information on any newly proposed/constructed high capacity wells within or near the DWSMA or any changes to existing appropriations permits for existing, nearby high capacity wells. City staff will also request assistance from the Wellhead Protection Consultant and the MDH to evaluate whether identified proposed pumping (or changes to pumping) will change the boundaries of the DWSMA delineated for Fridley's wells.

7.2.3.2 Cooperators

MDH, MDNR, and the Wellhead Protection Consultant.

7.2.3.3 Time Frame

Request information from the MDH and MDNR every five years; evaluation of potential changes to the DWSMA boundaries as needed.

7.2.3.4 Estimated Cost

Approximately $3,000-$10,000 for each event of identifying new wells or changes to existing appropriations permits and evaluating how the changes may affect the DWSMA boundaries. City staff time and, potentially, Wellhead Protection Consultant time. Actual costs will depend on the number of proposed/new high capacity wells and changes to existing appropriations permits are identified each request.

7.2.3.5 Goals Achieved

As this action is implemented, the City's WHPA/DWSMA delineations will remain current. New well owners will also be identified and educational materials identified/developed as part of other well management strategies can be provided to these new well owners.

Success criterion: Determination of whether there are new high capacity wells in or near the DWSMA and if there have been any major changes in permitted appropriations for existing high capacity wells in or near the DWSMA.

7.3 Potential Contaminant Source Properties

The management objectives outlined in this section consist of providing to owners of properties where Class V wells may be present information on Class V wells, promoting proper operation of storage tanks, maintaining an up-to-date database of storage tank properties in the portions of the DWSMA where aquifer vulnerability is classified as Moderate or High, promoting proper handling of chemicals and wastes, tracking of the status of groundwater contaminant release sites in the DWSMA, and maintaining the Inner Wellhead Management Zone (IWMZ) around each well so that potential contaminants are prevented from entering the IWMZs.

7.3.1 Potential Class V Well Properties

During the PCSI, 28 separate property parcels where Class V wells may be or may have been located were identified within the DWSMA. The City will provide a fact sheet on Class V wells and reporting requirements to owners of properties where Class V wells may be or may have been located. The fact sheet will describe what a Class V well is and the impacts such wells can have on groundwater quality.

Anoka County Community Health and Environmental Service Department (ACCHESD) regulates hazardous and solid waste disposal. Many of the 28 properties may also be regulated by the County. The County prohibits disposal of hazardous waste through a Class V well. The City will work with Anoka County Environmental Services to inspect those properties that the County permits as hazardous waste generators.

7.3.1.1 Source of Action

City staff, perhaps with the assistance of the MDH, U.S. EPA, and/or Wellhead Protection Consultant, will obtain or prepare a fact sheet that includes information on what constitutes a Class V well and what federal requirements are associated with Class V wells. City staff will mail the fact sheet to targeted property owners in the DWSMA and, if necessary, work with staff from the other cities into which the DWSMA extends to distribute the information to property owners within the other cities.

City staff will work with Anoka County Environmental Services to inspect those properties that are permitted as hazardous waste generators by the County.

7.3.1.2 Cooperators

Anoka County Environmental Services, potentially staff from the cities of Mounds View, New Brighton, and Spring Lake Park, MDH, U.S. EPA, and the Wellhead Protection Consultant.

7.3.1.3 Time Frame

Distribution of the fact sheet on Class V wells will occur within two years of approval of this Plan. Inspection of the properties with County hazardous waste generator permits will occur within four years of approval of this Plan.

7.3.1.4 Estimated Cost

Approximately $1,000 to $4,000. Estimated costs include Fridley staff time, printing and postage costs and, potentially, Wellhead Protection Consultant costs.

7.3.1.5 Goals Achieved

Property owners will become aware of their responsibilities related to Class V wells. Compliance with the applicable regulations regarding Class V wells by the property owners will reduce the potential for groundwater contamination and impact to the source water aquifers. In addition, the City and County will be able to determine if Class V wells are present on the properties with County hazardous waste generator permits.

Success criterion: Distribution of fact sheet and inspection of the targeted properties completed according to the schedule outlined in section 7.3.1.3 and tracking of the number of fact sheets distributed.

7.3.2 Information for Registered Storage Tank Owners

The City, possibly with the assistance of the Wellhead Protection Consultant, will prepare and send a letter to owners of properties within the DWSMA that have active registered storage tanks. The letter will not be sent to owners of properties for which available information indicates that the storage tanks have been removed. This letter will direct recipients to MPCA publications and guidance on proper operation and maintenance of storage tanks and include information on the City's Wellhead and Source Water Protection Program. Information in the letter will also be posted on the City's website. Copies of the letter will be available in a publically accessible location in City Hall.

7.3.2.1 Source of Action

City staff, possibly with the assistance of the Wellhead Protection Consultant, will prepare the letter to owners of targeted storage tank properties. City staff will also post information contained in the letter to the City's website.

7.3.2.2 Cooperators

Wellhead Protection Consultant, if needed

7.3.2.3 Time Frame

The letter will be sent to owners of active tanks on properties where aquifer vulnerability is classified as Moderate or High within two years of approval of this Plan. In addition, letters will be sent to property owners as new storage tanks are identified in the Moderate and High aquifer vulnerability portions of the DWSMA. A reminder letter will be sent to all targeted storage tank property owners in in year seven of Plan implementation.

7.3.2.4 Estimated Cost

Approximately $1,200-$2,000. Estimated costs include City staff time, letter production and postage costs, and Wellhead Protection Consultant costs (as necessary).

7.3.2.5 Goals Achieved

Targeted property owners will be educated concerning the Wellhead and Source Water Protection program and on where to find information on proper operation and maintenance of storage tanks and the requirements necessary to maintain a safe and secure system. Property owners will be encouraged to use best management practices regarding their storage tanks and report any releases of contaminants to the City in addition to any other actions required by applicable regulations. Planned distribution of this letter provides the City the opportunity to heighten the awareness of wellhead and source water protection with these property owners.

Success criterion: Distribution of the letter to owners of active storage tanks completed according to the schedule outlined in section 7.3.2.3 and tracking of the number of letters distributed.

7.3.3 Tracking of Registered Storage Tanks

In year five of Plan implementation, the City will request, or direct the Wellhead Protection Consultant to request, from the MPCA information on the status of registered storage tanks in the Fridley DWSMA. This information will allow the City of Fridley to update the PCSI database and maintain current information regarding these potential contaminant sources in the DWSMA. It is anticipated that this activity would also identify any new registered storage tanks in the DWSMA.

7.3.3.1 Source of Action

City staff, or the Wellhead Protection Consultant on behalf of the City, will contact MPCA staff to obtain the information on the status of registered storage tanks.

7.3.3.2 Cooperators

MPCA and, potentially, the Wellhead Protection Consultant.

7.3.3.3 Time Frame

Information will be requested from the MPCA in year five after approval of this Plan.

7.3.3.4 Estimated Cost

Approximately $1,000-$2,000 for each review and update. Estimated costs include City staff time and Wellhead Protection Consultant time (as necessary). Costs may vary depending upon the number of new registered storage tank locations that must be added to the PCSI database.

7.3.3.5 Goals Achieved

By tracking the status of registered storage tanks within the target areas, the City will remain aware of the current status of these potential contaminant sources. This will allow the City to identify potential impacts to the municipal water supply and give the City time to determine the best response to any potential impacts before the municipal water supply is compromised.

Success criterion: Submittal of request to the MPCA for information regarding the status of registered storage tanks in the DWSMA per the schedule in section 7.3.3.3 and completion of any updates to the PCSI database necessitated by the new information.

7.3.4 Information for Chemical Storage and Hazardous Waste Generator Properties

Through direct mail contact, the City will encourage the owners of the potential contaminant source properties associated with chemical storage and hazardous waste generator permits within the DWSMA to participate in self-audits of their chemical storage and waste generation and handling. The direct mail contact from the City will also encourage these businesses to request a site visit from the Minnesota Technical Assistance Program (MnTAP). MnTAP helps Minnesota businesses implement industry-tailored solutions that maximize resource efficiency, prevent pollution, and reduce costs to improve public health and the environment.

MnTAP helps Minnesota businesses protect the environment and stay competitive by providing practical alternatives to prevent pollution of land, air, and water. By reducing waste and increasing efficiency, businesses can save on disposal and raw material costs, decrease the regulatory compliance burden, and make working conditions healthier and safer for their employees.

A copy of the letters and mailing lists will also be sent to ACCHESD with a request that the County determine whether the properties are compliant with the County hazardous waste management ordinance that requires proper management of potential pollutants.

7.3.4.1 Source of Action

City staff, perhaps with the assistance of the Wellhead Protection Consultant, will prepare and distribute the direct mail notice.

7.3.4.2 Cooperators

ACCHESD and, potentially, the Wellhead Protection Consultant.

7.3.4.3 Time Frame

Distribution of the direct mail notices forwarding a copy of the letters and mailing lists to ACCHESD will occur within one year of approval of this Plan. In year six of Plan implementation the direct mail notice will be sent to owners of any newly identified properties within the DWSMA that are associated with chemical storage or hazardous waste generation.

7.3.4.4 Estimated Cost

Approximately $1,000 to $2,000 for each direct mail notification. Costs for the preparation of the direct mail notice will include City staff time, printing, postage costs, and, potentially, Wellhead Protection Consultant costs.

7.3.4.5 Goals Achieved

Business owners will become aware of issues related to their chemical storage or waste generation and handling and learn of available assistance for identifying ways to minimize and properly dispose of their waste.

Success criterion: Contact of property owners according to the schedule outlined in section 7.3.4.3.

7.3.5 Sites Where Contaminants May be Present

During the PCSI, locations of brownfields redevelopment sites, Superfund Sites, and other sites where contaminants may be present were identified in the DWSMA. City staff will biannually request from the MPCA updates on the current status of these properties, including information on any groundwater contamination associated with these sites. Updated information will be reviewed to determine if any additional actions related to protection of the City's water supply are warranted. If necessary, the City will request assistance from the Wellhead Protection Consultant.

7.3.5.1 Source of Action

City staff

7.3.5.2 Cooperators

MPCA, and potentially the Wellhead Protection Consultant

7.3.5.3 Time Frame

Requests for updated data will be made biannually starting two years after approval of this Plan amendment.

7.3.5.4 Estimated Cost

Approximately $500 to $1,000 for each data update. Estimated costs include City staff time. If the assistance of the Wellhead Protection Consultant is needed there would be additional costs.

7.3.5.5 Goals Achieved

The City will maintain current information on the status of the dump, spill, wastewater, brownfields, and Superfund sites and any groundwater contamination associated with these sites.

Success criterion: Data update requests according to the schedule outlined in section 7.3.5.3.

7.3.6 Inner Wellhead Management Zone Management

The IWMZ is defined in the Minnesota Rules as that area within a 200-foot radius of a public water supply well. The City will monitor setbacks in the IWMZs, possibly with the assistance of the MDH, to ensure that the IWMZ around each Fridley municipal well remains free of potential contaminant sources. City staff, possibly with the assistance of the MDH, will document each IWMZ inspection and any actions taken to remove potential contaminant sources from an IWMZ.

7.3.6.1 Source of Action

Fridley staff.

7.3.6.2 Cooperators

Possibly the MDH

7.3.6.3 Time Frame

The monitoring of setbacks within the IWMZs will be done at least biannually after approval of this Plan.

7.3.6.4 Estimated Cost

Costs for monitoring the IWMZ setbacks include Fridley staff time estimated as $1,000.

7.3.6.5 Goals Achieved

By monitoring the IWMZ setbacks, the City will be able to keep the IWMZ around each well free of potential contaminant sources and ensure that any new regulated activities will meet required setbacks.

Success criterion: Completion of IWMZ potential contaminant source inventories and keeping the IWMZs free of potential contaminant sources.

7.3.7 Transportation Corridors, Pipelines, and Emergency Response

Establishing communication and create awareness among Fridley city staff, including first responders, about transportation corridor and pipeline issues that may affect the public water supply and the procedures in place to address spills and prevent released contaminants from entering the municipal water supply. Transportation corridors include Federal, State, and County highways, railroads, and pipelines (e.g., Figure 1 and Figure C-16). The Wellhead Protection Manager will work with the City's Police and Fire Chiefs to ensure that emergency procedures that will protect the municipal water supply are part of the City's emergency response program.

The Wellhead Protection Manager will also provide copies of the WHPP to the Minnesota Pollution Control Agency (MPCA), Minnesota Office of Pipeline Safety (MnOPS), the cities of Mounds View, New Brighton, and Spring Lake Park, and owners of the pipeline and railroad that cross in the DWSMA.

7.3.7.1 Source of Action

Fridley staff

7.3.7.2 Cooperators

None

7.3.7.3 Time Frame

Meeting with the Police and Fire Chiefs will occur within two years of approval of this Plan. Transmittal of the WHPP to the MPCA, MnOPS, cities of Mounds View, New Brighton, and Spring Lake Park, and railroad and pipeline owners will occur within one year after approval of this Plan.

7.3.7.4 Estimated Cost

Costs for this action will include City staff time and production costs for WHPP copies. Estimated cost is $2,000 to $2,500.

7.3.7.5 Goals Achieved

The City's emergency responders will work with and assist County and State first responders in the handling of spills in transportation corridors or from the pipeline to prevent, to the extent possible, released contaminants from entering the environment and impacting the municipal water supply.

State agencies, the cities of Mounds View, New Brighton, and Spring Lake Park, and railroad and pipeline owners will be educated regarding the boundaries of the Fridley DWSMA and the management actions that are planned.

Success criterion: Emergency responder and railroad and pipeline owner awareness of the City's DWSMA.

7.4 General Public Education

Public education concerning the DWSMA associated with the City's municipal wells will include: distribution of the Fridley Annual Water Quality Reports to residents of Fridley, providing information on the City of Fridley website (http://www.ci.fridley.mn.us/) and the *Know the Flow* website (http://www.knowtheflow.us/), periodic distribution of Wellhead and Source Water Protection Program information via the bi-monthly newsletter, and inclusion of wellhead and source water protection in the City's planning process.

7.4.1 Wellhead Protection Information

The City will develop information regarding the Wellhead and Source Water Protection Program that can periodically be distributed via the City's bi-monthly *Community Connection* newsletter. The Wellhead Protection Manager may also request assistance from the cities of Mounds View, New Brighton, and Spring Lake part to disseminate the information to their residents that are within the Fridley DWSMA boundaries.

7.4.1.1 Source of Action

City staff will prepare information on wellhead protection for the City's newsletter approximately once per year. If necessary, the Wellhead Protection Consultant will be contacted for assistance in preparing this information. City staff may also draw on the ACMWPG and ACCHESD or MDH for wellhead and source water protection educational materials.

7.4.1.2 Cooperators

ACMWPG, ACCHESD, Mounds View, New Brighton, Spring Lake Park, MDH and Wellhead Protection Consultant, if necessary.

7.4.1.3 Time Frame

Approximately one time per year after approval of this Plan.

7.4.1.4 Estimated Cost

Approximately $500 - $2,500 each time information is prepared for distribution. Costs will include City staff time for preparing the information, and costs for Wellhead Protection Consultant assistance (as needed).

7.4.1.5 Goals Achieved

The information in the newsletter will be intended to educate owners of properties within the DWSMA, and the general public, about the City's Wellhead and Source Water Protection Program, groundwater protection principles, and steps that everyone can take to protect the City's municipal water supply.

Success criterion: Approximately annual distribution of information related to groundwater and wellhead protection via the City's newsletter.

7.4.2 Drinking Water Quality Report

The City will continue to prepare and distribute the Annual Water Quality Report to all Fridley residents via the City's website. The report provides residents with information regarding the City's municipal water supply and its water quality.

7.4.2.1 Source of Action

City staff.

7.4.2.2 Cooperators

None.

7.4.2.3 Time Frame

Annually as required by Federal regulations.

7.4.2.4 Estimated Cost

Costs include City staff time for preparation of the report and posting the report on the City's website. Estimated annual cost for preparation of the report is $800 to $1,500.

7.4.2.5 Goals Achieved

The residents of Fridley will become more aware of the Federal water quality requirements for public water supplies. Residents will also become more aware of the overall quality of Fridley's municipal water supply.

Success criterion: Annual publication/distribution of the Annual Water Quality Report.

7.4.3 City of Fridley and *Know the* Flow Websites

The City will post information on the Wellhead and Source Water Protection Program on the City's website (http://www.ci.fridley.mn.us/) and on the ACMWPG's *Know the Flow* website (http://www.knowtheflow.us/). City staff may also the Wellhead Protection Consultant to assist with the preparation of information to be posted on the website or ask other members of the ACMWPG if they have wellhead and source water protection-related educational items that the City could disseminate via the website.

The City will also work with other members of the ACMWPG to maintain an up to date online DWSMA map and to notify residents of this resource. The map can be found at http://gis.anokacountymn.gov/dwsmas/.

7.4.3.1 Source of Action

City staff.

7.4.3.2 Cooperators

ACMWPG, Anoka County GIS, and, as needed, the Wellhead Protection Consultant.

7.4.3.3 Time Frame

To begin within one year of approval of this WHPP. Information on the websites will be updated periodically thereafter. Updates to the Anoka County online DWSMA map will be made as the City identifies new potential contaminant sources in the Fridley DWSMA.

7.4.3.4 Estimated Cost

Approximately $500-$2,500. City staff time and, potentially, Wellhead Protection Consultant costs.

7.4.3.5 Goals Achieved

The residents of Fridley will become more aware of wellhead and source water protection issues and the actions Fridley is taking to protect the municipal water supply. Education of the residents should lead to a better awareness of pollution prevention among the City's population.

Success criterion: Posting of Wellhead and Source Water Protection Program information on the City and County websites and periodic updating of the Anoka County online DWSMA map according to the schedule identified in section 7.4.3.3.

7.4.4 Inclusion of Wellhead and Source Water Protection in the Planning Process within the DWSMA

Copies of this WHPP amendment will be supplied to the City's Community Development Department so that they have the most current information on the City's Wellhead Protection Program. The City has guidelines for infiltration of stormwater. The City will continue to use these guidelines in the reviews of permit applications and proposed development/redevelopment projects. Use of these guidelines ensures that the development process is consistent with the goals of the City's Wellhead Protection Program.

7.4.4.1 Source of Action

City staff.

7.4.4.2 Cooperators

None.

7.4.4.3 Time Frame

Ongoing

7.4.4.4 Estimated Cost

City staff time for completing reviews. The costs will vary from year to year depending on the number applications reviewed and the size of proposed projects.

Success criterion: Ongoing incorporation of wellhead and source water protection into the City's development, zoning, and planning processes.

7.4.4.5 Goals Achieved

Wellhead and source water protection will be incorporated into future planning/development efforts. Potential pollution risks to the source water aquifers will be reduced.

7.5 Data Collection

Fridley will continue to collect and maintain local geologic and hydrogeologic data as it becomes available in order to improve and augment current information and to provide additional data for future revisions of this WHPP. The City will also continue to collect information on potential contaminant sources within the DWSMA.

7.5.1 Monitoring Static and Pumping Levels in Municipal Wells

The City will continue to routinely measure the static and pumping water levels in the municipal wells. These water levels will be recorded by the SCADA system and can be summarized in the reports obtained from the SCADA system.

7.5.1.1 Source of Action

City staff.

7.5.1.2 Cooperators

None.

7.5.1.3 Time Frame

Ongoing.

7.5.1.4 Estimated Cost

Monitoring of water levels in the City's wells by the SCADA system is part of routine operations.

7.5.1.5 Goals Achieved

Routine collection of groundwater levels in the municipal wells will provide data for the evaluation of groundwater elevation trends over time in the source water aquifers.

Success criterion: Compilation of a long term groundwater elevation dataset that can be used to evaluate groundwater elevation trends in the source water aquifers.

7.5.2 Other Geologic and Hydrogeologic Data Collection

The City will attempt to obtain local geologic and hydrogeologic data for the Fridley area as it becomes available from other public sources or through City-sponsored projects. The City will also support, whenever possible, future data collection efforts by other governmental entities (e.g., MGS, MDH, MDA, MDNR, MPCA, Coon Creek Watershed District, Rice Creek Watershed District, Mississippi Watershed Management Organization. Anoka County, and Ramsey County).

7.5.2.1 Source of Action

City staff.

7.5.2.2 Cooperators

State, Anoka County and Ramsey County agencies, and the watershed management organizations conducting geologic and hydrogeologic studies, well drilling companies, Wellhead Protection Consultant, and others.

7.5.2.3 Time Frame

Ongoing beginning with approval of this WHPP.

7.5.2.4 Estimated Cost

Approximately $1,000 to $1,500 for compiling data from other public sources. Note that the cost could vary (and potentially be higher than estimated) depending on the source and the amount of data and the level of effort needed to put the data into a usable format.

7.5.2.5 Goals Achieved

More accurate hydrogeologic data will be available for use in siting any future wells and for future revisions of the WHPA and the DWSMA delineations for the City's wells. Updated and more accurate vulnerability assessments may be possible as a result of new information.

Success criterion: Compilation of a geologic/hydrogeologic dataset that can be used in the future.

7.5.3 Updating of the Groundwater Model Used in the WHPA Delineations

Any new local geologic and hydrogeologic data obtained for the Fridley area will be periodically reviewed

to determine if the groundwater model used in the WHPA delineations will need to be updated. In addition, pumping from high capacity wells often changes over time. Changes in pumping from high capacity wells in or near the Fridley DWSMA could affect the DWSMA boundaries. Therefore, the City will work with the Wellhead Protection Consultant to review available information and determine if the groundwater flow model should be updated so that future WHPA/DWSMA delineations will be consistent with available information.

7.5.3.1 Source of Action

City staff

7.5.3.2 Cooperators

Wellhead Protection Consultant

7.5.3.3 Time Frame

Five to seven years after approval of this Plan

7.5.3.4 Estimated Cost

Approximately $1,000 to $5,000 depending upon the magnitude of the revisions needed to make the groundwater flow model consistent with the most current available information.

7.5.3.5 Goals Achieved

The groundwater flow model for the Fridley area used in the WHPA delineations will be consistent with available information. Since the groundwater flow model used to delineate the WHPAs will be consistent with current information updating of the WHPAs in the future can be done more efficiently.

Success criterion: An updated groundwater flow model that can be used for future updates to Part 1 of the City's WHPP, to evaluate the effect of new, non-City high capacity wells on the DWSMA boundaries, or to evaluate sites for new municipal wells.

7.5.4 Potential Contaminant Source Database

The City will periodically update the information on potential contaminant sources within the DWSMA collected during the development of this WHPP amendment, with the assistance of the Wellhead Protection consultant – if needed. The City will add information to the potential contaminant source database as additional potential contaminant source sites are identified or as sites are closed through working with the MPCA, the MDH, the MDNR, the U.S. EPA, Anoka County, and Ramsey County. New information for the PCSI database will be obtained by contacting appropriate MPCA, MDH, MDNR, U.S. EPA, and County programs in year five of Plan implementation.

7.5.4.1 Source of Action

City staff.

7.5.4.2 Cooperators

MPCA, MDH, MDNR, U.S. EPA, Anoka County, Ramsey County, and the Wellhead Protection Consultant, if needed.

7.5.4.3 Time Frame

Year five after approval of this Plan.

7.5.4.4 Estimated Cost

Approximately $1,000-$3,500. City staff time and, if needed, Wellhead Protection Consultant costs. Actual costs will depend upon the amount of new potential contaminant source location information that must be added to the potential contaminant source database and in any year could be higher than the estimated range shown.

7.5.4.5 Goals Achieved

The PCSI database will be a useful tool to track, catalog, and document the status of potential contaminant sources within the DWSMA.

Success criterion: Maintaining an up to date potential contaminant source database.

7.5.5 Potential Contaminant Source Verification

Potential contaminant sources were identified within the DWSMA during the PCSI. As part of the development of this WHPP, all locations of identified potential contaminant sources were verified by the Wellhead Protection Consultant to the extent possible based on the available data. Any new potential contaminant source locations identified during the implementation of this WHPP will be verified by the City with the assistance of the Wellhead Protection Consultant, if needed.

7.5.5.1 Source of Action

City staff.

7.5.5.2 Cooperators

Wellhead Protection Consultant, if needed.

7.5.5.3 Time Frame

When new potential contaminant sources in the DWSMA are identified.

7.5.5.4 Estimated Cost

Approximately $1,000-$3,500. City staff time and Wellhead Protection Consultant costs, if needed. Actual costs will depend upon the number of new potential contaminant source locations that must be verified and in any update could be higher than the estimated range shown.

7.5.5.5 Goals Achieved

Verification of newly identified potential contaminant source locations within the DWSMA will allow the City to remain in compliance with the requirements of the State of Minnesota's Wellhead and Source Water Protection Program. Verification of the newly identified locations will also ensure that the City uses the most accurate data on type and location of potential contaminant sources as implementation of this WHPP proceeds.

Success criterion: All potential contaminant source locations in the database are verified to the extent possible.

7.5.6 Tritium and Stable Isotope Sampling

In Part 1 of this Plan amendment (Barr, 2018) it is recommended that the City should request the MDH to resample selected water supply wells for tritium and to sample selected water supply wells and surface waters in the City for stable isotopes.

Tritium (^{3}H), a radioactive isotope of hydrogen, whose atmospheric concentrations rose in the 1950s and early 1960s due to atmospheric hydrogen bomb testing, has been used extensively to date groundwater. Tritium activities peaked during atmospheric hydrogen bomb testing of the 1950s and 1960s, and values of ^{3}H in precipitation reached a maximum of approximately 10,000 TU (tritium units) in 1963 (Mazor, 2004). Natural production of ^{3}H in the upper atmosphere introduces approximately 5 TU to precipitation each year (Mazor, 2004). The presence of tritium at concentrations above 1 tritium unit in a groundwater sample indicates the presence of a significant fraction of post-1954 (i.e., recently infiltrated) water in the sample.

The MDH sampled Wells 10 and 11 for tritium in 1999 and 1997, respectively. The City's other water supply wells have not been sampled for tritium. Sampling of City wells for tritium at regular intervals will allow for tracking of tritium concentrations over time. As noted above, tritium concentrations can be used to determine if a well is pumping water that was recently infiltrated. In addition, if a tritium concentration in a groundwater sample from a well is significantly higher than the concentration in a previous sample from the same well it could be an indication that there is a pathway such as a breech in the well casing or an unused, unsealed well in the vicinity that allows water to move from the surface to the source water aquifer faster than before the pathway became available. The City will ask the MDH to sample, at a minimum, Wells 3, 6, and 12 for tritium in year four of Plan implementation. Since the MDH already has a program to sample municipal wells for tritium the City would rely on the MDH to collect the samples and have them analyzed for tritium.

Per the recommendation in the Part 1 WHPP amendment (Barr, 2018), the City will also work with the MDH to develop a program for stable isotope sampling of Wells 6, 7, 8, and 9 along with surface water bodies in Fridley no later than year five of Plan implementation. The objective of the sampling will be to obtain data for determining if groundwater pumped from the wells is a mixture of groundwater and surface water from the surface water bodies in the City. This information would inform the next update of Part 1 of the WHPP.

7.5.6.1 Source of Action

City and MDH staff.

7.5.6.2 Cooperators

MDH

7.5.6.3 Time Frame

Tritium sampling in year four of Plan implementation. Stable isotope sampling no later than year five of Plan implementation. The exact schedule for the sampling will be determined during discussions with MDH staff.

7.5.6.4 Estimated Cost

At the time this Plan was prepared, cities were not charged by the MDH for tritium or stable isotope sampling and analysis.

7.5.6.5 Goals Achieved

Tritium sampling will provide data for evaluating if pathways that allow for relatively rapid movement of water from the surface to the source water aquifers are present. Stable isotope sampling will provide data for determining if the City's wells are pumping a mixture of groundwater and surface water.

Success criterion: Collection of groundwater samples from, at a minimum, Wells 3, 6, and 12, and analysis of these samples for tritium on the schedule outlined in section 7.5.6.3. Sampling of Wells 6, 7, 8, and 9 along with surface water bodies in Fridley for stable isotopes on the scheduled developed in conjunction with the MDH.

8.0 Evaluation Program

Per Minnesota Rule 4720.5270, the progress in implementing a WHPP must be evaluated routinely to determine the effectiveness of the WHPP in terms of accomplishment of goals. Monitoring and evaluation measures to ensure effectiveness of the management strategies are detailed below.

Evaluation activities discussed in this WHPP amendment include the following:

- Track the implementation of the objectives, activities, and tasks discussed above in Section 7.0.
- Determine the effectiveness of specific management strategies for the protection of the Fridley municipal water supply.
- Identify possible changes to the management strategies to improve overall effectiveness.
- Determine the adequacy of financial resources and staff availability to perform and implement the management strategies planned each year.
- Update the WHPP in the event that new wells are added to the municipal water supply system.

The City of Fridley will continue to cooperate with the MDH in the monitoring of the City's municipal water supply to determine if the management strategies presented in this WHPP are having a positive effect on water quality and to identify any water quality problems that may arise and need to be addressed.

The City's Wellhead Protection Manager will strive to provide a report to the City Council every two years that summarizes the progress in implementing the management strategies and objectives in this WHPP. The report will be completed using the MDH Wellhead Protection Program Evaluation form (Appendix F). The City will retain a copy of the report in its Wellhead Protection file and send a copy of the report to the MDH Source Water Protection Unit in St. Paul. The intent of the biannual reports is to compile a comprehensive review of the implementation of the source management strategies for use when the City updates or revises this WHPP. As specified by the Wellhead Protection Rules, this WHPP will be updated a minimum of every 10 years, or more often as required due to changes to the municipal water supply system.

9.0 Alternative Water Supply Contingency Strategy

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

In 2008 the MDNR approved the City's Water Supply Plan that includes a water supply contingency that would be implemented in the event of a water emergency. Since the MDNR requires that Water Supply Plans be updated every 10 years, the City submitted a new Water Supply Plan to the MDNR for review and approval in December 2016. The 2016 Water Supply Plan addresses water emergencies and water conservation. At the time this Plan amendment was prepared the MDNR had not yet issued an approval of the December 2016 Water Supply Plan. Since it is not known when the MDNR will complete its review of the City's new Water Supply Plan, the Emergency Preparedness Procedures from the 2016 Water Supply Plan are included in Appendix G and will be followed by the City going forward. After the 2016 Water Supply Plan is approved by the MDNR and adopted by the City documentation of the approval and adoption of the 2016 Water Supply Plan will be provided to the MDH by the City.

10.0 References

Barr Engineering Co. (Barr), 2018. City of Fridley Wellhead Protection Plan Amendment – Part 1: Delineation of the Wellhead Protection Area (WHPA), Drinking Water Supply Management Area (DWSMA) and Assessments of Well and DWSMA Vulnerability, prepared for the City of Fridley, July 2018.

City of Fridley (Fridley), 2016. Draft Water Supply Plan, submitted to Minnesota Department of Natural Resources December 2016.

Mazor, E. 2004. Chemical and Isotopic Groundwater Hydrology, 3rd ed., New York: Marcel Dekker Inc.

Metropolitan Council, 2015. 2015 System Statement – City of Fridley, System Statement issue date September 17, 2015.

Metropolitan Council, 2018a. 2017 Preliminary Population Estimates by City and Township, downloaded from https://metrocouncil.org/Data-and-Maps/Publications-And-Resources/Files-and-reports/2017-Population-Estimates-(Final,-July-2018)-(1).aspx

Metropolitan Council, 2018b. Thrive MSP 2040 – Forecasts as of January 1, 2018, downloaded from https://metrocouncil.org/Data-and-Maps/Data/CouncilResearchProducts/Council-Forecasts.aspx?source=child .

Minnesota Department of Health (MDH), 2016. Scoping Decision Notice No. 1 for the City of Fridley, PWSID 1020031, for Amending the Wellhead Protection Plan, Letter from Amal Djerrari of the MDH to City of Fridley, August 17, 2016.

Minnesota Department of Health (MDH), 2018a. Letter from Amal M. Djerrari of the MDH to James Kosluchar of the City of Fridley approving the Part 1 Wellhead Protection Plan Amendment, July 31, 2018.

Minnesota Department of Health (MDH), 2018b. Scoping 2 Decision Notice and Meeting Summary – City of Fridley – PWSID 1020031, letter from John Freitag of the MDH to James Kosluchar of the City of Fridley, September 25, 2018.

Tables

Table 1

Municipal Well Construction Summary
Fridley WHPP Amendment

Local Well ID	Unique Number	Use/ Status[1]	Casing Diameter (in.)	Casing Depth (ft.)	Well Depth (ft.)	Year Constructed	Aquifer	Well Vulnerability
2	206674	P	24 x 16	675	842	1960	CMTS	Not Vulnerable
3	206670	P	24 x 16 x 10	784	836	1961	CMTS	Not Vulnerable
4	201158	P	24 x 16	663	831	1961	CMTS	Not Vulnerable
5	206675	P	16	656	845	1961	CMTS	Not Vulnerable
6	206673	P	24	153	255	1972	OPCJ	Vulnerable
7	206678	P	24 x 16 x 12	138	262	1970	OPDC	Vulnerable
8	206669	P	16 x 12	138	265	1969	OPDC	Vulnerable
9	206672	P	30 x 24	153	255	1972	OPCJ	Vulnerable
10	206658	P	24 x 16	128	199	1969	QBAA	Vulnerable
11	206657	P	30 x 24	325	669	1970	CTMS	Vulnerable
12	209207	P	30 x 24	234	276	1970	CJDN	Vulnerable

[1] P = Primary

Aquifer Codes:
CJDN = Jordan Sandstone
CMTS = Mt. Simon Sandstone
CTMS = Tunnel City Group and Mt. Simon Sandstone
OPCJ = Prairie du Chien Group and Jordan Sandstone
OPDC = Prairie du Chien Group
QBAA = Quaternary buried artesian aquifer

Table 2

Annual Volume of Water Pumped
Fridley WHPP Amendment

		Total Annual Withdrawal (gal/yr)				
Unique Number	**Well Name**	**2013**	**2014**	**2015**	**2016**	**2017**
206674	2	74,051,000	79,307,000	97,780,000	36,620,000	54,288,000
206670	3	80,778,000	7,492,000	6,361,000	180,586,000	188,104,000
201158	4	44,591,000	77,042,000	96,109,000	105,095,000	123,090,000
206675	5	26,970,000	28,949,000	86,516,000	84,889,000	52,376,000
206673	6	38,244,000	41,605,000	70,681,000	144,788,000	155,268,000
206678	7	141,000	6,201,000	193,000	34,329,000	13,958,000
206669	8	152,578,933	119,448,000	135,190,000	261,475,000	286,642,000
206672	9	62,768,000	140,100,000	150,352,000	56,294,000	49,938,000
206658	10	114,662,000	104,938,000	105,434,000	10,079,000	48,000
206657	11	163,316,000	124,015,000	116,542,000	90,609,000	38,966,000
209207	12	217,233,000	178,272,000	214,798,000	294,593,000	271,900,000
	Totals	975,332,933	907,369,000	1,079,956,000	1,299,357,000	1,234,578,000

Source: MPARS, City water use records

Table 3

Summary of Potential Sources of Contaminants and Assigned Management Priority
City of Fridley WHPP Amendment

Potential Contaminant Source Category	Total Number in DWSMA	Number Within IWMZ and Priority Assigned	Number Within ERZ and Priority Assigned	Number Within Remainder of the DWSMAs and Priority Assigned
Dump Locations	5[1]	MVZ – 0 HVZ – 0	MVZ – 2 (Mod.) HVZ – 0	LVZ – 0 MVZ – 3 (Mod.) HVZ – 0
Potential Class V Well Locations (CVMVW)	32[3]	MVZ – 0 HVZ – 0	MVZ – 9 (Mod.) HVZ – 0	LVZ – 0 MVZ – 20 (Mod.) HVZ – 3 (Mod.)
Potential Contaminant Source Locations (Brownfield and Superfund Sites)	20[1]	LVZ – 0 MVZ – 1[5,6] (Mod.) HVZ – 0	MVZ – 3 (High) HVZ – 0	LVZ – 0 MVZ – 14 (Mod.) HVZ – 2 (High)
Spill Location Sites	39[1]	MVZ – 0 HVZ – 0	MVZ – 13[7] (Low) HVZ – 1[7] (Low)	LVZ – 0 MVZ – 22[7] (Low) HVZ – 3[7] (Low)
Wastewater Locations	1[1]	MVZ – 0 HVZ – 0	MVZ – 0 HVZ – 0	LVZ – 0 MVZ – 0 HVZ – 1 (High)
Chemical Storage Sites				
Agricultural	2[1]	MVZ – 0 HVZ – 0	MVZ – 1 (High) HVZ – 0	LVZ – 0 MVZ – 1 (Mod.) HVZ – 0
Non-Agricultural	32[1]	MVZ – 3[5] (Mod.) HVZ – 0	MVZ – 6 (High; Mod.[8]) HVZ – 0	LVZ – 0 MVZ – 20 (Mod.) HVZ – 3 (High)
Hazardous Waste Generator Locations				
HWG Permit Status = Active	28[2]	MVZ – 0 HVZ – 0	MVZ – 6 (High) HVZ – 1 (High)	LVZ – 0 MVZ – 12 HVZ – 9
HWG Permit Status = Inactive	9[2]	MVZ – 0 HVZ – 0	MVZ – 2 (Mod.) HVZ – 1 (Mod.)	LVZ – 0 MVZ – 5 (Mod.) HVZ – 1 (High)

Table 3

Summary of Potential Sources of Contaminants and Assigned Management Priority
City of Fridley WHPP Amendment

Potential Contaminant Source Category	Total Number in DWSMA	Number Within IWMZ and Priority Assigned	Number Within ERZ and Priority Assigned	Number Within Remainder of the DWSMAs and Priority Assigned
Leaking Tank Sites				
Closed	63[2]	MVZ – 0 HVZ – 0	MVZ – 17 (Low) HVZ – 0	LVZ – 0 MVZ – 43 (Low) HVZ – 3 (Low)
Registered Storage Tank Sites				
Status = Active	30[2]	MVZ – 0 HVZ – 0	MVZ – 8 (High) HVZ – 0	LVZ – 0 MVZ – 21 (Mod.) HVZ – 1 (High)
Status = Inactive, Closed, Removed or Unknown	45[2]	MVZ – 0 HVZ – 0	MVZ – 12 (Mod.) HVZ – 0	LVZ – 0 MVZ – 29 (Mod.) HVZ – 4 (Mod.)
Wells				
Completed in or penetrating a source water aquifer	35[4]	MVZ – 0 HVZ – 0	MVZ – 14 (High) HVZ – 0	LVZ – 0 MVZ – 21 (High) HVZ – 0
Not completed in or penetrating source water aquifer	245[4]	MVZ – 1[5] (Mod.) HVZ – 0	MVZ – 20 (Mod.) HVZ – 0	LVZ – 0 MVZ – 214 (Mod.) HVZ – 10 (Mod.)

HVZ High aquifer vulnerability zone MVZ Moderate aquifer vulnerability zone LVZ Low aquifer vulnerability zone
ERZ Emergency Response Zone: defined as portion of the WHPA within the 1-year groundwater time of travel area.
IWMZ Inner Wellhead Management Zone: defined in MR4720.5100 subpart 19 as the area within 200 feet of a public water supply well.
[1] Total number of the potential contaminant source type identified during the PCSI.
[2] Total number of property parcels on which the potential contaminant source type is located.
[3] Total number of the potential contaminant source type identified during the PCSI based on hazardous waste generator permits.
[4] Total number does not include the 11 Fridley municipal water supply wells.
[5] Site is under City control so priority is set as moderate.
[6] Commons Park Wellfield site.
[7] All spill sites have been closed by MPCA so priority set to moderate.
[8] The City Public Works Garage is included in this number. Garage is under City control so priority for that site is set as moderate.

Table 4

High Capacity Wells within One Mile of the DWSMA
City of Fridley WHPP Amendment

PCSI ID	Unique ID	Status	Permittee	Use	Aquifer	Permitted Volume MGY
2	206674	Active	Fridley, City Of	Municipal/Public Water Supply	CMTS	2400
3	206670	Active	Fridley, City Of	Municipal/Public Water Supply	CMTS	2400
4	201158	Active	Fridley, City Of	Municipal/Public Water Supply	CMTS	2400
5	206675	Active	Fridley, City Of	Municipal/Public Water Supply	CMTS	2400
6	206673	Active	Fridley, City Of	Municipal/Public Water Supply	OPCJ	2400
7	206678	Active	Fridley, City Of	Municipal/Public Water Supply	OPDC	2400
8	206669	Active	Fridley, City Of	Municipal/Public Water Supply	OPDC	2400
9	206672	Active	Fridley, City Of	Municipal/Public Water Supply	OPCJ	2400
10	206658	Active	Fridley, City Of	Municipal/Public Water Supply	QBAA	2400
11	206657	Active	Fridley, City Of	Municipal/Public Water Supply	CTCM	2400
12	209207	Active	Fridley, City Of	Municipal/Public Water Supply	CJDN	2400
16	206761	Active	New Brighton, City Of	Golf Course Irrigation	OPCJ	16.5
28	206680	Active	Stylmark INC	Other Industrial Processing	OPCJ	20
35	206679	Active	Ind School District 14	Landscaping/Athletic Field Irrigation	OPDC	8
39	206683	Active	Ind School District 14	Landscaping/Athletic Field Irrigation	OPDC	36
40	206659	Active	Brand-Broadway Assoc	Private Water Supply	QBAA	50
41	206660	Active	Brand-Broadway Assoc	Private Water Supply	OPCW	50
94	206722	Active	Mounds View, City Of	Municipal/Public Water Supply	OPCJ	594
95	206717	Active	Mounds View, City Of	Municipal/Public Water Supply	CJCM	594
129	110485	Active	New Brighton, City Of	Municipal/Public Water Supply	CMTS	1925
110493	110493	Active	Brooklyn Center, City of	Municipal/Public Water Supply	CJDN	1800
127269	127269	Active	Brooklyn Center, City of	Municipal/Public Water Supply	OPCJ	1800
180920	180920	Active	Spring Lake Park, City Of	Municipal/Public Water Supply	CMTS	399
203257	203257	Active	Brooklyn Center, City of	Municipal/Public Water Supply	CJDN	1800
203258	203258	Active	Brooklyn Center, City of	Municipal/Public Water Supply	CJDN	1800

Table 4

High Capacity Wells Within One Mile of the DWSMA
City of Fridley

PCSI ID	Unique ID	Status	Permittee	Use	Aquifer	Permitted Volume MGY
206637	206637	Active	Spring Lake Park, City Of	Municipal/Public Water Supply	CTCM	398.6
206638	206638	Active	Spring Lake Park, City Of	Municipal/Public Water Supply	CTCM	399
206685	206685	Active	Fridley, City Of	Municipal/Public Water Supply	CTCM	2400
206694	206694	Active	Kurt Manufacturing	Pollution Containment	CJDN	20
206696	206696	Active	Fridley, City Of	Municipal/Public Water Supply	OPCJ	2400
206716	206716	Active	Mounds View, City Of	Municipal/Public Water Supply	CMTS	594
206719	206719	Active	Mounds View, City Of	Municipal/Public Water Supply	CTCM	594
206720	206720	Active	Mounds View, City Of	Municipal/Public Water Supply	CJDN	594
206721	206721	Active	Mounds View, City Of	Municipal/Public Water Supply	CTCM	594
206792	206792	Active	New Brighton, City Of	Municipal/Public Water Supply	OPCJ	1925
206793	206793	Active	New Brighton, City Of	Municipal/Public Water Supply	OPCJ	1925
206794	206794	Active	New Brighton, City Of	Municipal/Public Water Supply	CMTS	1925
206795	206795	Active	New Brighton, City Of	Municipal/Public Water Supply	OPCJ	1925
206797	206797	Active	New Brighton, City Of	Municipal/Public Water Supply	CJDN	1925
223294	223294	Active	Spring Lake Park, City Of	Municipal/Public Water Supply	CTCM	398.6
256194	256194	Active	US Army Corps of Engineers	Pollution Containment	QWTA	1600
426842	426842	Active	US Army Corps of Engineers	Pollution Containment	QWTA	1600
426843	426843	Active	US Army Corps of Engineers	Pollution Containment	QWTA	1600
426844	426844	Active	US Army Corps of Engineers	Pollution Containment	QWTA	1600
426845	426845	Active	US Army Corps of Engineers	Pollution Containment	QWTA	1600
426846	426846	Active	US Army Corps of Engineers	Pollution Containment	QWTA	1600
426847	426847	Active	US Army Corps of Engineers	Pollution Containment	QWTA	1600
453821	453821	Active	US Army Corps of Engineers	Pollution Containment	QWTA	1600
453822	453822	Active	US Army Corps of Engineers	Pollution Containment	QWTA	1600
453823	453823	Active	US Army Corps of Engineers	Pollution Containment	QBAA	1600

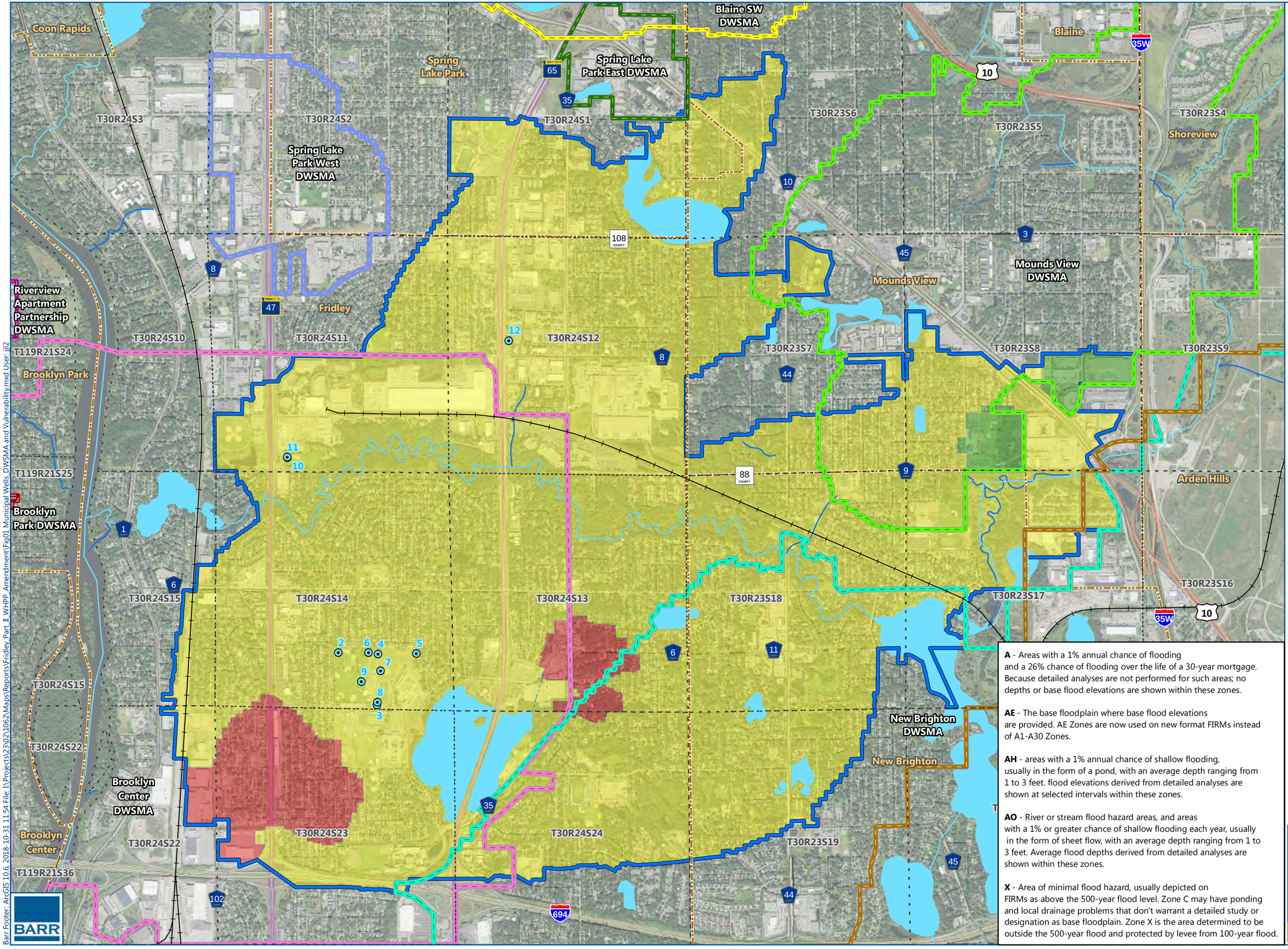
Table 4

High Capacity Wells Within One Mile of the DWSMA
City of Fridley

PCSI ID	Unique ID	Status	Permittee	Use	Aquifer	Permitted Volume MGY
453825	453825	Active	US Army Corps of Engineers	Pollution Containment	CJDN	1600
453826	453826	Active	US Army Corps of Engineers	Pollution Containment	OPCJ	1600
453827	453827	Active	US Army Corps of Engineers	Pollution Containment	OPCJ	1600
453828	453828	Active	US Army Corps of Engineers	Pollution Containment	OPCJ	1600
509083	509083	Active	New Brighton, City Of	Municipal/Public Water Supply	CMTS	1925
538076	538076	Active	Kurt Manufacturing	Pollution Containment	QBAA	20
554216	554216	Active	New Brighton, City Of	Municipal/Public Water Supply	OPCJ	1925
563006	563006	Active	Spring Lake Park, City Of	Municipal/Public Water Supply	CMTS	399
575168	575168	Active	Perfect 10 Car Wash	Commercial/Institutional Water Supply	CJDN	10
582628	582628	Active	New Brighton, City Of	Municipal/Public Water Supply	OPCJ	1925
609817	609817	Active	Bachman's Inc	Landscaping/Athletic Field Irrigation	CTCW	3.5
609817	609817	Active	Bachman's Inc	Nursery Irrigation	CTCW	4
687112	687112	Active	US Army Corps of Engineers	Pollution Containment	QWTA	1600
NA1	NA	Active	City of Fridley	Construction Dewatering	NA	4
NA2	NA	Active	Spring Lake Park Leased Housing Associates I, LLLP	Construction Dewatering	NA	47.5
NA3	NA	Active	US Army Corps of Engineers	Pollution Containment	NA	11
NA4	NA	Active	US Navy	Pollution Containment	QBAA	526
NA5	NA	Active	US Navy	Pollution Containment	QWTA	526

[1] PCSI ID refers to Figure 4
NA = Not Available
Aquifer/Formation Codes:
CJDN = Jordan Sandstone
CJCM = Jordan Sandstone – Mt. Simon Sandstone
CMTS = Mt. Simon Sandstone
CTCW = Tunnel City Group – Wonewoc Sandstone
CTCM = Tunnel City Group – Mt. Simon Sandstone
OPCJ = Prairie du Chien Group – Jordan Sandstone
OPDC = Prairie du Chien Group
OPCW = Prairie du Chien Group – Wonewoc Sandstone
QBAA = Quaternary Buried Artesian Aquifer
QWTA = Quaternary Water Table Aquifer

Figures



Municipal Well
Railroad
PLS Section
Fridley DWSMA
Municipal Boundary

Nearby DWSMAs

Blaine SW
Brooklyn Center
Brooklyn Park
Mounds View
New Brighton
Riverview Apartment Partnership
Saint Anthony Village
Spring Lake Park East
Spring Lake Park West

Aquifer Vulnerability

High
Moderate
Low

2 - Municipal Well Location PCSI ID (PCSI ID refers to Table C-3)

0 1,000 2,000
Feet

Image Source: FSA (2017)

A - Areas with a 1% annual chance of flooding and a 26% chance of flooding over the life of a 30-year mortgage. Because detailed analyses are not performed for such areas; no depths or base flood elevations are shown within these zones.

AE - The base floodplain where base flood elevations are provided. AE Zones are now used on new format FIRMs instead of A1-A30 Zones.

AH - areas with a 1% annual chance of shallow flooding, usually in the form of a pond, with an average depth ranging from 1 to 3 feet. flood elevations derived from detailed analyses are shown at selected intervals within these zones.

AO - River or stream flood hazard areas, and areas with a 1% or greater chance of shallow flooding each year, usually in the form of sheet flow, with an average depth ranging from 1 to 3 feet. Average flood depths derived from detailed analyses are shown within these zones.

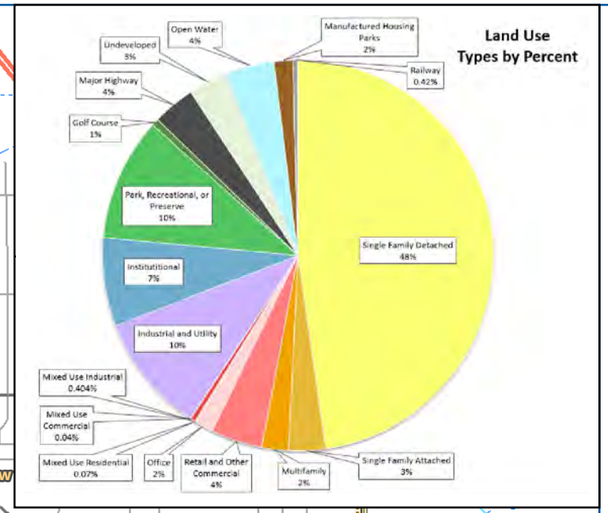
X - Area of minimal flood hazard, usually depicted on FIRMs as above the 500-year flood level. Zone C may have ponding and local drainage problems that don't warrant a detailed study or designation as base floodplain. Zone X is the area determined to be outside the 500-year flood and protected by levee from 100-year flood.

MUNICIPAL WELLS AND AQUIFER VULNERABILITY
Part 2 WHPP Amendment
City of Fridley
Anoka County, MN

FIGURE 1

BARR

Barr Footer: ArcGIS 10.6, 2018-10-31 11:54 File: I:\Projects\23\02\1062\Maps\Reports\Fridley_Part_II_WHPP_Amendment\Fig01_Municipal Wells_DWSMA and Vulnerability.mxd User: jil2



Municipal Well

Fridley DWSMA

Municipal Boundary

Single Family Detached

Manufactured Housing Park

Single Family Attached

Multifamily

Retail and Other Commercial

Office

Mixed Use Residential

Mixed Use Industrial

Mixed Use Commercial and Other

Industrial and Utility

Institutional

Park, Recreational or Preserve

Golf Course

Major Highway

Railway

Undeveloped

Water

N

0 1,000 2,000

Feet

* Land Use Data (Met Council 2010 Generalized Land Use)

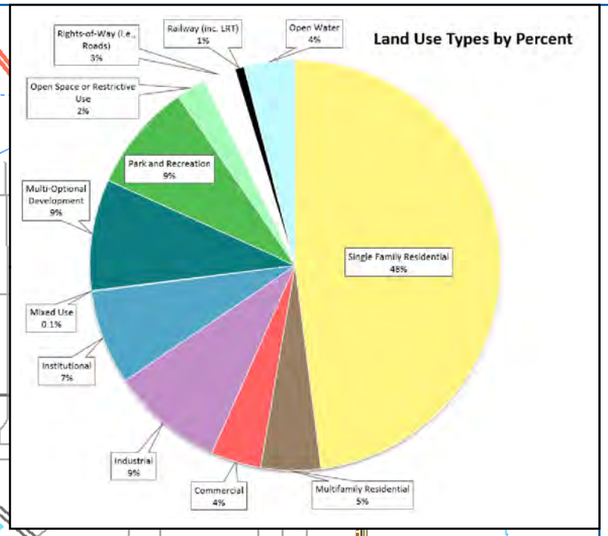
2 - Municipal Well Location PCSI ID (PCSI ID refers to Table C-3)

CURRENT LAND USE
Part 2 WHPP Amendment
City of Fridley
Anoka County, MN

FIGURE 2

BARR

Barr Footer: ArcGIS 10.6 2018-10-15 12:30 File: I:\Projects\23\02\1062\Maps\Reports\Fridley_Part_II_WHPP_Amendment\Fig02 Current Land Use.mxd User: jil2



Coon Rapids
Spring Lake Park
Fridley
Mounds View
Brooklyn Park
Arden Hills
New Brighton
Brooklyn Center

Municipal Well
Fridley DWSMA
Municipal Boundary

Planned Future Land Use*

- Agricultural
- Rural or Large-Lot Residential
- Single Family Residential
- Multifamily Residential
- Commercial
- Industrial
- Institutional
- Mixed Use
- Multi-Optional Development
- Park and Recreation
- Open Space or Restrictive Use
- Rights-of-Way (i.e., Roads)
- Railway (inc. LRT)
- Airport
- Vacant or Unknown
- Open Water

* Land Use Data (Met Council 2030 Generalized Interpreted Land Use)

2 - Municipal Well Location PCSI ID (PCSI ID refers to Table C-3)

N

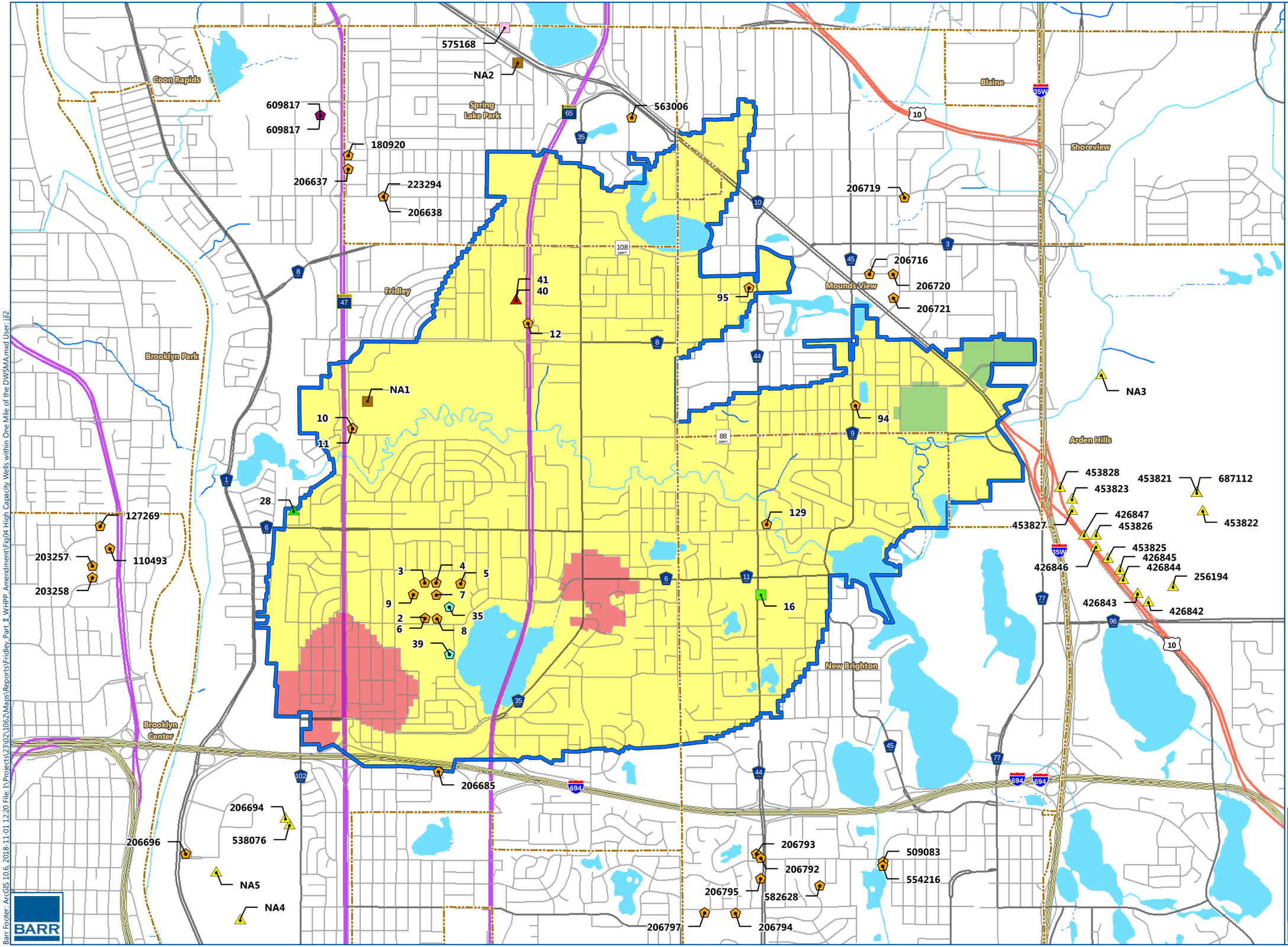
0 1,000 2,000
Feet

PLANNED FUTURE LAND USE
Part 2 WHPP Amendment
City of Fridley
Anoka County, MN

FIGURE 3

BARR

Barr Footer: ArcGIS 10.6, 2018-10-12 14:07 File: I:\Projects\23\02\1062\Maps\Reports\Fridley_Part_II_WHPP_Amendment\Fig03 Planned Future Land Use.mxd User: jil2



Permitted Water Appropriations (MPARS) Within 1 Mile of DWSMA

- Commercial/Ins... Water Supply
- Construction Dewatering
- Golf Course Irrigation
- Landscaping/At... Field Irrigation
- Municipal/Public Water Supply
- Nursery Irrigation
- Other Industrial Processing
- Pollution Containment
- Private Water Supply
- Fridley DWSMA
- Municipal Boundary

Aquifer Vulnerability

- High
- Moderate
- Low

453821 - MPARS Location PCSI ID (PCSI ID refers to Table C-12)

0 1,250 2,500
Feet

HIGH CAPACITY WELLS WITHIN ONE MILE OF THE DWSMA
Part 2 WHPP Amendment
City of Fridley
Anoka County, MN

FIGURE 4

BARR

Barr Footer: ArcGIS 10.6, 2018-11-01 12:20 File: I:\Projects\23\02\1062\Maps\Reports\Fridley_Part_II_WHPP_Amendment\Fig04 High Capacity Wells within One Mile of the DWSMA.mxd User: jl2

Appendix A

Well Construction Records

Minnesota Unique Well Number

206674

County Anoka
Quad Minneapolis
Quad ID 120D

MINNESOTA DEPARTMENT OF HEALTH

WELL AND BORING REPORT

Minnesota Statutes Chapter 1031

Entry Date 04/15/1991
Update Date 11/15/2016
Received Date

Well Name	Township	Range	Dir	Section	Subsection
FRIDLEY 2	30	24	W	14	DCBBBB

Elevation 865 ft. **Elev. Method** 7.5 minute topographic map (+/- 5 feet)

Address

C/W 6251 7TH ST NE FRIDLEY MN

Stratigraphy Information

Geological Material	From	To (ft.)	Color	Hardness
SAND & GRAVEL	0	120		
SAND & GRAVEL	120	131		
DOLOMITE ROCK	131	243		
JORDAN SANDSTONE	243	312		
DOLOMITE & SHALE	312	347		
DOLOMITE & SHALE	347	390		
FRANCONIA SHALE	390	452		
SANDSTONE	452	500		
SANDSTONE	500	510		
SANDSTONE & RED	510	550		
SANDSTONE & RED	550	635		
SANDSTONE & RED	635	654		
MT. SIMON	654	718		
HINCKLEY	718	838		
HINCKLEY	838	840		
FOND DU LAC	840	842		

Remarks

M.G.S. NO.192 , INFERRED CABLE TOOL METHOD, BASED ON OTHER WELLS DRILLED 1960-61
BY LAYNE

Well Depth 842 ft. **Depth Completed** 842 ft. **Date Well Completed** 12/15/1960

Drill Method Cable Tool **Drill Fluid**

Use community supply(municipal) **Status** Active

Well Hydrofractured? Yes ☐ No ☐ **From** **To**

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

Casing Diameter		Weight
16 in. To	675 ft.	lbs./ft.
24 in. To	131 ft.	lbs./ft.

Open Hole From 675 ft. To 842 ft.

Screen? ☐ **Type** **Make**

Static Water Level
131 ft. land surface Measure 12/15/1960

Pumping Level (below land surface)

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

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

Material	Amount	From	To
	0 Sacks	0 ft.	ft.

Nearest Known Source of Contamination
feet Direction Type
Well disinfected upon completion? ☐ Yes ☐ No

Pump ☐ Not Installed Date Installed
Manufacturer's name
Model Number HP 0 Volt
Length of drop pipe ft Capacity g.p. Typ

Abandoned
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

Miscellaneous
First Bedrock Prairie Du Chien Group Aquifer Mt.Simon
Last Strat Mid.Prot. sed. undivided Depth to Bedrock 131 ft
Located by Minnesota Department of Health
Locate Method GPS Differentially Corrected
System UTM - NAD83, Zone 15, Meters X 479719 Y 4992127
Unique Number Verification Input Date 07/27/1999

Angled Drill Hole

Well Contractor
Layne Well Co. 27010
Licensee Business Lic. or Reg. No. Name of Driller

Minnesota Unique Well No.

206674

County Anoka
Quad Minneapolis North
Quad ID 120D

MINNESOTA DEPARTMENT OF HEALTH

WELL AND BORING RECORD

Minnesota Statutes Chapter 1031

Entry Date 04/15/1991
Update
Received Date 11/15/2016

Well Name	Township	Range	Dir	Section	Subsection	Use	Status	Well Depth	Depth Completed	Date Well Completed	Lic/Reg. No.
FRIDLEY 2	30	24	W	14	DCBBBB	community supply	A	842 ft.	842 ft.	12/15/1960	27010

Elevation 865 ft. **Elev. Method** 7.5 minute topographic map (+/- 5 feet) **Aquifer** Mt.Simon **Depth to Bedrock** 131 ft **Open Hole** 675 - 842 ft **Static Water Level** 131 ft

Field Located By Minnesota Department of
Unique No. Verified
Geological Interpretation John Mossler
Agency (Interpretation)

Locate Method GPS Differentially Corrected
Input Source Minnesota Department of Health
Input Date 07/27/1999

Universal Transverse Mercator (UTM) - NAD83 - Zone 15 -
UTM Easting (X) 479719
UTM Northing (Y) 499212
Interpretaion Method Geologic study 1:24k to 1:100k

			Depth (ft.)			Elevation (ft.)					
Geological Material	**Color**	**Hardness**	**From**	**To**	**Thickness**	**From**	**To**	**Stratigraphy**	**Primary Lithology**	**Secondary**	**Minor Lithology**
SAND & GRAVEL			0	120	120	865	745	sand +larger	sand	gravel	
SAND & GRAVEL			120	131	11	745	734	sand +larger	sand	gravel	
DOLOMITE ROCK			131	243	112	734	622	Prairie Du Chien	dolomite		
JORDAN SANDSTONE			243	312	69	622	553	Jordan Sandstone	sandstone		
DOLOMITE & SHALE			312	347	35	553	518	St.Lawrence	sandstone	siltstone	dolomite
DOLOMITE & SHALE			347	390	43	518	475	Tunnel City Group	sandstone	siltstone	dolomite
FRANCONIA SHALE			390	452	62	475	413	Tunnel City Group	sandstone	shale	siltstone
SANDSTONE			452	500	48	413	365	Tunnel City Group	sandstone	siltstone	
SANDSTONE			500	510	10	365	355	Wonewoc Sandstone	sandstone		
SANDSTONE & RED SHALE			510	550	40	355	315	Wonewoc Sandstone	sandstone		
SANDSTONE & RED SHALE			550	635	85	315	230	Eau Claire Formation	siltstone		
SANDSTONE & RED SHALE			635	654	19	230	211	Mt.Simon Sandstone	sandstone		
MT. SIMON SANDSTONE			654	718	64	211	147	Mt.Simon Sandstone	sandstone		
HINCKLEY SANDSTONE			718	838	120	147	27	Mt.Simon Sandstone	sandstone		
HINCKLEY SANDSTONE			838	840	2	27	25	Mid.Prot. sed.	shale		
FOND DU LAC			840	842	2	25	23	Mid.Prot. sed.	shale		

Minnesota Unique Well Number

206670

County Anoka
Quad Minneapolis
Quad ID 120D

MINNESOTA DEPARTMENT OF HEALTH
WELL AND BORING REPORT
Minnesota Statutes Chapter 1031

Entry Date 04/15/1991
Update Date 11/15/2016
Received Date

Well Name	Township	Range	Dir	Section	Subsection
FRIDLEY 3	30	24	W	14	DCDCDD

Elevation 885 ft. **Elev. Method** 7.5 minute topographic map (+/- 5 feet)

Address

C/W 611 61ST AV NE FRIDLEY MN

Stratigraphy Information

Geological Material	From	To (ft.)	Color	Hardness
DRIFT	0	140		
ST. PETER	140	145		
SHAKOPEE-ONEOTA	145	232		
SHAKOPEE-ONEOTA	232	283		
JORDAN	283	324		
JORDAN	324	360		
JORDAN	360	363		
ST. LAWRENCE	363	380		
ST. LAWRENCE	380	435		
FRANCONIA	435	522		
FRANCONIA	522	536		
GALESVILLE	536	574		
GALESVILLE	574	580		
EAU CLAIRE	580	660		
EAU CLAIRE	660	728		
MT. SIMON	728	831		
HINCKLEY BOTTOM	831	870		

Remarks

M.G.S. NO.195, ON 62ND AVE HALF WAY BETWEEN UNIVERSITY & CENTRAL

NO DATE ON GAMMA LOG. INFERRED CABLE TOOL METHOD, BASED ON OTHER WELLS DRILLED
1960-61 BY LAYNE, GAMMA LOGGED 10-20-2015 BY JIM TRAEN.

REVISED BEDROCK CONTACTS.

Well Depth 870 ft. **Depth Completed** 836 ft. **Date Well Completed** 03/03/1961

Drill Method Cable Tool **Drill Fluid**

Use community supply(municipal) **Status** Active

Well Hydrofractured? Yes ☐ No ☐ **From** **To**

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

Casing Diameter			Weight
24	in. To	145 ft.	lbs./ft.
16	in. To	752 ft.	lbs./ft.
10	in. To	784 ft.	lbs./ft.

Open Hole From 752 ft. To 870 ft.

Screen? ☐ **Type** **Make**

Static Water Level
63 ft. land surface Measure 03/03/1961

Pumping Level (below land surface)

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

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

Material	Amount		From	To
neat cement	0	Sacks	0 ft.	ft.

Nearest Known Source of Contamination
feet Direction Type
Well disinfected upon completion? ☐ Yes ☐ No

Pump ☐ Not Installed Date Installed
Manufacturer's name
Model Number HP 0 Volt
Length of drop pipe ft Capacity g.p. Typ

Abandoned
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

Miscellaneous
First Bedrock Prairie Du Chien Group Aquifer Mt.Simon
Last Strat Mt.Simon Sandstone Depth to Bedrock 140 ft
Located by Minnesota Department of Health
Locate Method GPS Differentially Corrected
System UTM - NAD83, Zone 15, Meters X 479981 Y 4991769
Unique Number Verification Input Date 07/27/1999

Angled Drill Hole

Well Contractor
Layne Well Co. 27010
Licensee Business Lic. or Reg. No. Name of Driller

Minnesota Unique Well No.

206670

County Anoka
Quad Minneapolis North
Quad ID 120D

MINNESOTA DEPARTMENT OF HEALTH

WELL AND BORING RECORD

Minnesota Statutes Chapter 1031

Entry Date 04/15/1991
Update
Received Date 11/15/2016

Well Name	Township	Range	Dir	Section	Subsection	Use	Status	Well Depth	Depth Completed	Date Well Completed	Lic/Reg. No.
FRIDLEY 3	30	24	W	14	DCDCDD	community supply	A	870 ft.	836 ft.	03/03/1961	27010

Elevation 885 ft. **Elev. Method** 7.5 minute topographic map (+/- 5 feet) **Aquifer** Mt.Simon **Depth to Bedrock** 140 ft **Open Hole** 752 - 870 ft **Static Water Level** 331 ft

Field Located By Minnesota Department of
Unique No. Verified
Geological Interpretation Andrew Retzler
Agency (Interpretation)

Locate Method GPS Differentially Corrected
Input Source Minnesota Department of Health
Input Date 07/27/1999

Universal Transverse Mercator (UTM) - NAD83 - Zone 15 -
UTM Easting (X) 479981
UTM Northing (Y) 499176
Interpretaion Method Cuttings + geophysical log

			Depth (ft.)			Elevation (ft.)					
Geological Material	**Color**	**Hardness**	**From**	**To**	**Thickness**	**From**	**To**	**Stratigraphy**	**Primary Lithology**	**Secondary**	**Minor Lithology**
DRIFT			0	140	140	885	745	Quaternary deposit	drift		
ST. PETER			140	145	5	745	740	Prairie Du Chien	dolomite	sandstone	
SHAKOPEE-ONEOTA			145	232	87	740	653	Prairie Du Chien	dolomite		
SHAKOPEE-ONEOTA			232	283	51	653	602	Jordan Sandstone	sandstone		
JORDAN			283	324	41	602	561	Jordan Sandstone	sandstone		
JORDAN			324	360	36	561	525	St.Lawrence	siltstone	dolomite	
JORDAN			360	363	3	525	522	Tunnel City Group	sandstone	shale	dolomite
ST. LAWRENCE			363	380	17	522	505	Tunnel City Group	sandstone	shale	dolomite
ST. LAWRENCE			380	435	55	505	450	Tunnel City Group	sandstone	dolomite	
FRANCONIA			435	522	87	450	363	Tunnel City Group	sandstone	siltstone	dolomite
FRANCONIA			522	536	14	363	349	Wonewoc Sandstone	sandstone		
GALESVILLE			536	574	38	349	311	Wonewoc Sandstone	sandstone		
GALESVILLE			574	580	6	311	305	Eau Claire Formation	siltstone	sandstone	
EAU CLAIRE			580	660	80	305	225	Eau Claire Formation	siltstone	sandstone	
EAU CLAIRE			660	728	68	225	157	Mt.Simon Sandstone	sandstone		
MT. SIMON			728	831	103	157	54	Mt.Simon Sandstone	sandstone		
HINCKLEY BOTTOM			831	870	39	54	15	Mt.Simon Sandstone	sandstone		

Minnesota Unique Well Number

201158

County Anoka
Quad Minneapolis
Quad ID 120D

MINNESOTA DEPARTMENT OF HEALTH

WELL AND BORING REPORT

Minnesota Statutes Chapter 1031

Entry Date 04/15/1991
Update Date 11/15/2016
Received Date

Well Name	Township	Range	Dir	Section	Subsection
FRIDLEY 4	30	24	W	14	DCABAD

Elevation 883 ft. **Elev. Method** 7.5 minute topographic map (+/- 5 feet)

Address

C/W 631 63RD AV NE FRIDLEY MN

Stratigraphy Information

Geological Material	From	To (ft.)	Color	Hardness
FINE SAND	0	19		
CLAY & BOULDERS	19	70		
SAND & BOULDERS	70	120		
SAND & BOULDERS	120	123		
ST. PETER	123	138		
SHAKOPEE LIMESTONE	138	235		
SHAKOPEE LIMESTONE	235	253		
JORDAN SANDSTONE	253	320		
SHALE & SAND	320	364		
SHALE & SAND	364	500		
SANDSTONE & SHALE	500	504		
SANDSTONE & SHALE	504	525		
GALESVILLE SAND	525	550		
HARD SANDSTONE &	550	552		
HARD SANDSTONE &	552	640		
HARD SANDSTONE &	640	665		
HINCKLEY	665	830		
HINCKLEY	830	831		

Remarks

M.G.S. NO.194 INFERRED CABLE TOOL METHOD & PRESENCE OF GROUT
BASED ON OTHER WELLS DRILLED 1960-61 BY LAYNE
GAMMA LOGGED 5-9-2016 BY JIM TRAEN.

Well Depth 831 ft. **Depth Completed** 831 ft. **Date Well Completed** 02/20/1961

Drill Method Cable Tool **Drill Fluid**

Use community supply(municipal) **Status** Active

Well Hydrofractured? Yes ☐ No ☐ **From** **To**

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

Casing Diameter		Weight
16 in. To 663 ft.		lbs./ft.
24 in. To 138 ft.		lbs./ft.

Open Hole From 663 ft. To 830 ft.

Screen? ☐ **Type** **Make**

Static Water Level
160 ft. land surface Measure 02/20/1961

Pumping Level (below land surface)

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

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

Nearest Known Source of Contamination
feet Direction Type
Well disinfected upon completion? ☐ Yes ☐ No

Pump ☐ Not Installed Date Installed
Manufacturer's name
Model Number HP 0 Volt
Length of drop pipe ft Capacity g.p. Typ

Abandoned
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

Miscellaneous
First Bedrock St.Peter Sandstone Aquifer Mt.Simon
Last Strat Mid.Prot. sed. undivided Depth to Bedrock 120 ft
Located by Minnesota Department of Health
Locate Method GPS Differentially Corrected
System UTM - NAD83, Zone 15, Meters X 479988 Y 4992116
Unique Number Verification Information from Input Date 07/27/1999

Angled Drill Hole

Well Contractor
Layne Well Co. 27010 SHUEY, P.
Licensee Business Lic. or Reg. No. Name of Driller

Minnesota Well Index Report | **201158** | Printed on 01/09/2018 HE-01205-15

Minnesota Unique Well No.

201158

County Anoka
Quad Minneapolis North
Quad ID 120D

MINNESOTA DEPARTMENT OF HEALTH

WELL AND BORING RECORD

Minnesota Statutes Chapter 1031

Entry Date 04/15/1991
Update
Received Date 11/15/2016

Well Name	Township	Range	Dir	Section	Subsection	Use	Status	Well Depth	Depth Completed	Date Well Completed	Lic/Reg. No.
FRIDLEY 4	30	24	W	14	DCABAD	community supply	A	831 ft.	831 ft.	02/20/1961	27010

Elevation 883 ft. **Elev. Method** 7.5 minute topographic map (+/- 5 feet) **Aquifer** Mt.Simon **Depth to Bedrock** 120 ft **Open Hole** 663 - 830 ft **Static Water Level** 160 ft

Field Located By Minnesota Department of
Unique No. Verified Information from owner
Geological Interpretation Andrew Retzler
Agency (Interpretation)

Locate Method GPS Differentially Corrected
Input Source Minnesota Department of Health
Input Date 07/27/1999

Universal Transverse Mercator (UTM) - NAD83 - Zone 15 -
UTM Easting (X) 479988
UTM Northing (Y) 499211
Interpretaion Method Cuttings + geophysical log

Geological Material	Color	Hardness	Depth (ft.) From	Depth (ft.) To	Thickness	Elevation (ft.) From	Elevation (ft.) To	Stratigraphy	Primary Lithology	Secondary	Minor Lithology
FINE SAND			0	19	19	883	864	sand	sand		
CLAY & BOULDERS			19	70	51	864	813	pebbly sand/silt/clay	clay	boulder	
SAND & BOULDERS			70	120	50	813	763	sand +larger	sand	boulder	
SAND & BOULDERS			120	123	3	763	760	St.Peter Sandstone	sandstone		
ST. PETER SANDSTONE			123	138	15	760	745	St.Peter Sandstone	sandstone		
SHAKOPEE LIMESTONE			138	235	97	745	648	Prairie Du Chien	dolomite		
SHAKOPEE LIMESTONE			235	253	18	648	630	Jordan Sandstone	sandstone		
JORDAN SANDSTONE			253	320	67	630	563	Jordan Sandstone	sandstone		
SHALE & SAND			320	364	44	563	519	St.Lawrence	dolomite	flint	
SHALE & SAND			364	500	136	519	383	Tunnel City Group	sandstone	shale	dolomite
SANDSTONE & SHALE			500	504	4	383	379	Tunnel City Group	sandstone	shale	dolomite
SANDSTONE & SHALE			504	525	21	379	358	Wonewoc Sandstone	sandstone		
GALESVILLE SAND			525	550	25	358	333	Wonewoc Sandstone	sandstone		
HARD SANDSTONE & SHALE			550	552	2	333	331	Wonewoc Sandstone	sandstone		
HARD SANDSTONE & SHALE			552	640	88	331	243	Eau Claire Formation	shale	sandstone	
HARD SANDSTONE & SHALE			640	665	25	243	218	Mt.Simon Sandstone	sandstone		
HINCKLEY SANDSTONE			665	830	165	218	53	Mt.Simon Sandstone	sandstone		
HINCKLEY SANDSTONE			830	831	1	53	52	Mid.Prot. sed.	shale		

Minnesota Unique Well Number

206675

County Anoka
Quad Minneapolis
Quad ID 120D

MINNESOTA DEPARTMENT OF HEALTH

WELL AND BORING REPORT

Minnesota Statutes Chapter 1031

Entry Date 04/15/1991
Update Date 11/15/2016
Received Date

Well Name	Township	Range	Dir	Section	Subsection
FRIDLEY 5	30	24	W	14	DDBABD

Elevation 879 ft. **Elev. Method** 7.5 minute topographic map (+/- 5 feet)

Address

C/W 770 63RD AV NE FRIDLEY MN

Stratigraphy Information

Geological Material	From	To (ft.)	Color	Hardness
FINE TO MED.	0	25	BROWN	
TILL-CLAY TO PEBBLES	25	60	GRAY	
GRAVEL-GRANULES	60	65	GRAY	
TILL-GRANULES TO	65	80	RED	
SAND-COARSE TO	80	114	BROWN	
SAND, CARB.-CLAY TO	114	118	TAN	
SAND-VERY COARSE	118	122	BROWN	
DOLOMITE	122	250	BRN/RED	
SANDSTONE	250	295	BRN/TAN	
DOLOMITE, SILTSTONE	295	335	LT. PNK	
SHALE, SILTSTONE	335	400	VARIED	
SANDSTONE	400	420	GREEN	
SHALE, SILTSTONE	420	450	GREEN	
SHALE	450	500	GRAY	
SANDSTONE	500	510	GREEN	
SHALE	510	525	GRAY	
SANDSTONE	525	550	GRAY	
SHALE	550	560	GRAY	
SANDSTONE	560	570	GRAY	
SHALE	570	650	VARIED	
SANDSTONE	650	842	TAN/PNK	
SILTSTONE,	842	845	RED/BRN	

Remarks

M.G.S. NO. 193 G.W.Q. NO. 0224, INFERRED CABLE TOOL METHOD & PRESENCE OF GROUT,
BASED ON OTHER WELLS DRILLED FOR FRIDLEY 1960-61 BY LAYNE

Well Depth 845 ft. **Depth Completed** 845 ft. **Date Well Completed** 00/00/1961

Drill Method Cable Tool **Drill Fluid**

Use community supply(municipal) **Status** Active

Well Hydrofractured? Yes ☐ No ☐ **From** **To**

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

Casing Diameter **Weight**
16 in. To 656 ft. lbs./ft.

Open Hole From 656 ft. To 845 ft.

Screen? ☐ **Type** **Make**

Static Water Level

Pumping Level (below land surface)

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

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

Nearest Known Source of Contamination
feet Direction Type
Well disinfected upon completion? ☐ Yes ☐ No

Pump ☐ Not Installed Date Installed
Manufacturer's name
Model Number HP 0 Volt
Length of drop pipe ft Capacity g.p. Typ Submersible

Abandoned
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

Miscellaneous
First Bedrock Prairie Du Chien Group Aquifer Mt.Simon
Last Strat Mid.Prot. sed. undivided Depth to Bedrock 122 ft
Located by Minnesota Department of Health
Locate Method GPS Differentially Corrected
System UTM - NAD83, Zone 15, Meters X 480250 Y 4992120
Unique Number Verification Input Date 07/27/1999

Angled Drill Hole

Well Contractor
Layne Well Co. 27010
Licensee Business Lic. or Reg. No. Name of Driller

Minnesota Unique Well No.

206675

County Anoka
Quad Minneapolis North
Quad ID 120D

MINNESOTA DEPARTMENT OF HEALTH

WELL AND BORING RECORD

Minnesota Statutes Chapter 1031

Entry Date 04/15/1991
Update
Received Date 11/15/2016

Well Name	Township	Range	Dir	Section	Subsection	Use	Status	Well Depth	Depth Completed	Date Well Completed	Lic/Reg. No.
FRIDLEY 5	30	24	W	14	DDBABD	community supply	A	845 ft.	845 ft.	00/00/1961	27010

Elevation 879 ft. **Elev. Method** 7.5 minute topographic map (+/- 5 feet) **Aquifer** Mt.Simon **Depth to Bedrock** 122 ft **Open Hole** 656 - 845 ft **Static Water Level** ft

Field Located By Minnesota Department of
Unique No. Verified
Geological Interpretation John Mossler
Agency (Interpretation)

Locate Method GPS Differentially Corrected
Input Source Minnesota Department of Health
Input Date 07/27/1999

Universal Transverse Mercator (UTM) - NAD83 - Zone 15 -
UTM Easting (X) 480250
UTM Northing (Y) 499212
Interpretaion Method Geologic study 1:24k to 1:100k

			Depth (ft.)			Elevation (ft.)					
Geological Material	**Color**	**Hardness**	**From**	**To**	**Thickness**	**From**	**To**	**Stratigraphy**	**Primary Lithology**	**Secondary**	**Minor Lithology**
FINE TO MED. OUTWASH	BROWN		0	25	25	879	854	sand-brown	sand		
TILL-CLAY TO PEBBLES	GRAY		25	60	35	854	819	till-gray	till	clay	pebbles
GRAVEL-GRANULES TO FINE	GRAY		60	65	5	819	814	gravel (+larger)-gray	gravel		
TILL-GRANULES TO CLAY	RED		65	80	15	814	799	till-red	till		
SAND-COARSE TO MEDIUM	BROWN		80	114	34	799	765	sand-brown	sand		
SAND, CARB.-CLAY TO	TAN		114	118	4	765	761	clay+sand	sand	clay	
SAND-VERY COARSE	BROWN		118	122	4	761	757	sand-brown	sand		
DOLOMITE	BRN/RED		122	250	128	757	629	Prairie Du Chien	dolomite		
SANDSTONE	BRN/TAN		250	295	45	629	584	Jordan Sandstone	sandstone		
DOLOMITE, SILTSTONE	LT. PNK		295	335	40	584	544	St.Lawrence	dolomite	siltstone	
SHALE, SILTSTONE	VARIED		335	400	65	544	479	Tunnel City Group	shale	siltstone	
SANDSTONE	GREEN		400	420	20	479	459	Tunnel City Group	sandstone		
SHALE, SILTSTONE	GREEN		420	450	30	459	429	Tunnel City Group	shale	siltstone	
SHALE	GRAY		450	500	50	429	379	Tunnel City Group	shale		
SANDSTONE	GREEN		500	510	10	379	369	Tunnel City Group	sandstone		
SHALE	GRAY		510	525	15	369	354	Tunnel City Group	shale		
SANDSTONE	GRAY		525	550	25	354	329	Wonewoc Sandstone	sandstone		
SHALE	GRAY		550	560	10	329	319	Wonewoc Sandstone	shale		
SANDSTONE	GRAY		560	570	10	319	309	Wonewoc Sandstone	sandstone		
SHALE	VARIED		570	650	80	309	229	Eau Claire Formation	shale		
SANDSTONE	TAN/PNK		650	842	192	229	37	Mt.Simon Sandstone	sandstone		
SILTSTONE, SANDSTONE	RED/BRN		842	845	3	37	34	Mid.Prot. sed.	siltstone	sandstone	

Minnesota Unique Well Number

206673

County Anoka
Quad Minneapolis
Quad ID 120D

MINNESOTA DEPARTMENT OF HEALTH

WELL AND BORING REPORT

Minnesota Statutes Chapter 1031

Entry Date 04/15/1991
Update Date 05/13/2016
Received Date

Well Name	Township	Range	Dir	Section	Subsection
FRIDLEY 6	30	24	W	14	DCABBB

Elevation 877 ft. **Elev. Method** 7.5 minute topographic map (+/- 5 feet)

Address

Well 600 63RD AV NE FRIDLEY MN 55432
Contact FRIDLEY MN 55432

Stratigraphy Information

Geological Material	From	To (ft.)	Color	Hardness
MEDIUM SAND	0	13		
SILT & CLAY	13	65		
SAND & GRAVEL	65	115		
ST. PETER	115	125		
ST. PETER	125	130		
SHAKOPEE LIMESTONE	130	233		
SHAKOPEE LIMESTONE	233	248		
JORDAN SANDSTONE	248	255		

Remarks

GAMMA LOGGED 5-9-2016 BY JIM TRAEN.
JIM TRAEN HAS 24 IN. CASING ENDING AT 144.3 FT.

Well Depth 255 ft. **Depth Completed** 255 ft. **Date Well Completed** 08/00/1972

Drill Method Cable Tool **Drill Fluid**

Use community supply(municipal) **Status** Active

Well Hydrofractured? Yes ☐ No ☐ **From** **To**

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

Casing Diameter **Weight**
24 in. To 153 ft. lbs./ft.

Open Hole From 153 ft. To 255 ft.

Screen? ☐ **Type** **Make**

Static Water Level
56.5 ft. land surface Measure 08/00/1972

Pumping Level (below land surface)

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

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

Material	Amount		From	To
neat cement	7	Cubic yards	0 ft.	ft.

Nearest Known Source of Contamination
feet Direction Type
Well disinfected upon completion? ☐ Yes ☐ No

Pump ☐ Not Installed Date Installed
Manufacturer's name
Model Number HP 0 Volt
Length of drop pipe ft Capacity g.p. Typ

Abandoned
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

Miscellaneous
First Bedrock Prairie Du Chien Group Aquifer Prairie Du Chien-
Last Strat Jordan Sandstone Depth to Bedrock 125 ft
Located by Minnesota Department of Health
Locate Method GPS Differentially Corrected
System UTM - NAD83, Zone 15, Meters X 479923 Y 4992127
Unique Number Verification Input Date 07/27/1999

Angled Drill Hole

Well Contractor
Layne Well Co. 27010
Licensee Business Lic. or Reg. No. Name of Driller

Minnesota Unique Well No.

206673

County Anoka
Quad Minneapolis North
Quad ID 120D

MINNESOTA DEPARTMENT OF HEALTH

WELL AND BORING RECORD

Minnesota Statutes Chapter 1031

Entry Date 04/15/1991
Update
Received Date 05/13/2016

Well Name	Township	Range	Dir	Section	Subsection	Use	Status	Well Depth	Depth Completed	Date Well Completed	Lic/Reg. No.
FRIDLEY 6	30	24	W	14	DCABBB	community supply	A	255 ft.	255 ft.	08/00/1972	27010

Elevation 877 ft. **Elev. Method** 7.5 minute topographic map (+/- 5 feet) **Aquifer** Prairie Du Chien- **Depth to Bedrock** 125 ft **Open Hole** 153 - 255 ft **Static Water Level** 56.5 ft

Field Located By Minnesota Department of
Unique No. Verified
Geological Interpretation Andrew Retzler
Agency (Interpretation)

Locate Method GPS Differentially Corrected
Input Source Minnesota Department of Health
Input Date 07/27/1999

Universal Transverse Mercator (UTM) - NAD83 - Zone 15 -
UTM Easting (X) 479923
UTM Northing (Y) 499212
Interpretaion Method Inferred from geophysical log

Geological Material	Color	Hardness	Depth (ft.) From	Depth (ft.) To	Thickness	Elevation (ft.) From	Elevation (ft.) To	Stratigraphy	Primary Lithology	Secondary	Minor Lithology
MEDIUM SAND			0	13	13	877	864	sand	sand		
SILT & CLAY			13	65	52	864	812	silt+clay	silt	clay	
SAND & GRAVEL			65	115	50	812	762	sand +larger	sand	gravel	
ST. PETER SANDSTONE			115	125	10	762	752	Quaternary deposit	sand	gravel	
ST. PETER SANDSTONE			125	130	5	752	747	Prairie Du Chien	dolomite		
SHAKOPEE LIMESTONE			130	233	103	747	644	Prairie Du Chien	dolomite		
SHAKOPEE LIMESTONE			233	248	15	644	629	Jordan Sandstone	sandstone		
JORDAN SANDSTONE			248	255	7	629	622	Jordan Sandstone	sandstone		

Minnesota Unique Well Number

206678

County Anoka
Quad Minneapolis
Quad ID 120D

MINNESOTA DEPARTMENT OF HEALTH

WELL AND BORING REPORT

Minnesota Statutes Chapter 1031

Entry Date 04/15/1991
Update Date 11/15/2016
Received Date

Well Name	Township	Range	Dir	Section	Subsection
FRIDLEY 7	30	24	W	14	DCADBC

Elevation 885 ft. **Elev. Method** 7.5 minute topographic map (+/- 5 feet)

Address

C/W 680 63RD AV NE FRIDLEY MN

Stratigraphy Information

Geological Material	From	To (ft.)	Color	Hardness
FINE SAND	0	26		
BLUE CLAY, LITTLE	26	60		
GOOD WATER GRAVEL	60	73		
MUDDY SAND	73	75		
GRAVEL	75	110	LIGHT	
ST. PETER	110	128	YELLOW	
SHAKOPEE	128	136	RED	
SHAKOPEE & ST.	136	150	WHITE	
SHAKOPEE	150	262	TAN	

Remarks

ORIGINAL NO. 206671 - COMPLETED IN DRIFT, DEEPENED 1970 BY KEYS INTO BEDROCK
GAMMA LOGGED 10-20-2015 BY JIM TRAEN.

Well Depth 262 ft. **Depth Completed** 262 ft. **Date Well Completed** 01/14/1970

Drill Method **Drill Fluid**

Use community supply(municipal) **Status** Active

Well Hydrofractured? Yes ☐ No ☐ **From** **To**

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

Casing Diameter		Weight
16 in. To 67 ft.		lbs./ft.
12 in. To 138 ft.		lbs./ft.
24 in. To 27.7 ft.		lbs./ft.

Open Hole From 138 ft. To 262 ft.

Screen? ☐ **Type** **Make**

Static Water Level
65 ft. land surface Measure 01/14/1970

Pumping Level (below land surface)
73 ft. hrs. Pumping at 1600 g.p.m.

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

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

Nearest Known Source of Contamination
feet Direction Type
Well disinfected upon completion? ☐ Yes ☐ No

Pump ☐ Not Installed Date Installed
Manufacturer's name JACUZZI
Model Number SVB00 HP 75 Volt
Length of drop pipe 71 ft Capacity 1100 g.p. Typ

Abandoned
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

Miscellaneous
First Bedrock St.Peter Sandstone Aquifer Prairie Du Chien
Last Strat Prairie Du Chien Group Depth to Bedrock 110 ft
Located by Minnesota Department of Health
Locate Method GPS Differentially Corrected
System UTM - NAD83, Zone 15, Meters X 480005 Y 4992003
Unique Number Verification Information from Input Date 07/27/1999

Angled Drill Hole

Well Contractor
Renner E.H. & Sons 02015
Licensee Business Lic. or Reg. No. Name of Driller

Minnesota Unique Well No.

206678

County Anoka
Quad Minneapolis North
Quad ID 120D

MINNESOTA DEPARTMENT OF HEALTH

WELL AND BORING RECORD

Minnesota Statutes Chapter 1031

Entry Date 04/15/1991
Update
Received Date 11/15/2016

Well Name	Township	Range	Dir	Section	Subsection	Use	Status	Well Depth	Depth Completed	Date Well Completed	Lic/Reg. No.
FRIDLEY 7	30	24	W	14	DCADBC	community supply	A	262 ft.	262 ft.	01/14/1970	02015

Elevation 885 ft. **Elev. Method** 7.5 minute topographic map (+/- 5 feet) **Aquifer** Prairie Du Chien **Depth to Bedrock** 110 ft **Open Hole** 138 - 262 ft **Static Water Level** 65 ft

Field Located By Minnesota Department of
Unique No. Verified Information from owner
Geological Interpretation John Mossler
Agency (Interpretation)

Locate Method GPS Differentially Corrected
Input Source Minnesota Department of Health
Input Date 07/27/1999

Universal Transverse Mercator (UTM) - NAD83 - Zone 15 -
UTM Easting (X) 480005
UTM Northing (Y) 499200
Interpretaion Method Geologic study 1:24k to 1:100k

			Depth (ft.)			Elevation (ft.)					
Geological Material	**Color**	**Hardness**	**From**	**To**	**Thickness**	**From**	**To**	**Stratigraphy**	**Primary Lithology**	**Secondary**	**Minor Lithology**
FINE SAND			0	26	26	885	859	sand	sand		
BLUE CLAY, LITTLE GRAVEL			26	60	34	859	825	pebbly sand/silt/clay-	clay	gravel	
GOOD WATER GRAVEL			60	73	13	825	812	gravel (+larger)	gravel		
MUDDY SAND			73	75	2	812	810	sand+silt	sand	mud	
GRAVEL	LIGHT		75	110	35	810	775	gravel (+larger)	gravel		
ST. PETER	YELLOW		110	128	18	775	757	St.Peter Sandstone	sandstone		
SHAKOPEE	RED		128	136	8	757	749	Prairie Du Chien	dolomite		
SHAKOPEE & ST. PETER	WHITE		136	150	14	749	735	Prairie Du Chien	dolomite	sandstone	
SHAKOPEE	TAN		150	262	112	735	623	Prairie Du Chien	dolomite		

Minnesota Unique Well Number

206669

County Anoka
Quad Minneapolis
Quad ID 120D

MINNESOTA DEPARTMENT OF HEALTH

WELL AND BORING REPORT

Minnesota Statutes Chapter 1031

Entry Date 04/15/1991
Update Date 03/10/2014
Received Date

Well Name	Township	Range	Dir	Section	Subsection
FRIDLEY 8	30	24	W	14	DCDCDA

Elevation 885 ft. **Elev. Method** 7.5 minute topographic map (+/- 5 feet)

Address

C/W 613 61ST AV NE FRIDLEY MN

Stratigraphy Information

Geological Material	From	To (ft.)	Color	Hardness
NO RECORD	0	64		
GRAVEL & STONES	64	122	GRAY	
SHALE	122	126	BLACK	
ST. PETER, DUSTY	126	130	WHITE	
ST. PETER, SHAKOPEE	130	186	YELLOW	
SHAKOPEE	186	195	TAN	
SHAKOPEE	195	265	TAN	
JORDAN	265	265	YELLOW	

Remarks

M.G.S. NO. 526

0 TO 64 FEET IS 16" CASE HOLE, DRILLED BY OTHERS.

Well Depth 265 ft. **Depth Completed** 265 ft. **Date Well Completed** 12/17/1969

Drill Method **Drill Fluid**

Use community supply(municipal) **Status** Active

Well Hydrofractured? Yes ☐ No ☐ **From** **To**

Casing Type Step down **Joint**

Drive Shoe? Yes ☐ No ☐ **Above/Below** 0 ft.

Casing Diameter			Weight
12	in. To	138 ft.	lbs./ft.
16	in. To	64 ft.	lbs./ft.

Open Hole From 138 ft. To 265 ft.

Screen? ☐ **Type** **Make**

Static Water Level

70 ft. land surface Measure 12/17/1969

Pumping Level (below land surface)

74 ft. hrs. Pumping at 1160 g.p.m.

Wellhead Completion

Pitless adapter manufacturer Model

☐ Casing Protection ☐ 12 in. above grade

☐ At-grade (Environmental Wells and Borings ONLY)

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

Nearest Known Source of Contamination

feet Direction Type

Well disinfected upon completion? ☐ Yes ☐ No

Pump ☐ Not Installed Date Installed

Manufacturer's name JACUZZI

Model Number 12MC24 HP 75 Volt

Length of drop pipe 125 ft Capacity 1150 g.p. Typ Turbine

Abandoned

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

Miscellaneous

First Bedrock St.Peter Sandstone Aquifer Prairie Du Chien

Last Strat Jordan Sandstone Depth to Bedrock 126 ft

Located by Minnesota Department of Health

Locate Method GPS Differentially Corrected

System UTM - NAD83, Zone 15, Meters X 479984 Y 4991790

Unique Number Verification Input Date 07/27/1999

Angled Drill Hole

Well Contractor

Renner E.H. & Sons 02015

Licensee Business Lic. or Reg. No. Name of Driller

Minnesota Unique Well No.

206669

County Anoka
Quad Minneapolis North
Quad ID 120D

MINNESOTA DEPARTMENT OF HEALTH

WELL AND BORING RECORD

Minnesota Statutes Chapter 1031

Entry Date 04/15/1991
Update
Received Date 03/10/2014

Well Name	Township	Range	Dir	Section	Subsection	Use	Status	Well Depth	Depth Completed	Date Well Completed	Lic/Reg. No.
FRIDLEY 8	30	24	W	14	DCDCDA	community supply	A	265 ft.	265 ft.	12/17/1969	02015

Elevation 885 ft. **Elev. Method** 7.5 minute topographic map (+/- 5 feet) **Aquifer** Prairie Du Chien **Depth to Bedrock** 126 ft **Open Hole** 138 - 265 ft **Static Water Level** 70 ft

Field Located By Minnesota Department of
Unique No. Verified
Geological Interpretation John Mossler
Agency (Interpretation)

Locate Method GPS Differentially Corrected
Input Source Minnesota Department of Health
Input Date 07/27/1999

Universal Transverse Mercator (UTM) - NAD83 - Zone 15 -
UTM Easting (X) 479984
UTM Northing (Y) 499179
Interpretaion Method Geologic study 1:24k to 1:100k

			Depth (ft.)			Elevation (ft.)					
Geological Material	**Color**	**Hardness**	**From**	**To**	**Thickness**	**From**	**To**	**Stratigraphy**	**Primary Lithology**	**Secondary**	**Minor Lithology**
NO RECORD			0	64	64	885	821	Quaternary deposit	drift		
GRAVEL & STONES	GRAY		64	122	58	821	763	gravel (+larger)-gray	gravel	pebbles	
SHALE	BLACK		122	126	4	763	759	clay-black	clay		
ST. PETER, DUSTY	WHITE		126	130	4	759	755	St.Peter Sandstone	sandstone		
ST. PETER, SHAKOPEE	YELLOW		130	186	56	755	699	Prairie Du Chien	sandstone	dolomite	
SHAKOPEE	TAN		186	195	9	699	690	Prairie Du Chien	dolomite		
SHAKOPEE	TAN		195	265	70	690	620	Prairie Du Chien	dolomite		
JORDAN	YELLOW		265	265	0	620	620	Jordan Sandstone	sandstone		

Minnesota Unique Well Number

206672

County Anoka
Quad Minneapolis
Quad ID 120D

MINNESOTA DEPARTMENT OF HEALTH
WELL AND BORING REPORT
Minnesota Statutes Chapter 1031

Entry Date 04/15/1991
Update Date 03/10/2014
Received Date

Well Name	Township	Range	Dir	Section	Subsection
FRIDLEY 9	30	24	W	14	DCCAAB

Elevation 882 ft. **Elev. Method** 7.5 minute topographic map (+/- 5 feet)

Address

C/W 603 61ST AV NE FRIDLEY MN

Stratigraphy Information

Geological Material	From	To (ft.)	Color	Hardness
SAND	0	15		
SILT & CLAY	15	67		
SAND & GRAVEL	67	117		
ST. PETER	117	132		
DOLOMITE	132	250		
JORDAN SANDROCK	250	255		SOFT

Remarks

DEEPENED BY LAYNE MINN. CO. TO 255 FT. IN 1972.

Well Depth 255 ft. **Depth Completed** 255 ft. **Date Well Completed** 12/22/1965

Drill Method **Drill Fluid**

Use community supply(municipal) **Status** Active

Well Hydrofractured? Yes ☐ No ☐ **From** **To**

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

Casing Diameter		Weight
24 in. To 153 ft.		lbs./ft.
30 in. To 67 ft.		lbs./ft.

Open Hole From 153 ft. To 255 ft.

Screen? ☐ **Type** **Make**

Static Water Level

56 ft. land surface Measure 12/22/1965

Pumping Level (below land surface)

59 ft. hrs. Pumping at 1000 g.p.m.

Wellhead Completion

Pitless adapter manufacturer Model

☐ Casing Protection ☐ 12 in. above grade
☐ At-grade (Environmental Wells and Borings ONLY)

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

Nearest Known Source of Contamination

feet Direction Type

Well disinfected upon completion? ☐ Yes ☐ No

Pump ☐ Not Installed Date Installed

Manufacturer's name JACUZZI

Model Number HP 75 Volt 220

Length of drop pipe ft Capacity 1100 g.p. Typ Turbine

Abandoned

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

Miscellaneous

First Bedrock St.Peter Sandstone Aquifer Prairie Du Chien-
Last Strat Jordan Sandstone Depth to Bedrock 117 ft
Located by Minnesota Department of Health
Locate Method GPS Differentially Corrected
System UTM - NAD83, Zone 15, Meters X 479875 Y 4991927
Unique Number Verification Information from Input Date 07/27/1999

Angled Drill Hole

Well Contractor

Keys Well Co. 62012
Licensee Business Lic. or Reg. No. Name of Driller

Minnesota Well Index Report | **206672** | Printed on 01/09/2018 HE-01205-15

Minnesota Unique Well No.

206672

County Anoka
Quad Minneapolis North
Quad ID 120D

MINNESOTA DEPARTMENT OF HEALTH

WELL AND BORING RECORD

Minnesota Statutes Chapter 1031

Entry Date 04/15/1991
Update
Received Date 03/10/2014

Well Name	Township	Range	Dir	Section	Subsection	Use	Status	Well Depth	Depth Completed	Date Well Completed	Lic/Reg. No.
FRIDLEY 9	30	24	W	14	DCCAAB	community supply	A	255 ft.	255 ft.	12/22/1965	62012

Elevation 882 ft. **Elev. Method** 7.5 minute topographic map (+/- 5 feet) **Aquifer** Prairie Du Chien- **Depth to Bedrock** 117 ft **Open Hole** 153 - 255 ft **Static Water Level** 56 ft

Field Located By Minnesota Department of
Unique No. Verified Information from owner
Geological Interpretation John Mossler
Agency (Interpretation)

Locate Method GPS Differentially Corrected
Input Source Minnesota Department of Health
Input Date 07/27/1999

Universal Transverse Mercator (UTM) - NAD83 - Zone 15 -
UTM Easting (X) 479875
UTM Northing (Y) 499192
Interpretaion Method Geologic study 1:24k to 1:100k

			Depth (ft.)			Elevation (ft.)					
Geological Material	**Color**	**Hardness**	**From**	**To**	**Thickness**	**From**	**To**	**Stratigraphy**	**Primary Lithology**	**Secondary**	**Minor Lithology**
SAND			0	15	15	882	867	sand	sand		
SILT & CLAY			15	67	52	867	815	silt+clay	silt	clay	
SAND & GRAVEL			67	117	50	815	765	sand +larger	sand	gravel	
ST. PETER SANDSTONE			117	132	15	765	750	St.Peter Sandstone	sandstone		
DOLOMITE			132	250	118	750	632	Prairie Du Chien	dolomite		
JORDAN SANDROCK		SOFT	250	255	5	632	627	Jordan Sandstone	sandstone		

Minnesota Unique Well Number

206658

County Anoka
Quad Minneapolis
Quad ID 120D

MINNESOTA DEPARTMENT OF HEALTH

WELL AND BORING REPORT

Minnesota Statutes Chapter 1031

Entry Date 04/15/1991
Update Date 03/26/2015
Received Date

Well Name	Township	Range	Dir	Section	Subsection
FRIDLEY 10	30	24	W	11	CDCCAA

Elevation 861 ft. **Elev. Method** 7.5 minute topographic map (+/- 5 feet)

Address

C/W 6911 UNIVERSITY AV NE FRIDLEY MN

Stratigraphy Information

Geological Material	From	To (ft.)	Color	Hardness
SAND	0	8		
CLAY	8	35		
GRAVEL	35	42		
SAND, GRAVEL & CLAY	42	95		
SAND	95	123		
SAND & GRAVEL	123	173		
SAND	173	199		

Remarks

SOUTH WELL. M.G.S. NO. 547.
GAMMA LOGGED 3-19-2015 BY JIM TRAEN.

Well Depth	Depth Completed	Date Well Completed
199 ft.	199 ft.	12/29/1969

Drill Method **Drill Fluid**

Use community supply(municipal) **Status** Active

Well Hydrofractured? **Yes** ☐ **No** ☐ **From** **To**

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

Casing Diameter		Weight
16 in.	To 128 ft.	lbs./ft.
24 in.	To 16 ft.	lbs./ft.

Open Hole From ft. To ft.

Screen? ☒ **Type** stainless **Make**

Diameter	Slot/Gauze	Length	Set	
16 in.		73 ft.	128 ft.	199 ft.

Static Water Level

38 ft. top of breather pipe Measure 12/29/1969

Pumping Level (below land surface)

43.2 ft. 2 hrs. Pumping at 800 g.p.m.

Wellhead Completion

Pitless adapter manufacturer Model

☐ Casing Protection ☐ 12 in. above grade
☐ At-grade (Environmental Wells and Borings ONLY)

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

Material	Amount	From	To
neat cement	130 Cubic yards	0 ft.	35 ft.

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 Volt

Length of drop pipe ft Capacity g.p. Typ

Abandoned

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

Miscellaneous

First Bedrock Aquifer Quat. buried
Last Strat sand Depth to Bedrock ft
Located by Minnesota Department of Health
Locate Method GPS SA On (averaged)
System UTM - NAD83, Zone 15, Meters X 479373 Y 4993450
Unique Number Verification Input Date 04/07/1999

Angled Drill Hole

Well Contractor

Keys Well Co. 62012
Licensee Business Lic. or Reg. No. Name of Driller

Minnesota Unique Well No.

206658

County Anoka
Quad Minneapolis North
Quad ID 120D

MINNESOTA DEPARTMENT OF HEALTH

WELL AND BORING RECORD

Minnesota Statutes Chapter 1031

Entry Date 04/15/1991
Update
Received Date 03/26/2015

Well Name	Township	Range	Dir	Section	Subsection	Use	Status	Well Depth	Depth Completed	Date Well Completed	Lic/Reg. No.
FRIDLEY 10	30	24	W	11	CDCCAA	community supply	A	199 ft.	199 ft.	12/29/1969	62012

Elevation 861 ft. **Elev. Method** 7.5 minute topographic map (+/- 5 feet) **Aquifer** Quat. buried artes. **Depth to Bedrock** ft **Open Hole** - ft **Static Water Level** 38 ft

Field Located By Minnesota Department of
Unique No. Verified
Geological Interpretation Emily Bauer
Agency (Interpretation)

Locate Method GPS SA On (averaged)
Input Source Minnesota Department of Health
Input Date 04/07/1999

Universal Transverse Mercator (UTM) - NAD83 - Zone 15 -
UTM Easting (X) 479373
UTM Northing (Y) 499345
Interpretaion Method Cuttings + geophysical log

			Depth (ft.)			Elevation (ft.)					
Geological Material	**Color**	**Hardness**	**From**	**To**	**Thickness**	**From**	**To**	**Stratigraphy**	**Primary Lithology**	**Secondary**	**Minor Lithology**
SAND			0	8	8	861	853	sand	sand		
CLAY			8	35	27	853	826	clay	clay		
GRAVEL			35	42	7	826	819	gravel (+larger)	gravel		
SAND, GRAVEL & CLAY			42	95	53	819	766	pebbly sand/silt/clay	sand	gravel	clay
SAND			95	123	28	766	738	sand	sand		
SAND & GRAVEL			123	173	50	738	688	sand +larger	sand	gravel	
SAND			173	199	26	688	662	sand	sand		

Minnesota Unique Well Number

206657

County Anoka
Quad Minneapolis
Quad ID 120D

MINNESOTA DEPARTMENT OF HEALTH

WELL AND BORING REPORT

Minnesota Statutes Chapter 1031

Entry Date 04/15/1991
Update Date 03/26/2015
Received Date

Well Name	Township	Range	Dir	Section	Subsection
FRIDLEY 11	30	24	W	11	CDCCAA

Elevation 861 ft. **Elev. Method** 7.5 minute topographic map (+/- 5 feet)

Address

C/W 6911 UNIVERSITY AV FRIDLEY MN

Stratigraphy Information

Geological Material	From	To (ft.)	Color	Hardness
DRIFT	0	221		
SAND, GRAVEL &	221	225		
SHAKOPEE LIMEROCK	225	235		
SHAKOPEE LIMEROCK	235	236		
JORDAN	236	245		SOFT
JORDAN SANDROCK	245	320		
JORDAN SANDROCK	320	350		
JORDAN SANDROCK	350	355		
ST. LAWRENCE SHALE	355	490		
FRANCONIA	490	548		
FRANCONIA	548	618		
FRANCONIA	618	669		

Remarks

M.G.S. NO 523. NORTH WELL.
GAMMA LOGGED 3-19-2015 BY JIM TRAEN.

Well Depth 669 ft. **Depth Completed** 669 ft. **Date Well Completed** 04/20/1970

Drill Method **Drill Fluid**

Use community supply(municipal) **Status** Active

Well Hydrofractured? **Yes** ☐ **No** ☐ **From** **To**

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

Casing Diameter	Weight	Hole Diameter
24 in. To 325 ft.	lbs./ft.	23 in. To 344 ft.
30 in. To 225 ft.	lbs./ft.	

Open Hole From 325 ft. To 669 ft.

Screen? ☐ **Type** **Make**

Static Water Level
52 ft. land surface Measure 04/20/1970

Pumping Level (below land surface)
144 ft. 16 hrs. Pumping at 1000 g.p.m.

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

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

Material	Amount	From	To
neat cement	300 Sacks	0 ft.	248 ft.

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 Volt
Length of drop pipe ft Capacity g.p. Typ

Abandoned
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

Miscellaneous
First Bedrock Prairie Du Chien Group Aquifer Jordan-Mt.Simon
Last Strat Mt.Simon Sandstone Depth to Bedrock 225 ft
Located by Minnesota Department of Health
Locate Method GPS Differentially Corrected
System UTM - NAD83, Zone 15, Meters X 479371 Y 4993454
Unique Number Verification Information from Input Date 07/27/1999

Angled Drill Hole

Well Contractor
Keys Well Co. 62012 HALEY, R.
Licensee Business Lic. or Reg. No. Name of Driller

Minnesota Unique Well No.

206657

County Anoka
Quad Minneapolis North
Quad ID 120D

MINNESOTA DEPARTMENT OF HEALTH

WELL AND BORING RECORD

Minnesota Statutes Chapter 1031

Entry Date 04/15/1991
Update
Received Date 03/26/2015

Well Name	Township	Range	Dir	Section	Subsection	Use	Status	Well Depth	Depth Completed	Date Well Completed	Lic/Reg. No.
FRIDLEY 11	30	24	W	11	CDCCAA	community supply	A	669 ft.	669 ft.	04/20/1970	62012

Elevation 861 ft. **Elev. Method** 7.5 minute topographic map (+/- 5 feet) **Aquifer** Jordan-Mt.Simon **Depth to Bedrock** 225 ft **Open Hole** 325 - 669 ft **Static Water Level** 52 ft

Field Located By Minnesota Department of
Unique No. Verified Information from owner
Geological Interpretation Julia Steenberg
Agency (Interpretation)

Locate Method GPS Differentially Corrected
Input Source Minnesota Department of Health
Input Date 07/27/1999

Universal Transverse Mercator (UTM) - NAD83 - Zone 15 -
UTM Easting (X) 479371
UTM Northing (Y) 499345
Interpretaion Method Cuttings + geophysical log

			Depth (ft.)			Elevation (ft.)					
Geological Material	**Color**	**Hardness**	**From**	**To**	**Thickness**	**From**	**To**	**Stratigraphy**	**Primary Lithology**	**Secondary**	**Minor Lithology**
DRIFT			0	221	221	861	640	Quaternary deposit	drift		
SAND, GRAVEL & BROKEN			221	225	4	640	636	sand	sand	gravel	boulder
SHAKOPEE LIMEROCK			225	235	10	636	626	Prairie Du Chien	dolomite	sandstone	
SHAKOPEE LIMEROCK			235	236	1	626	625	Jordan Sandstone	sandstone		
JORDAN		SOFT	236	245	9	625	616	Jordan Sandstone	sandstone		
JORDAN SANDROCK			245	320	75	616	541	Jordan Sandstone	sandstone		
JORDAN SANDROCK			320	350	30	541	511	St.Lawrence	shale	dolomite	sandstone
JORDAN SANDROCK			350	355	5	511	506	Tunnel City Group	sandstone	shale	dolomite
ST. LAWRENCE SHALE			355	490	135	506	371	Tunnel City Group	sandstone	shale	dolomite
FRANCONIA SANDROCK &			490	548	58	371	313	Wonewoc Sandstone	sandstone		
FRANCONIA SANDROCK &			548	618	70	313	243	Eau Claire Formation	shale	sandstone	
FRANCONIA SANDROCK &			618	669	51	243	192	Mt.Simon Sandstone	sandstone		

Minnesota Unique Well Number

209207

County Anoka
Quad New
Quad ID 119C

MINNESOTA DEPARTMENT OF HEALTH

WELL AND BORING REPORT

Minnesota Statutes Chapter 1031

Entry Date 04/15/1991
Update Date 05/22/2014
Received Date

Well Name	Township	Range	Dir	Section	Subsection
FRIDLEY 12	30	24	W	12	BCDDAA

Elevation 890 ft. **Elev. Method** 7.5 minute topographic map (+/- 5 feet)

Address

C/W 7345 65 HY FRIDLEY MN

Stratigraphy Information

Geological Material	From	To (ft.)	Color	Hardness
SAND	0	20		
CLAY	20	55		
CLAY & GRAVEL	55	72		
SAND	72	86		
CLAY	86	93		
CLAY & GRAVEL	93	95		
SAND & GRAVEL	95	153		
SHAKOPEE	153	225		
JORDAN	225	276		

Remarks

M.G.S. NO. 524

Well Depth 276 ft. **Depth Completed** 276 ft. **Date Well Completed** 00/00/1970

Drill Method Cable Tool **Drill Fluid**

Use community supply(municipal) **Status** Active

Well Hydrofractured? Yes ☐ No ☐ **From** **To**

Casing Type Step down **Joint**

Drive Shoe? Yes ☐ No ☐ **Above/Below** 0 ft.

Casing Diameter		Weight
24 in. To 234 ft.		lbs./ft.
30 in. To 153 ft.		lbs./ft.

Open Hole From 234 ft. To 276 ft.

Screen? ☐ **Type** **Make**

Static Water Level

53.5 ft. land surface Measure 00/00/1970

Pumping Level (below land surface)

73.5 ft. hrs. Pumping at 1212 g.p.m.

Wellhead Completion

Pitless adapter manufacturer Model

☐ Casing Protection ☐ 12 in. above grade
☐ At-grade (Environmental Wells and Borings ONLY)

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

Nearest Known Source of Contamination

feet Direction Type

Well disinfected upon completion? ☐ Yes ☐ No

Pump ☐ Not Installed Date Installed

Manufacturer's name

Model Number HP 150 Volt

Length of drop pipe ft Capacity 1200 g.p. Typ

Abandoned

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

Miscellaneous

First Bedrock Prairie Du Chien Group Aquifer Jordan

Last Strat Jordan Sandstone Depth to Bedrock 153 ft

Located by Minnesota Department of Health

Locate Method GPS Differentially Corrected

System UTM - NAD83, Zone 15, Meters X 480877 Y 4994245

Unique Number Verification Information from Input Date 07/27/1999

Angled Drill Hole

Well Contractor

Keys Well Co. 62012

Licensee Business Lic. or Reg. No. Name of Driller

Minnesota Unique Well No.

209207

County Anoka
Quad New Brighton
Quad ID 119C

MINNESOTA DEPARTMENT OF HEALTH

WELL AND BORING RECORD

Minnesota Statutes Chapter 1031

Entry Date 04/15/1991
Update
Received Date 05/22/2014

Well Name	Township	Range	Dir	Section	Subsection	Use	Status	Well Depth	Depth Completed	Date Well Completed	Lic/Reg. No.
FRIDLEY 12	30	24	W	12	BCDDAA	community supply	A	276 ft.	276 ft.	00/00/1970	62012

Elevation 890 ft. **Elev. Method** 7.5 minute topographic map (+/- 5 feet) **Aquifer** Jordan **Depth to Bedrock** 153 ft **Open Hole** 234 - 276 ft **Static Water Level** 53.5 ft

Field Located By Minnesota Department of
Unique No. Verified Information from owner
Geological Interpretation John Mossler
Agency (Interpretation)

Locate Method GPS Differentially Corrected
Input Source Minnesota Department of Health
Input Date 07/27/1999

Universal Transverse Mercator (UTM) - NAD83 - Zone 15 -
UTM Easting (X) 480877
UTM Northing (Y) 499424
Interpretaion Method Geologic study 1:24k to 1:100k

Geological Material	Color	Hardness	Depth (ft.) From	Depth (ft.) To	Thickness	Elevation (ft.) From	Elevation (ft.) To	Stratigraphy	Primary Lithology	Secondary	Minor Lithology
SAND			0	20	20	890	870	sand	sand		
CLAY			20	55	35	870	835	clay	clay		
CLAY & GRAVEL			55	72	17	835	818	pebbly sand/silt/clay	clay	gravel	
SAND			72	86	14	818	804	sand	sand		
CLAY			86	93	7	804	797	clay	clay		
CLAY & GRAVEL			93	95	2	797	795	pebbly sand/silt/clay	clay	gravel	
SAND & GRAVEL			95	153	58	795	737	sand +larger	sand	gravel	
SHAKOPEE			153	225	72	737	665	Prairie Du Chien	dolomite		
JORDAN			225	276	51	665	614	Jordan Sandstone	sandstone		

Appendix B

Part 1 Wellhead Protection Plan Amendment

City of Fridley Wellhead Protection Plan Amendment

Part I:

Delineation of the Wellhead Protection Area (WHPA), Drinking Water Supply Management Area (DWSMA), and Assessments of Well and DWSMA Vulnerability

Prepared for
City of Fridley

July 2018

City of Fridley Wellhead Protection Plan Amendment

Part I:

Delineation of the Wellhead Protection Area (WHPA), Drinking Water Supply Management Area (DWSMA), and Assessments of Well and DWSMA Vulnerability

Prepared for
City of Fridley

July 2018

4300 MarketPointe Drive, Suite 200
Minneapolis, MN 55435
Phone: 952.832.2600
Fax: 952.832.2601

City of Fridley Wellhead Protection Plan Amendment

July 2018

Contents

List of Tables

List of Figures

List of Appendices

Certifications

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.

John C. Greer	July 5, 2018
PG #: 30347	Date

Public Water Supply Profile

The following persons are the contacts for the Fridley Wellhead Protection Plan:

Public Water Supply Contact

Jason Wiehle
Lead Water Operator
Fridley Municipal Center
6431 University Avenue NE
Fridley, Minnesota 55432
Telephone: 763-238-8074
Email: jason.wiehle@fridleymn.gov

Wellhead Protection Manager

Jim Kosluchar
Public Works Director/City Engineer
Fridley Municipal Center
6431 University Avenue NE
Fridley, Minnesota 55432
Telephone: 763-572-3550
Email: jim.kosluchar@fridleymn.gov

Wellhead Protection Consultant

John Greer, PG
Barr Engineering Company
4300 MarketPointe Drive, Suite 200
Minneapolis, Minnesota 55435
Telephone: 952-832-2600
Fax: 952-832-2601
E-mail: jgreer@barr.com

General Information

UNIQUE WELL NUMBER(S) 206674, 206670, 201158, 206675, 206673, 206678, 206669, 206672, 206658, 206657, 209207

SIZE OF POPULATION SERVED 27,208 (2010 Census)

COUNTY Anoka

Executive 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 WHPA, called the drinking water supply management area, or DWSMA. This report describes how a new WHPA and DWSMA, shown on Figure 9, were delineated for the City of Fridley.

Geology and Groundwater Flow – The city of Fridley has eleven primary water supply wells:

- Wells 2, 3, 4, and 5 draw water from the Mt. Simon Sandstone aquifer between 656 and 845 feet below ground surface (ft bgs)
- Wells 6, 7, 8, and 9 draw water from the Prairie du Chien Group aquifer between 138 and 265 ft bgs (Wells 6 and 9 are also open to small [22 and 5 feet, respectively] thickness of the Jordan Sandstone.)
- Well 10 draws water from a buried sand and gravel aquifer between 128 and 199 ft bgs
- Well 11 is open to the St. Lawrence Formation aquitard and the Tunnel City Group, Wonewoc Sandstone, and Mt. Simon Sandstone aquifers between 325 and 669 ft bgs (note: the contribution to the total volume pumped by Well 11 from the St. Lawrence is considered negligible relative to the Tunnel City Group, Wonewoc, and Mt. Simon)
- Well 12 draws water from the Jordan Sandstone aquifer between 234 and 276 ft bgs

Regionally, groundwater flow is to the southwest in the shallower aquifers and to the south in the Mt. Simon aquifer.

Well Vulnerability - The vulnerability of each individual 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. Wells 6, 7, 8, 9, 10, 11, and 12 are considered vulnerable to contamination, while Wells 2, 3, 4, and 5 are considered not vulnerable.

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, regions of high, moderate, and low vulnerability have been assigned to the DWSMA. The majority of the DWSMA has moderate vulnerability, which suggests that water, and any contaminants, may travel from the land surface to the City's aquifers within a time span of a few years to a few decades. High vulnerability, meaning that water may travel from the land surface to the City's aquifers within a time span of months to a few years, and low vulnerability, meaning that water may travel from the land surface to the City's aquifers within a time span of decades to centuries, were assigned to small portions of the DWSMA. Due to the presence of high vulnerability in the DWSMA, additional water quality monitoring has been recommended.

Water Quality Concerns - At present, none of the contaminants for which the Safe Drinking Water Act has established health-based standards are found above maximum allowable levels in the City's water supply (Fridley, 2017). Low levels of trichloroethene (TCE) were detected in Well 9 in 2017 and traces of 1,4-dioxane were detected in multiple wells. Well 10 was shut down in late 2016 due to detections of per- and poly-fluoroalkyl substances (PFAS).

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 recommended activities include water quality monitoring, details of which can be found in Section 7.0 of this report.

1.0 Introduction

In compliance with the Minnesota Wellhead Protection Rules (MN Rules 4720.5100 through 4720.5590), wellhead protection areas (WHPAs) and a Drinking Water Supply Management Area (DWSMA) were delineated for the City of Fridley in 2002. Minnesota Rule 4720.5570 states that wellhead protection plans must be reviewed and amended at least every ten years. In addition, the Minnesota Department of Health (MDH) has instituted requirements for inclusion of fracture-flow analysis in the delineation of WHPAs since the last delineation of the City's WHPAs and DWSMA.

As required by Minnesota Rule 4720.5570, a new WHPA and a new DWSMA have been delineated for the City of Fridley. This report summarizes work completed to update the delineation of the Fridley WHPA and DWSMA in compliance with the Minnesota Wellhead Protection Rules and to meet the current MDH requirements. Data elements used in preparation of the report are presented in Table 1.

The City of Fridley currently has 11 primary municipal water supply wells. In order of shallowest to deepest aquifer the wells:

- Well 10 (unique number 206658) is completed in the buried Quaternary glacial drift aquifer;
- Wells 7 (unique number 206678) and 8 (unique number 206669) are completed in the Prairie du Chien Group aquifer;
- Wells 6 (unique number 206673) and 9 (unique number 206672) are completed in both the Prairie du Chien Group and Jordan Sandstone aquifers;
- Well 12 (unique number 209207) is completed in the Jordan Sandstone aquifer;
- Well 11 is completed in both the Tunnel City Group-Wonewoc Sandstone and Mt. Simon Sandstone aquifers;
- Wells 2 (unique number 206674), 3 (unique number 206670), 4 (unique number 201158), and 5 (unique number 206675) are completed in the Mt. Simon Sandstone aquifer.

Well locations are shown on Figure 1. Table 2 summarizes construction, use, and vulnerability information for the Fridley water supply wells. Well logs for the City's wells are presented in Appendix A.

2.0 Criteria for Wellhead Protection Area Delineation

The following criteria were used to ensure accurate delineation of the WHPAs.

2.1 Time of Travel

A minimum 10-year groundwater time of travel criterion must be used to delineate a WHPA (MN Rule 4720.5510) so there is sufficient reaction time to remediate potential health impacts in the event of contamination of the aquifer. A groundwater time of travel of ten years was considered in this study. As required by the Wellhead Protection Rules, the one-year groundwater time of travel zone was also determined for each well addressed in this study.

2.2 Aquifer Transmissivity

For this study, transmissivities of the buried Quaternary glacial drift aquifer, the Prairie du Chien Group aquifer, the Jordan Sandstone aquifer, the Tunnel City Group-Wonewoc Sandstone aquifer, and the Mt. Simon Sandstone aquifer were estimated using pumping tests conducted at Well 10 (Quaternary), Wells 6 and 8 (Prairie du Chien), Brooklyn Center Well 9 (Jordan), Blaine Well 7 (Tunnel City-Wonewoc), and Wells 2 and 3 (Mt. Simon). Summaries of the aquifer tests are included in Appendix B. See Section 2.5 below for details regarding how these transmissivity values were incorporated into the groundwater model.

Analysis of specific capacity data from Well 10 using the TGuess Method (Bradbury and Rothschild, 1985) estimated a transmissivity of 64,000 ft^2/day (5,950 m^2/day) for the buried Quaternary aquifer.

Analysis of data from pumping tests conducted at Wells 6 and 8 estimated a representative transmissivity of 149,000 ft^2/day (13,800 m^2/day) for the Prairie du Chien Group aquifer.

Analysis of data from a pumping test conducted at Brooklyn Center Well 9 (unique number 110493) estimated a representative transmissivity of 2,773 ft^2/day (258 m^2/day) for the Jordan Sandstone aquifer. This transmissivity was scaled by the ratio of the average Jordan thickness at Fridley Wells 2, 3, and 5 (87.3 feet) to the Jordan thickness at Brooklyn Center Well 9 (90 feet) to obtain a representative Jordan transmissivity in Fridley of 2,689 ft^2/day (250 m^2/day).

Analysis of data from a pumping test conducted at Blaine Well 7 (unique number 208616) estimated a representative transmissivity of 1,300 ft^2/day (121 m^2/day) for the combined Tunnel City Group-Wonewoc Sandstone aquifer. This transmissivity was scaled by the ratio of the combined Tunnel City-Wonewoc thickness at Fridley Well 11 (198 feet) to Tunnel City-Wonewoc thickness at Blaine Well 7 (191 feet) to obtain a representative Tunnel City-Wonewoc transmissivity in Fridley of 1,348 ft^2/day (125 m^2/day). In the absence of sufficient data to determine individual transmissivities of the Tunnel City Group and Wonewoc Sandstone, it was assumed that both units have the same hydraulic conductivity and so the transmissivity was simply apportioned between units by the ratio of their individual thicknesses at Well 11 to the combined total. Therefore a transmissivity of 953 ft^2/day (89 m^2/day) was assigned to the Tunnel City

Group (140 feet thick at Well 11) and a transmissivity of 345 ft^2/day (37 m^2/day) was assigned to the Wonewoc Sandstone (58 feet thick at Well 11).

Analysis of two production tests at Well 2 and three production tests at Well 3 estimated a geometric mean transmissivity of 5,048 ft^2/day (469 m^2/day) for the Mt. Simon Sandstone.

2.3 Daily Volume of Water Pumped

Pumping data for the City of Fridley for the period 2013 through 2017 are summarized in Table 3. The largest annual withdrawal for 2013-2017 was 1,299,357,000 gallons in 2016. It should be noted that on average during the period 1995-2014 the City imported approximately 27% of its total distributed water from New Brighton. During the period 2015-2017 the City had to pump its wells more because the New Brighton source was unavailable. The City's Water Supply Plan (Fridley, 2016) projects a 2023 average daily demand of 3.66 million gallons per day. For this plan, it was assumed that the City's wells would supply the full 2023 projected demand (i.e., potential water imports from New Brighton were ignored). Projected 2023 pumping rates for each well were calculated by multiplying the total 2023 projected demand by the 2013-2017 average percentage of total withdrawal for each well. The pumping rate used in the model for each Fridley well for the WHPA delineation was either this 2023 projection or the historical maximum for the period 2013-2017, whichever was greater. The maximum 2013-2017 rates were greater than the projected 2023 rates for all wells. Table 3 summarizes the pumping rates used in the model for delineation of the WHPAs. Unaccounted water (the difference between the total volume pumped annually by the City's wells and the total amount billed to users) averaged approximately 9% from 2010-2015 (Fridley, 2016).

2.4 Conceptual Hydrogeologic Model

The regional hydrogeologic conceptual model is presented in Metropolitan Council (2014). Additional geological information is included below, along with discussion of groundwater flow boundaries and flow directions specific to the Fridley area.

2.4.1 Regional Bedrock Geology

A bedrock map derived from the Twin Cities ten-county metropolitan area geologic map (Mossler, 2013) is shown on Figure 1. Locations of two geologic cross sections through the study area are also shown on Figure 1. Geologic cross section A-A' (Figure 2) is a west to east cross section that intersects north to south cross section B-B' (Figure 3) at Fridley Well 4.

The hydrostratigraphic units of importance for this study are described in more detail below.

Mt. Simon Sandstone

The Cambrian-aged Mt. Simon Sandstone consists of multiple beds of medium- to coarse-grained quartz sandstone intermixed with beds of siltstone and feldspathic sandstone (Mossler, 2012). The formation is 125-200 feet thick in Anoka County. The Mt. Simon Sandstone is overlain by the Eau Claire Formation (a confining unit) throughout Fridley.

Eau Claire Formation

The Cambrian-aged Eau Claire Formation is comprised of very fine feldspathic sandstone, siltstone, and shale, and is 75-80 feet thick in Anoka County (Mossler, 2012). The Eau Claire Formation functions as a regional confining unit throughout Fridley.

Wonewoc Sandstone (formerly Ironton and Galesville Sandstones)

The Cambrian-aged Wonewoc Sandstone is fine- to coarse-grained, quartzose sandstone, with its upper part coarser-grained than its lower part (Mossler, 2012). It is 50-60 feet thick in Anoka County.

Tunnel City Group (formerly Franconia Formation)

The Cambrian-aged Tunnel City Group is divided into two formations: the Mazomanie Formation and the Lone Rock Formation. The Mazomanie Formation is mostly a fine- to medium-grained friable, quartz sandstone. The Lone Rock Formation underlies the Mazomanie Formation and consists of fine grained glauconitic, feldspathic sandstone and shale with dolostone interclasts (Mossler, 2012). The Tunnel City Group is the uppermost bedrock in northwestern Fridley. It is 135 to 180 feet thick where not eroded. The Mazomanie Formation is present in the uppermost 60-80 feet of the unit.

St. Lawrence Formation

The Cambrian-aged St. Lawrence Formation is composed of dolomitic, feldspathic siltstone with interbedded very fine-grained sandstone and shale (Mossler, 2012). The St. Lawrence Formation is 38 to 50 feet thick in Anoka County and typically functions as a confining unit between the overlying Jordan Sandstone and the underlying Tunnel City Group.

Jordan Sandstone

The Cambrian-aged Jordan Sandstone consists of two interlayered facies: a medium- to coarse-grained, friable, quartz sandstone and a very fine-grained, feldspathic sandstone with lenses of siltstone and shale (Mossler, 2012). Where it is not eroded the Jordan Sandstone is typically 85 to 100 feet thick. As shown on Figure 1, the Jordan Sandstone is the uppermost bedrock in the bedrock valley within which Wells 10 and 11 are located.

Prairie du Chien Group

The Ordovician-aged Prairie du Chien Group is divided into two formations: the upper Shakopee Formation and the lower Oneota Dolomite. The Shakopee Formation is a heterolithic unit composed of dolostone, sandy dolostone, and sandstone, while the Oneota Dolomite is medium- to thick-bedded dolomite (Mossler, 2012). The Prairie du Chien Group is the uppermost bedrock across much of Fridley. It is 125 to 140 feet thick where not eroded. The Prairie du Chien Group is classified as being highly fractured over much of the Twin Cities metropolitan area, especially under shallow bedrock conditions (overlying bedrock thickness < 200 feet, after Runkel et al. (2003)). Groundwater in the Prairie du Chien Group flows through fractures and macropores (Berg, 2016).

Quaternary Glacial Drift

The Quaternary-aged sediments that overlie the bedrock in Fridley were deposited by multiple glacial advances during the Pleistocene Epoch (Meyer et al., 2013) and vary in thickness from approximately 50 feet thick where the St. Peter Sandstone is the uppermost bedrock at the western end of cross-section A-A' to nearly 300 feet thick where the Tunnel City Group is the uppermost bedrock in northwestern Fridley. The west-east cross section (Figure 2) shows the Quaternary sediments thickening from west to east in Fridley, with these deposits primarily composed of sand and gravel. A confining unit of clay and silt is first encountered at Well 7 and continues to the east, separating the Quaternary sand and gravel into shallow and deep units. Well 10 is completed in the deep unit in a buried valley to the north of the cross section.

2.4.2 Flow Boundaries

The Mississippi River to the west of Fridley is a regional groundwater flow boundary. Local flow directions, especially in the Mt. Simon aquifer, are influenced by multiple high-capacity pumping wells in the area; see Section 2.6 below for more discussion.

2.5 Model Description

To accurately delineate the WHPAs, it is necessary to assess how nearby wells, rivers, lakes, and variations in geologic conditions affect groundwater flow directions and velocities in the aquifer. A groundwater model constructed using the finite difference code MODFLOW-NWT (Niswonger, et al., 2011) was used for this study to simulate groundwater flow in the hydrostratigraphic units from the Quaternary aquifer down to the Mt. Simon Sandstone. MODFLOW-NWT is public domain software that is available at no cost from the United States Geological Survey. The pre- and post-processor Groundwater Vistas (version 7) (Environmental Simulations, Inc., 2017) was used to create the model data files and evaluate the model results.

2.5.1 Base Model

Since the previous Fridley Wellhead Protection Plan was prepared, the Twin Cities Metropolitan Area Regional Groundwater Flow Model, Version 3.0 (Metropolitan Council, 2014) was developed by Barr Engineering for the Metropolitan Council. A new model based on Metro Model 3 was developed by Barr for the Coon Rapids Wellhead Protection Plan Amendment (Barr, 2016). This model includes local edits to the Metro Model 3 hydraulic conductivity field and projected 2020 pumping rates for the Coon Rapids municipal wells. Because Coon Rapids is adjacent to Fridley, the Coon Rapids model was used as the base model for the new Fridley WHPA delineations.

The model is divided into 9 layers to represent the major hydrostatigraphic units in the Twin Cities Metropolitan Area. In Fridley, the model layers represent the following (ordered from youngest to oldest; i.e., shallowest to deepest):

- Layer 1: Quaternary glacial drift or Platteville and Glenwood Formations (where present)
- Layer 2: St. Peter Sandstone or Quaternary glacial drift (where present)
- Layer 3: Prairie du Chien Group or Quaternary glacial drift (where present)

- Layer 4: Jordan Sandstone or Quaternary glacial drift (where present)
- Layer 5: St. Lawrence Formation or Quaternary glacial drift (where present)
- Layer 6: Tunnel City Group
- Layer 7: Wonewoc Sandstone
- Layer 8: Eau Claire Formation
- Layer 9: Mt. Simon Sandstone

Major rivers near Fridley (i.e., the Mississippi River) as well as lakes in the area are simulated using the River Package within MODFLOW-NWT. Baseflow measurements for rivers and streams in the area were used during calibration of Metro Model 3.

Recharge for the groundwater flow model was determined using the SWB recharge model (Westenbroek et al., 2010) for the Twin Cities metropolitan area as described in Metropolitan Council (2012). Monthly precipitation data for Fridley from the last 5 years is summarized in Table 4.

Modifications made to the base model for the Fridley WHPA delineations are discussed in the following section.

2.5.2 Model Modifications and Updates

The following modifications and updates were made to the base model:

- The model grid was refined from the 500-m square cells in the far field of the base model down to 125-m square cells throughout the Fridley city limits and down to 7.81-m square cells in the immediate vicinity of the Fridley wells.
- The Layer 2 bottom surface was adjusted in the vicinity of Well 10 so that the open interval of this well would be entirely contained within Layer 3 instead of straddling the contact between Layers 2 and 3.
- The edges of the Prairie du Chien Group and Jordan Sandstone within the refined grid area were revised to more closely follow the bedrock map.
- Horizontal hydraulic conductivity values (Kx) were updated so that model layer transmissivities in the vicinity of the Fridley wells match aquifer test transmissivities (Section 2.2; Appendix B) as described below. Table C1 in Appendix C summarizes the effective hydraulic conductivity values used in the model in order to match the aquifer test transmissivities. Appendix C also includes maps of model hydraulic conductivity fields for the modified model layers (Figures C1-C7).
    - Quaternary. The estimated transmissivity of 64,000 ft^2/day (5,946 m^2/day) was divided by the saturated aquifer thickness of 161 ft (49 m) to obtain an effective Kx value of 398 ft/day (121 m/day). This Kx value was applied within the buried valley containing Well 10 in Layer 3. The detailed Quaternary mapping from the Anoka County Geologic Atlas (Meyer et al., 2013) was used to infer appropriate regions within which to apply the pumping test Kx value in Layers 1 and 2. A Kx/Kz ratio of 10 was assumed for all modified Quaternary cells.
    - St. Peter Sandstone. The Metro Model 3 Kx value of 206 ft/day (62.7 m/day) and Kz value of 67.3 ft/day (20.5 m/day) seemed too high for this unit. A St. Peter Kx value of 38.7 ft/day (11.8 m/day) from Runkel et al. (2003) was applied to model cells

representing the St. Peter Sandstone within the refined area in Layer 2. A Kx/Kz ratio of 10 was assumed for these cells.

- Prairie du Chien. The representative pumping test transmissivity of 149,000 ft^2/day (135 m^2/day) was divided by the formation thickness of 135 ft (41 m) to obtain an effective Kx value of 1,104 ft/day (336 m/day). This Kx value was applied to model cells representing the Prairie du Chien Group within the refined grid area in Layer 3. A Kx/Kz ratio of 66, derived from the calibrated Metro Model 3 Kx and Kz for the Prairie du Chien Group in this area, was assumed for these cells.
- Jordan. The scaled pumping test transmissivity of 2,689 ft^2/day (250 m^2/day) was divided by the average Jordan thickness in Fridley of 87.3 ft (27 m) to obtain an effective Kx value of 30.8 ft/day (9.39 m/day). This Kx value was applied to model cells representing the Jordan Sandstone within the refined grid area in Layer 4. A Kx/Kz ratio of 10 was assumed for these cells.
- Tunnel City Group and Wonewoc Sandstone. As described above in Section 2.2, the combined transmissivity was apportioned between the two units by assuming that the hydraulic conductivity of both units was the same. Therefore, the scaled pumping test transmissivity of 1,348 ft^2/day (125 m^2/day) for the combined Tunnel City Group-Wonewoc Sandstone aquifer was divided by the combined thickness of 198 feet (60.3 m) to obtain an effective hydraulic conductivity of 6.81 ft/day (2.08 m/day). This Kx value was applied to model cells within the refined zone in Layers 6 and 7. A Kx/Kz ratio of 100 was assumed for the Layer 6 (Tunnel City) cells based on the significant fraction of shale in the Tunnel City Group indicated on the logs for the Fridley wells that penetrate this unit. A Kx/Kz ratio of 10 was assumed for the Layer 7 (Wonewoc) cells.
- Mt. Simon Sandstone. The pumping test transmissivity of 5,048 ft^2/day (469 m^2/day) was divided by the formation thickness of 206.5 ft (62.9 m) to obtain an effective Kx value of 24.4 ft/day (7.45 m/day). This Kx value was applied to model cells within the refined grid area in Layer 9. A Kx/Kz ratio of 10 was assumed for these cells.

- After the above modifications were made, modeled heads were compared to observed heads from Minnesota Well Index records located within the model domain. No further calibration was deemed necessary. Plots of modeled versus measured heads are included as Figures C8 and C9 in Appendix C. Full discussion of the Metro Model 3 calibration is presented in Metropolitan Council (2014).
- The pumping rates for the City's wells were changed to the model input rates shown in Table 3.
- Pumping rates for 95 high-capacity wells within 3 kilometers of Fridley were updated to use 2012-2016 averages. A list of these wells is included as Table C2 in Appendix C.

MODFLOW files for the updated model are included in Appendix G.

2.6 Groundwater Flow Field

The groundwater flow field used for delineation of the WHPAs was determined by the groundwater flow model; modeled contours for the Prairie du Chien Group/Quaternary glacial drift (Layer 3), Jordan

Sandstone/Quaternary glacial drift (Layer 4), Tunnel City Group and Wonewoc Sandstone (Layers 6 and 7), and Mt. Simon Sandstone (Layer 9) are shown on Figures 4, 5, 6, and 7, respectively.

In general, Figures 4, 5, and 6 show westerly to southwesterly flow directions in the Quaternary, Prairie du Chien, Jordan, and Tunnel City-Wonewoc aquifers. The modeled Quaternary, Prairie du Chien, and Jordan flow directions are consistent with published contour maps for these aquifers in Anoka County (Berg, 2016); the Tunnel City and Wonewoc contour maps from the same publication do not show contours in Fridley. Figure 7 shows generally southerly flow directions in the Mt. Simon aquifer, with a notable cone of depression around Fridley Wells 2-5. Berg (2016) shows southerly- to southeasterly flow in the Mt. Simon in this area. Based on these comparisons and the acceptable calibration of the groundwater model, the groundwater flow field was determined to be of acceptable accuracy.

3.0 Delineation of the Wellhead Protection Area

Delineation of the WHPA for the Fridley wells involved the evaluation of both porous media flow and fracture flow as detailed below.

3.1 Porous Media Flow Evaluation

The groundwater flow model discussed above in Section 2 was used to simulate the groundwater flow field in the vicinity of Fridley. The porous media capture zone for the Fridley well field was delineated using the software program MODPATH (Version 6; Pollock, 2012) with the modeled groundwater flow field. A minimum of 180 particles were tracked from each well. The particles were released from up to 6 vertical points in each layer along the open interval of each well. These particles were tracked backwards in time for both one and ten years. In plan view, the areas encompassed by the particle traces were then outlined as the 1-year and 10-year porous media time of travel zones for the well field.

Porosity values used for the porous media flow evaluation were as follows (Norvitch et al., 1974, Schwartz and Zhang, 2003):

- Quaternary Glacial Drift = 0.25
- St. Peter Sandstone = 0.2
- Prairie du Chien Group = 0.056
- Jordan Sandstone = 0.2
- St. Lawrence Formation = 0.2
- Tunnel City Group = 0.2
- Wonewoc Sandstone = 0.2
- Eau Claire Formation = 0.01
- Mt. Simon Sandstone = 0.2

3.1.1 Sensitivity Analysis

A sensitivity analysis was performed to test the sensitivity of the model results to varying hydraulic conductivity in the Quaternary glacial drift, Prairie du Chien Group, Jordan Sandstone, Tunnel City Group-Wonewoc Sandstone, and Mt. Simon Sandstone aquifers. Table C1 in Appendix C summarizes the upper and lower hydraulic conductivity bounds used in the sensitivity analysis. These values were calculated from (1) pumping test transmissivity ranges for the Tunnel City-Wonewoc and Mt. Simon aquifers (Appendix B), (2) plus and minus 50 percent of the base hydraulic conductivity for the Quaternary glacial drift and Jordan Sandstone aquifers, and (3) the upper pumping test transmissivity and original Metro Model 3 hydraulic conductivity for the Prairie du Chien Group aquifer. The ratio of horizontal to vertical hydraulic conductivity used in the base model run was preserved for each sensitivity run. The model was most sensitive to raising the hydraulic conductivity of the Tunnel City Group and Wonewoc Sandstone and lowering the hydraulic conductivity of the Mt. Simon Sandstone. A plot of the sensitivity analysis results is included in Appendix C (Figure C10).

Multiple particle tracking simulations were conducted to account for uncertainty in the groundwater flow model. In addition to the base model run, particle tracking simulations were conducted for the upper and

lower conductivity bounds of each sensitivity run. Particle traces from all simulations were used to delineate the 1-year and 10-year porous media capture zones for each well.

3.2 Fracture Flow Evaluation

As noted in Section 1.0, Wells 6, 7, 8, and 9 are open to the Prairie du Chien Group. Well 12 is open to the Jordan Sandstone, which is likely hydraulically connected to the Prairie du Chien Group. To address fracture flow in the Prairie du Chien Group, MDH (2011a) guidelines for delineating WHPAs in fractured and solution-weathered bedrock were followed using Delineation Technique Number 2 for Wells 6-9 and Delineation Technique Number 4 (wells open only to a porous media aquifer that is hydraulically connected to a fractured or solution-weathered aquifer) for Well 12. A summary of the calculations used in the delineation of fracture flow capture zones is presented in Appendix D. The fracture flow capture zones are shown on Figure 8.

3.2.1 Fixed Radius Capture Zones and Upgradient Extensions

Due to the close proximity of Wells 6, 7, 8, and 9, these wells were treated as a single well for the fracture flow delineation. Coordinates for this effective single well were determined using a pumping-rate weighted average of the coordinates of each individual well. The pumping rate applied to the effective single well was the sum of the individual model pumping rates for Wells 6, 7, 8, and 9 (Table 3). Delineation Technique Number 1 was used to delineate a 1-year fixed radius capture zone for the combined Wells 6-9. Next, following the MDH guidelines (MDH, 2011a), the ratio of the well discharge to the discharge vector was calculated. This ratio was less than 3,000, so Delineation Technique Number 2 was used to delineate a 5-year fixed radius capture zone with a 5-year upgradient extension. Both the 5-year fixed radius capture zone and the 5-year upgradient extension were truncated along the edge of the Prairie du Chien Group to the north and east of the wells.

Although Well 12 is open to only the Jordan Sandstone, a porous media aquifer, the porous media modeling suggests that the Jordan Sandstone is hydraulically connected to the fractured and solution-weathered Prairie du Chien Group. The water budget software ZONEBUDGET (Harbaugh, 1990) was used to compute the contribution from model layer 3 (Prairie du Chien Group) to the baseline 10-year porous media capture zone for Well 12. Flow from model layer 3 to model layer 4 within the Well 12 capture zone was approximately 50% of the Well 12 pumping rate. The MDH guidelines cite a threshold of 10% for determining whether or not recharge from the fractured or solution-weathered aquifer is a significant source of recharge to the porous media aquifer; since the calculated percentage for Well 12 was above this threshold, it was necessary to delineate a fracture flow capture zone for this well.

The ratio of the well discharge to the discharge vector was calculated for Well 12 using the contribution from model layer 3 calculated by ZONEBUDGET as the pumping rate. This ratio was less than 3,000, so an upgradient extension was required for the 10-year fracture flow capture zone. Delineation Technique Number 1 was used to delineate a 1-year fixed radius capture zone and Delineation Technique Number 2 was used to delineate a 5-year fixed radius capture zone with a 5-year upgradient extension. The 5-year fixed radius capture zone and the 5-year upgradient extension were truncated along the edge of the Prairie du Chien Group to the south and northeast, respectively, of Well 12.

3.3 WHPA Delineations

The composite 10-year porous media capture zones, 5-year fixed radius fracture flow capture zones, and 5-year upgradient extensions define the WHPA. The Emergency Response Area (ERA) is delineated for each well by the composite 1-year porous media capture zones and 1-year fixed radius fracture flow capture zones. The WHPA and ERAs are shown on Figure 9.

3.4 Conjunctive Delineation

While there is an area of high aquifer vulnerability within the DWSMA, as discussed below in section 6.0, current MDH policy is to recommend stable isotope sampling to assess groundwater/surface water interaction. Stable isotope samples have not yet been collected from the City's wells but are recommended (see Section 7.0). In the absence of isotope data, a conjunctive delineation (i.e., inclusion of a surface water catchment area) was not completed at this time.

4.0 Delineation of the Drinking Water Supply Management Area

The Fridley DWSMA encompasses the WHPA with boundaries that correspond to geographically identifiable features (e.g., roads, parcel boundaries, quarter-quarter section lines). 2017 parcel data from Anoka and Ramsey Counties and quarter-quarter section lines were used to delineate the DWSMA, which extends east of the Fridley city limits into New Brighton and Mounds View and north into Spring Lake Park. The Fridley DWSMA is shown on Figure 9.

5.0 Well Vulnerability Assessment

MDH evaluated the vulnerability of the Fridley municipal wells to contamination from contaminants released at the surface. The evaluation parameters include geology, well construction, pumping rate, and water quality. Fridley Wells 2, 3, 4, and 5 are classified as "not vulnerable." Fridley Wells 6, 7, 8, 9, 10, 11, and 12 are classified as "vulnerable." Copies of the MDH well vulnerability scoring sheets for the Fridley wells are included in Appendix E.

6.0 Drinking Water Supply Management Area Vulnerability Assessment

The vulnerabilities of the Quaternary glacial drift, Prairie du Chien Group, and Jordan Sandstone within the DWSMA associated with the Fridley wells were evaluated in a manner consistent with MDH guidance for assessing aquifer vulnerability (MDH, 1997) using geologic sensitivities based on L scores computed from boring log data and water quality data for the Fridley wells.

The first step in the assessment is to determine the geologic sensitivity rating of the aquifer. The Minnesota Department of Natural Resources (MnDNR) defines geologic sensitivity based on the travel time of water moving vertically from the surface to the aquifer of interest as follows (see MnDNR, 1991):

- Sensitivity = Very High: vertical travel time is hours to months
- Sensitivity = High: vertical travel time is weeks to years
- Sensitivity = Moderate: vertical travel time is years to decades
- Sensitivity = Low: vertical travel time is several decades to a century
- Sensitivity = Very Low: vertical travel time is more than a century

The majority of the Fridley WHPA, and therefore also the DWSMA, is defined by the fracture flow capture zones for the Prairie du Chien Group. Therefore, the geologic sensitivity of the Prairie du Chien group was assumed to represent the geologic sensitivity of the DWSMA. The geologic sensitivity of the Prairie du Chien Group within the Fridley DWSMA was evaluated using 2 methods:

- Within Anoka County - Pollution sensitivity map for the top of bedrock surface from Part B of the Anoka County Geologic Atlas (Berg, 2016). While the Prairie du Chien Group is not the uppermost bedrock throughout the DWSMA, the overlying St. Peter Sandstone is thin (< 20 feet thick) at the Fridley wells where it is encountered. In the buried valley where the Prairie du Chien Group is not present, the pollution sensitivity maps for the deep Quaternary (Sx aquifer) and the top of bedrock were identical.
- Within Ramsey County - "L scores" based on the thickness of low permeability units at CWI well locations in the vicinity of the DWSMA, computed using the MDH L score tool [See MnDNR (1991) for a discussion of how to determine L scores]. L scores were calculated for 10 wells completed in the Prairie du Chien Group and/or Jordan Sandstone in the vicinity of the Fridley DWSMA in Ramsey County.

Figure F1 in Appendix F shows a composite geologic sensitivity map for the Fridley DWSMA. Geologic sensitivity is low over a majority of the DWSMA, though regions of high and very high geologic sensitivity exist both east and west of Fridley's primary well field.

The second step in the assessment is to refine the geologic sensitivity using water quality data from the water supply wells. In their source water assessment program, MDH uses a classification scheme that rates the vulnerability of groundwater to surface contamination based on sampling data for a list of parameters that indicate man-made impacts or similarity to rainwater (MDH, 2011) and gives some indication of relative groundwater residence time in the subsurface. There are five main categories lettered A to E in

descending order of vulnerability, ranging from Category A which indicates that groundwater has been recharged rapidly from precipitation to Category E which indicates old, saline groundwater with a very long residence time in the subsurface. Table 5 summarizes the available water quality data from the Fridley wells. Water from Wells 2, 3, and 4 was classified as Category D1 ("Pre-1953 Impacted Non-Pathogen"), water from Well 5 was classified as Category D2 ("Pre-1953 Vintage"), water from Wells 6, 8, and 12 was classified as Category B4 ("Post-1953 Impacted Non-Pathogen"), and water from Well 10 was classified as Category B3 ("Road Salt/Water Softener Impacted").

Tritium samples were collected at Wells 10 and 11 in 1999 and 1997, respectively. Tritium (^{3}H), a radioactive isotope of hydrogen, has been used extensively to date groundwater. Tritium activities peaked during atmospheric hydrogen bomb testing of the 1950s and 1960s, and values of ^{3}H in precipitation reached a maximum of approximately 10,000 T.U. (tritium units) in 1963 (Mazor, 2004). Natural production of ^{3}H in the upper atmosphere introduces approximately 5 T.U. to precipitation each year (Mazor, 2004). Because ^{3}H has a relatively short half-life of 12.43 years, radioactive decay since the bomb peak has reduced tritium activities to near background levels and ^{3}H is used mostly for relative age dating today. Groundwater that has little or no detectible ^{3}H is stated to be "vintage" or pre-bomb. Groundwater with detectable concentrations of ^{3}H is stated to be "young" or post-bomb. The presence of tritium at concentrations above 1 tritium unit indicates the presence of a significant fraction of post-1953 (i.e., recently infiltrated) water in the groundwater sample. As shown on Table 5, tritium was detected in the samples collected from Wells 10 and 11 at concentrations of 6.5 and 1.1 T.U., respectively.

When water quality data does not indicate the presence of tritium or other constituents that are consistent with contamination from the surface the aquifer vulnerability classification and the geologic sensitivity rating can be the same. The presence of tritium in groundwater samples from a well suggests that the water traveled vertically from the ground surface to the aquifer in less than about 50 years. When tritium has been detected in a well, geologic sensitivity ratings of low or very low would not be consistent with water quality data, unless groundwater flow information would indicate a nearby connection to an area of rapid vertical movement of water (e.g., a buried bedrock valley filled with sand and gravel) where water could travel from the surface to the aquifer quickly enough that tritium could be detected in a well with a geologic sensitivity rating of low or very low. If there is no hydraulic connection to an area of rapid vertical movement of water, the aquifer vulnerability would need to be classified as no lower than moderate to explain the presence of tritium in the well.

Similarly, when other contaminants (such as volatile organic compounds [VOCs] and per- and polyfluoroalkyl substances [PFAS]) have been detected in a well, geologic sensitivity ratings of low or very low would not be consistent with these detections. If there is no hydraulic connection to an area of rapid vertical movement of water, the aquifer vulnerability would need to be classified as no lower than moderate to explain the presence of these contaminants in the well.

As noted earlier, the majority of the Fridley DWSMA is defined by the fracture flow capture zones for the Prairie du Chien Group; the remainder is defined by the porous media capture zones for the Quaternary (Well 10), Jordan (Well 12), and Tunnel City-Wonewoc (Well 11) aquifers. Tritium has been detected at both Wells 10 and 11, so moderate vulnerability was assigned to these areas of the DWSMA because the

geologic sensitivity was low. No tritium data are available for the Prairie du Chien and Jordan aquifers; however, low levels of VOCs have been detected over the years at Wells 6, 7, 8, 9, and 12 (see Appendix E) and PFAS have been detected at Well 10. The low-level detections are consistent with a travel time of decades to the wells, so moderate vulnerability was assigned to the areas of the DWSMA with low geologic sensitivity defined by the fracture flow and Jordan porous media capture zones. Moderate geologic sensitivity was mapped directly to moderate vulnerability. Areas of high and very high geologic sensitivity larger than 40 acres were mapped to high vulnerability. Small areas of low vulnerability were assigned in the far eastern extents of the Fridley DWSMA for consistency with the overlapping Mounds View DWSMA. The final aquifer vulnerability map is shown on Figure 10.

7.0 Recommendations

It is recommended that the City work with the MDH to conduct tritium sampling of the municipal wells in order to have current data available when updating the aquifer vulnerability assessment as part of the next wellhead protection plan amendment. A minimum list of suggested wells for tritium sampling includes Well 3 (Mt. Simon), Well 6 (Prairie du Chien-Jordan), and Well 12 (Jordan).

As discussed in Sections 3.4 and 6.0, there are areas of high aquifer vulnerability within the Fridley DWSMA but a conjunctive delineation (i.e., inclusion of a surface water catchment area) was not completed at this time due to the absence of water quality data (i.e., stable isotopes) that would indicate rapid recharge of water from the ground surface (including surface water bodies) to the aquifer. The wells most likely to be influenced by potential rapid recharge of surface water are Wells 6, 7, 8, and 9. Stable isotope sampling of these wells is recommended prior to the next wellhead protection plan amendment to assess groundwater/surface water interaction and determine the need for a conjunctive delineation.

8.0 Supporting Data Files

The groundwater model files and GIS files are included in Appendix G. (Appendix G can be found in the "Part1" folder on the CD.)

The groundwater model can be reviewed using MODFLOW-NWT (Niswonger et al., 2011). MODPATH files can be reviewed using MODPATH Version 6 (Pollock, 2012).

All coordinates in the modeling files are based on UTM NAD 83 Zone 15 N datum. Elevations are in meters above mean sea level (m MSL). Time units are days. Length units are meters.

The GIS files have been named according to the MDH conventions. Shapefiles are in UTM NAD83 Zone 15 N datum.

9.0 References

Berg, J.A., 2016. Geologic atlas of Anoka County, Minnesota (Part B.: Minnesota Department of Natural Resources, County Atlas Series C-27, report and pls. 7–9, http://www.dnr.state.mn.us/waters/programs/gw_section/mapping/platesum/anokcga.html.

Environmental Simulations, Inc., 2017. Guide to using Groundwater Vistas, Version 7, Environmental Simulations Inc.

Fridley, City of, 2017. City of Fridley 2017 Drinking Water Report. Accessed from <http://www.ci.fridley.mn.us/DocumentCenter/View/4803/2017-Water-Quality-Report>.

Fridley, City of, 2016. City of Fridley DRAFT Local Water Supply Plan, Third Generation Plan for 2016.

Landon, M.K., Delin, G.N., Komor, S.C., and C.P. Regan, 2000. Relation of Pathways and Transit Times of Recharge Water to Nitrate Concentrations Using Stable Isotopes. *Ground Water* v. 38, no. 3, pp. 381-395

Mazor, E, 2004. Chemical and Isotopic Groundwater Hydrology, 3rd ed., New York: Marcel Dekker Inc.

Metropolitan Council, 2014. Twin Cities Metropolitan Area Regional Groundwater Flow Model, Version 3.0. Prepared by Barr Engineering. Metropolitan Council: Saint Paul, MN.

Metropolitan Council, 2012. Using the soil water balance model (SWB) to estimate recharge for the Twin Cities Metropolitan Area Groundwater Model Version 3. Prepared by Barr Engineering. Metropolitan Council: Saint Paul, MN.

Meyer, G.N., Tipping, R.G., and R.S. Lively, 2013. Sand Distribution Model. Plate 5 of 6, *in* Geologic Atlas of Anoka County, Minnesota: D.R. Setterholm (ed.). Minnesota Geological Survey County Atlas Series, Atlas C-27. University of Minnesota, St. Paul.

Minnesota Department of Health (MDH), 2018. Personal communication: Pre-Delineation Meeting with MDH and Barr Engineering staffs held on March 8, 2018 at Barr Engineering Company, Bloomington, MN.

Minnesota Department of Health (MDH), 2011. Draft Assessment Monitoring Pilot Study, Minnesota Department of Health, May 2011, Workgroup Review Draft Version 2.0.

Minnesota Department of Natural Resources (MnDNR), Division of Waters. 1991. *Criteria and Guidelines for Assessing Geologic Sensitivity of Ground Water Resources in Minnesota*. Prepared for the Legislative Commission on Minnesota Resources, 122 p., June 1991.

Mossler, J.H., 2013. Bedrock geology of the Twin Cities ten-county metropolitan area, Minnesota. Miscellaneous Map Series M-194, Minnesota Geological Survey.

Mossler, J.H., 2012. Bedrock Geology. Plate 2 of 6, *in* Geologic Atlas of Anoka County, Minnesota: D.R. Setterholm (ed.). Minnesota Geological Survey County Atlas Series, Atlas C-27. University of Minnesota, St. Paul.

Niswonger, R.G., Panday, S., and Ibaraki, M., 2011. MODFLOW-NWT, A Newton formulation for MODFLOW-2005. U.S. Geological Survey Techniques and Methods 6-A37, 44 p.

Norvitch, R.F., Ross, T.G., and A. Brietkrietz, 1974. Water resources outlook for the Minneapolis-St. Paul metropolitan area. Metropolitan Council of the Twin Cities area, 219pp.

Pollock, D.W., 2012. User Guide for MODPATH Version 6—A Particle-Tracking Model for MODFLOW: U.S. Geological Survey Techniques and Methods 6–A41, 58 p.

Runkel, A.C., Tipping, R.G., Alexander, E.C. Jr., Green, J.A., Mossler, J.H., and S.C. Alexander, 2003. Hydrogeology of the Paleozoic Bedrock in Southeastern Minnesota. Minnesota Geological Survey Report of Investigations 61.

Schwartz, F.W. and H. Zhang, 2003. *Fundamentals of Ground Water*. John Wiley and Sons, Inc. New York, New York.

Westenbroek, S.M., V.A. Kelson, W.R. Dripps, R.J. Hunt, and K.R. Bradbury, 2010. SWB – A Modified Thornthwaite-Mather Soil-Water-Balance Code for Estimating Groundwater Recharge, Techniques and Methods 6-A31, U.S. Geological Survey, Groundwater Resources Program, Reston, VA, 72 pp.

Tables

Table 1

Assessment of Data Elements
Fridley WHPP Amendment

Data Element	Present and Future Implications				Data Source
	Use of the Wells	Delineation Criteria	Quality and Quantity of Well Water	Land and Groundwater Use in DWSMA	
Precipitation	M	L	M	M	Minnesota Climatology Working Group
Geology					
Maps and geologic descriptions	M	H	H	H	MGS, CWI
Subsurface data	M	H	H	H	MGS, MDH, CWI
Borehole geophysics	M	M	M	M	MGS
Surface geophysics	L	L	L	L	Not Available
Maps and soil descriptions	L	M	M	M	MGS, NRCS
Eroding lands					
Water Resources					
Watershed units	L	L	L	L	DNR
List of public waters	L	L	L	L	DNR
Shoreland classifications					
Wetlands map					
Floodplain map					
Land Use					
Parcel boundaries map	L	H	L	L	Metropolitan Council, Anoka County
Political boundaries map	L	L	L	L	MNGEO
PLS map	L	L	L	L	DNR
Land use map and inventory					
Comprehensive land use map					
Zoning map					
Public Utility Services					
Transportation routes and corridors	L	M	L	L	MNDOT
Storm/sanitary sewers and PWS system map	L	L	L	L	City of Fridley
Oil and gas pipelines map					

Definitions Used for Assessing Data Elements:

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

CWI – Minnesota County Well Index
DNR – Minnesota Department of Natural Resources
MNGEO - Minnesota Geospatial Information Office
MDH – Minnesota Department of Health
MNDOT – Minnesota Department of Transportation
MPCA – Minnesota Pollution Control Agency
NRCS – Natural Resources Conservation Service
SSURGO – Soil Survey Geographic Database
USGS – United States Geological Survey

Table 1

Assessment of Data Elements (Continued)
Fridley WHPP Amendment

Data Element	Present and Future Implications				Data Source
	Use of the Wells	Delineation Criteria	Quality and Quantity of Well Water	Land and Groundwater Use in DWSMA	
Public drainage systems map/ list	L	L	L	L	City of Fridley
Records of well construction, maintenance, and use	H	H	L	L	City of Fridley, CWI, MDH files
Surface Water Quantity					
Stream flow data	L	L	L	L	DNR
Ordinary high water mark data	L	L	L	L	DNR
Permitted withdrawals	L	L	L	L	DNR
Protected levels/flows	L	L	L	L	DNR
Water use conflicts	L	L	L	L	DNR
Groundwater Quantity					
Permitted withdrawals	H	H	H	H	DNR
Groundwater use conflicts	L	L	L	L	DNR
Water levels	H	H	H	H	CWI, MDH
Surface Water Quality					
Stream and lake water quality management classification					
Monitoring data summary	L	L	L	L	MPCA, MDH
Groundwater Quality					
Monitoring data	H	H	H	H	MDH
Isotopic data	H	H	H	H	MDH
Tracer studies	L	L	L	L	Not Available
Contamination site data	L	L	M	M	MPCA, MDH
Property audit data from contamination sites					
MPCA and MDA spills/release reports	L	L	L	L	MDH, MPCA

Definitions Used for Assessing Data Elements:

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

CWI – Minnesota County Well Index
DNR – Minnesota Department of Natural Resources
MNGEO - Minnesota Geospatial Information Office
MDH – Minnesota Department of Health
MNDOT – Minnesota Department of Transportation
MPCA – Minnesota Pollution Control Agency
NRCS – Natural Resources Conservation Service
SSURGO – Soil Survey Geographic Database
USGS – United States Geological Survey

Table 2

Water Supply Well Information
Fridley WHPP Amendment

Local Well ID	Unique Number	Use/ Status[1]	Casing Diameter (in.)	Casing Depth (ft.)	Well Depth (ft.)	Year Constructed	Aquifer	Well Vulnerability
2	206674	P	24 x 16	675	842	1960	Mt. Simon	Not Vulnerable
3	206670	P	24 x 16 x 10	784	836	1961	Mt. Simon	Not Vulnerable
4	201158	P	24 x 16	663	831	1961	Mt. Simon	Not Vulnerable
5	206675	P	16	656	845	1961	Mt. Simon	Not Vulnerable
6	206673	P	24	153	255	1972	Prairie du Chien - Jordan	Vulnerable
7	206678	P	24 x 16 x 12	138	262	1970	Prairie du Chien	Vulnerable
8	206669	P	16 x 12	138	265	1969	Prairie du Chien	Vulnerable
9	206672	P	30 x 24	153	255	1972	Prairie du Chien - Jordan	Vulnerable
10	206658	P	24 x 16	128	199	1969	Confined Quaternary	Vulnerable
11	206657	P	30 x 24	325	669	1970	St. Lawrence – Mt. Simon	Vulnerable
12	209207	P	30 x 24	234	276	1970	Jordan	Vulnerable

[1] P = Primary

Table 3

Annual and Projected Pumping Rates for Fridley Wells
Fridley WHPP Amendment

		Total Annual Withdrawal (gal/yr)				
Unique Number	Well Name	2013	2014	2015	2016	2017
206674	2	74,051,000	79,307,000	97,780,000	36,620,000	54,288,000
206670	3	80,778,000	7,492,000	6,361,000	180,586,000	188,104,000
201158	4	44,591,000	77,042,000	96,109,000	105,095,000	123,090,000
206675	5	26,970,000	28,949,000	86,516,000	84,889,000	52,376,000
206673	6	38,244,000	41,605,000	70,681,000	144,788,000	155,268,000
206678	7	141,000	6,201,000	193,000	34,329,000	13,958,000
206669	8	152,578,933	119,448,000	135,190,000	261,475,000	286,642,000
206672	9	62,768,000	140,100,000	150,352,000	56,294,000	49,938,000
206658	10	114,662,000	104,938,000	105,434,000	10,079,000	48,000
206657	11	163,316,000	124,015,000	116,542,000	90,609,000	38,966,000
209207	12	217,233,000	178,272,000	214,798,000	294,593,000	271,900,000
	Totals	975,332,933	907,369,000	1,079,956,000	1,299,357,000	1,234,578,000

Source: MPARS, City water use records

		Percentage of Annual Withdrawal					
Unique Number	Well Name	2013	2014	2015	2016	2017	Average Annual % of Withdrawal
206674	2	7.6%	8.7%	9.1%	2.8%	4.4%	6.5%
206670	3	8.3%	0.8%	0.6%	13.9%	15.2%	7.8%
201158	4	4.6%	8.5%	8.9%	8.1%	10.0%	8.0%
206675	5	2.8%	3.2%	8.0%	6.5%	4.2%	4.9%
206673	6	3.9%	4.6%	6.5%	11.1%	12.6%	7.8%
206678	7	0.0%	0.7%	0.0%	2.6%	1.1%	0.9%
206669	8	15.6%	13.2%	12.5%	20.1%	23.2%	16.9%
206672	9	6.4%	15.4%	13.9%	4.3%	4.0%	8.8%
206658	10	11.8%	11.6%	9.8%	0.8%	0.0%	6.8%
206657	11	16.7%	13.7%	10.8%	7.0%	3.2%	10.3%
209207	12	22.3%	19.6%	19.9%	22.7%	22.0%	21.3%

Table 3

Annual and Projected Pumping Rates for Fridley Wells
Fridley WHPP Amendment

		Projected Water Use (2023)			Maximum Total Pumping for Model Input[3]		
Unique Number	Well Name	Total[1] (gal/yr)	% of Total Projected Water Use Well[2]	Projected Well Pumpage Based on % (gal/yr)	gal/yr	gal/day	m^3/day
206674	2		6.5%	86,833,500	97,780,000	267,890	1,014
206670	3		7.8%	104,200,200	188,104,000	515,353	1,951
201158	4		8.0%	106,872,000	123,090,000	337,233	1,277
206675	5		4.9%	65,459,100	86,516,000	237,030	897
206673	6		7.8%	104,200,200	155,268,000	425,392	1,610
206678	7		0.9%	12,023,100	34,329,000	94,052	356
206669	8		16.9%	225,767,100	286,642,000	785,321	2,973
206672	9		8.8%	117,559,200	150,352,000	411,923	1,559
206658	10		6.8%	90,841,200	114,662,000	314,142	1,189
206657	11		10.3%	137,597,700	163,316,000	447,441	1,694
209207	12		21.3%	284,546,700	294,593,000	807,104	3,055
	Totals	1,335,900,000		1,335,900,000	1,694,652,000	4,642,882	17,576

Appropriation 2,400,000,000

[1] 2023 projected average daily demand of 3.66 million gallons per day from Fridley Water Supply Plan (City of Fridley, 2016)

[2] Percentages for all wells are based the average % of annual withdrawal for the period 2013 through 2017

[3] For each well, the greater of the estimated pumpage based on projected 2023 withdrawal and actual annual pumpage for 2013 - 2017.

Table 4

Fridley Precipitation Data 2013-2017
Fridley WHPP Amendment

Month	2013	2014	2015	2016	2017	Average
January	0.69	1.37	0.23	0.28	0.75	0.66
February	1.12	1.51	0.36	0.50	0.68	0.83
March	2.03	0.79	0.72	1.54	0.62	1.14
April	3.78	7.43	1.88	4.28	2.52	3.98
May	5.00	5.02	5.49	2.69	7.11	5.06
June	7.43	8.02	3.82	3.29	3.51	5.21
July	3.61	2.76	7.14	4.88	2.45	4.17
August	1.05	4.39	4.20	9.66	6.01	5.06
September	1.33	1.60	4.56	8.45	1.43	3.47
October	4.06	1.16	2.32	3.28	6.07	3.38
November	0.44	1.15	3.95	3.39	0.51	1.89
December	1.60	0.95	1.55	1.88	0.70	1.34
Total	32.14	36.15	36.22	44.12	32.36	36.20

Source: Minnesota Climatology Working Group

Table 5

Fridley Water Quality Data
Fridley WHPP Amendment

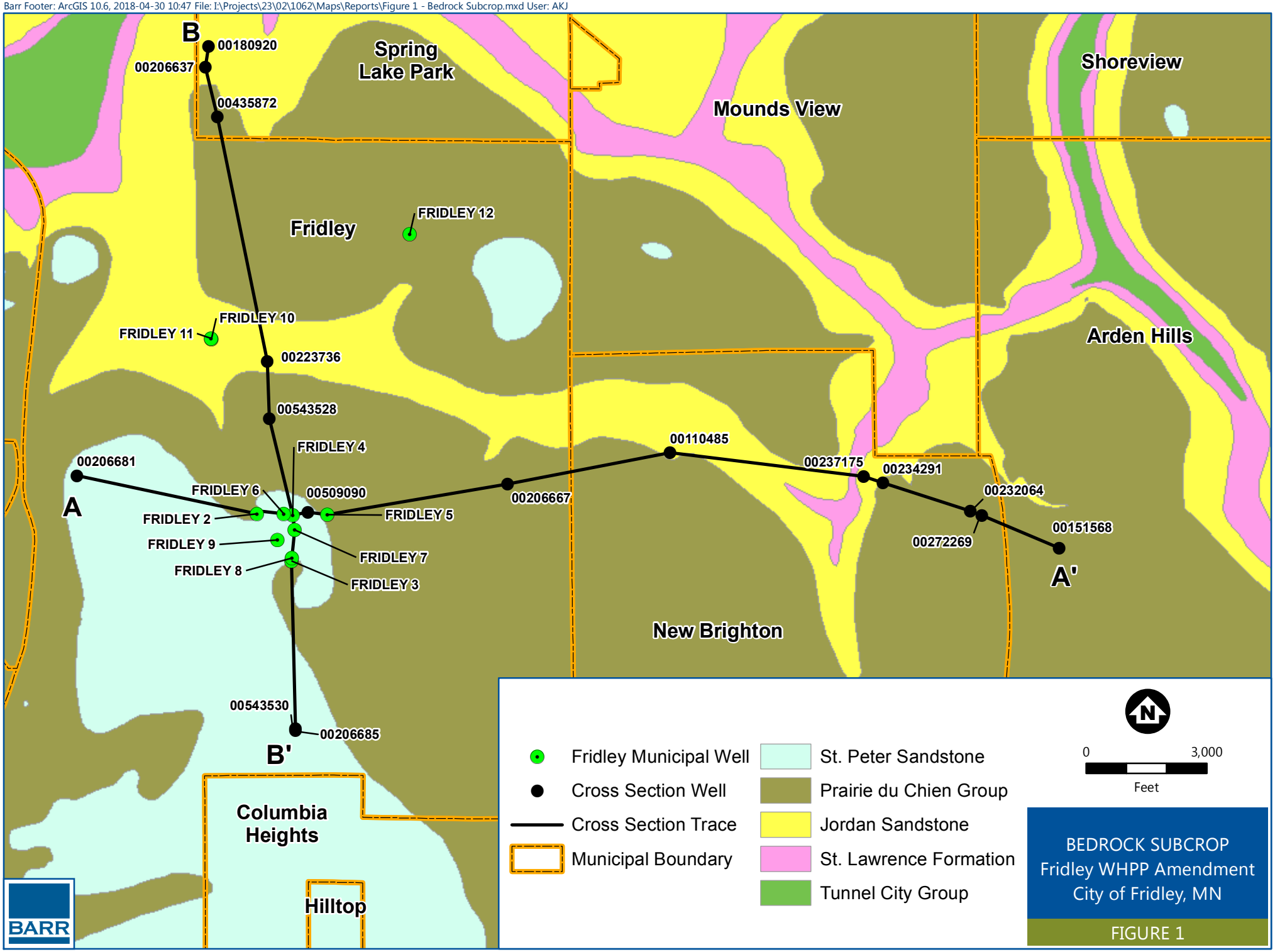
Well	Sample Date	Aquifer	Br (mg/L)	Cl (mg/L)	Cl/Br	NO_3 (mg/L)	SO_4 (mg/L)	NH_3 (mg/L)	^3H (TU)	MDH Classification
2	7/23/2013	Mt. Simon	0.18	38.2	212	< 0.05	2.93	0.32	-	D1(1)
3	7/23/2013	Mt. Simon	0.1	19.5	195	< 0.05	2.54	0.29	-	D1(1)
4	6/4/2007	Mt. Simon	0.1	22.6	226	-	3.58	-	-	D1(1)
5	7/23/2013	Mt. Simon	0.04	7.27	182	< 0.05	1.77	0.27	-	D2
6	7/23/2013	Prairie du Chien - Jordan	0.04	24.4	610	< 0.05	27.6	0.18	-	B4(2)
8	7/23/2013	Prairie du Chien	0.04	19.6	490	< 0.05	25	0.16	-	B4(2)
10	7/23/2013	Quaternary	0.03	55.1	1837	< 0.05	38.4	0.34	6.5(3)	B3
11	4/23/1997	St. Lawrence-Mt. Simon	-	-	-	-	-	-	1.1	-(4)
12	7/23/2013	Jordan	0.03	8.75	292	0.38(5)	8.02	0.34	-	B4(6)

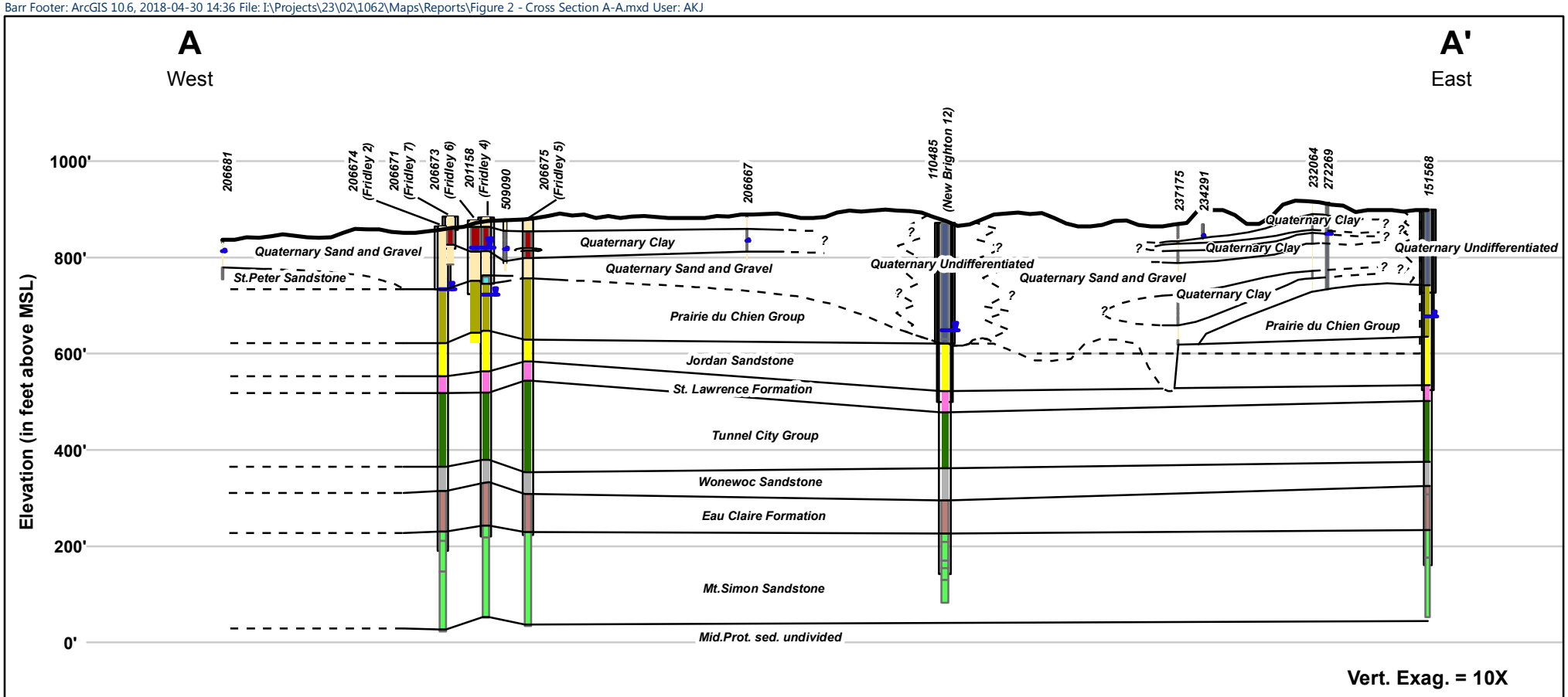
Notes:

(1) Cl/Br ratio is not greater than 250 but Cl is too high for D2 classification.
(2) B4 designation chosen despite lack of ^3H data due to detections of 1,1,2-Trichloroethane
(3) Tritium sample collected on 11/4/1999
(4) Insufficient data to classify the water from this well
(5) NO_3 sample collected on 5/20/2014
(6) B4 designation chosen despite lack of ^3H data due to detections of xylenes

MDH Classification	Description
B3	Road Salt/Water Softener Impacted
B4	Post-1953 Impacted Non-Pathogen
C	Post-1953 Unimpacted
D1	Pre-1953 Impacted Non-Pathogen
D2	Pre-1953 Vintage

Figures


B
00180920
00206637
00435872
Spring Lake Park
Mounds View
Shoreview
Fridley
FRIDLEY 12
FRIDLEY 11
FRIDLEY 10
00223736
Arden Hills
00543528
FRIDLEY 4
00110485
00206681
A
FRIDLEY 6
00509090
00206667
00237175
00234291
00232064
FRIDLEY 2
FRIDLEY 5
FRIDLEY 9
FRIDLEY 7
00272269
00151568
FRIDLEY 8
FRIDLEY 3
A'
New Brighton
00543530
00206685
B'
Columbia Heights
Hilltop
Fridley Municipal Well
Cross Section Well
Cross Section Trace
Municipal Boundary
St. Peter Sandstone
Prairie du Chien Group
Jordan Sandstone
St. Lawrence Formation
Tunnel City Group
N
0
3,000
Feet
BARR
BEDROCK SUBCROP
Fridley WHPP Amendment
City of Fridley, MN
FIGURE 1



Static Water Level
Surface Elevation Line
Well Casing

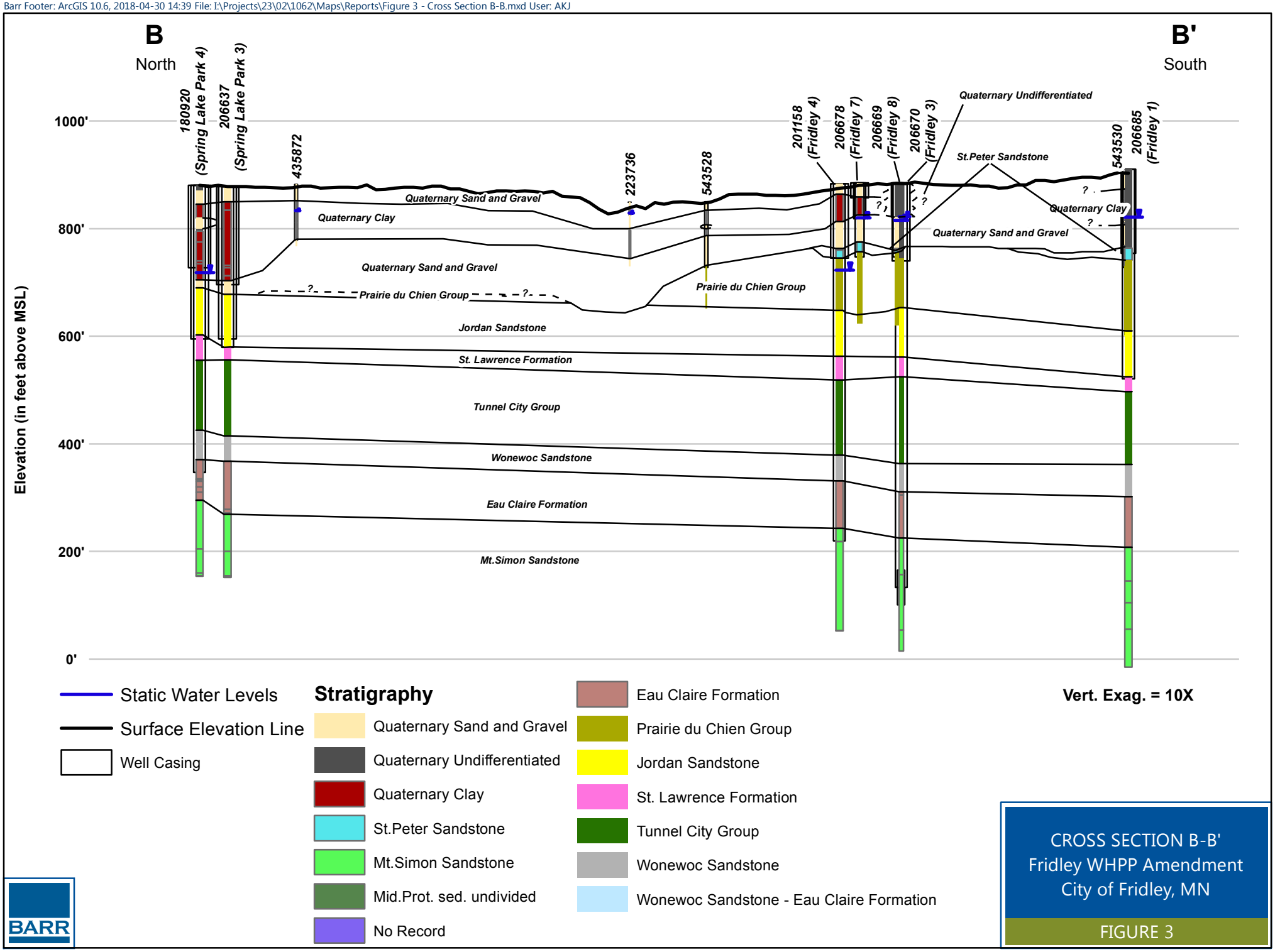
Stratigraphy

- Quaternary Clay
- Quaternary Undifferentiated
- St.Peter Sandstone
- Mt.Simon Sandstone
- Mid.Prot. sed. undivided
- No Record
- Eau Claire Formation
- Quaternary Sand and Gravel
- Prairie du Chien Group
- Jordan Sandstone
- St. Lawrence Formation
- Tunnel City Group
- Wonewoc Sandstone
- Wonewoc Sandstone - Eau Claire Formation

BARR

CROSS SECTION A-A'
Fridley WHPP Amendment
City of Fridley, MN

FIGURE 2

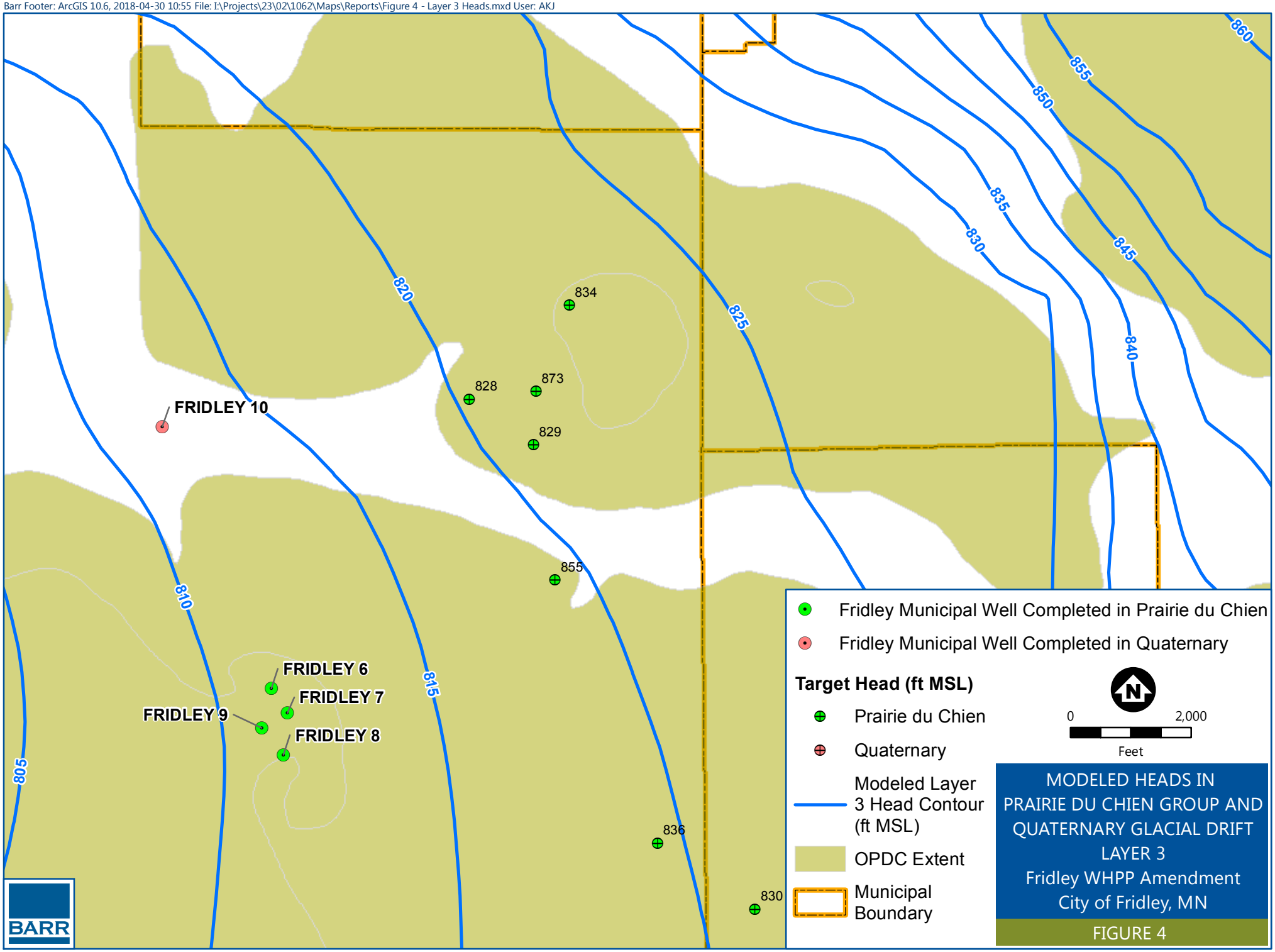


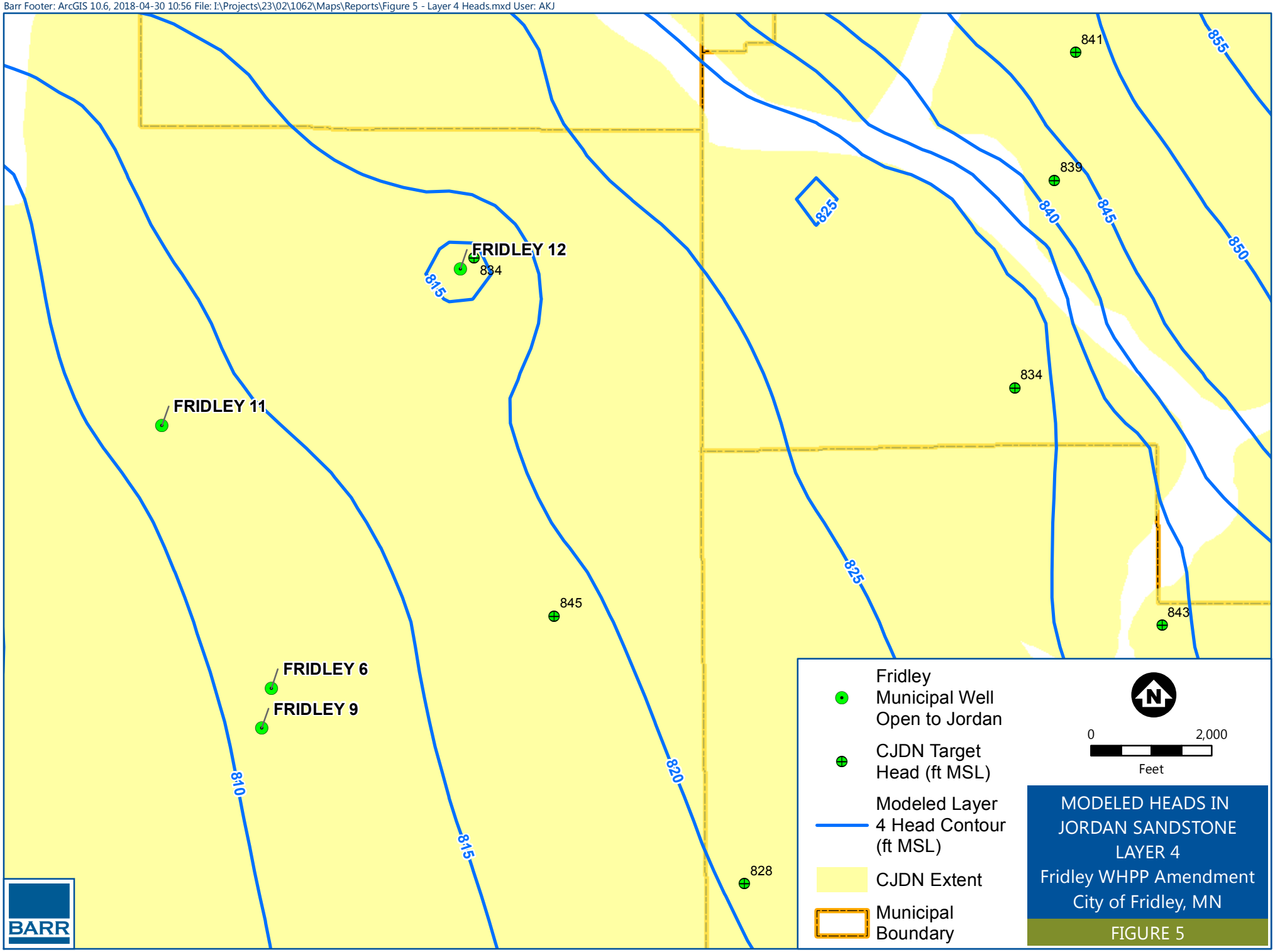
BARR

CROSS SECTION B-B'
Fridley WHPP Amendment
City of Fridley, MN

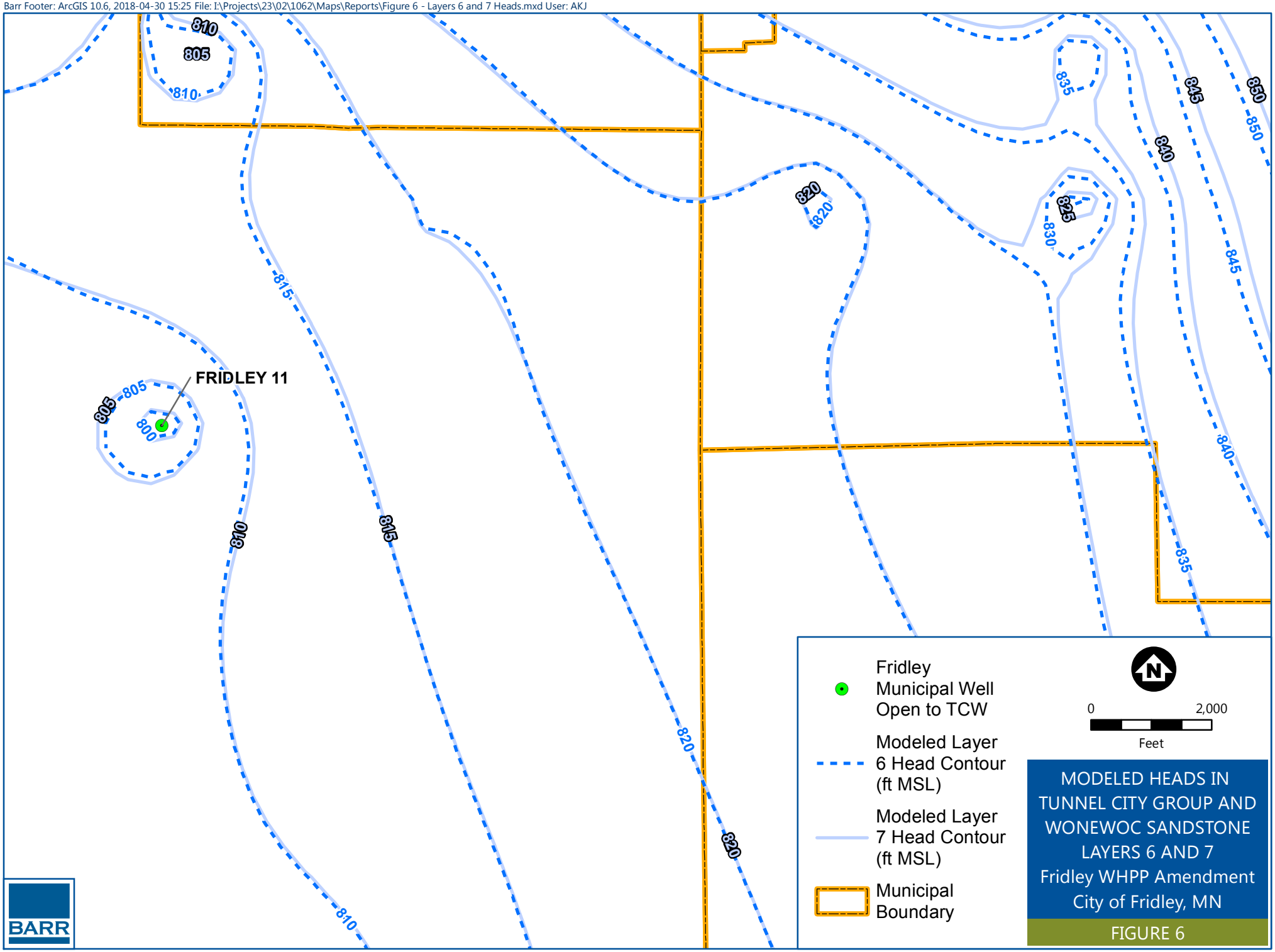
FIGURE 3

Barr Footer: ArcGIS 10.6, 2018-04-30 10:55 File: I:\Projects\23\02\1062\Maps\Reports\Figure 4 - Layer 3 Heads.mxd User: AKJ





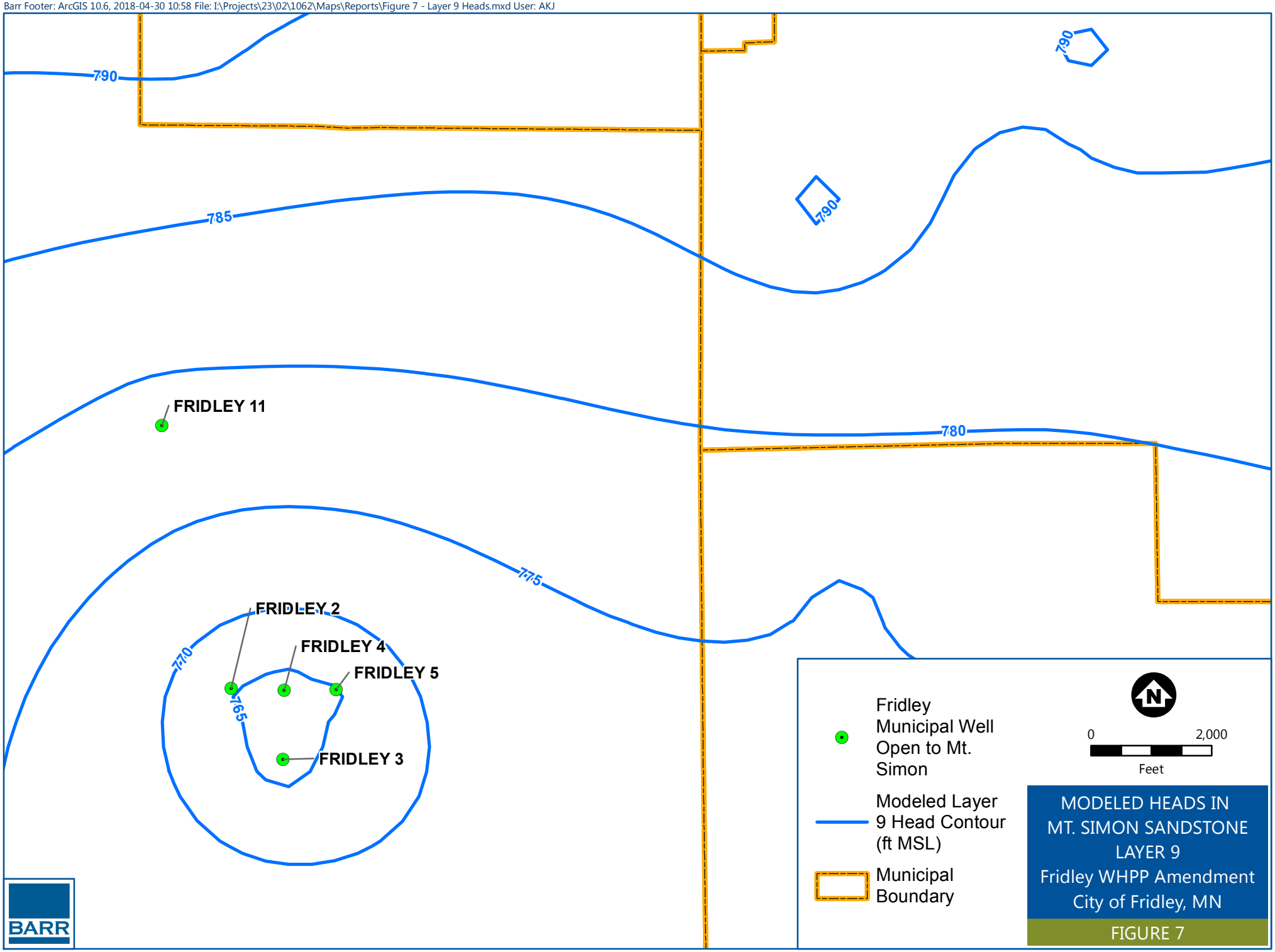
Barr Footer: ArcGIS 10.6, 2018-04-30 15:25 File: I:\Projects\23\02\1062\Maps\Reports\Figure 6 - Layers 6 and 7 Heads.mxd User: AKJ

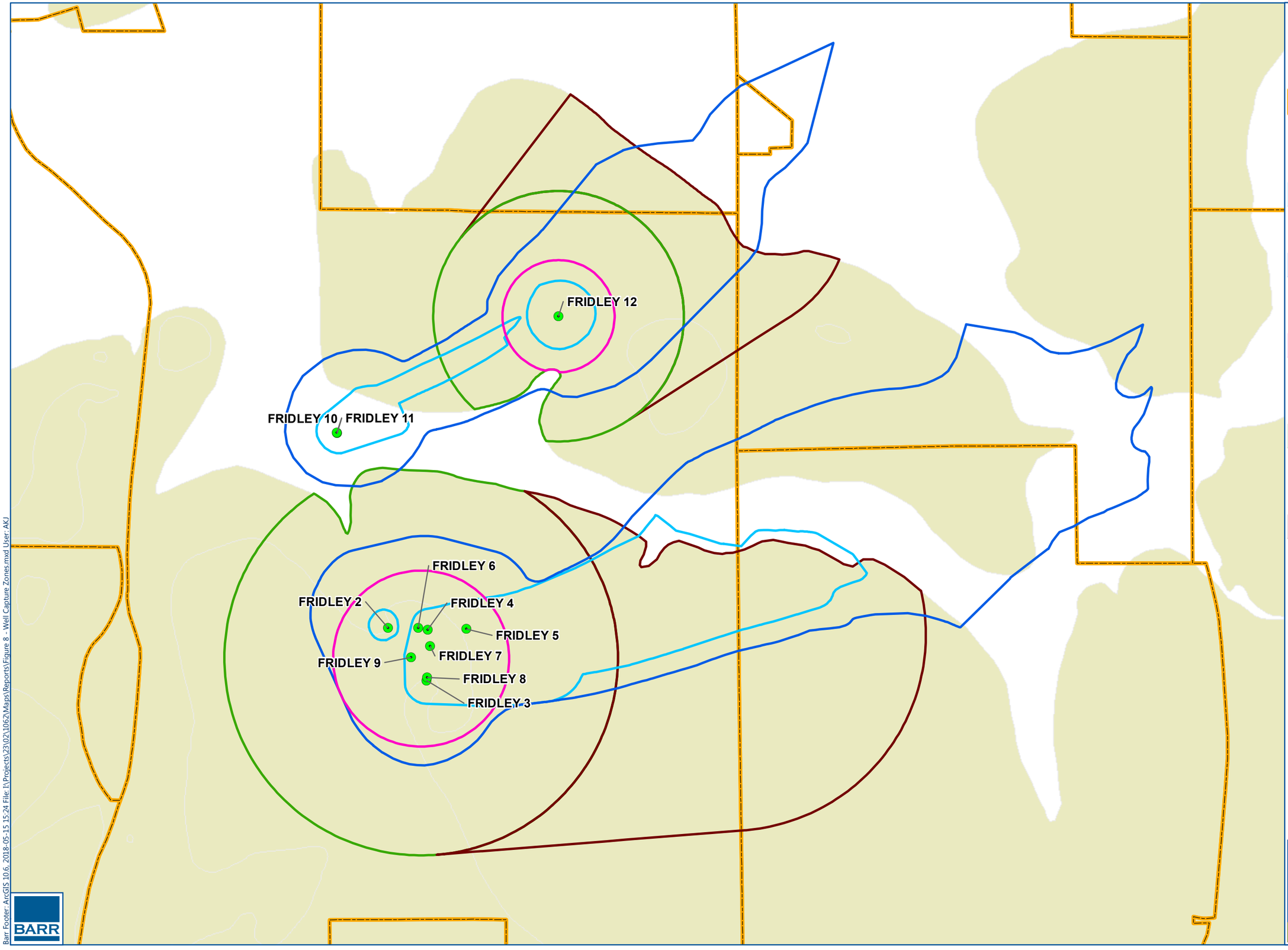


MODELED HEADS IN TUNNEL CITY GROUP AND WONEWOC SANDSTONE LAYERS 6 AND 7

Fridley WHPP Amendment
City of Fridley, MN

FIGURE 6


790
790
790
785
780
775
770
765
FRIDLEY 11
FRIDLEY 2
FRIDLEY 4
FRIDLEY 5
FRIDLEY 3
Fridley Municipal Well Open to Mt. Simon
Modeled Layer 9 Head Contour (ft MSL)
Municipal Boundary
N
0
2,000
Feet
MODELED HEADS IN MT. SIMON SANDSTONE LAYER 9
Fridley WHPP Amendment
City of Fridley, MN
FIGURE 7
BARR



WELL CAPTURE ZONES
Fridley WHPP Amendment
City of Fridley, MN

FIGURE 8

BARR

Barr Footer: ArcGIS 10.6, 2018-05-15 15:24 File: I:\Projects\23\02\1062\Maps\Reports\Figure 8 - Well Capture Zones.mxd User: AKJ

Spring Lake Park

Mounds View

New Brighton

FRIDLEY 12

FRIDLEY 10

FRIDLEY 11

FRIDLEY 6

FRIDLEY 2

FRIDLEY 4

FRIDLEY 5

FRIDLEY 7

FRIDLEY 9

FRIDLEY 8

FRIDLEY 3

Fridley Municipal Well

DWSMA

WHPA

ERA

Municipal Boundary

Parcel

0 2,000

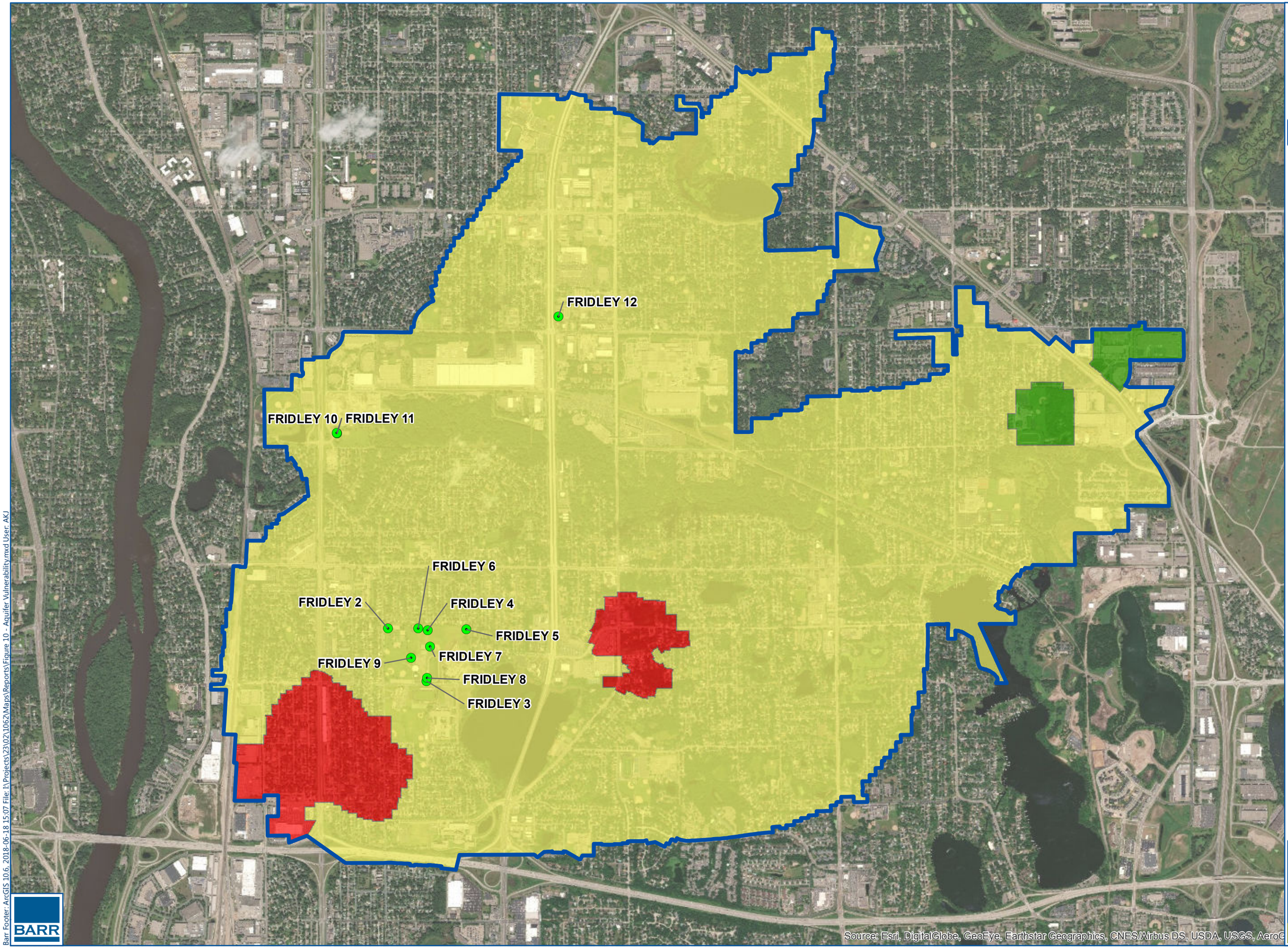
Feet

WHPA & DWSMA
Fridley WHPP Amendment
City of Fridley, MN

FIGURE 9

BARR

Barr Footer: ArcGIS 10.6, 2018-06-18 15:05 File: I:\Projects\23\02\1062\Maps\Reports\Figure 9 - WHPA & DWSMA.mxd User: AKJ



Fridley Municipal Well

DWSMA

Vulnerability

High

Moderate

Low

0 2,000

Feet

AQUIFER VULNERABILITY
Fridley WHPP Amendment
City of Fridley, MN

FIGURE 10

Appendix A

Well Construction Records

Minnesota Unique Well Number

206674

County Anoka
Quad Minneapolis
Quad ID 120D

MINNESOTA DEPARTMENT OF HEALTH

WELL AND BORING REPORT

Minnesota Statutes Chapter 1031

Entry Date 04/15/1991
Update Date 11/15/2016
Received Date

Well Name	Township	Range	Dir	Section	Subsection
FRIDLEY 2	30	24	W	14	DCBBBB

Elevation 865 ft. **Elev. Method** 7.5 minute topographic map (+/- 5 feet)

Address

C/W 6251 7TH ST NE FRIDLEY MN

Stratigraphy Information

Geological Material	From	To (ft.)	Color	Hardness
SAND & GRAVEL	0	120		
SAND & GRAVEL	120	131		
DOLOMITE ROCK	131	243		
JORDAN SANDSTONE	243	312		
DOLOMITE & SHALE	312	347		
DOLOMITE & SHALE	347	390		
FRANCONIA SHALE	390	452		
SANDSTONE	452	500		
SANDSTONE	500	510		
SANDSTONE & RED	510	550		
SANDSTONE & RED	550	635		
SANDSTONE & RED	635	654		
MT. SIMON	654	718		
HINCKLEY	718	838		
HINCKLEY	838	840		
FOND DU LAC	840	842		

Remarks

M.G.S. NO.192 , INFERRED CABLE TOOL METHOD, BASED ON OTHER WELLS DRILLED 1960-61
BY LAYNE

Well Depth 842 ft. **Depth Completed** 842 ft. **Date Well Completed** 12/15/1960

Drill Method Cable Tool **Drill Fluid**

Use community supply(municipal) **Status** Active

Well Hydrofractured? Yes ☐ No ☐ **From** **To**

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

Casing Diameter		Weight
16 in. To	675 ft.	lbs./ft.
24 in. To	131 ft.	lbs./ft.

Open Hole From 675 ft. To 842 ft.

Screen? ☐ **Type** **Make**

Static Water Level
131 ft. land surface Measure 12/15/1960

Pumping Level (below land surface)

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

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

Material	Amount	From	To
	0 Sacks	0 ft.	ft.

Nearest Known Source of Contamination
feet Direction Type
Well disinfected upon completion? ☐ Yes ☐ No

Pump ☐ Not Installed Date Installed
Manufacturer's name
Model Number HP 0 Volt
Length of drop pipe ft Capacity g.p. Typ

Abandoned
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

Miscellaneous
First Bedrock Prairie Du Chien Group Aquifer Mt.Simon
Last Strat Mid.Prot. sed. undivided Depth to Bedrock 131 ft
Located by Minnesota Department of Health
Locate Method GPS Differentially Corrected
System UTM - NAD83, Zone 15, Meters X 479719 Y 4992127
Unique Number Verification Input Date 07/27/1999

Angled Drill Hole

Well Contractor
Layne Well Co. 27010
Licensee Business Lic. or Reg. No. Name of Driller

Minnesota Unique Well No.

206674

County Anoka
Quad Minneapolis North
Quad ID 120D

MINNESOTA DEPARTMENT OF HEALTH

WELL AND BORING RECORD

Minnesota Statutes Chapter 1031

Entry Date 04/15/1991
Update
Received Date 11/15/2016

Well Name	Township	Range	Dir	Section	Subsection	Use	Status	Well Depth	Depth Completed	Date Well Completed	Lic/Reg. No.
FRIDLEY 2	30	24	W	14	DCBBBB	community supply	A	842 ft.	842 ft.	12/15/1960	27010

Elevation 865 ft. **Elev. Method** 7.5 minute topographic map (+/- 5 feet) **Aquifer** Mt.Simon **Depth to Bedrock** 131 ft **Open Hole** 675 - 842 ft **Static Water Level** 131 ft

Field Located By Minnesota Department of
Unique No. Verified
Geological Interpretation John Mossler
Agency (Interpretation)

Locate Method GPS Differentially Corrected
Input Source Minnesota Department of Health
Input Date 07/27/1999

Universal Transverse Mercator (UTM) - NAD83 - Zone 15 -
UTM Easting (X) 479719
UTM Northing (Y) 499212
Interpretaion Method Geologic study 1:24k to 1:100k

			Depth (ft.)			Elevation (ft.)					
Geological Material	**Color**	**Hardness**	**From**	**To**	**Thickness**	**From**	**To**	**Stratigraphy**	**Primary Lithology**	**Secondary**	**Minor Lithology**
SAND & GRAVEL			0	120	120	865	745	sand +larger	sand	gravel	
SAND & GRAVEL			120	131	11	745	734	sand +larger	sand	gravel	
DOLOMITE ROCK			131	243	112	734	622	Prairie Du Chien	dolomite		
JORDAN SANDSTONE			243	312	69	622	553	Jordan Sandstone	sandstone		
DOLOMITE & SHALE			312	347	35	553	518	St.Lawrence	sandstone	siltstone	dolomite
DOLOMITE & SHALE			347	390	43	518	475	Tunnel City Group	sandstone	siltstone	dolomite
FRANCONIA SHALE			390	452	62	475	413	Tunnel City Group	sandstone	shale	siltstone
SANDSTONE			452	500	48	413	365	Tunnel City Group	sandstone	siltstone	
SANDSTONE			500	510	10	365	355	Wonewoc Sandstone	sandstone		
SANDSTONE & RED SHALE			510	550	40	355	315	Wonewoc Sandstone	sandstone		
SANDSTONE & RED SHALE			550	635	85	315	230	Eau Claire Formation	siltstone		
SANDSTONE & RED SHALE			635	654	19	230	211	Mt.Simon Sandstone	sandstone		
MT. SIMON SANDSTONE			654	718	64	211	147	Mt.Simon Sandstone	sandstone		
HINCKLEY SANDSTONE			718	838	120	147	27	Mt.Simon Sandstone	sandstone		
HINCKLEY SANDSTONE			838	840	2	27	25	Mid.Prot. sed.	shale		
FOND DU LAC			840	842	2	25	23	Mid.Prot. sed.	shale		

Minnesota Unique Well Number

206670

County Anoka
Quad Minneapolis
Quad ID 120D

MINNESOTA DEPARTMENT OF HEALTH
WELL AND BORING REPORT
Minnesota Statutes Chapter 1031

Entry Date 04/15/1991
Update Date 11/15/2016
Received Date

Well Name	Township	Range	Dir	Section	Subsection
FRIDLEY 3	30	24	W	14	DCDCDD

Elevation 885 ft. **Elev. Method** 7.5 minute topographic map (+/- 5 feet)

Address

C/W 611 61ST AV NE FRIDLEY MN

Stratigraphy Information

Geological Material	From	To (ft.)	Color	Hardness
DRIFT	0	140		
ST. PETER	140	145		
SHAKOPEE-ONEOTA	145	232		
SHAKOPEE-ONEOTA	232	283		
JORDAN	283	324		
JORDAN	324	360		
JORDAN	360	363		
ST. LAWRENCE	363	380		
ST. LAWRENCE	380	435		
FRANCONIA	435	522		
FRANCONIA	522	536		
GALESVILLE	536	574		
GALESVILLE	574	580		
EAU CLAIRE	580	660		
EAU CLAIRE	660	728		
MT. SIMON	728	831		
HINCKLEY BOTTOM	831	870		

Remarks

M.G.S. NO.195, ON 62ND AVE HALF WAY BETWEEN UNIVERSITY & CENTRAL

NO DATE ON GAMMA LOG. INFERRED CABLE TOOL METHOD, BASED ON OTHER WELLS DRILLED
1960-61 BY LAYNE, GAMMA LOGGED 10-20-2015 BY JIM TRAEN.

REVISED BEDROCK CONTACTS.

Well Depth 870 ft. **Depth Completed** 836 ft. **Date Well Completed** 03/03/1961

Drill Method Cable Tool **Drill Fluid**

Use community supply(municipal) **Status** Active

Well Hydrofractured? Yes ☐ No ☐ **From** **To**

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

Casing Diameter			Weight
24	in. To	145 ft.	lbs./ft.
16	in. To	752 ft.	lbs./ft.
10	in. To	784 ft.	lbs./ft.

Open Hole From 752 ft. To 870 ft.

Screen? ☐ **Type** **Make**

Static Water Level
63 ft. land surface Measure 03/03/1961

Pumping Level (below land surface)

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

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

Material	Amount		From	To
neat cement	0	Sacks	0 ft.	ft.

Nearest Known Source of Contamination
feet Direction Type
Well disinfected upon completion? ☐ Yes ☐ No

Pump ☐ Not Installed Date Installed
Manufacturer's name
Model Number HP 0 Volt
Length of drop pipe ft Capacity g.p. Typ

Abandoned
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

Miscellaneous
First Bedrock Prairie Du Chien Group Aquifer Mt.Simon
Last Strat Mt.Simon Sandstone Depth to Bedrock 140 ft
Located by Minnesota Department of Health
Locate Method GPS Differentially Corrected
System UTM - NAD83, Zone 15, Meters X 479981 Y 4991769
Unique Number Verification Input Date 07/27/1999

Angled Drill Hole

Well Contractor
Layne Well Co. 27010
Licensee Business Lic. or Reg. No. Name of Driller

Minnesota Unique Well No.

206670

County Anoka
Quad Minneapolis North
Quad ID 120D

MINNESOTA DEPARTMENT OF HEALTH

WELL AND BORING RECORD

Minnesota Statutes Chapter 1031

Entry Date 04/15/1991
Update
Received Date 11/15/2016

Well Name	Township	Range	Dir	Section	Subsection	Use	Status	Well Depth	Depth Completed	Date Well Completed	Lic/Reg. No.
FRIDLEY 3	30	24	W	14	DCDCDD	community supply	A	870 ft.	836 ft.	03/03/1961	27010

Elevation 885 ft. **Elev. Method** 7.5 minute topographic map (+/- 5 feet) **Aquifer** Mt.Simon **Depth to Bedrock** 140 ft **Open Hole** 752 - 870 ft **Static Water Level** 331 ft

Field Located By Minnesota Department of
Unique No. Verified
Geological Interpretation Andrew Retzler
Agency (Interpretation)

Locate Method GPS Differentially Corrected
Input Source Minnesota Department of Health
Input Date 07/27/1999

Universal Transverse Mercator (UTM) - NAD83 - Zone 15 -
UTM Easting (X) 479981
UTM Northing (Y) 499176
Interpretaion Method Cuttings + geophysical log

			Depth (ft.)			Elevation (ft.)					
Geological Material	**Color**	**Hardness**	**From**	**To**	**Thickness**	**From**	**To**	**Stratigraphy**	**Primary Lithology**	**Secondary**	**Minor Lithology**
DRIFT			0	140	140	885	745	Quaternary deposit	drift		
ST. PETER			140	145	5	745	740	Prairie Du Chien	dolomite	sandstone	
SHAKOPEE-ONEOTA			145	232	87	740	653	Prairie Du Chien	dolomite		
SHAKOPEE-ONEOTA			232	283	51	653	602	Jordan Sandstone	sandstone		
JORDAN			283	324	41	602	561	Jordan Sandstone	sandstone		
JORDAN			324	360	36	561	525	St.Lawrence	siltstone	dolomite	
JORDAN			360	363	3	525	522	Tunnel City Group	sandstone	shale	dolomite
ST. LAWRENCE			363	380	17	522	505	Tunnel City Group	sandstone	shale	dolomite
ST. LAWRENCE			380	435	55	505	450	Tunnel City Group	sandstone	dolomite	
FRANCONIA			435	522	87	450	363	Tunnel City Group	sandstone	siltstone	dolomite
FRANCONIA			522	536	14	363	349	Wonewoc Sandstone	sandstone		
GALESVILLE			536	574	38	349	311	Wonewoc Sandstone	sandstone		
GALESVILLE			574	580	6	311	305	Eau Claire Formation	siltstone	sandstone	
EAU CLAIRE			580	660	80	305	225	Eau Claire Formation	siltstone	sandstone	
EAU CLAIRE			660	728	68	225	157	Mt.Simon Sandstone	sandstone		
MT. SIMON			728	831	103	157	54	Mt.Simon Sandstone	sandstone		
HINCKLEY BOTTOM			831	870	39	54	15	Mt.Simon Sandstone	sandstone		

Minnesota Unique Well Number

201158

County Anoka
Quad Minneapolis
Quad ID 120D

MINNESOTA DEPARTMENT OF HEALTH

WELL AND BORING REPORT

Minnesota Statutes Chapter 1031

Entry Date 04/15/1991
Update Date 11/15/2016
Received Date

Well Name	Township	Range	Dir	Section	Subsection
FRIDLEY 4	30	24	W	14	DCABAD

Elevation 883 ft. **Elev. Method** 7.5 minute topographic map (+/- 5 feet)

Address

C/W 631 63RD AV NE FRIDLEY MN

Stratigraphy Information

Geological Material	From	To (ft.)	Color	Hardness
FINE SAND	0	19		
CLAY & BOULDERS	19	70		
SAND & BOULDERS	70	120		
SAND & BOULDERS	120	123		
ST. PETER	123	138		
SHAKOPEE LIMESTONE	138	235		
SHAKOPEE LIMESTONE	235	253		
JORDAN SANDSTONE	253	320		
SHALE & SAND	320	364		
SHALE & SAND	364	500		
SANDSTONE & SHALE	500	504		
SANDSTONE & SHALE	504	525		
GALESVILLE SAND	525	550		
HARD SANDSTONE &	550	552		
HARD SANDSTONE &	552	640		
HARD SANDSTONE &	640	665		
HINCKLEY	665	830		
HINCKLEY	830	831		

Remarks

M.G.S. NO.194 INFERRED CABLE TOOL METHOD & PRESENCE OF GROUT
BASED ON OTHER WELLS DRILLED 1960-61 BY LAYNE
GAMMA LOGGED 5-9-2016 BY JIM TRAEN.

Well Depth 831 ft. **Depth Completed** 831 ft. **Date Well Completed** 02/20/1961

Drill Method Cable Tool **Drill Fluid**

Use community supply(municipal) **Status** Active

Well Hydrofractured? Yes ☐ No ☐ **From** **To**

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

Casing Diameter		Weight
16 in. To 663 ft.		lbs./ft.
24 in. To 138 ft.		lbs./ft.

Open Hole From 663 ft. To 830 ft.

Screen? ☐ **Type** **Make**

Static Water Level
160 ft. land surface Measure 02/20/1961

Pumping Level (below land surface)

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

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

Nearest Known Source of Contamination
feet Direction Type
Well disinfected upon completion? ☐ Yes ☐ No

Pump ☐ Not Installed Date Installed
Manufacturer's name
Model Number HP 0 Volt
Length of drop pipe ft Capacity g.p. Typ

Abandoned
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

Miscellaneous
First Bedrock St.Peter Sandstone Aquifer Mt.Simon
Last Strat Mid.Prot. sed. undivided Depth to Bedrock 120 ft
Located by Minnesota Department of Health
Locate Method GPS Differentially Corrected
System UTM - NAD83, Zone 15, Meters X 479988 Y 4992116
Unique Number Verification Information from Input Date 07/27/1999

Angled Drill Hole

Well Contractor
Layne Well Co. 27010 SHUEY, P.
Licensee Business Lic. or Reg. No. Name of Driller

Minnesota Well Index Report | **201158** | Printed on 01/09/2018 HE-01205-15

Minnesota Unique Well No.

201158

County Anoka
Quad Minneapolis North
Quad ID 120D

MINNESOTA DEPARTMENT OF HEALTH

WELL AND BORING RECORD

Minnesota Statutes Chapter 1031

Entry Date 04/15/1991
Update
Received Date 11/15/2016

Well Name	Township	Range	Dir	Section	Subsection	Use	Status	Well Depth	Depth Completed	Date Well Completed	Lic/Reg. No.
FRIDLEY 4	30	24	W	14	DCABAD	community supply	A	831 ft.	831 ft.	02/20/1961	27010

Elevation 883 ft. **Elev. Method** 7.5 minute topographic map (+/- 5 feet) **Aquifer** Mt.Simon **Depth to Bedrock** 120 ft **Open Hole** 663 - 830 ft **Static Water Level** 160 ft

Field Located By Minnesota Department of
Unique No. Verified Information from owner
Geological Interpretation Andrew Retzler
Agency (Interpretation)

Locate Method GPS Differentially Corrected
Input Source Minnesota Department of Health
Input Date 07/27/1999

Universal Transverse Mercator (UTM) - NAD83 - Zone 15 -
UTM Easting (X) 479988
UTM Northing (Y) 499211
Interpretaion Method Cuttings + geophysical log

Geological Material	Color	Hardness	Depth (ft.) From	Depth (ft.) To	Thickness	Elevation (ft.) From	Elevation (ft.) To	Stratigraphy	Primary Lithology	Secondary	Minor Lithology
FINE SAND			0	19	19	883	864	sand	sand		
CLAY & BOULDERS			19	70	51	864	813	pebbly sand/silt/clay	clay	boulder	
SAND & BOULDERS			70	120	50	813	763	sand +larger	sand	boulder	
SAND & BOULDERS			120	123	3	763	760	St.Peter Sandstone	sandstone		
ST. PETER SANDSTONE			123	138	15	760	745	St.Peter Sandstone	sandstone		
SHAKOPEE LIMESTONE			138	235	97	745	648	Prairie Du Chien	dolomite		
SHAKOPEE LIMESTONE			235	253	18	648	630	Jordan Sandstone	sandstone		
JORDAN SANDSTONE			253	320	67	630	563	Jordan Sandstone	sandstone		
SHALE & SAND			320	364	44	563	519	St.Lawrence	dolomite	flint	
SHALE & SAND			364	500	136	519	383	Tunnel City Group	sandstone	shale	dolomite
SANDSTONE & SHALE			500	504	4	383	379	Tunnel City Group	sandstone	shale	dolomite
SANDSTONE & SHALE			504	525	21	379	358	Wonewoc Sandstone	sandstone		
GALESVILLE SAND			525	550	25	358	333	Wonewoc Sandstone	sandstone		
HARD SANDSTONE & SHALE			550	552	2	333	331	Wonewoc Sandstone	sandstone		
HARD SANDSTONE & SHALE			552	640	88	331	243	Eau Claire Formation	shale	sandstone	
HARD SANDSTONE & SHALE			640	665	25	243	218	Mt.Simon Sandstone	sandstone		
HINCKLEY SANDSTONE			665	830	165	218	53	Mt.Simon Sandstone	sandstone		
HINCKLEY SANDSTONE			830	831	1	53	52	Mid.Prot. sed.	shale		

Minnesota Unique Well Number

206675

County Anoka
Quad Minneapolis
Quad ID 120D

MINNESOTA DEPARTMENT OF HEALTH

WELL AND BORING REPORT

Minnesota Statutes Chapter 1031

Entry Date 04/15/1991
Update Date 11/15/2016
Received Date

Well Name	Township	Range	Dir	Section	Subsection
FRIDLEY 5	30	24	W	14	DDBABD

Elevation 879 ft. **Elev. Method** 7.5 minute topographic map (+/- 5 feet)

Address

C/W 770 63RD AV NE FRIDLEY MN

Stratigraphy Information

Geological Material	From	To (ft.)	Color	Hardness
FINE TO MED.	0	25	BROWN	
TILL-CLAY TO PEBBLES	25	60	GRAY	
GRAVEL-GRANULES	60	65	GRAY	
TILL-GRANULES TO	65	80	RED	
SAND-COARSE TO	80	114	BROWN	
SAND, CARB.-CLAY TO	114	118	TAN	
SAND-VERY COARSE	118	122	BROWN	
DOLOMITE	122	250	BRN/RED	
SANDSTONE	250	295	BRN/TAN	
DOLOMITE, SILTSTONE	295	335	LT. PNK	
SHALE, SILTSTONE	335	400	VARIED	
SANDSTONE	400	420	GREEN	
SHALE, SILTSTONE	420	450	GREEN	
SHALE	450	500	GRAY	
SANDSTONE	500	510	GREEN	
SHALE	510	525	GRAY	
SANDSTONE	525	550	GRAY	
SHALE	550	560	GRAY	
SANDSTONE	560	570	GRAY	
SHALE	570	650	VARIED	
SANDSTONE	650	842	TAN/PNK	
SILTSTONE,	842	845	RED/BRN	

Remarks

M.G.S. NO. 193 G.W.Q. NO. 0224, INFERRED CABLE TOOL METHOD & PRESENCE OF GROUT,
BASED ON OTHER WELLS DRILLED FOR FRIDLEY 1960-61 BY LAYNE

Well Depth 845 ft. **Depth Completed** 845 ft. **Date Well Completed** 00/00/1961

Drill Method Cable Tool **Drill Fluid**

Use community supply(municipal) **Status** Active

Well Hydrofractured? Yes ☐ No ☐ **From** **To**

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

Casing Diameter **Weight**
16 in. To 656 ft. lbs./ft.

Open Hole From 656 ft. To 845 ft.

Screen? ☐ **Type** **Make**

Static Water Level

Pumping Level (below land surface)

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

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

Nearest Known Source of Contamination
feet Direction Type
Well disinfected upon completion? ☐ Yes ☐ No

Pump ☐ Not Installed Date Installed
Manufacturer's name
Model Number HP 0 Volt
Length of drop pipe ft Capacity g.p. Typ Submersible

Abandoned
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

Miscellaneous
First Bedrock Prairie Du Chien Group Aquifer Mt.Simon
Last Strat Mid.Prot. sed. undivided Depth to Bedrock 122 ft
Located by Minnesota Department of Health
Locate Method GPS Differentially Corrected
System UTM - NAD83, Zone 15, Meters X 480250 Y 4992120
Unique Number Verification Input Date 07/27/1999

Angled Drill Hole

Well Contractor
Layne Well Co. 27010
Licensee Business Lic. or Reg. No. Name of Driller

Minnesota Unique Well No.

206675

County Anoka
Quad Minneapolis North
Quad ID 120D

MINNESOTA DEPARTMENT OF HEALTH

WELL AND BORING RECORD

Minnesota Statutes Chapter 1031

Entry Date 04/15/1991
Update
Received Date 11/15/2016

Well Name	Township	Range	Dir	Section	Subsection	Use	Status	Well Depth	Depth Completed	Date Well Completed	Lic/Reg. No.
FRIDLEY 5	30	24	W	14	DDBABD	community supply	A	845 ft.	845 ft.	00/00/1961	27010

Elevation 879 ft. **Elev. Method** 7.5 minute topographic map (+/- 5 feet) **Aquifer** Mt.Simon **Depth to Bedrock** 122 ft **Open Hole** 656 - 845 ft **Static Water Level** ft

Field Located By Minnesota Department of
Unique No. Verified
Geological Interpretation John Mossler
Agency (Interpretation)

Locate Method GPS Differentially Corrected
Input Source Minnesota Department of Health
Input Date 07/27/1999

Universal Transverse Mercator (UTM) - NAD83 - Zone 15 -
UTM Easting (X) 480250
UTM Northing (Y) 499212
Interpretaion Method Geologic study 1:24k to 1:100k

			Depth (ft.)			Elevation (ft.)					
Geological Material	**Color**	**Hardness**	**From**	**To**	**Thickness**	**From**	**To**	**Stratigraphy**	**Primary Lithology**	**Secondary**	**Minor Lithology**
FINE TO MED. OUTWASH	BROWN		0	25	25	879	854	sand-brown	sand		
TILL-CLAY TO PEBBLES	GRAY		25	60	35	854	819	till-gray	till	clay	pebbles
GRAVEL-GRANULES TO FINE	GRAY		60	65	5	819	814	gravel (+larger)-gray	gravel		
TILL-GRANULES TO CLAY	RED		65	80	15	814	799	till-red	till		
SAND-COARSE TO MEDIUM	BROWN		80	114	34	799	765	sand-brown	sand		
SAND, CARB.-CLAY TO	TAN		114	118	4	765	761	clay+sand	sand	clay	
SAND-VERY COARSE	BROWN		118	122	4	761	757	sand-brown	sand		
DOLOMITE	BRN/RED		122	250	128	757	629	Prairie Du Chien	dolomite		
SANDSTONE	BRN/TAN		250	295	45	629	584	Jordan Sandstone	sandstone		
DOLOMITE, SILTSTONE	LT. PNK		295	335	40	584	544	St.Lawrence	dolomite	siltstone	
SHALE, SILTSTONE	VARIED		335	400	65	544	479	Tunnel City Group	shale	siltstone	
SANDSTONE	GREEN		400	420	20	479	459	Tunnel City Group	sandstone		
SHALE, SILTSTONE	GREEN		420	450	30	459	429	Tunnel City Group	shale	siltstone	
SHALE	GRAY		450	500	50	429	379	Tunnel City Group	shale		
SANDSTONE	GREEN		500	510	10	379	369	Tunnel City Group	sandstone		
SHALE	GRAY		510	525	15	369	354	Tunnel City Group	shale		
SANDSTONE	GRAY		525	550	25	354	329	Wonewoc Sandstone	sandstone		
SHALE	GRAY		550	560	10	329	319	Wonewoc Sandstone	shale		
SANDSTONE	GRAY		560	570	10	319	309	Wonewoc Sandstone	sandstone		
SHALE	VARIED		570	650	80	309	229	Eau Claire Formation	shale		
SANDSTONE	TAN/PNK		650	842	192	229	37	Mt.Simon Sandstone	sandstone		
SILTSTONE, SANDSTONE	RED/BRN		842	845	3	37	34	Mid.Prot. sed.	siltstone	sandstone	

Minnesota Unique Well Number

206673

County Anoka
Quad Minneapolis
Quad ID 120D

MINNESOTA DEPARTMENT OF HEALTH

WELL AND BORING REPORT

Minnesota Statutes Chapter 1031

Entry Date 04/15/1991
Update Date 05/13/2016
Received Date

Well Name	Township	Range	Dir	Section	Subsection
FRIDLEY 6	30	24	W	14	DCABBB

Elevation 877 ft. **Elev. Method** 7.5 minute topographic map (+/- 5 feet)

Address

Well 600 63RD AV NE FRIDLEY MN 55432
Contact FRIDLEY MN 55432

Stratigraphy Information

Geological Material	From	To (ft.)	Color	Hardness
MEDIUM SAND	0	13		
SILT & CLAY	13	65		
SAND & GRAVEL	65	115		
ST. PETER	115	125		
ST. PETER	125	130		
SHAKOPEE LIMESTONE	130	233		
SHAKOPEE LIMESTONE	233	248		
JORDAN SANDSTONE	248	255		

Remarks

GAMMA LOGGED 5-9-2016 BY JIM TRAEN.
JIM TRAEN HAS 24 IN. CASING ENDING AT 144.3 FT.

Well Depth 255 ft. **Depth Completed** 255 ft. **Date Well Completed** 08/00/1972

Drill Method Cable Tool **Drill Fluid**

Use community supply(municipal) **Status** Active

Well Hydrofractured? Yes ☐ No ☐ **From** **To**

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

Casing Diameter **Weight**
24 in. To 153 ft. lbs./ft.

Open Hole From 153 ft. To 255 ft.

Screen? ☐ **Type** **Make**

Static Water Level
56.5 ft. land surface Measure 08/00/1972

Pumping Level (below land surface)

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

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

Material	Amount		From	To
neat cement	7	Cubic yards	0 ft.	ft.

Nearest Known Source of Contamination
feet Direction Type
Well disinfected upon completion? ☐ Yes ☐ No

Pump ☐ Not Installed Date Installed
Manufacturer's name
Model Number HP 0 Volt
Length of drop pipe ft Capacity g.p. Typ

Abandoned
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

Miscellaneous
First Bedrock Prairie Du Chien Group Aquifer Prairie Du Chien-
Last Strat Jordan Sandstone Depth to Bedrock 125 ft
Located by Minnesota Department of Health
Locate Method GPS Differentially Corrected
System UTM - NAD83, Zone 15, Meters X 479923 Y 4992127
Unique Number Verification Input Date 07/27/1999

Angled Drill Hole

Well Contractor
Layne Well Co. 27010
Licensee Business Lic. or Reg. No. Name of Driller

Minnesota Unique Well No.

206673

County Anoka
Quad Minneapolis North
Quad ID 120D

MINNESOTA DEPARTMENT OF HEALTH

WELL AND BORING RECORD

Minnesota Statutes Chapter 1031

Entry Date 04/15/1991
Update
Received Date 05/13/2016

Well Name	Township	Range	Dir	Section	Subsection	Use	Status	Well Depth	Depth Completed	Date Well Completed	Lic/Reg. No.
FRIDLEY 6	30	24	W	14	DCABBB	community supply	A	255 ft.	255 ft.	08/00/1972	27010

Elevation 877 ft. **Elev. Method** 7.5 minute topographic map (+/- 5 feet) **Aquifer** Prairie Du Chien- **Depth to Bedrock** 125 ft **Open Hole** 153 - 255 ft **Static Water Level** 56.5 ft

Field Located By Minnesota Department of
Unique No. Verified
Geological Interpretation Andrew Retzler
Agency (Interpretation)

Locate Method GPS Differentially Corrected
Input Source Minnesota Department of Health
Input Date 07/27/1999

Universal Transverse Mercator (UTM) - NAD83 - Zone 15 -
UTM Easting (X) 479923
UTM Northing (Y) 499212
Interpretaion Method Inferred from geophysical log

Geological Material	Color	Hardness	Depth (ft.) From	Depth (ft.) To	Thickness	Elevation (ft.) From	Elevation (ft.) To	Stratigraphy	Primary Lithology	Secondary	Minor Lithology
MEDIUM SAND			0	13	13	877	864	sand	sand		
SILT & CLAY			13	65	52	864	812	silt+clay	silt	clay	
SAND & GRAVEL			65	115	50	812	762	sand +larger	sand	gravel	
ST. PETER SANDSTONE			115	125	10	762	752	Quaternary deposit	sand	gravel	
ST. PETER SANDSTONE			125	130	5	752	747	Prairie Du Chien	dolomite		
SHAKOPEE LIMESTONE			130	233	103	747	644	Prairie Du Chien	dolomite		
SHAKOPEE LIMESTONE			233	248	15	644	629	Jordan Sandstone	sandstone		
JORDAN SANDSTONE			248	255	7	629	622	Jordan Sandstone	sandstone		

Minnesota Unique Well Number

206678

County Anoka
Quad Minneapolis
Quad ID 120D

MINNESOTA DEPARTMENT OF HEALTH

WELL AND BORING REPORT

Minnesota Statutes Chapter 1031

Entry Date 04/15/1991
Update Date 11/15/2016
Received Date

Well Name	Township	Range	Dir	Section	Subsection
FRIDLEY 7	30	24	W	14	DCADBC

Elevation 885 ft. **Elev. Method** 7.5 minute topographic map (+/- 5 feet)

Address

C/W 680 63RD AV NE FRIDLEY MN

Stratigraphy Information

Geological Material	From	To (ft.)	Color	Hardness
FINE SAND	0	26		
BLUE CLAY, LITTLE	26	60		
GOOD WATER GRAVEL	60	73		
MUDDY SAND	73	75		
GRAVEL	75	110	LIGHT	
ST. PETER	110	128	YELLOW	
SHAKOPEE	128	136	RED	
SHAKOPEE & ST.	136	150	WHITE	
SHAKOPEE	150	262	TAN	

Remarks

ORIGINAL NO. 206671 - COMPLETED IN DRIFT, DEEPENED 1970 BY KEYS INTO BEDROCK
GAMMA LOGGED 10-20-2015 BY JIM TRAEN.

Well Depth 262 ft. **Depth Completed** 262 ft. **Date Well Completed** 01/14/1970

Drill Method **Drill Fluid**

Use community supply(municipal) **Status** Active

Well Hydrofractured? Yes ☐ No ☐ **From** **To**

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

Casing Diameter		Weight
16 in. To 67 ft.		lbs./ft.
12 in. To 138 ft.		lbs./ft.
24 in. To 27.7 ft.		lbs./ft.

Open Hole From 138 ft. To 262 ft.

Screen? ☐ **Type** **Make**

Static Water Level
65 ft. land surface Measure 01/14/1970

Pumping Level (below land surface)
73 ft. hrs. Pumping at 1600 g.p.m.

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

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

Nearest Known Source of Contamination
feet Direction Type
Well disinfected upon completion? ☐ Yes ☐ No

Pump ☐ Not Installed Date Installed
Manufacturer's name JACUZZI
Model Number SVB00 HP 75 Volt
Length of drop pipe 71 ft Capacity 1100 g.p. Typ

Abandoned
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

Miscellaneous
First Bedrock St.Peter Sandstone Aquifer Prairie Du Chien
Last Strat Prairie Du Chien Group Depth to Bedrock 110 ft
Located by Minnesota Department of Health
Locate Method GPS Differentially Corrected
System UTM - NAD83, Zone 15, Meters X 480005 Y 4992003
Unique Number Verification Information from Input Date 07/27/1999

Angled Drill Hole

Well Contractor
Renner E.H. & Sons 02015
Licensee Business Lic. or Reg. No. Name of Driller

Minnesota Unique Well No.

206678

County Anoka
Quad Minneapolis North
Quad ID 120D

MINNESOTA DEPARTMENT OF HEALTH

WELL AND BORING RECORD

Minnesota Statutes Chapter 1031

Entry Date 04/15/1991
Update
Received Date 11/15/2016

Well Name	Township	Range	Dir	Section	Subsection	Use	Status	Well Depth	Depth Completed	Date Well Completed	Lic/Reg. No.
FRIDLEY 7	30	24	W	14	DCADBC	community supply	A	262 ft.	262 ft.	01/14/1970	02015

Elevation 885 ft. **Elev. Method** 7.5 minute topographic map (+/- 5 feet) **Aquifer** Prairie Du Chien **Depth to Bedrock** 110 ft **Open Hole** 138 - 262 ft **Static Water Level** 65 ft

Field Located By Minnesota Department of
Unique No. Verified Information from owner
Geological Interpretation John Mossler
Agency (Interpretation)

Locate Method GPS Differentially Corrected
Input Source Minnesota Department of Health
Input Date 07/27/1999

Universal Transverse Mercator (UTM) - NAD83 - Zone 15 -
UTM Easting (X) 480005
UTM Northing (Y) 499200
Interpretaion Method Geologic study 1:24k to 1:100k

			Depth (ft.)			Elevation (ft.)					
Geological Material	**Color**	**Hardness**	**From**	**To**	**Thickness**	**From**	**To**	**Stratigraphy**	**Primary Lithology**	**Secondary**	**Minor Lithology**
FINE SAND			0	26	26	885	859	sand	sand		
BLUE CLAY, LITTLE GRAVEL			26	60	34	859	825	pebbly sand/silt/clay-	clay	gravel	
GOOD WATER GRAVEL			60	73	13	825	812	gravel (+larger)	gravel		
MUDDY SAND			73	75	2	812	810	sand+silt	sand	mud	
GRAVEL	LIGHT		75	110	35	810	775	gravel (+larger)	gravel		
ST. PETER	YELLOW		110	128	18	775	757	St.Peter Sandstone	sandstone		
SHAKOPEE	RED		128	136	8	757	749	Prairie Du Chien	dolomite		
SHAKOPEE & ST. PETER	WHITE		136	150	14	749	735	Prairie Du Chien	dolomite	sandstone	
SHAKOPEE	TAN		150	262	112	735	623	Prairie Du Chien	dolomite		

Minnesota Unique Well Number

206669

County Anoka
Quad Minneapolis
Quad ID 120D

MINNESOTA DEPARTMENT OF HEALTH

WELL AND BORING REPORT

Minnesota Statutes Chapter 1031

Entry Date 04/15/1991
Update Date 03/10/2014
Received Date

Well Name	Township	Range	Dir	Section	Subsection
FRIDLEY 8	30	24	W	14	DCDCDA

Elevation 885 ft. **Elev. Method** 7.5 minute topographic map (+/- 5 feet)

Address

C/W 613 61ST AV NE FRIDLEY MN

Stratigraphy Information

Geological Material	From	To (ft.)	Color	Hardness
NO RECORD	0	64		
GRAVEL & STONES	64	122	GRAY	
SHALE	122	126	BLACK	
ST. PETER, DUSTY	126	130	WHITE	
ST. PETER, SHAKOPEE	130	186	YELLOW	
SHAKOPEE	186	195	TAN	
SHAKOPEE	195	265	TAN	
JORDAN	265	265	YELLOW	

Remarks

M.G.S. NO. 526

0 TO 64 FEET IS 16" CASE HOLE, DRILLED BY OTHERS.

Well Depth 265 ft. **Depth Completed** 265 ft. **Date Well Completed** 12/17/1969

Drill Method **Drill Fluid**

Use community supply(municipal) **Status** Active

Well Hydrofractured? Yes ☐ No ☐ **From** **To**

Casing Type Step down **Joint**

Drive Shoe? Yes ☐ No ☐ **Above/Below** 0 ft.

Casing Diameter			Weight
12	in. To	138 ft.	lbs./ft.
16	in. To	64 ft.	lbs./ft.

Open Hole From 138 ft. To 265 ft.

Screen? ☐ **Type** **Make**

Static Water Level

70 ft. land surface Measure 12/17/1969

Pumping Level (below land surface)

74 ft. hrs. Pumping at 1160 g.p.m.

Wellhead Completion

Pitless adapter manufacturer Model

☐ Casing Protection ☐ 12 in. above grade

☐ At-grade (Environmental Wells and Borings ONLY)

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

Nearest Known Source of Contamination

feet Direction Type

Well disinfected upon completion? ☐ Yes ☐ No

Pump ☐ Not Installed Date Installed

Manufacturer's name JACUZZI

Model Number 12MC24 HP 75 Volt

Length of drop pipe 125 ft Capacity 1150 g.p. Typ Turbine

Abandoned

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

Miscellaneous

First Bedrock St.Peter Sandstone Aquifer Prairie Du Chien

Last Strat Jordan Sandstone Depth to Bedrock 126 ft

Located by Minnesota Department of Health

Locate Method GPS Differentially Corrected

System UTM - NAD83, Zone 15, Meters X 479984 Y 4991790

Unique Number Verification Input Date 07/27/1999

Angled Drill Hole

Well Contractor

Renner E.H. & Sons 02015

Licensee Business Lic. or Reg. No. Name of Driller

Minnesota Unique Well No.

206669

County Anoka
Quad Minneapolis North
Quad ID 120D

MINNESOTA DEPARTMENT OF HEALTH

WELL AND BORING RECORD

Minnesota Statutes Chapter 1031

Entry Date 04/15/1991
Update
Received Date 03/10/2014

Well Name	Township	Range	Dir	Section	Subsection	Use	Status	Well Depth	Depth Completed	Date Well Completed	Lic/Reg. No.
FRIDLEY 8	30	24	W	14	DCDCDA	community supply	A	265 ft.	265 ft.	12/17/1969	02015

Elevation 885 ft. **Elev. Method** 7.5 minute topographic map (+/- 5 feet) **Aquifer** Prairie Du Chien **Depth to Bedrock** 126 ft **Open Hole** 138 - 265 ft **Static Water Level** 70 ft

Field Located By Minnesota Department of
Unique No. Verified
Geological Interpretation John Mossler
Agency (Interpretation)

Locate Method GPS Differentially Corrected
Input Source Minnesota Department of Health
Input Date 07/27/1999

Universal Transverse Mercator (UTM) - NAD83 - Zone 15 -
UTM Easting (X) 479984
UTM Northing (Y) 499179
Interpretaion Method Geologic study 1:24k to 1:100k

			Depth (ft.)			Elevation (ft.)					
Geological Material	**Color**	**Hardness**	**From**	**To**	**Thickness**	**From**	**To**	**Stratigraphy**	**Primary Lithology**	**Secondary**	**Minor Lithology**
NO RECORD			0	64	64	885	821	Quaternary deposit	drift		
GRAVEL & STONES	GRAY		64	122	58	821	763	gravel (+larger)-gray	gravel	pebbles	
SHALE	BLACK		122	126	4	763	759	clay-black	clay		
ST. PETER, DUSTY	WHITE		126	130	4	759	755	St.Peter Sandstone	sandstone		
ST. PETER, SHAKOPEE	YELLOW		130	186	56	755	699	Prairie Du Chien	sandstone	dolomite	
SHAKOPEE	TAN		186	195	9	699	690	Prairie Du Chien	dolomite		
SHAKOPEE	TAN		195	265	70	690	620	Prairie Du Chien	dolomite		
JORDAN	YELLOW		265	265	0	620	620	Jordan Sandstone	sandstone		

Minnesota Unique Well Number

206672

County Anoka
Quad Minneapolis
Quad ID 120D

MINNESOTA DEPARTMENT OF HEALTH
WELL AND BORING REPORT
Minnesota Statutes Chapter 1031

Entry Date 04/15/1991
Update Date 03/10/2014
Received Date

Well Name	Township	Range	Dir	Section	Subsection
FRIDLEY 9	30	24	W	14	DCCAAB

Elevation 882 ft. **Elev. Method** 7.5 minute topographic map (+/- 5 feet)

Address

C/W 603 61ST AV NE FRIDLEY MN

Stratigraphy Information

Geological Material	From	To (ft.)	Color	Hardness
SAND	0	15		
SILT & CLAY	15	67		
SAND & GRAVEL	67	117		
ST. PETER	117	132		
DOLOMITE	132	250		
JORDAN SANDROCK	250	255		SOFT

Remarks

DEEPENED BY LAYNE MINN. CO. TO 255 FT. IN 1972.

Well Depth 255 ft. **Depth Completed** 255 ft. **Date Well Completed** 12/22/1965

Drill Method **Drill Fluid**

Use community supply(municipal) **Status** Active

Well Hydrofractured? Yes ☐ No ☐ **From** **To**

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

Casing Diameter		Weight
24 in. To 153 ft.		lbs./ft.
30 in. To 67 ft.		lbs./ft.

Open Hole From 153 ft. To 255 ft.

Screen? ☐ **Type** **Make**

Static Water Level

56 ft. land surface Measure 12/22/1965

Pumping Level (below land surface)

59 ft. hrs. Pumping at 1000 g.p.m.

Wellhead Completion

Pitless adapter manufacturer Model

☐ Casing Protection ☐ 12 in. above grade
☐ At-grade (Environmental Wells and Borings ONLY)

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

Nearest Known Source of Contamination

feet Direction Type

Well disinfected upon completion? ☐ Yes ☐ No

Pump ☐ Not Installed Date Installed

Manufacturer's name JACUZZI

Model Number HP 75 Volt 220

Length of drop pipe ft Capacity 1100 g.p. Typ Turbine

Abandoned

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

Miscellaneous

First Bedrock St.Peter Sandstone Aquifer Prairie Du Chien-
Last Strat Jordan Sandstone Depth to Bedrock 117 ft
Located by Minnesota Department of Health
Locate Method GPS Differentially Corrected
System UTM - NAD83, Zone 15, Meters X 479875 Y 4991927
Unique Number Verification Information from Input Date 07/27/1999

Angled Drill Hole

Well Contractor

Keys Well Co. 62012
Licensee Business Lic. or Reg. No. Name of Driller

Minnesota Well Index Report | **206672** | Printed on 01/09/2018 HE-01205-15

Minnesota Unique Well No.

206672

County Anoka
Quad Minneapolis North
Quad ID 120D

MINNESOTA DEPARTMENT OF HEALTH

WELL AND BORING RECORD

Minnesota Statutes Chapter 1031

Entry Date 04/15/1991
Update
Received Date 03/10/2014

Well Name	Township	Range	Dir	Section	Subsection	Use	Status	Well Depth	Depth Completed	Date Well Completed	Lic/Reg. No.
FRIDLEY 9	30	24	W	14	DCCAAB	community supply	A	255 ft.	255 ft.	12/22/1965	62012

Elevation 882 ft. **Elev. Method** 7.5 minute topographic map (+/- 5 feet) **Aquifer** Prairie Du Chien- **Depth to Bedrock** 117 ft **Open Hole** 153 - 255 ft **Static Water Level** 56 ft

Field Located By Minnesota Department of
Unique No. Verified Information from owner
Geological Interpretation John Mossler
Agency (Interpretation)

Locate Method GPS Differentially Corrected
Input Source Minnesota Department of Health
Input Date 07/27/1999

Universal Transverse Mercator (UTM) - NAD83 - Zone 15 -
UTM Easting (X) 479875
UTM Northing (Y) 499192
Interpretaion Method Geologic study 1:24k to 1:100k

			Depth (ft.)			Elevation (ft.)					
Geological Material	**Color**	**Hardness**	**From**	**To**	**Thickness**	**From**	**To**	**Stratigraphy**	**Primary Lithology**	**Secondary**	**Minor Lithology**
SAND			0	15	15	882	867	sand	sand		
SILT & CLAY			15	67	52	867	815	silt+clay	silt	clay	
SAND & GRAVEL			67	117	50	815	765	sand +larger	sand	gravel	
ST. PETER SANDSTONE			117	132	15	765	750	St.Peter Sandstone	sandstone		
DOLOMITE			132	250	118	750	632	Prairie Du Chien	dolomite		
JORDAN SANDROCK		SOFT	250	255	5	632	627	Jordan Sandstone	sandstone		

Minnesota Unique Well Number

206658

County Anoka
Quad Minneapolis
Quad ID 120D

MINNESOTA DEPARTMENT OF HEALTH

WELL AND BORING REPORT

Minnesota Statutes Chapter 1031

Entry Date 04/15/1991
Update Date 03/26/2015
Received Date

Well Name	Township	Range	Dir	Section	Subsection
FRIDLEY 10	30	24	W	11	CDCCAA

Elevation 861 ft. **Elev. Method** 7.5 minute topographic map (+/- 5 feet)

Address

C/W 6911 UNIVERSITY AV NE FRIDLEY MN

Stratigraphy Information

Geological Material	From	To (ft.)	Color	Hardness
SAND	0	8		
CLAY	8	35		
GRAVEL	35	42		
SAND, GRAVEL & CLAY	42	95		
SAND	95	123		
SAND & GRAVEL	123	173		
SAND	173	199		

Remarks

SOUTH WELL. M.G.S. NO. 547.
GAMMA LOGGED 3-19-2015 BY JIM TRAEN.

Well Depth	Depth Completed	Date Well Completed
199 ft.	199 ft.	12/29/1969

Drill Method **Drill Fluid**

Use community supply(municipal) **Status** Active

Well Hydrofractured? **Yes** ☐ **No** ☐ **From** **To**

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

Casing Diameter		Weight
16 in.	To 128 ft.	lbs./ft.
24 in.	To 16 ft.	lbs./ft.

Open Hole From ft. To ft.

Screen? ☒ **Type** stainless **Make**

Diameter	Slot/Gauze	Length	Set	
16 in.		73 ft.	128 ft.	199 ft.

Static Water Level

38 ft. top of breather pipe Measure 12/29/1969

Pumping Level (below land surface)

43.2 ft. 2 hrs. Pumping at 800 g.p.m.

Wellhead Completion

Pitless adapter manufacturer Model

☐ Casing Protection ☐ 12 in. above grade
☐ At-grade (Environmental Wells and Borings ONLY)

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

Material	Amount	From	To
neat cement	130 Cubic yards	0 ft.	35 ft.

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 Volt

Length of drop pipe ft Capacity g.p. Typ

Abandoned

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

Miscellaneous

First Bedrock Aquifer Quat. buried
Last Strat sand Depth to Bedrock ft
Located by Minnesota Department of Health
Locate Method GPS SA On (averaged)
System UTM - NAD83, Zone 15, Meters X 479373 Y 4993450
Unique Number Verification Input Date 04/07/1999

Angled Drill Hole

Well Contractor

Keys Well Co. 62012
Licensee Business Lic. or Reg. No. Name of Driller

Minnesota Unique Well No.

206658

County Anoka
Quad Minneapolis North
Quad ID 120D

MINNESOTA DEPARTMENT OF HEALTH

WELL AND BORING RECORD

Minnesota Statutes Chapter 1031

Entry Date 04/15/1991
Update
Received Date 03/26/2015

Well Name	Township	Range	Dir	Section	Subsection	Use	Status	Well Depth	Depth Completed	Date Well Completed	Lic/Reg. No.
FRIDLEY 10	30	24	W	11	CDCCAA	community supply	A	199 ft.	199 ft.	12/29/1969	62012

Elevation 861 ft. **Elev. Method** 7.5 minute topographic map (+/- 5 feet) **Aquifer** Quat. buried artes. **Depth to Bedrock** ft **Open Hole** - ft **Static Water Level** 38 ft

Field Located By Minnesota Department of
Unique No. Verified
Geological Interpretation Emily Bauer
Agency (Interpretation)

Locate Method GPS SA On (averaged)
Input Source Minnesota Department of Health
Input Date 04/07/1999

Universal Transverse Mercator (UTM) - NAD83 - Zone 15 -
UTM Easting (X) 479373
UTM Northing (Y) 499345
Interpretaion Method Cuttings + geophysical log

			Depth (ft.)			Elevation (ft.)					
Geological Material	**Color**	**Hardness**	**From**	**To**	**Thickness**	**From**	**To**	**Stratigraphy**	**Primary Lithology**	**Secondary**	**Minor Lithology**
SAND			0	8	8	861	853	sand	sand		
CLAY			8	35	27	853	826	clay	clay		
GRAVEL			35	42	7	826	819	gravel (+larger)	gravel		
SAND, GRAVEL & CLAY			42	95	53	819	766	pebbly sand/silt/clay	sand	gravel	clay
SAND			95	123	28	766	738	sand	sand		
SAND & GRAVEL			123	173	50	738	688	sand +larger	sand	gravel	
SAND			173	199	26	688	662	sand	sand		

Minnesota Unique Well Number

206657

County Anoka
Quad Minneapolis
Quad ID 120D

MINNESOTA DEPARTMENT OF HEALTH

WELL AND BORING REPORT

Minnesota Statutes Chapter 1031

Entry Date 04/15/1991
Update Date 03/26/2015
Received Date

Well Name	Township	Range	Dir	Section	Subsection
FRIDLEY 11	30	24	W	11	CDCCAA

Elevation 861 ft. **Elev. Method** 7.5 minute topographic map (+/- 5 feet)

Address

C/W 6911 UNIVERSITY AV FRIDLEY MN

Stratigraphy Information

Geological Material	From	To (ft.)	Color	Hardness
DRIFT	0	221		
SAND, GRAVEL &	221	225		
SHAKOPEE LIMEROCK	225	235		
SHAKOPEE LIMEROCK	235	236		
JORDAN	236	245		SOFT
JORDAN SANDROCK	245	320		
JORDAN SANDROCK	320	350		
JORDAN SANDROCK	350	355		
ST. LAWRENCE SHALE	355	490		
FRANCONIA	490	548		
FRANCONIA	548	618		
FRANCONIA	618	669		

Remarks

M.G.S. NO 523. NORTH WELL.
GAMMA LOGGED 3-19-2015 BY JIM TRAEN.

Well Depth 669 ft. **Depth Completed** 669 ft. **Date Well Completed** 04/20/1970

Drill Method **Drill Fluid**

Use community supply(municipal) **Status** Active

Well Hydrofractured? **Yes** ☐ **No** ☐ **From** **To**

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

Casing Diameter	Weight	Hole Diameter
24 in. To 325 ft.	lbs./ft.	23 in. To 344 ft.
30 in. To 225 ft.	lbs./ft.	

Open Hole From 325 ft. To 669 ft.

Screen? ☐ **Type** **Make**

Static Water Level
52 ft. land surface Measure 04/20/1970

Pumping Level (below land surface)
144 ft. 16 hrs. Pumping at 1000 g.p.m.

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

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

Material	Amount	From	To
neat cement	300 Sacks	0 ft.	248 ft.

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 Volt
Length of drop pipe ft Capacity g.p. Typ

Abandoned
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

Miscellaneous
First Bedrock Prairie Du Chien Group Aquifer Jordan-Mt.Simon
Last Strat Mt.Simon Sandstone Depth to Bedrock 225 ft
Located by Minnesota Department of Health
Locate Method GPS Differentially Corrected
System UTM - NAD83, Zone 15, Meters X 479371 Y 4993454
Unique Number Verification Information from Input Date 07/27/1999

Angled Drill Hole

Well Contractor
Keys Well Co. 62012 HALEY, R.
Licensee Business Lic. or Reg. No. Name of Driller

Minnesota Unique Well No.

206657

County Anoka
Quad Minneapolis North
Quad ID 120D

MINNESOTA DEPARTMENT OF HEALTH

WELL AND BORING RECORD

Minnesota Statutes Chapter 1031

Entry Date 04/15/1991
Update
Received Date 03/26/2015

Well Name	Township	Range	Dir	Section	Subsection	Use	Status	Well Depth	Depth Completed	Date Well Completed	Lic/Reg. No.
FRIDLEY 11	30	24	W	11	CDCCAA	community supply	A	669 ft.	669 ft.	04/20/1970	62012

Elevation 861 ft. **Elev. Method** 7.5 minute topographic map (+/- 5 feet) **Aquifer** Jordan-Mt.Simon **Depth to Bedrock** 225 ft **Open Hole** 325 - 669 ft **Static Water Level** 52 ft

Field Located By Minnesota Department of
Unique No. Verified Information from owner
Geological Interpretation Julia Steenberg
Agency (Interpretation)

Locate Method GPS Differentially Corrected
Input Source Minnesota Department of Health
Input Date 07/27/1999

Universal Transverse Mercator (UTM) - NAD83 - Zone 15 -
UTM Easting (X) 479371
UTM Northing (Y) 499345
Interpretaion Method Cuttings + geophysical log

			Depth (ft.)			Elevation (ft.)					
Geological Material	**Color**	**Hardness**	**From**	**To**	**Thickness**	**From**	**To**	**Stratigraphy**	**Primary Lithology**	**Secondary**	**Minor Lithology**
DRIFT			0	221	221	861	640	Quaternary deposit	drift		
SAND, GRAVEL & BROKEN			221	225	4	640	636	sand	sand	gravel	boulder
SHAKOPEE LIMEROCK			225	235	10	636	626	Prairie Du Chien	dolomite	sandstone	
SHAKOPEE LIMEROCK			235	236	1	626	625	Jordan Sandstone	sandstone		
JORDAN		SOFT	236	245	9	625	616	Jordan Sandstone	sandstone		
JORDAN SANDROCK			245	320	75	616	541	Jordan Sandstone	sandstone		
JORDAN SANDROCK			320	350	30	541	511	St.Lawrence	shale	dolomite	sandstone
JORDAN SANDROCK			350	355	5	511	506	Tunnel City Group	sandstone	shale	dolomite
ST. LAWRENCE SHALE			355	490	135	506	371	Tunnel City Group	sandstone	shale	dolomite
FRANCONIA SANDROCK &			490	548	58	371	313	Wonewoc Sandstone	sandstone		
FRANCONIA SANDROCK &			548	618	70	313	243	Eau Claire Formation	shale	sandstone	
FRANCONIA SANDROCK &			618	669	51	243	192	Mt.Simon Sandstone	sandstone		

Minnesota Unique Well Number

209207

County Anoka
Quad New
Quad ID 119C

MINNESOTA DEPARTMENT OF HEALTH

WELL AND BORING REPORT

Minnesota Statutes Chapter 1031

Entry Date 04/15/1991
Update Date 05/22/2014
Received Date

Well Name	Township	Range	Dir	Section	Subsection
FRIDLEY 12	30	24	W	12	BCDDAA

Elevation 890 ft. **Elev. Method** 7.5 minute topographic map (+/- 5 feet)

Address

C/W 7345 65 HY FRIDLEY MN

Stratigraphy Information

Geological Material	From	To (ft.)	Color	Hardness
SAND	0	20		
CLAY	20	55		
CLAY & GRAVEL	55	72		
SAND	72	86		
CLAY	86	93		
CLAY & GRAVEL	93	95		
SAND & GRAVEL	95	153		
SHAKOPEE	153	225		
JORDAN	225	276		

Remarks

M.G.S. NO. 524

Well Depth 276 ft. **Depth Completed** 276 ft. **Date Well Completed** 00/00/1970

Drill Method Cable Tool **Drill Fluid**

Use community supply(municipal) **Status** Active

Well Hydrofractured? Yes ☐ No ☐ **From** **To**

Casing Type Step down **Joint**

Drive Shoe? Yes ☐ No ☐ **Above/Below** 0 ft.

Casing Diameter		Weight
24 in. To 234 ft.		lbs./ft.
30 in. To 153 ft.		lbs./ft.

Open Hole From 234 ft. To 276 ft.

Screen? ☐ **Type** **Make**

Static Water Level

53.5 ft. land surface Measure 00/00/1970

Pumping Level (below land surface)

73.5 ft. hrs. Pumping at 1212 g.p.m.

Wellhead Completion

Pitless adapter manufacturer Model

☐ Casing Protection ☐ 12 in. above grade
☐ At-grade (Environmental Wells and Borings ONLY)

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

Nearest Known Source of Contamination

feet Direction Type

Well disinfected upon completion? ☐ Yes ☐ No

Pump ☐ Not Installed Date Installed

Manufacturer's name

Model Number HP 150 Volt

Length of drop pipe ft Capacity 1200 g.p. Typ

Abandoned

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

Miscellaneous

First Bedrock Prairie Du Chien Group Aquifer Jordan

Last Strat Jordan Sandstone Depth to Bedrock 153 ft

Located by Minnesota Department of Health

Locate Method GPS Differentially Corrected

System UTM - NAD83, Zone 15, Meters X 480877 Y 4994245

Unique Number Verification Information from Input Date 07/27/1999

Angled Drill Hole

Well Contractor

Keys Well Co. 62012

Licensee Business Lic. or Reg. No. Name of Driller

Minnesota Unique Well No.

209207

County Anoka
Quad New Brighton
Quad ID 119C

MINNESOTA DEPARTMENT OF HEALTH

WELL AND BORING RECORD

Minnesota Statutes Chapter 1031

Entry Date 04/15/1991
Update
Received Date 05/22/2014

Well Name	Township	Range	Dir	Section	Subsection	Use	Status	Well Depth	Depth Completed	Date Well Completed	Lic/Reg. No.
FRIDLEY 12	30	24	W	12	BCDDAA	community supply	A	276 ft.	276 ft.	00/00/1970	62012

Elevation 890 ft. **Elev. Method** 7.5 minute topographic map (+/- 5 feet) **Aquifer** Jordan **Depth to Bedrock** 153 ft **Open Hole** 234 - 276 ft **Static Water Level** 53.5 ft

Field Located By Minnesota Department of
Unique No. Verified Information from owner
Geological Interpretation John Mossler
Agency (Interpretation)

Locate Method GPS Differentially Corrected
Input Source Minnesota Department of Health
Input Date 07/27/1999

Universal Transverse Mercator (UTM) - NAD83 - Zone 15 -
UTM Easting (X) 480877
UTM Northing (Y) 499424
Interpretaion Method Geologic study 1:24k to 1:100k

Geological Material	Color	Hardness	Depth (ft.) From	Depth (ft.) To	Thickness	Elevation (ft.) From	Elevation (ft.) To	Stratigraphy	Primary Lithology	Secondary	Minor Lithology
SAND			0	20	20	890	870	sand	sand		
CLAY			20	55	35	870	835	clay	clay		
CLAY & GRAVEL			55	72	17	835	818	pebbly sand/silt/clay	clay	gravel	
SAND			72	86	14	818	804	sand	sand		
CLAY			86	93	7	804	797	clay	clay		
CLAY & GRAVEL			93	95	2	797	795	pebbly sand/silt/clay	clay	gravel	
SAND & GRAVEL			95	153	58	795	737	sand +larger	sand	gravel	
SHAKOPEE			153	225	72	737	665	Prairie Du Chien	dolomite		
JORDAN			225	276	51	665	614	Jordan Sandstone	sandstone		

Appendix B

Aquifer Test Data and Analysis

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

Determination of Aquifer Properties and Aquifer Test Plan (DAP-ATP) Form

Public Water Supply ID:	1020031	PWS Name:	Fridley

Contact Information for Person Completing this Form

Name:	Adam Janzen
Address:	4300 MarketPointe Drive
	Suite 200
City, State, Zip:	Bloomington, MN, 55435
Phone, Fax, e-mail:	(952) 842-3596 (p), (952) 832-2601 (f), ajanzen@barr.com

Aquifer Properties Determination Methods

For Methods 1 - 5, check all that apply - attach Summary of Aquifer Properties Based on Existing Data

- ☐ 1. An existing pumping test that meets the requirements of wellhead protection rule part 4720.5520 and that was previously conducted on a well connected to the public water supply system.
- ☐ 2. An existing pumping test that meets the requirements of wellhead protection rule part 4720.5520 and that was previously conducted on another well in a hydrogeologic setting determined by the department to be equivalent.
- ☐ 3. An existing pumping test that does not meet the requirements of wellhead protection rule part 4720.5520 and that was previously conducted on: 1) a public water supply well or 2) another well in a hydrogeologic setting determined by the department to be equivalent.
- ☑ 4. Existing specific capacity test(s) conducted on the public water supply well(s) or specific capacity tests conducted on other wells in a hydrogeologic setting determined by the department to be equivalent.
- ☐ 5. An existing published transmissivity value.

For Method 6 or 7 - attach detailed Aquifer Test Plan for Proposed Test

- ☐ 6. A proposed new test to be conducted on a new or existing well connected to the public water supply system and that meets the requirements for larger-sized water systems (wellhead protection rule part 4720.5520). The test plan must be approved before conducting the test.
- ☐ 7. A proposed new test to be conducted on a new or existing public well connected to the public water supply system and that meets the requirements for smaller-sized water systems (wellhead protection rule part 4720.5530). The test plan must be approved before conducting the test.

List the unique number of each public water supply well to which this DAP-ATP Form applies

206658					

Submitted by: Adam Janzen	Prof. License: 53665	Date: 2/26/2018
Reviewed by: Amal Djerrari	Approved: ◉ Yes ○ No	Approval Date: 4/16/2018

Summary of Aquifer Properties Based on Existing Data

Aquifer Name: Quaternary Buried Unconfined | **Aquifer Code:** QBUA

Hydraulic Confinement ☐ Confined ☑ Unconfined ☐ Fractured Rock

Aquifer Test Number of test(s) on file used to compile the information tabulated below:

1

Aquifer Properties Summary Table

Representative Values		Unit	Range		+/- %
			Minimum	Maximum	
Top Stratigraphic Elev.	826	feet (MSL)			
Bottom Stratigraphic Elev.	662	feet (MSL)			
Transmissivity (T)	6.40E+04	ft^2/day			
Aquifer Thickness (b)	164	feet			
Saturated Thickness* (b)	161	feet			
Hydraulic Conductivity (k)	397	ft/day	199	596	+50/-50
Primary Porosity (e_p)	0.25	0.00 %			
Secondary Porosity** (e_s)		0.00 %			
Storativity (S)	8.9E-3	dimensionless			
Characteristic Leakage (L)		feet			
Hydraulic Resistance (c)		days			

Notes: Shaded fields are required - * hydraulically unconfined aquifer - ** dual porosity aquifer because of fractures or solution weathering

Describe rationale for selected method(s). Attach documentation and analysis.

One specific capacity test was conducted on Fridley Well 10 (Unique Number 206658) in 1969. The result of the test was analyzed using the TGuess method (see attached). The log for Fridley Well 10 shows a clay unit from 8-35 feet below grade and then sand and gravel to the bottom of the well. The log includes a static water level of 38 feet below the "top of breather pipe." This measuring point was assumed to be near the ground surface, and therefore the hydrogeologic setting was interpreted as buried unconfined.

Below is a summary of the results from Fridley Well 10 (Unique Number 206658):

Flow Rate (gpm)	T(ft**2/day)
800	6.40E+04

For the model sensitivity analysis, the hydraulic conductivities of the QBUA will be adjusted +/- 50%. The QBUA hydraulic conductivity range will therefore be 199-596 ft/day

Quaternary

Worksheet for Estimating Transmissivity and Hydraulic Conductivity from Specific Capacity Test Data

Explanation and notes attached.

Maximum iterations	20
Error tolerance (as drawdown)	0.001 feet

Field Data											*Estimated Parameters*				*Calculated Results*			*Diagnostics*						
		Depth to Water				Screened Interval												*Solution Integrity*			*Sensitivity of T:*		
Location	Well Diam.	Initial	Final	Test Duration	Mean Pumping Rate	Depth to Top	Depth to Bottom	Storage Coeff. (S)	Well loss Coeff. (C)	Aquifer Thickness (b)	Measured Drawdown (s_m)	Saturated Screen Length (L)	Well loss (s_w)	Partial Penetration Parameter (s_p)	Specific Capacity	**Transmissivity (T)**	**Conductivity (K)**	Calculated Drawdown	Error as Drawdown	Well Bore Storage Test	to S at ± 1 factor of 10	to s_w at 10% of s_m	to b at ± 25%
	inches	feet	feet	hours	gpm	feet	feet	-	sec^2/ft^5	feet	feet	feet	feet	-	gpm/ft	**sq ft/sec**	**ft/day**	feet			sq ft/sec	sq ft/sec	sq ft/sec
Fridley10_206658	16	38.0	43.2	2	800.0	128.0	199.0	0.001	0	161.0	5.20	71.0	0.0E+00	5.02	153.85	**7.4E-01**	**4.0E+02**	5.20	0.01%	pass	6.5E-02	8.6E-02	2.9E-01

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

Determination of Aquifer Properties and Aquifer Test Plan (DAP-ATP) Form

Public Water Supply ID:	1020031	PWS Name:	Fridley

Contact Information for Person Completing this Form

Name:	Adam Janzen
Address:	4300 MarketPointe Drive
	Suite 200
City, State, Zip:	Bloomington, MN, 55435
Phone, Fax, e-mail:	(952) 842-3596 (p), (952) 832-2601 (f), ajanzen@barr.com

Aquifer Properties Determination Methods

For Methods 1 - 5, check all that apply - attach Summary of Aquifer Properties Based on Existing Data

- [x] **1.** An existing pumping test that meets the requirements of wellhead protection rule part 4720.5520 and that was previously conducted on a well connected to the public water supply system.
- [ ] **2.** An existing pumping test that meets the requirements of wellhead protection rule part 4720.5520 and that was previously conducted on another well in a hydrogeologic setting determined by the department to be equivalent.
- [ ] **3.** An existing pumping test that does not meet the requirements of wellhead protection rule part 4720.5520 and that was previously conducted on: 1) a public water supply well or 2) another well in a hydrogeologic setting determined by the department to be equivalent.
- [ ] **4.** Existing specific capacity test(s) conducted on the public water supply well(s) or specific capacity tests conducted on other wells in a hydrogeologic setting determined by the department to be equivalent.
- [ ] **5.** An existing published transmissivity value.

For Method 6 or 7 - attach detailed Aquifer Test Plan for Proposed Test

- [ ] **6.** A proposed new test to be conducted on a new or existing well connected to the public water supply system and that meets the requirements for larger-sized water systems (wellhead protection rule part 4720.5520). The test plan must be approved before conducting the test.
- [ ] **7.** A proposed new test to be conducted on a new or existing public well connected to the public water supply system and that meets the requirements for smaller-sized water systems (wellhead protection rule part 4720.5530). The test plan must be approved before conducting the test.

List the unique number of each public water supply well to which this DAP-ATP Form applies

206673					
206678					
206669					
206672					

Submitted by: Adam Janzen	**Prof. License:** 53665	**Date:** 5/1/2018
Reviewed by: Amal Djerrari	**Approved:** (•) Yes ( ) No	**Approval Date:** 5/2/2018

Summary of Aquifer Properties Based on Existing Data

Aquifer Name: Prairie du Chien | **Aquifer Code:** OPDC

Hydraulic Confinement ☑ Confined ☐ Unconfined ☑ Fractured Rock

Aquifer Test Number of test(s) on file used to compile the information tabulated below:

2

Aquifer Properties Summary Table

Representative Values		Unit	Range		+/- %
			Minimum	Maximum	
Top Stratigraphic Elev.	755	feet (MSL)	734	757	+0.3/-2.8
Bottom Stratigraphic Elev.	620	feet (MSL)	620	653	+5.3/-0
Transmissivity (T)	149,000	ft^2/day	18,860	168,750	+13/-87
Aquifer Thickness (b)	135	feet	92	135	+0/-32
Saturated Thickness* (b)		feet			
Hydraulic Conductivity (k)	1100	ft/day	205	1250	+14/-81
Primary Porosity (e_p)	0.05	0.00 %			
Secondary Porosity** (e_s)	?	0.00 %	Cavernous interconnections present		
Storativity (S)	3.0E-04	dimensionless	2.0E-04	3.5E-04	
Characteristic Leakage (L)	7480	feet			
Hydraulic Resistance (c)	390	days	390	505	

Notes: Shaded fields are required - * hydraulically unconfined aquifer - ** dual porosity aquifer because of fractures or solution weathering

Describe rationale for selected method(s). Attach documentation and analysis.

Aquifer tests were performed on both Fridley Well 6 (206673) and Fridley Well 8 (206669) in 1993. The results of the pumping tests were analyzed by the MDH (see attachments). Both tests satisfy the requirements of rule 4720.5520.

Though Fridley Well 6 (206673) extends into the CJDN for a limited distance (~22 ft), the contribution of the CJDN to the properties of the screen aquifer is considered insignificant (see attachments). Fridley Well 8 (206669) is open only to the OPDC. Analysis of the aquifer tests at Fridley Well 6 and Fridley Well 8 estimated an OPDC transmissivity of 149,000 ft**2/day. The thickness of the OPDC at Well 8 is 135 ft, resulting in an estimated OPDC hydraulic conductivity of 1,100 ft/day. Both results for Fridley Well 6 and Fridley Well 8 indicated that cavernous porosity was present in the OPDC.

For the model sensitivity analysis, the lower bound hydraulic conductivity of the OPDC will be set to the 205 ft/day existing Metro Model 3 hydraulic conductivity at Well 6 and the upper bound will be set to the 1,250 ft/day maximum from the Well 6 test.

The logs for Fridley Wells 2, 3, 4, 5, 6, 7, 8, and 9 were used to determine the range of OPDC thicknesses and contact elevations. The representative values shown are from Well 8, consistent with the attached summary tables from both tests.

Memo

MDH Minnesota Department of Health

Date: November 15, 2016

To: Fridley WHP Project File (PWSID: 1020031)

From: Justin Blum

Subject: Analysis of the Fridley 6 (206673) Pumping Test, July 1, 1993, Confined Prairie du Chien Aquifer

Test No. 2585

This test is one of two tests performed in 1993 at the Fridley Commons Park well field by B.A. Liesch and Associates. Inc. The first test, performed on Fridley 6 (206673), was conducted as described below. The specifics of test location, scope, and timing are presented in Tables 2 and 3. Data were analyzed using standard methods cited in references. Individual analyses are presented in Appendix 1 and are summarized in Table 4. Appendix 2 includes maps, field notes, and any other test documentation.

Table 1. Summary of Results

Conceptual model: leaky-confined, radial porous-media flow, water-table aquifer is source of water to the pumped aquifer. The pumped aquifer is karsted dolostone and minor sandstone.

Aquifer Properties Summary					
Representative Values		Unit	Range		+/- %
			Minimum	Maximum	
Top Stratigraphic Elev.	755	feet (MSL)			
Bottom Stratigraphic Elev.	620	feet (MSL)			
Transmissivity (T)	149,000	ft^2/day	108,000	169,000	
Aquifer Thickness (b)	135	Feet			
Saturated Thickness* (b)		Feet			
Hydraulic Conductivity (k)	1100	ft/day	800	1250	
Primary Porosity (e_p)	0.05	0.00 %			
Secondary Porosity** (e_s)	?	0.00 %	Cavernous interconnections present		
Storativity (S)	3.0E-04	dimensionless	2.0E-04	3.5E-04	
Characteristic Leakage (L)	7480	Feet			
Hydraulic Resistance (c)	390	Days	390	505	
Effective Well Radius (r_e)	100	Feet	80	120	
* hydraulically unconfined aquifer, ** dual porosity aquifer because of fractures or solution weathering					

Boundaries: leakage, enlarged effective borehole radius resulting from conduit flow.

Remarks: high quality test, lack of early-time data (< 1 minute) does not materially affect results. Anomalous hydraulic response of observation wells and over-efficiency of the pumped well are attributed to flow in cavernous secondary-porosity developed in the dolostone of the Prairie du Chien.

Table 2. Aquifer Test Information

Aquifer Test Number	2585
Test Location	Fridley 6 (206673)
Well Owner	City of Fridley
Test Conducted By / For	B.A. Liesch Assoc. for MPCA
Aquifer	OPDC
Confined / Unconfined	Confined
Date/Time Monitoring Start	--
Date/Time Pump off Before Test	--
Date/Time Pumping Start	7/1/1993 09:00
Date/Time Recovery Start	7/2/1993 09:00
Date/Time Test Finish	7/2/1993 16:00
Flow Rate	1326 gpm
Data Collection Methods	Manual
Number of Observation Wells	4

Table 3. Wells Monitored During the Test

Well Name (Unique Well No.)	Radial Distance (feet)	Static Water Levels (feet below measuring point)			Change in Water Level (feet)	Aquifer
		Start	Mid-test	End		
Pumped Well:						
Fridley 6 (206673)	1				3.69	OPDC
Ob Wells:						
7 (206678)	488				2.67	OPDC
9 (206672)	675				2.51	OPDC
8 (206669)	1124				2.34	OPDC
MW-2 (509090)	601				0.3	QBAA

Table 4. Graphical Analysis Results

Transient Analysis

Well Name (Unique Well No.)	Transmissivity, T (ft^2/day)	Storage Coefficient, S	Analysis Method	Characteristic Leakage Factor, L (feet)	Plot No. Remarks
Pumped Well:					
Fridley 6 (206673)	41,400	--	Theis		1
	46,100	3.8E-04	Agarwal		10
	169,000	3.0E-04	Hunt-Scott	8,070 [c=390 days]	11 - effective borehole radius ~100 ft.
Ob Wells:					
F-7 (206678)	38,300	2.0E-04	Theis		2
"	149,000	3.5E-04	Hunt-Scott	7,600 [c=390 days]	12 – radius of 490 ft.
F-9 (206672)	50,700	2.6E-05	Theis		3
"	**140,000**	**2.0E-04**	**Hunt-Scott**	**7,480 [c=400 days]**	13 – radius of 675 ft.
F-8 (206669)	45,100	8.0E-05	Theis		4
"	108,000	3.0E-04	Hunt-Scott	5,810 [c=310 days]	14 – radius of 1100 ft.
MW-1 (509090)	170,000	3.4E-02	Theis		5 - Poor match
Distance – Drawdown	47,200	1.4E-04	Walton t/r^2		6 – over-efficient pumping well
	47,200	1.4E-04	Walton t/r^2	5000 to 9800 [c=530 to 2040 days]	7 – effective borehole radius ~100 ft.
	32,500	5.6E-05	Cooper-Jacob		8 – S is too small for this setting

Steady-state Analysis

Transmissivity, T (ft2/day)	Characteristic Leakage, L (feet)	Hydraulic Resistance, c (days)	Analysis Method	Plot No. Remarks
32,500	32,100	31,800	Hantush-Jacob	8 – L is unreasonably large for setting – not physically possible
50,700	12,000	2850	de Glee	9 - L is too large for setting – does not permit observed response in drift obwell

Test Description

Purpose of Test

The test was conducted to investigate the source and concentration of VOC contamination in the public water supply (PWS) wells at the Fridley Commons Park well field. The location and aquifer completion of the wells is shown on Figure 1, Appendix 2.

Hydrogeologic Setting

The test is documented in the B.A, Liesch & Assoc. report to Fridley and the MPCA dated September, 1993 – see references. The wells are constructed primarily as Prairie du Chien (PdC) wells. If they extend

into the Jordan Sandstone, it is for a limited distance. Therefore, it is assumed that the contribution of the Jordan to the production of these wells is insignificant.

Qualitative Aquifer Hydraulic Response:

Theis-curve matches are made to all wells, plots 1 to 5, to identify any possible boundaries and provide apparent aquifer properties based on the perspective of each well. The individual plots show the influence of leakage in late-time and no other boundaries were identified. The drift observation well, plot 5, clearly responded to pumping but data collection at that well was limited for this test and the curve-match was poor.

A distance-drawdown plot, t/r^2, is used to view all data from the test on one graph. Plot 6 shows that the pumped well is over-efficient relative to the Theis-curve based on a match to the nearest observation well. A reasonable explanation for the high hydraulic efficiency of this well is that it is open to one or more intervals of cavernous secondary porosity developed within the PdC. In addition, the response of the pumped well appears slightly leaky. With respect to the hydraulic response at the two more distant observation wells, Plot 6 shows that the early-time drawdowns are too large relative to the Theis-curve and the later-time drawdowns converge on a single leaky curve. [Rather than individual curves according to the radial distance of each observation well, as is normal in a porous media aquifer.] This is a strong indication that the cavernous interval extends throughout the Commons Park well field; causing these wells to be highly productive and distributing the hydraulic stress of pumping very efficiently relative to a porous-media aquifer.

Storativities calculated by the transient techniques, plots 1 through 8, are within the range for a highly confined aquifer, 10^{-5}, even though the drift monitoring well, completed in the layer above, clearly responded within 24 hours of pumping. The response of the drift monitoring well indicates a very leaky system. If the system is leaky, values for storativity should be in the range of 10^{-3} to 10^{-4}, not 10^{-4} to 10^{-5}, as seen from these analyses.

An iterative process is used to fit the pumped well data to the Theis curve by adjusting the nominal radius of the well. The effective borehole radius for Well 6 appears to be about 100 feet, plot 7. Once the large effective radius of the pumped well is taken into account, steady-state analyses show similar values for transmissivity as from the transient analyses, plots 8 and 9. The values for the characteristic leakage factor from the steady-state analyses are quite large, in the range of a tightly confined aquifer system. From the observed effect on the drift monitoring well, it would be expected that the hydraulic resistance should be in the range of hundreds of days (leakage factor^2/transmissivity, [L^2/T]) and the corresponding leakage factor should be in the range of 5,000 feet – not 12,000 feet and greater. Therefor the Walton t/r^2 leakage factor is more appropriate, plot 7; even though it is only based on the match to the nearest observation well.

These qualitative relationships between interdependent parameters; transmissivity, hydraulic confinement and leakiness are contradictory and indicate problems with the conceptual model of the flow system. It is a fact that the system is sufficiently leaky that the water table is affected by pumping in the PdC. This violates a primary assumption of the source of water for both transient and steady-state analysis techniques. Therefore, a slightly different conceptual model; in which the water table is

contained within the leaky layer, after Hunt-Scott (2007) - should be used to calculate the aquifer properties.[1]

Quantitative Analysis

Conceptual Model

The conceptual model is of porous radial flow to a well in a leaky two-layered system; the pumped aquifer and an overlying leaky confining layer that contains the water table.

Analysis Results

The Hunt-Scott analyses, plots 11 through 14, show an extraordinarily large transmissivity, a corresponding large leakage factor, along with a reasonable storativity. The hydraulic resistance of the confining layer calculated from these parameters [L^2/T] is in the range of 300 to 400 days; consistent with the leaky response of the drift observation well. Plot 11 is of data from the pumped well only so as to test the large effective borehole radius. A large effective borehole radius of 100 feet is required for the pumped well in order to provide a transmissivity value that is within the range of those provided by the other wells.

Hydraulic response affected by:

Flow within cavernous secondary-porosity.

Consistency with conceptual model:

Data from the PdC observation wells, modeled on plots 12, 13 and 14, show fairly consistent aquifer properties. Unfortunately, the length of the test was insufficient to confirm that the Hunt-Scott conceptual model is correct for this setting. An additional day of pumping would provide the data needed to differentiate between the late-time curves. Nevertheless, the most consistent set of aquifer parameters is provided by this method; in which the interdependent relationships between T, S, L and c are maintained – consistent with the hydrogeologic setting.

The results from the pumped well and the three PdC observation wells are quite consistent once the appropriate conceptual flow model was identified. Only the large effective borehole radius is needed to compensate for differences with the Hunt-Scott conceptual model of the flow system.

Representative aquifer properties best shown by:

Plots 11 through 14; nominal aquifer properties are shown in Table 1.

Selected References

Agarwal, R.G. 1980. A new method to account for producing time effects when drawdown type curves are used to analyze pressure buildup and other test data. SPE Paper 9289, presented at the 55th SPE Annual Technical Conference and Exhibition, Dallas, Texas, September 21–24, 1980.

Cooper, H.H. and Jacob, C.E. (1946) A Generalized Graphical Method for Evaluating Formation Constants and Summarizing Well-filed History, Trans. American Geophysical Union, V. 27, pp. 526 – 534.

[1] No criticism of the work performed by B.A. Liesch & Assoc. is expressed or implied; datasets that were carefully collected and appropriately documented may be re-examined by newer methods. This technique was not available at the time that the tests were performed in 1993.

de Glee, G. (1930) Over grondwaterstroomingen bij wateronttrekking door middle van putten. Ph.D. thesis, Delft Technische Hogeschool, Delft.

deGlee Method in:
Kruseman and De Ridder, (1991) Analysis and Evaluation of Pumping Test Data (2nd Edition), Publication 47, International Institute for Land Reclamation and Improvement, P.O. Box 45, 6700 AA Wageningen, The Netherlands, pp. 76-78.

Duffield, G.M. (2007) AQTESOLV for Windows Version 4.5 User's Guide, HydroSOLVE, Inc., Reston, VA.

Jacob, C.E. (1947) Drawdown Test to Determine the Effective Radius of Artesian Wells. Transactions of the American Society of Civil Engineers, 112, pp.1047–1170.

Hantush, M. S. and Jacob, C.E. (1955b) Steady Three-dimensional Flow to a Well in a Two-layered Aquifer, Trans. American Geophysical Union, Vol. 36, pp. 286-292.

Hantush, M. S. (1960) Modification of the Theory of Leaky Aquifers, Journal of Geophysical Research, Vol. 65, pp. 3713-25.

Hunt, B. (2012) Groundwater analysis using Function.xls. Bruce Hunt's Groundwater Website. Available at: https://sites.google.com/site/brucehuntsgroundwaterwebsite/.

Hunt, B. & Scott, D. (2007) Flow to a Well in a Two-Aquifer System. Journal of Hydrologic Engineering, 12(2), pp.146–155.

Theis, C. V. (1935) The Relation Between the Lowering of the Piezometric Surface and the Rate and Duration of Discharge of a Well Using Ground-Water Storage, Trans. American Geophysical Union, 16th Annual Meeting, April, 1935, pp. 519-24.

Walton, W.C. (1960) Leaky Artesian Aquifer Conditions In Illinois, Illinois State Water Survey, Bulletin 39, pp. 27.

Appendix 1 – Graphical Analysis

Test No: 2585
Pumped Well: Fridely 6 (206673)
Obwell: -- (--)
Test Date: 7/1/1993
Data Series: Composite pumping and recovery
Discharge Rate (gpm): 1326
Radial Distance (feet): 1

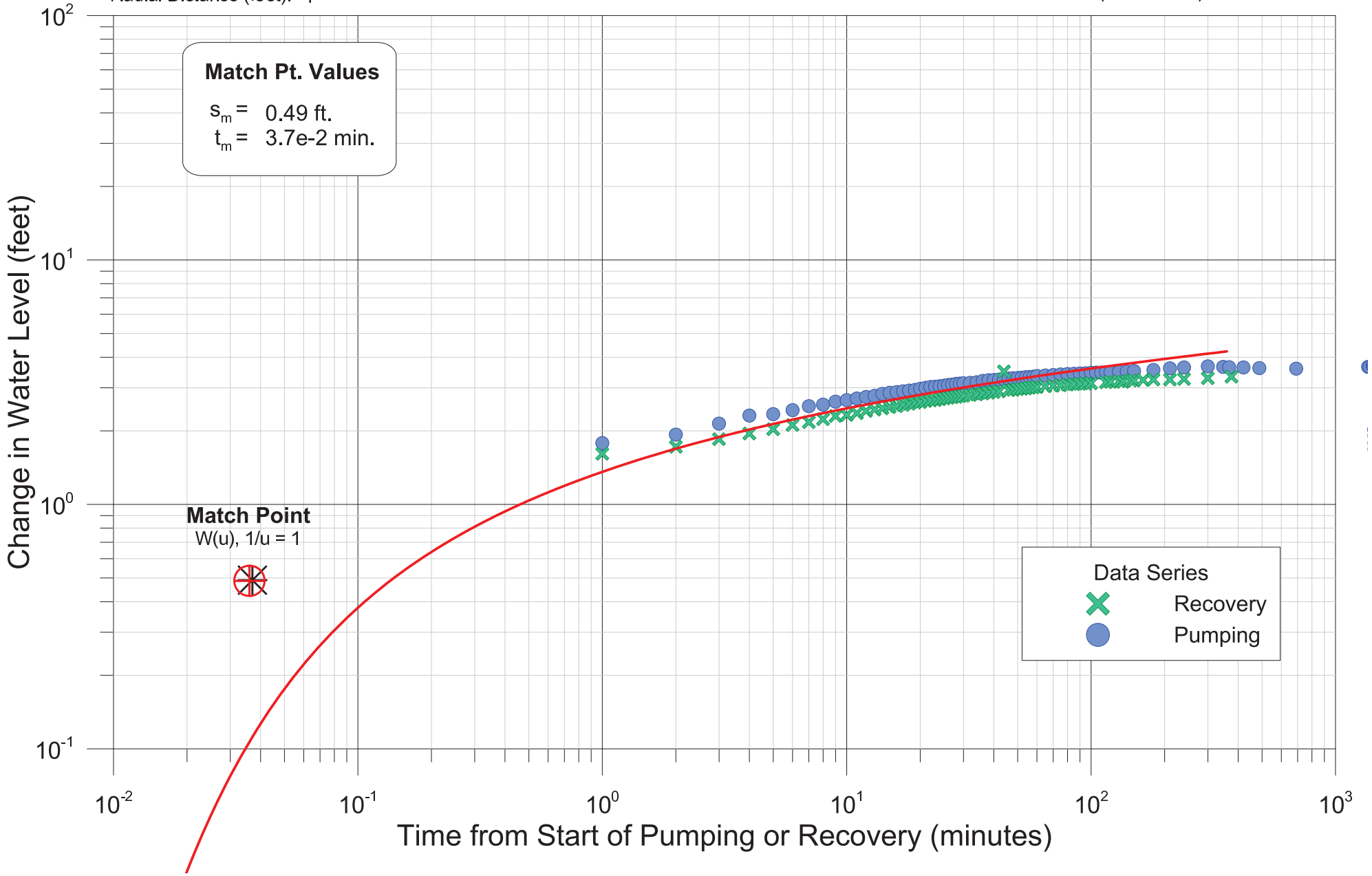
Theis Analysis
Plot 1

$T = (1440 / 4 / pi() / 7.48) \cdot Q \cdot W_{(u)} / s_m$

$S = (4 / 1440) \cdot T \cdot t_m \cdot 1/u / r^2$

$T = 15.3 * 1326 / 0.49 = 41403.7\ ft^2/day$

$S = 41403.7 * 0.037 / (1^2 * 360) = 4.25538$



Test No: 2585
Pumped Well: Fridely 6 (218916)
Obwell: Fridely 7 (206678)
Test Date: 7/1/1993
Data Series: Composite pumping and recovery
Discharge Rate (gpm): 1326
Radial Distance (feet): 488

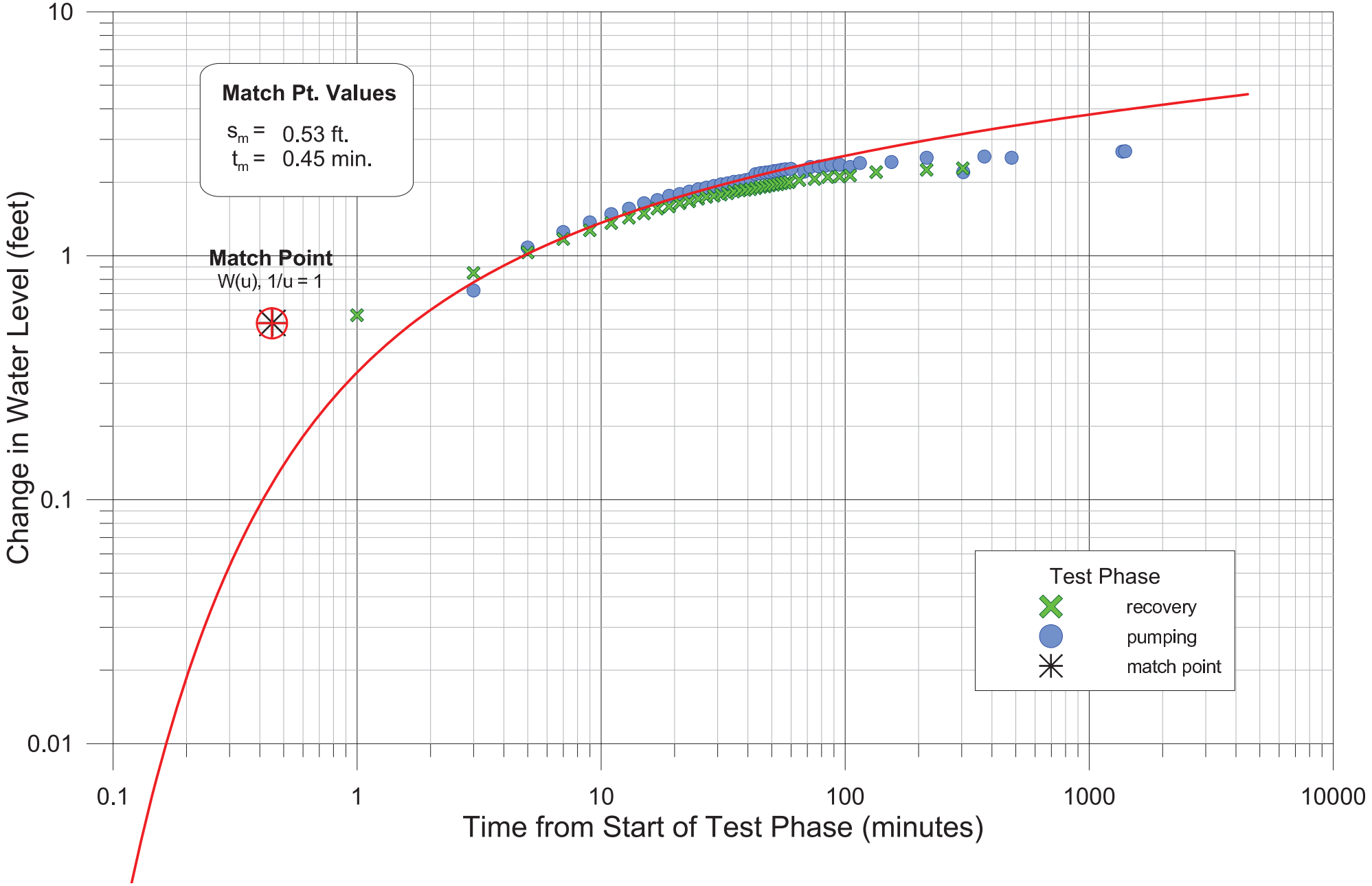
Theis Analysis
Plot 2

$T = (1440 / 4 / pi() / 7.48) \bullet Q \bullet W_{(u)} / s_m$

$S = (4 / 1440) \bullet T \bullet t_m \bullet 1/u / r^2$

$T = 15.3 * 1326 / 0.53 = 38278.9\ ft^2/day$

$S = 38278.9 * 0.45 / (488^2 * 360) = 0.000200923$



Test No: 2585
Pumped Well: Fridely 6 (218916)
Obwell: Fridely 8 (206669)
Test Date: 7/1/1993
Data Series: Composite pumping and recovery
Discharge Rate (gpm): 1326
Radial Distance (feet): 1124

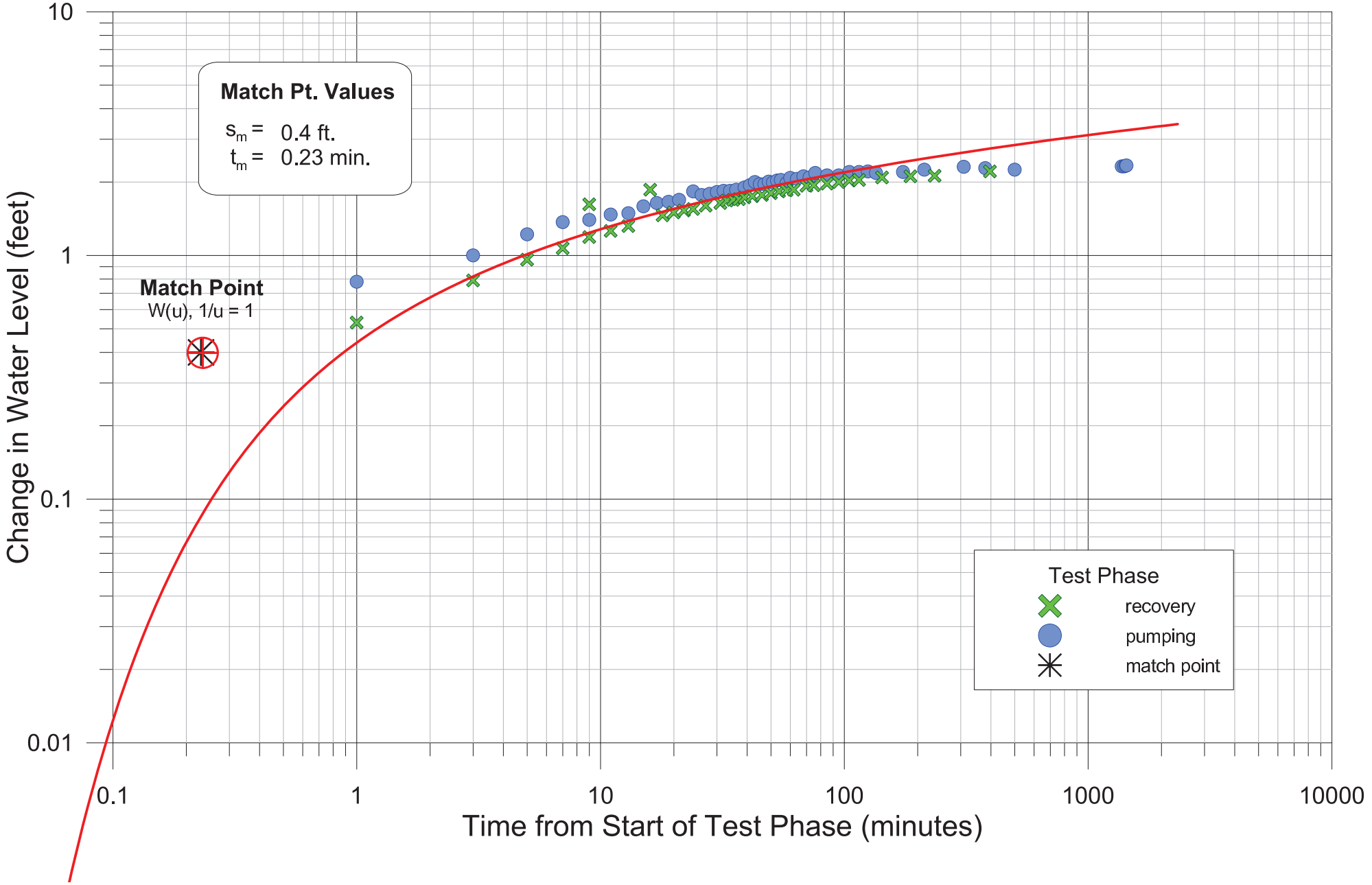
Theis Analysis
Plot 3

$T = (1440 / 4 / pi() / 7.48) \bullet Q \bullet W_{(u)} / s_m$

$S = (4 / 1440) \bullet T \bullet t_m \bullet 1/u / r^2$

$T = 15.3 * 1326 / 0.4 = 50719.5\ ft^2/day$

$S = 50719.5 * 0.23 / (1124^2 * 360) = 2.56488e-005$



Test No: 2585
Pumped Well: Fridely 6 (218916)
Obwell: Fridely 9 (206672)
Test Date: 7/1/1993
Data Series: Composite pumping and recovery
Discharge Rate (gpm): 1326
Radial Distance (feet): 675

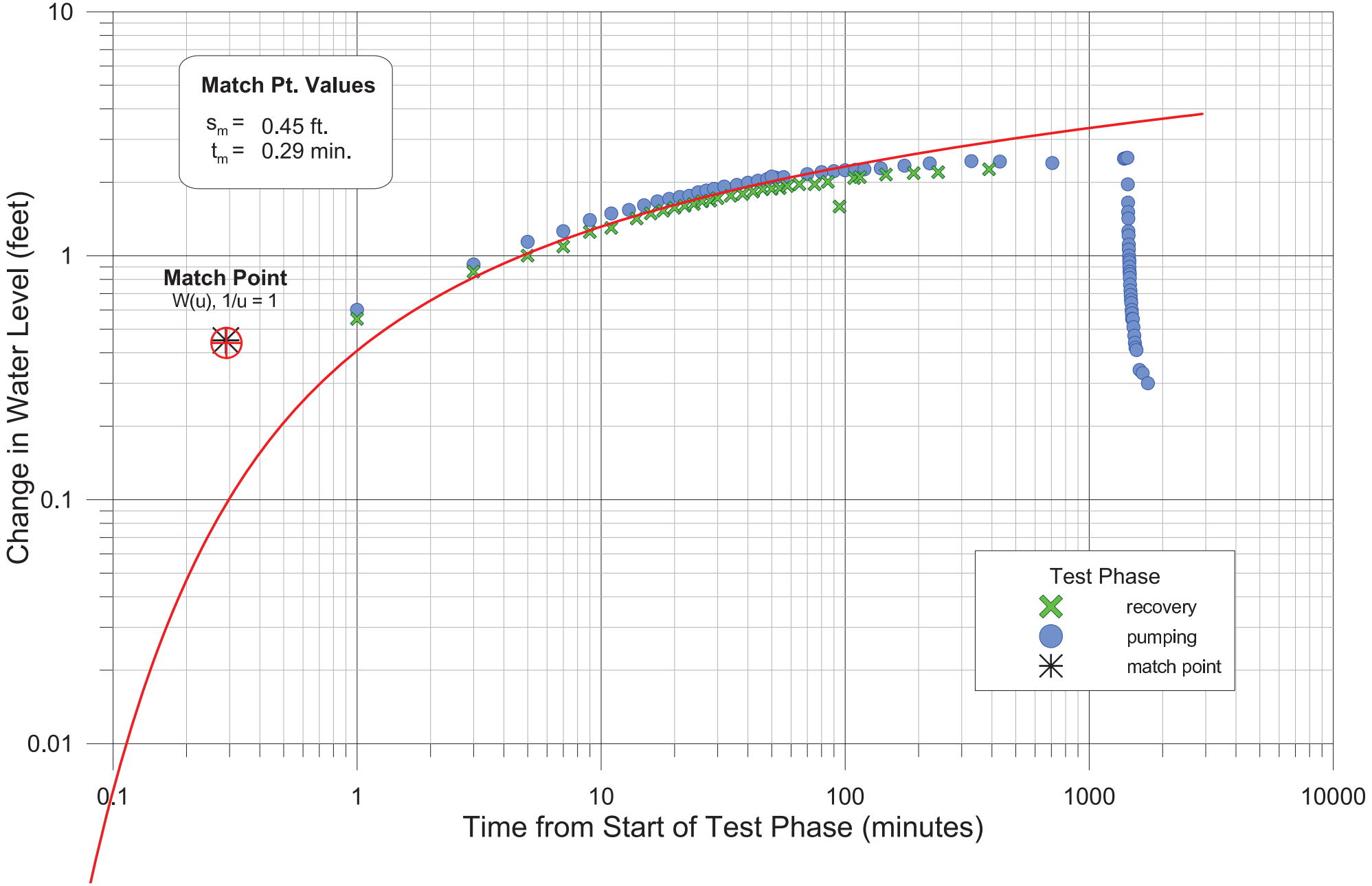
Theis Analysis
Plot 4

$T = (1440 / 4 / pi() / 7.48) \bullet Q \bullet W_{(u)} / s_m$

$S = (4 / 1440) \bullet T \bullet t_m \bullet 1/u / r^2$

$T = 15.3 * 1326 / 0.45 = 45084\ ft^2/day$

$S = 45084 * 0.29 / (675^2 * 360) = 7.97096e-005$



Test No: 2585
Pumped Well: Fridely 6 (218916)
Obwell: MW-2 (509090)
Test Date: 7/1/1993
Data Series: Composite pumping
Discharge Rate (gpm): 1326
Radial Distance (feet): 488

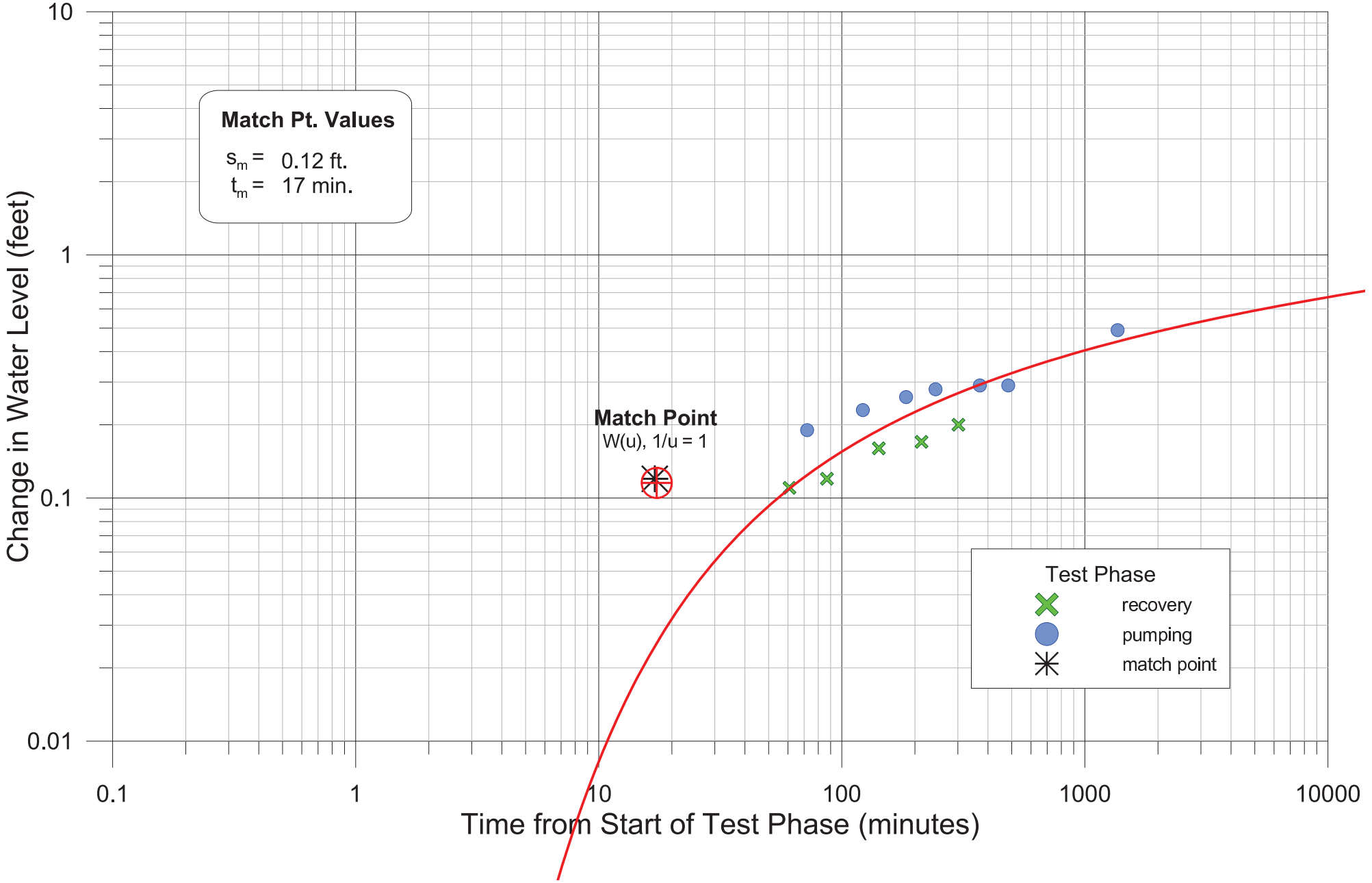
Theis Analysis
Plot 5

$T = (1440 / 4 / pi() / 7.48) \bullet Q \bullet W_{(u)} / s_m$

$S = (4 / 1440) \bullet T \bullet t_m \bullet 1/u / r^2$

$T = 15.3 * 1326 / 0.12 = 169065\ ft^2/day$

$S = 169065 * 17 / (488^2 * 360) = 0.0335244$

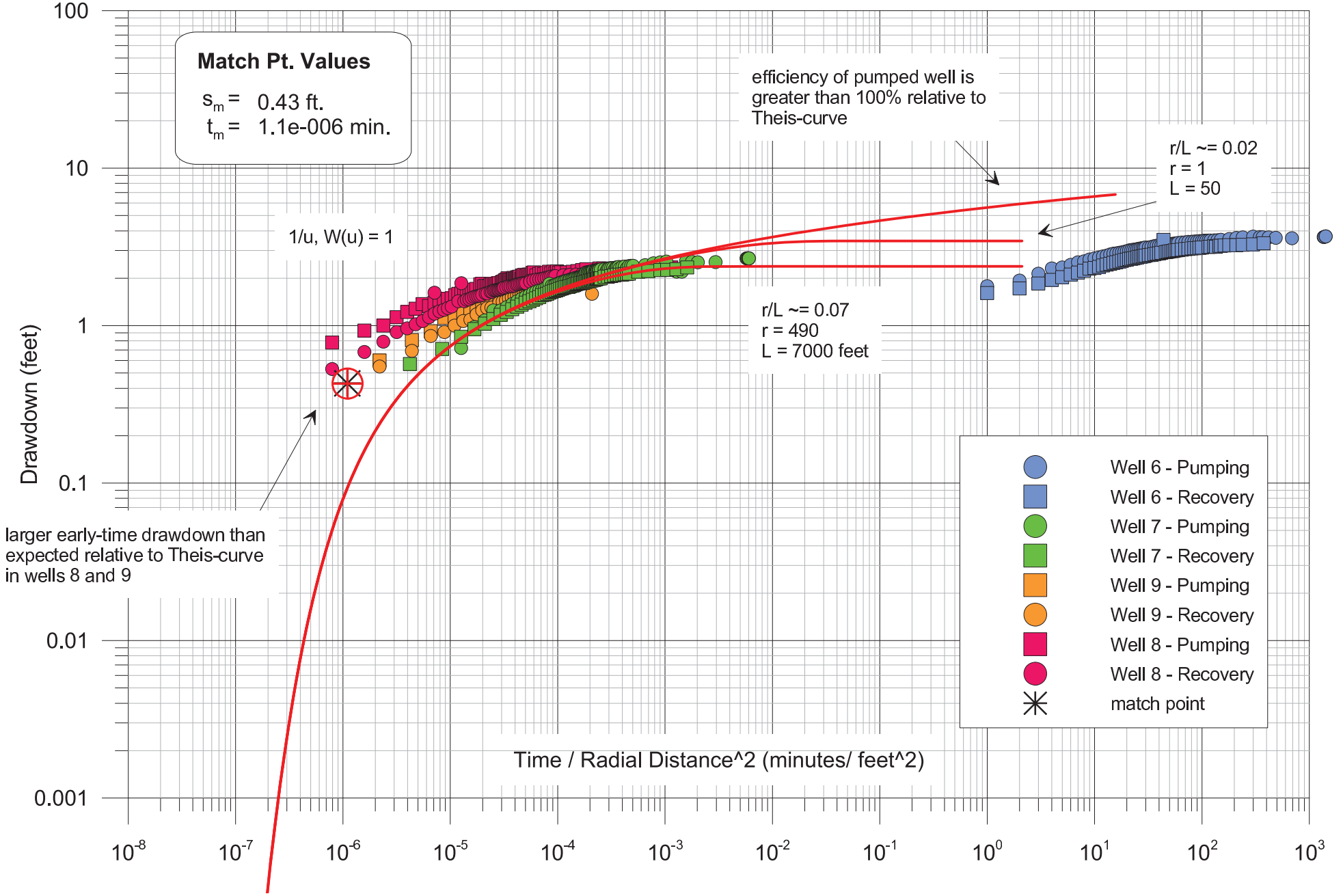


Test No: 2585
Pumped Well: Fridely 6 (218916)
Ob Well: -- (--)
Date: 7/1/1993
Data Series: Composite pumping and recovery
Rate (gpm): 1326

Walton Distance-Drawdown Analysis
Plot 6

$T = (1440 / 4 / pi() / 7.48) \bullet Q \bullet W_{(u)} / s_m$
$S = (4 / 1440) \bullet T \bullet t_m \bullet 1/u$

$T = 15.3 * 1326 / 0.43 = 47180.9$ ft²/day
$S = 47180.9 * 1.1e\text{-}006 / 360 = 0.000144164$

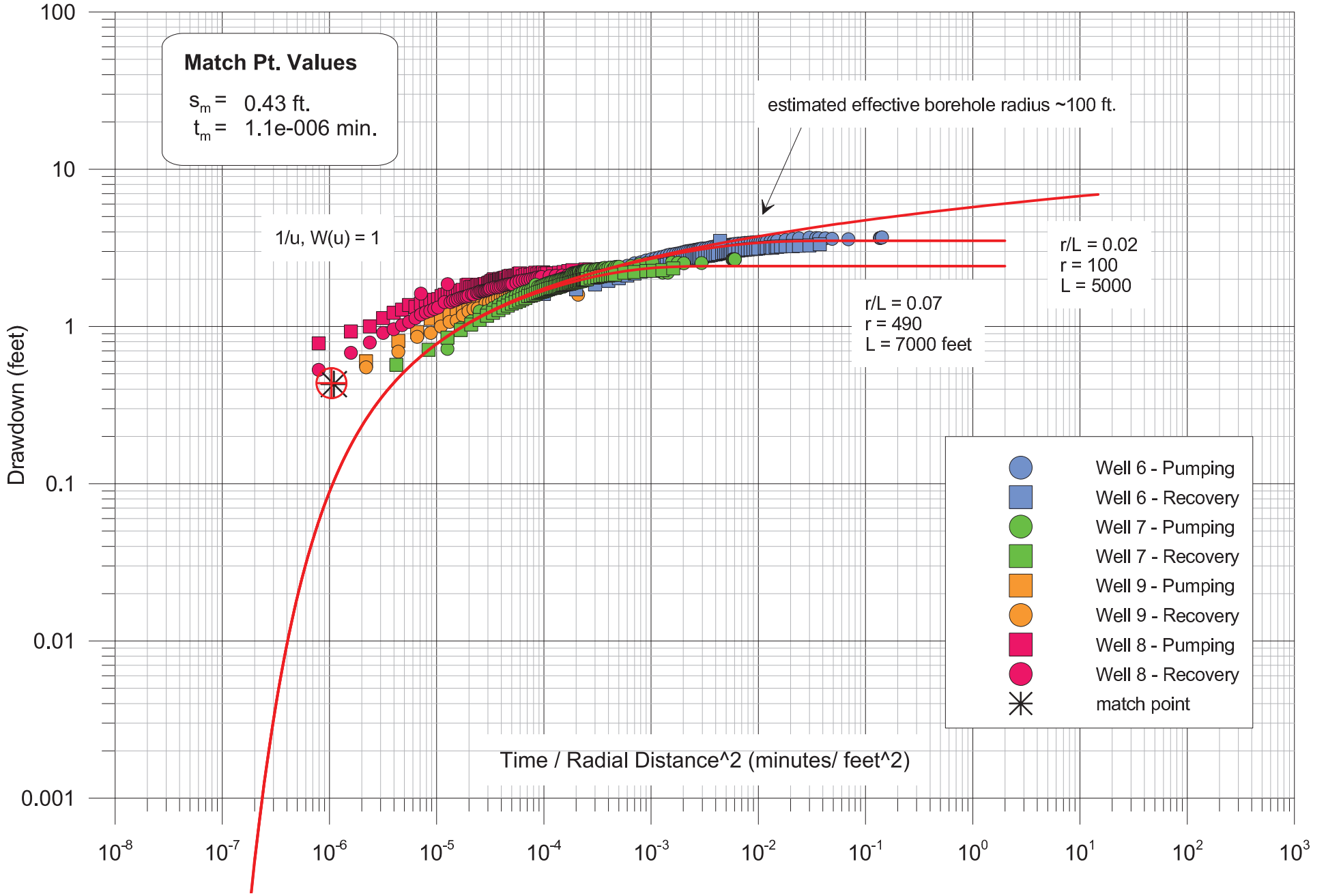


Test No: 2585
Pumped Well: Fridely 6 (218916)
Ob Well: -- (--)
Date: 7/1/1993
Data Series: Composite pumping and recovery
Rate (gpm): 1326

Walton Distance-Drawdown Analysis
Plot 6

$T = (1440 / 4 / pi() / 7.48) \bullet Q \bullet W_{(u)} / s_m$
$S = (4 / 1440) \bullet T \bullet t_m \bullet 1/u$

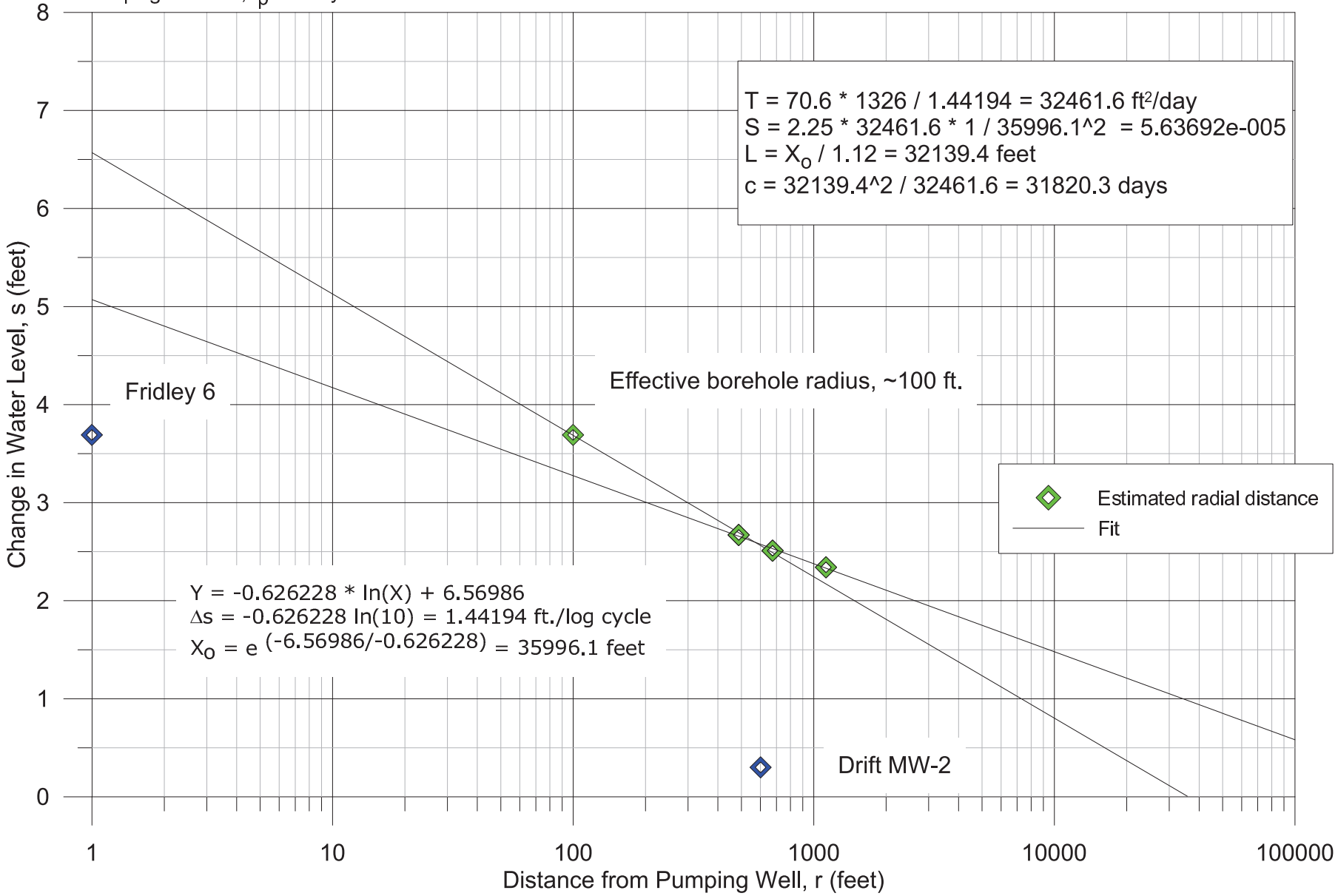
$T = 15.3 * 1326 / 0.43 = 47180.9$ ft²/day
$S = 47180.9 * 1.1e\text{-}006 / 360 = 0.000144164$



Cooper-Jacob, Hantush-Jacob Analysis
Plot 8

Test No: 2585
Pumped Well: Fridely 6 (218916)
Test Date: 7/1/1993
Data Series: Steady-state pumping - projected to 1000 minutes
Discharge Rate, Q: 1326 gpm
Pumping Duration, t_p : 1 days

$T = (2.303 * 1440 / 2 / pi() / 7.48) * Q / \Delta s$
$S = 2.25 * T * t_p / X_o^2$
$L = X_o / 1.12$, $c = L^2 / T$

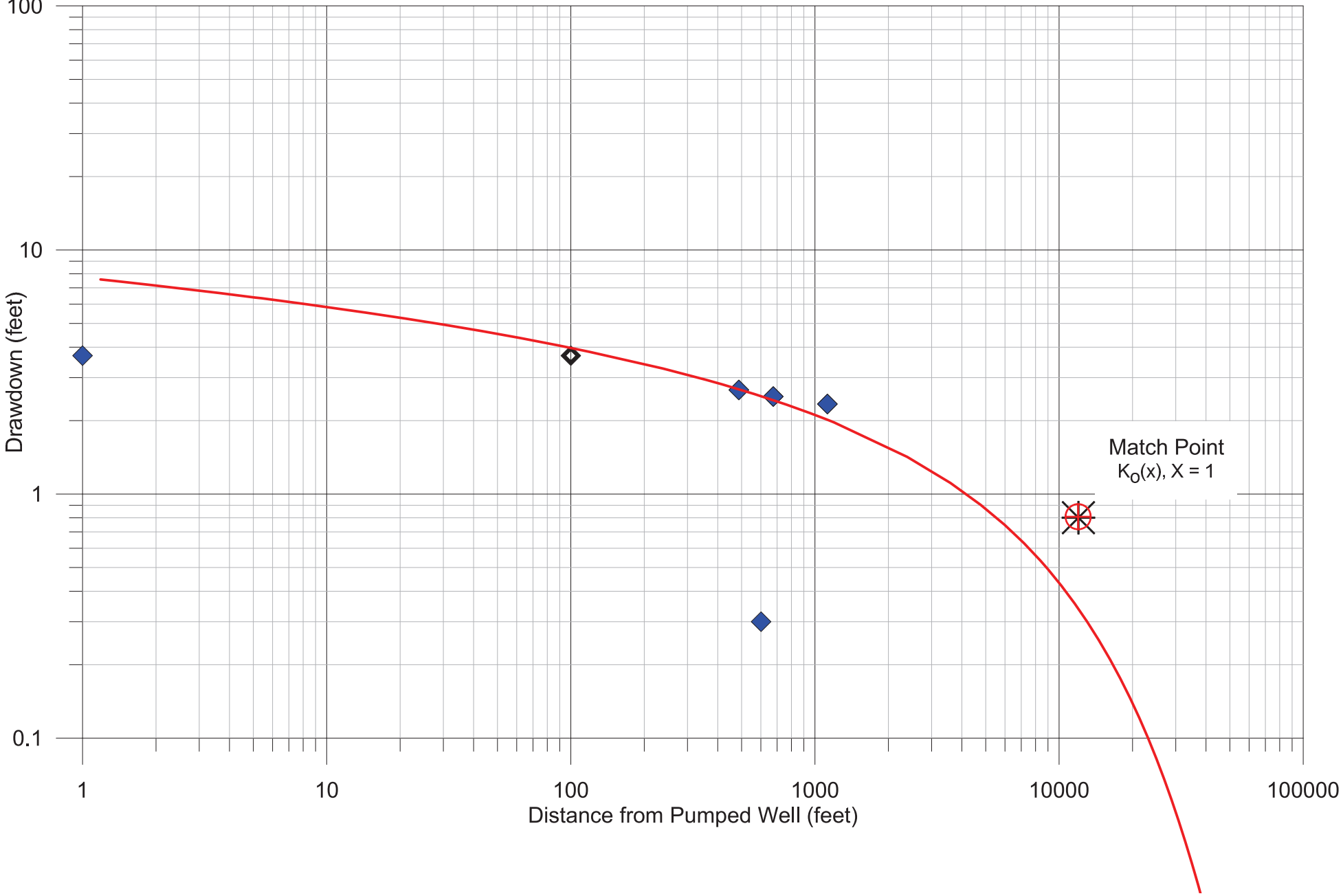


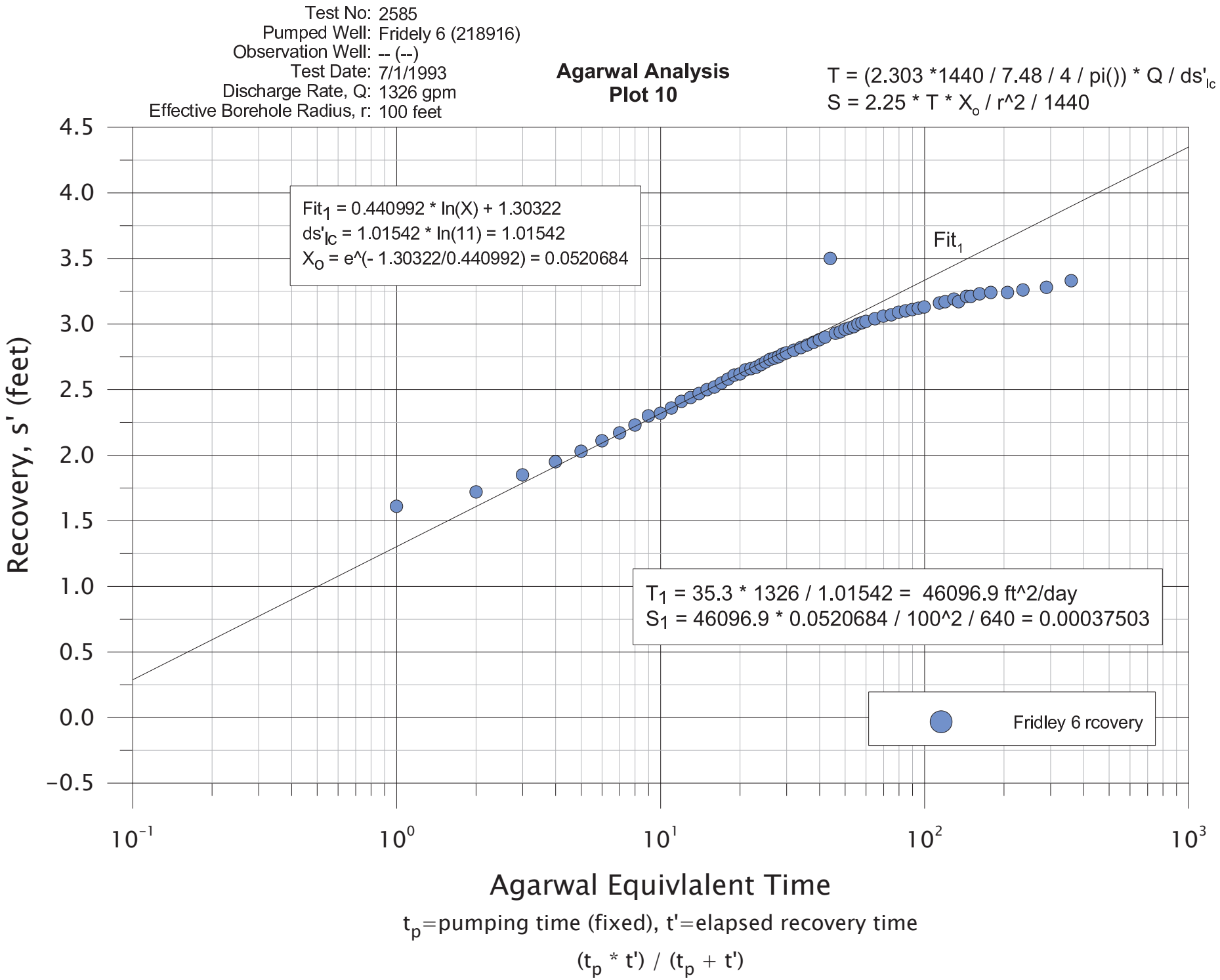
Test No: 2585
Pumped Well: Fridely 6 (218916)
Ob Well: -- (--)
Date: 7/1/1993
Data Series: Steady-state pumping
Rate (gpm): 1326

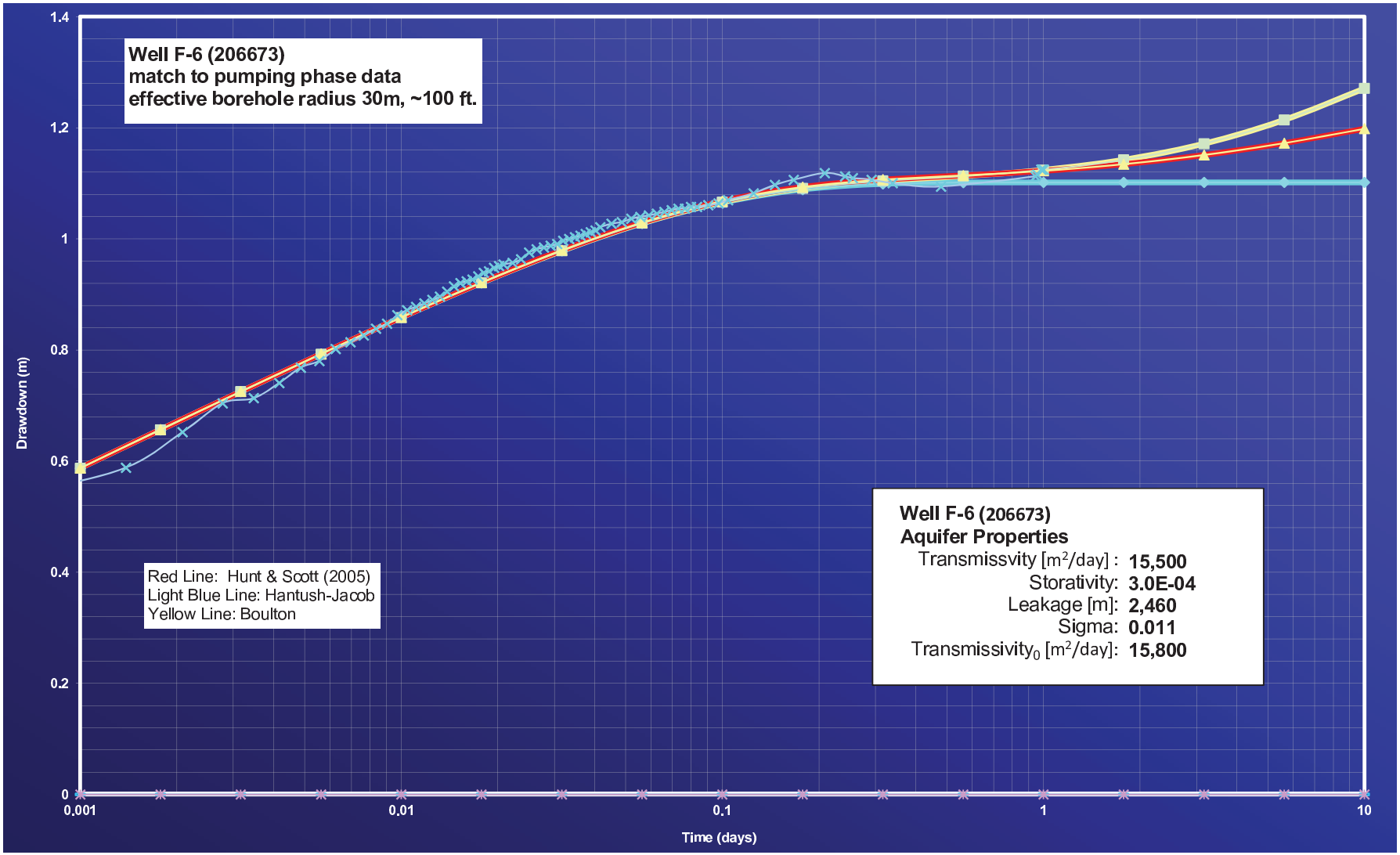
de Glee Analysis
Plot 9

$T = (1440 / 2 / pi() / 7.48) \bullet Q \bullet K_0(x)_m / s_m$
$L = X_m , c = L^2 / T$

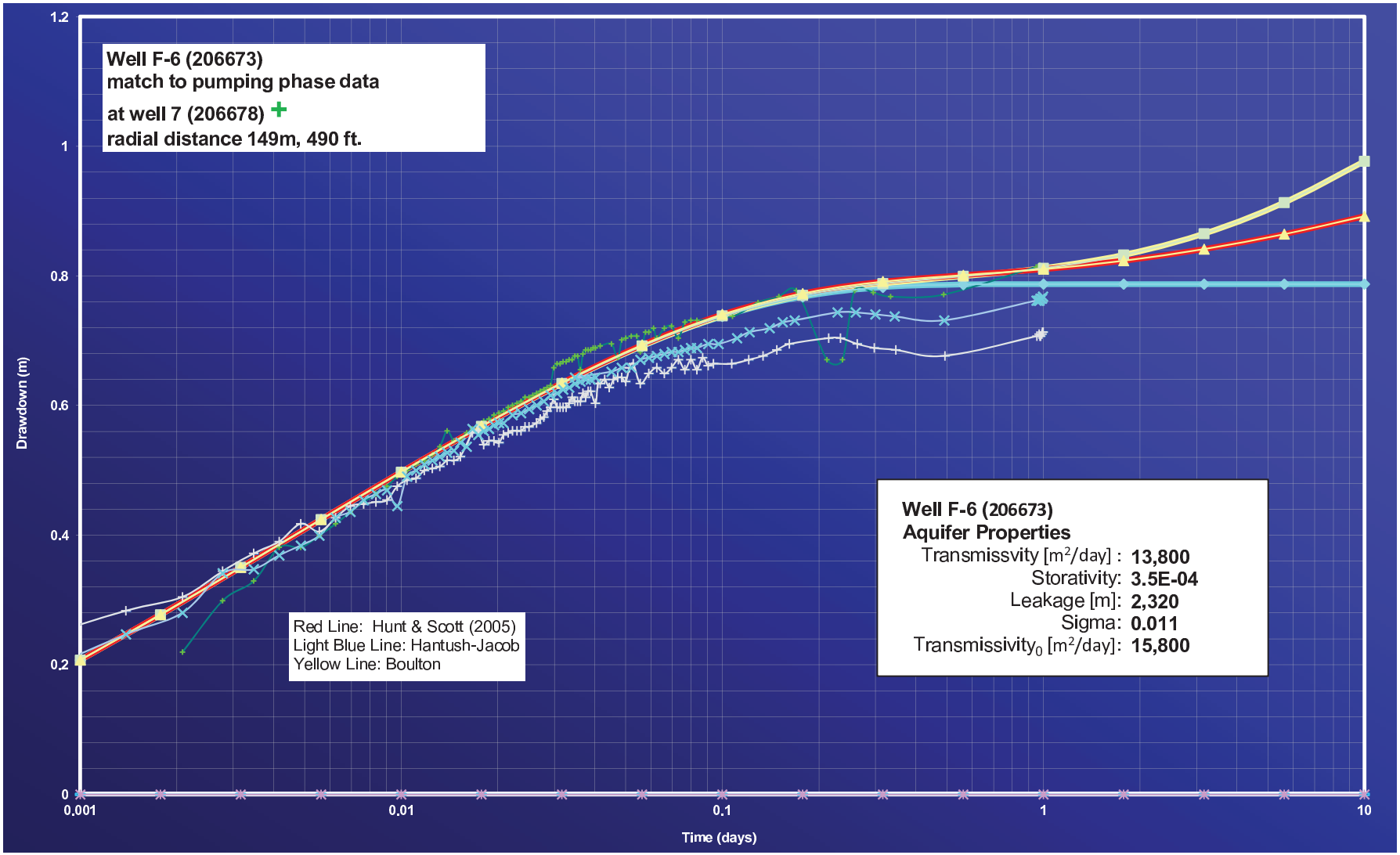
$T = 30.6 * 1326 / 0.8 = 50719.5 \text{ ft}^2/\text{day}$
$L = 12000 , c = (12000^2/50719.5) = 2839.14 \text{ days}$



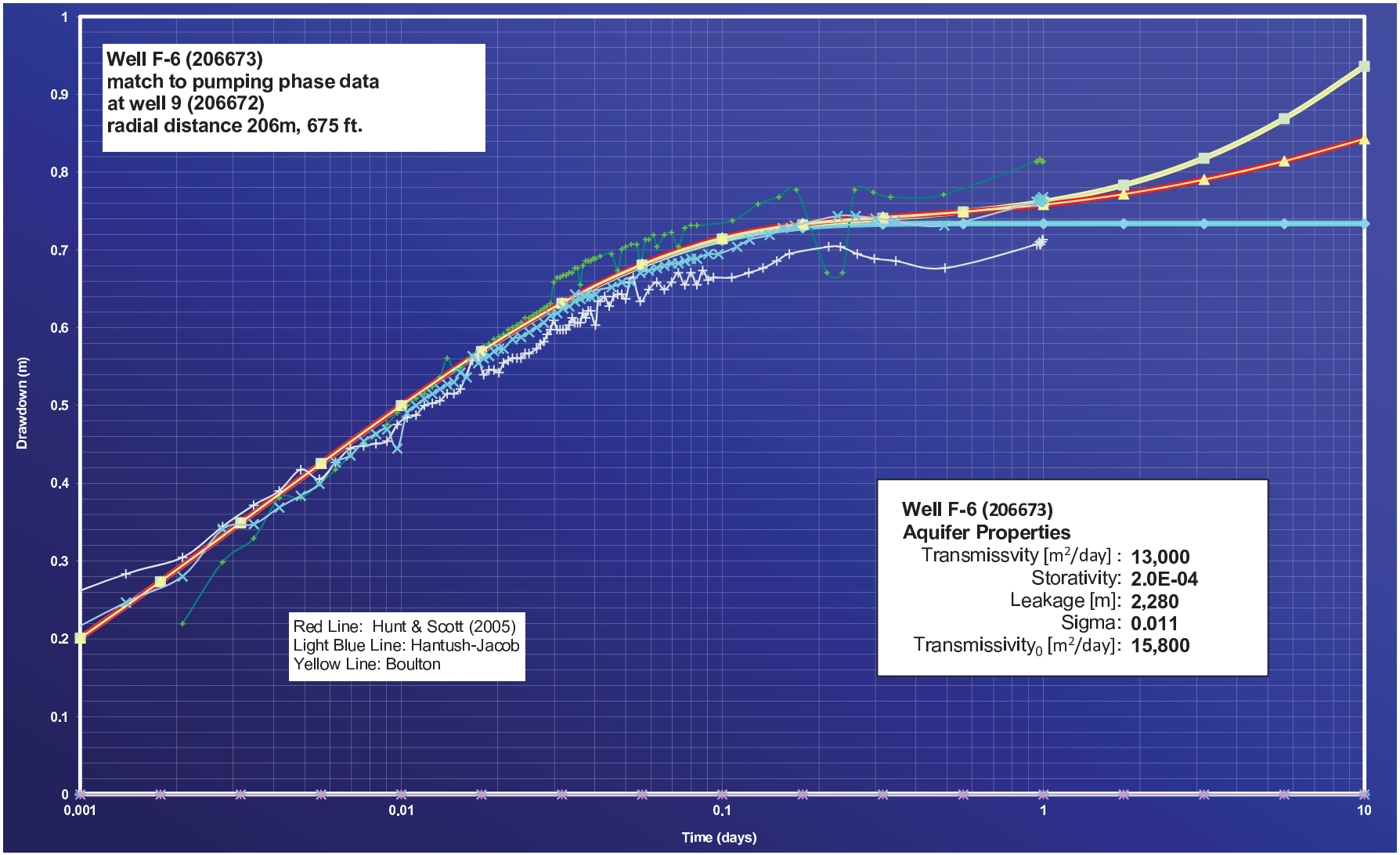

Test No: 2585
Pumped Well: Fridely 6 (218916)
Observation Well: -- (--)
Test Date: 7/1/1993
Discharge Rate, Q: 1326 gpm
Effective Borehole Radius, r: 100 feet
Agarwal Analysis
Plot 10
T = (2.303 *1440 / 7.48 / 4 / pi()) * Q / ds'lc
S = 2.25 * T * Xo / r^2 / 1440
Fit1 = 0.440992 * ln(X) + 1.30322
ds'lc = 1.01542 * ln(11) = 1.01542
Xo = e^(- 1.30322/0.440992) = 0.0520684
Fit1
T1 = 35.3 * 1326 / 1.01542 = 46096.9 ft^2/day
S1 = 46096.9 * 0.0520684 / 100^2 / 640 = 0.00037503
Fridley 6 rcovery
Recovery, s' (feet)
4.5
4.0
3.5
3.0
2.5
2.0
1.5
1.0
0.5
0.0
-0.5
10-1
100
101
102
103
Agarwal Equivlalent Time
tp=pumping time (fixed), t'=elapsed recovery time
(tp * t') / (tp + t')


Well F-6 (206673)
match to pumping phase data
effective borehole radius 30m, ~100 ft.
Red Line: Hunt & Scott (2005)
Light Blue Line: Hantush-Jacob
Yellow Line: Boulton
Well F-6 (206673)
Aquifer Properties
Transmissvity [m²/day] : 15,500
Storativity: 3.0E-04
Leakage [m]: 2,460
Sigma: 0.011
Transmissivity0 [m²/day]: 15,800
Drawdown (m)
Time (days)
1.4
1.2
1
0.8
0.6
0.4
0.2
0
0.001
0.01
0.1
1
10

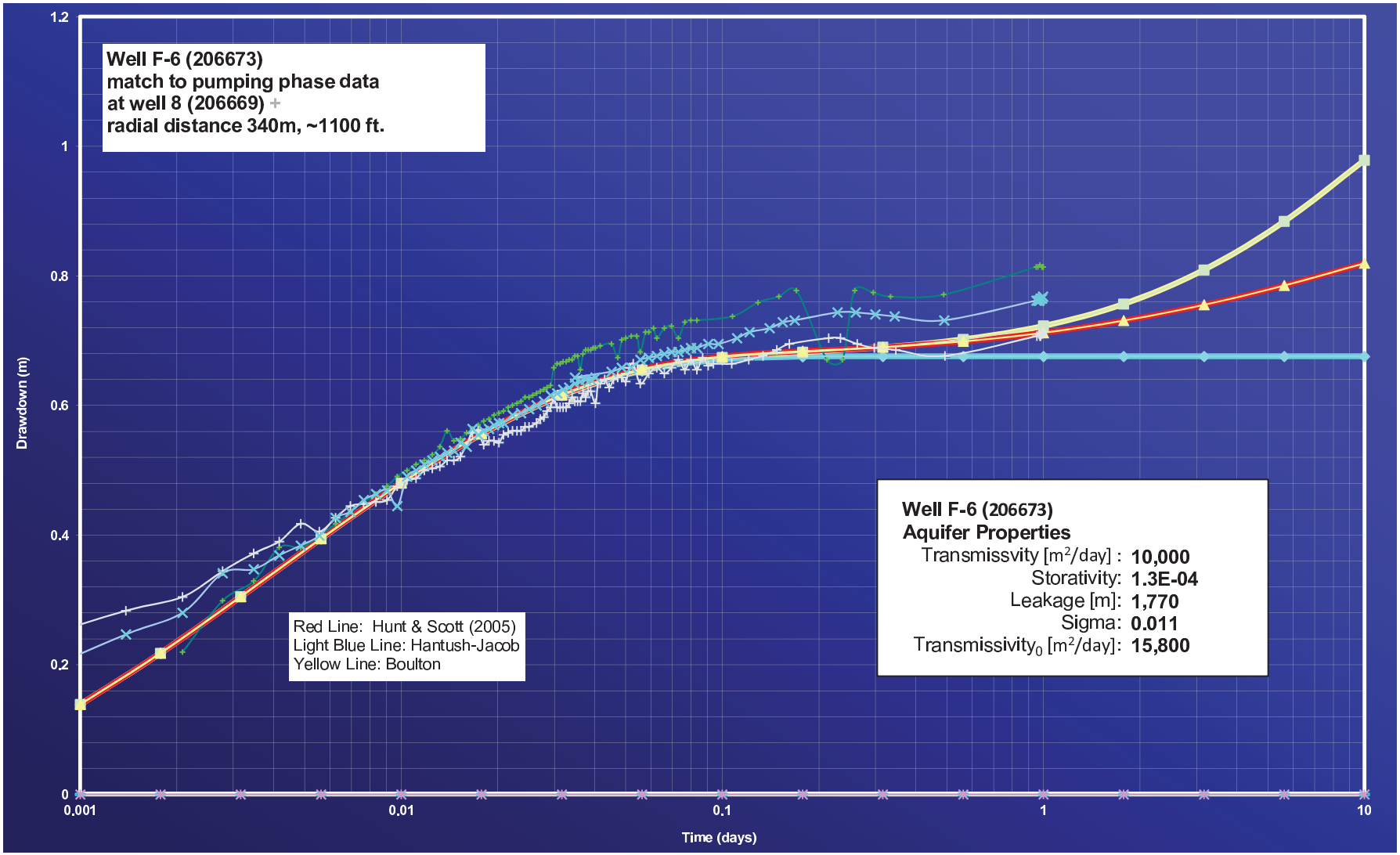
Plot 11


Well F-6 (206673)
match to pumping phase data
at well 7 (206678) +
radial distance 149m, 490 ft.
Red Line: Hunt & Scott (2005)
Light Blue Line: Hantush-Jacob
Yellow Line: Boulton
Well F-6 (206673)
Aquifer Properties
Transmissvity [m²/day] : 13,800
Storativity: 3.5E-04
Leakage [m]: 2,320
Sigma: 0.011
Transmissivity0 [m²/day]: 15,800
Drawdown (m)
Time (days)
1.2
1
0.8
0.6
0.4
0.2
0
0.001
0.01
0.1
1
10

Plot 12


Well F-6 (206673)
match to pumping phase data
at well 9 (206672)
radial distance 206m, 675 ft.
Red Line: Hunt & Scott (2005)
Light Blue Line: Hantush-Jacob
Yellow Line: Boulton
Well F-6 (206673)
Aquifer Properties
Transmissvity [m²/day] : 13,000
Storativity: 2.0E-04
Leakage [m]: 2,280
Sigma: 0.011
Transmissivity0 [m²/day]: 15,800
Drawdown (m)
Time (days)
0
0.1
0.2
0.3
0.4
0.5
0.6
0.7
0.8
0.9
1
0.001
0.01
0.1
1
10

Plot 13


Well F-6 (206673)
match to pumping phase data
at well 8 (206669) +
radial distance 340m, ~1100 ft.
Red Line: Hunt & Scott (2005)
Light Blue Line: Hantush-Jacob
Yellow Line: Boulton
Well F-6 (206673)
Aquifer Properties
Transmissvity [m²/day] : 10,000
Storativity: 1.3E-04
Leakage [m]: 1,770
Sigma: 0.011
Transmissivity0 [m²/day]: 15,800
Drawdown (m)
Time (days)
0
0.2
0.4
0.6
0.8
1
1.2
0.001
0.01
0.1
1
10

Plot 14

Appendix 2 – Documentation

Fridley Commons Park

0 250 500 1,000 Feet

N

WELLID	Name	distance_ft	effective r	drawdown	x-diff^2	y-diff^2	rms_meter	reported distance
206673	6	1	100	3.69	0	0	0.0	1
206678	7	488	488	2.67	6724	15376	148.7	530
206672	9	675	675	2.51	2304	40000	205.7	700
206669	8	1124	1124	2.34	3721	113569	342.5	1000
509090	MW-2	601		0.3	33489	121	183.3	660

datetime	etp	etr	agarwal	wl	dd	rec	t/r^2_p	t/r^2_r	r
7/1/1993 9:00				53.87					100
7/1/1993 9:01	1			55.65	1.78		**0.0001**		**30.4804**
7/1/1993 9:02	2			55.80	1.93		0.0002		
7/1/1993 9:03	3			56.01	2.14		0.0003		
7/1/1993 9:04	4			56.18	2.31		0.0004		
7/1/1993 9:05	5			56.21	2.34		0.0005		
7/1/1993 9:06	6			56.30	2.43		0.0006		
7/1/1993 9:07	7			56.39	2.52		0.0007		
7/1/1993 9:08	8			56.43	2.56		0.0008		
7/1/1993 9:09	9			56.50	2.63		0.0009		
7/1/1993 9:10	10			56.54	2.67		0.001		
7/1/1993 9:11	11			56.58	2.71		0.0011		
7/1/1993 9:12	12			56.62	2.75		0.0012		
7/1/1993 9:13	13			56.65	2.78		0.0013		
7/1/1993 9:14	14			56.70	2.83		0.0014		
7/1/1993 9:15	15			56.73	2.86		0.0015		
7/1/1993 9:16	16			56.75	2.88		0.0016		
7/1/1993 9:17	17			56.77	2.90		0.0017		
7/1/1993 9:18	18			56.79	2.92		0:02		
7/1/1993 9:19	19			56.81	2.94		0.0019		
7/1/1993 9:20	20			56.84	2.97		0.002		
7/1/1993 9:21	21			56.87	3.00		0.0021		
7/1/1993 9:22	22			56.89	3.02		0.0022		
7/1/1993 9:23	23			56.90	3.03		0.0023		
7/1/1993 9:24	24			56.91	3.04		0.0024		
7/1/1993 9:25	25			56.93	3.06		0.0025		
7/1/1993 9:26	26			56.95	3.08		0.0026		
7/1/1993 9:27	27			56.96	3.09		0.0027		
7/1/1993 9:28	28			56.98	3.11		0.0028		
7/1/1993 9:29	29			56.99	3.12		0.0029		
7/1/1993 9:30	30			57.00	3.13		0.003		
7/1/1993 9:32	32			57.01	3.14		0.0032		
7/1/1993 9:34	34			57.03	3.16		0.0034		
7/1/1993 9:36	36			57.07	3.20		0.0036		
7/1/1993 9:38	38			57.09	3.22		0.0038		
7/1/1993 9:40	40			57.10	3.23		0.004		
7/1/1993 9:42	42			57.11	3.24		0.0042		
7/1/1993 9:44	44			57.12	3.25		0.0044		
7/1/1993 9:46	46			57.14	3.27		0.0046		
7/1/1993 9:48	48			57.15	3.28		0:06		
7/1/1993 9:50	50			57.16	3.29		0.005		
7/1/1993 9:52	52			57.17	3.30		0.0052		
7/1/1993 9:54	54			57.18	3.31		0.0054		
7/1/1993 9:56	56			57.19	3.32		0.0056		
7/1/1993 9:58	58			57.20	3.33		0:08		
7/1/1993 10:00	60			57.22	3.35		0:08		

7/1/1993 10:05	65			57.24	3.37		0.0065		
7/1/1993 10:00	70			57.25	3.38		0.007		
7/1/1993 10:15	75			57.27	3.40		0.0075		
7/1/1993 10:20	80			57.28	3.41		0.008		
7/1/1993 10:25	85			57.29	3.42		0.0085		
7/1/1993 10:30	90			57.30	3.43		0.009		
7/1/2009 10:35	95			57.31	3.44		0.0095		
7/1/1993 10:40	100			57.32	3.45		0.01		
7/1/1993 10:45	105			57.33	3.46		0.0105		
7/1/1993 10:50	110			57.33	3.46		0.011		
7/1/1993 10:55	115			57.34	3.47		0.0115		
7/1/1993 11:00	120			57.34	3.47		0.012		
7/1/1993 11:10	130			57.35	3.48		0.013		
7/1/1993 11:20	140			57.36	3.49		0.014		
7/1/2009 11:30	150			57.38	3.51		0.015		
7/1/1993 12:00	180			57.42	3.55		0.018		
7/1/1993 12:30	210			57.47	3.60		0:30		
7/1/1993 1:00	240			57.50	3.63		0.024		
7/1/1993 2:00	300			57.54	3.67		0.03		
7/1/2009 2:47	347			57.52	3.65		0.0347		
7/1/1993 3:07	367			57.51	3.64		0.0367		
7/1/1993 4:00	420			57.50	3.63		0.042		
7/1/1993 5:08	488			57.48	3.61		0.0488		
7/1/1993 8:31	691			57.46	3.59		0.0691		
7/2/1993 7:39	1359			57.52	3.65		0.1359		
7/2/1993 7:57	1377			57.53	3.66		0.1377		
7/2/1993 8:38	1418			57.56	3.69		0.1418		
7/2/1993 8:46	1426			57.56	3.69		0.1426		
7/2/1993 8:59	1439			57.50	3.69		0.1439		
7/2/1993 9:00	1440								
7/2/1993 9:01	1441	1	1.00	55.89	2.02	1.61		0.0001	
7/2/1993 9:02	1442	2	2.00	55.78	1.91	1.72		0.0002	
7/2/1993 9:03	1443	3	3.00	55.65	1.78	1.85		0.0003	
7/2/1993 9:04	1444	4	4.00	55.55	1.68	1.95		0.0004	
7/2/1993 9:05	1445	5	5.00	55.47	1.60	2.03		0.0005	
7/2/1993 9:06	1446	6	6.00	55.39	1.52	2.11		0.0006	
7/2/1993 9:07	1447	7	7.00	55.33	1.46	2.17		0.0007	
7/2/1993 9:08	1448	8	7.99	55.27	1.40	2.23		0.0008	
7/2/1993 9:09	1449	9	8.99	55.20	1.33	2.30		0.0009	
7/2/1993 9:10	1450	10	9.99	55.18	1.31	2.32		0.001	
7/2/1993 9:11	1451	11	10.99	55.14	1.27	2.36		0.0011	
7/2/1993 9:12	1452	12	11.99	55.09	1.22	2.41		0.0012	
7/2/1993 9:13	1453	13	12.99	55.06	1.19	2.44		0.0013	
7/2/1993 9:14	1454	14	13.99	55.03	1.16	2.47		0.0014	
7/2/1993 9:15	1455	15	14.99	55.00	1.13	2.50		0.0015	
7/2/1993 9:16	1456	16	15.99	54.98	1.11	2.52		0.0016	
7/2/1993 9:17	1457	17	16.99	54.95	1.08	2.55		0.0017	

7/2/1993 9:18	1458	18	17.99	54.92	1.05	2.58		0.0018	
7/2/1993 9:19	1459	19	18.99	54.89	1.02	2.61		0.0019	
7/2/1993 9:20	1460	20	19.99	54.88	1.00	2.62		0.002	
7/2/1993 9:21	1461	21	20.99	54.85	0.98	2.65		0.0021	
7/2/1993 9:22	1462	22	21.98	54.84	0.97	2.66		0.0022	
7/2/1993 9:23	1463	23	22.98	54.83	0.96	2.67		0.0023	
7/2/1993 9:24	1464	24	23.98	54.81	0.94	2.69		0.0024	
7/2/1993 9:25	1465	25	24.98	54.79	0.92	2.71		0.0025	
7/2/1993 9:26	1466	26	25.98	54.77	0.90	2.73		0.0026	
7/2/1993 9:27	1467	27	26.98	54.76	0.89	2.74		0.0027	
7/2/1993 9:28	1468	28	27.98	54.75	0.88	2.75		0.0028	
7/2/1993 9:29	1469	29	28.98	54.73	0.86	2.77		0.0029	
7/2/1993 9:30	1470	30	29.98	54.72	0.85	2.78		0.003	
7/2/1993 9:32	1472	32	31.96	54.70	0.83	2.80		0.0032	
7/2/1993 9:34	1474	34	33.95	54.68	0.81	2.82		0.0034	
7/2/1993 9:36	1476	36	35.95	54.66	0.79	2.84		0.0036	
7/2/1993 9:38	1478	38	37.95	54.64	0.77	2.86		0.0038	
7/2/1993 9:40	1480	40	39.95	54.62	0.75	2.88		0.004	
7/2/1993 9:42	1482	42	41.94	54.60	0.73	2.90		0.0042	
7/2/1993 9:44	1484	44	43.94	54.00	0.72	3.50		0.0044	
7/2/1993 9:46	1486	46	45.94	54.57	0.70	2.93		0.0046	
7/2/1993 9:48	1488	48	47.94	54.56	0.69	2.94		0.0048	
7/2/1993 9:50	1490	50	49.93	54.54	0.67	2.96		0.005	
7/2/1993 9:52	1492	52	51.93	54.53	0.66	2.97		0.0052	
7/2/1993 9:54	1494	54	53.93	54.52	0.65	2.98		0.0054	
7/2/1993 9:56	1496	56	55.93	54.50	0.63	3.00		0.0056	
7/2/1993 9:58	1498	58	57.92	54.49	0.62	3.01		0.0058	
7/2/1993 10:00	1500	60	59.92	54.48	0.61	3.02		0.006	
7/2/1993 10:05	1505	65	64.78	54.46	0.59	3.04		0.0065	
7/2/1993 10:10	1510	70	69.77	54.44	0.57	3.06		0.007	
7/2/1993 10:15	1515	75	74.75	54.43	0.56	3.07		0.0075	
7/2/1993 10:20	1520	80	79.74	54.41	0.54	3.09		0.008	
7/2/1993 10:25	1525	85	84.72	54.40	0.53	3.10		0.0085	
7/2/1993 10:30	1530	90	89.71	54.39	0.52	3.11		0.009	
7/2/1993 10:35	1535	95	94.69	54.38	0.51	3.12		0.0095	
7/2/1993 10:40	1540	100	99.68	54.37	0.50	3.13		0.01	
7/2/1993 10:55	1555	115	113.89	54.34	0.47	3.16		0.0115	
7/2/1993 11:00	1560	120	119.62	54.33	0.46	3.17		0.012	
7/2/1993 11:10	1570	130	129.17	54.31	0.44	3.19		0.013	
7/2/1993 11:15	1575	135	134.57	54.33	0.46	3.17		0.0135	
7/2/1993 11:25	1585	145	144.09	54.29	0.42	3.21		0.0145	
7/2/1993 11:30	1590	150	149.53	54.29	0.42	3.21		0.015	
7/2/1993 11:43	1603	163	161.68	54.27	0.40	3.23		0.0163	
7/2/1993 12:00	1620	180	178.11	54.26	0.39	3.24		0.018	
7/2/1993 12:30	1650	210	206.18	54.26	0.39	3.24		0.021	
7/2/1993 13:00	1680	240	235.71	54.24	0.37	3.26		0.024	
7/2/1993 14:00	1740	300	289.66	54.22	0.35	3.28		0.03	

7/2/1993 15:15	1815	375	359.50	54.17	0.30	3.33		0.0375	

datetime	etp	etr	agarwal	wl	dd	rec	t/r^2_p	t/r^2_r	r
7/1/1993 9:00	0			61.84					488
7/1/1993 9:01	1			61.82	-0.02		4.2E-06		**148.744**
7/1/1993 9:03	3			62.56	0.72		1.3E-05		
7/1/1993 9:04	4			62.82	0.98		1.7E-05		
7/1/1993 9:05	5			62.92	1.08		2.1E-05		
7/1/1993 9:06	6			63.09	1.25		2.5E-05		
7/1/1993 9:07	7			63.09	1.25		2.9E-05		
7/1/1993 9:08	8			63.15	1.31		3.4E-05		
7/1/1993 9:09	9			63.21	1.37		3.8E-05		
7/1/1993 9:10	10			63.27	1.43		4.2E-05		
7/1/1993 9:11	11			63.32	1.48		4.6E-05		
7/1/1993 9:12	12			63.36	1.52		5E-05		
7/1/1993 9:13	13			63.40	1.56		5.5E-05		
7/1/1993 9:14	14			63.45	1.61		5.9E-05		
7/1/1993 9:15	15			63.48	1.64		6.3E-05		
7/1/1993 9:16	16			63.51	1.67		6.7E-05		
7/1/1993 9:17	17			63.53	1.69		7.1E-05		
7/1/1993 9:18	18			63.56	1.72		7.6E-05		
7/1/1993 9:19	19			63.60	1.76		8E-05		
7/1/1993 9:20	20			63.68	1.84		8.4E-05		
7/1/1993 9:21	21			63.63	1.79		8.8E-05		
7/1/1993 9:22	22			63.64	1.80		9.2E-05		
7/1/1993 9:23	23			63.67	1.83		9.7E-05		
7/1/1993 9:24	24			63.69	1.85		0.0001		
7/1/1993 9:25	25			63.71	1.87		0.0001		
7/1/1993 9:26	26			63.73	1.89		0.00011		
7/1/1993 9:27	27			63.74	1.90		0.00011		
7/1/1993 9:28	28			63.76	1.92		0.00012		
7/1/1993 9:29	29			63.77	1.93		0.00012		
7/1/1993 9:30	30			63.78	1.94		0.00013		
7/1/1993 9:31	31			63.80	1.96		0.00013		
7/1/1993 9:32	32			63.81	1.97		0.00013		
7/1/1993 9:33	33			63.82	1.98		0.00014		
7/1/1993 9:34	34			63.83	1.99		0.00014		
7/1/1993 9:35	35			63.85	2.01		0.00015		
7/1/1993 9:36	36			63.85	2.01		0.00015		
7/1/1993 9:37	37			63.86	2.02		0.00016		
7/1/1993 9:38	38			63.87	2.03		0.00016		
7/1/1993 9:39	39			63.88	2.04		0.00016		
7/1/1993 9:40	40			63.89	2.05		0.00017		
7/1/1993 9:41	41			63.90	2.06		0.00017		
7/1/1993 9:42	42			63.91	2.07		0.00018		
7/1/1993 9:44	43			64.00	2.16		0.00018		
7/1/1993 9:45	44			64.02	2.18		0.00018		
7/1/1993 9:46	45			64.02	2.18		0.00019		
7/1/1993 9:47	46			64.03	2.19		0.00019		

7/1/1993 9:48	47			64.03	2.19		0.0002		
7/1/1993 9:49	48			64.04	2.20		0.0002		
7/1/1993 9:50	49			64.04	2.20		0.00021		
7/1/1993 9:51	50			64.06	2.22		0.00021		
7/1/1993 9:52	51			64.06	2.22		0.00021		
7/1/1993 9:53	52			63.99	2.15		0.00022		
7/1/1993 9:54	53			64.07	2.23		0.00022		
7/1/1993 9:55	54			64.09	2.25		0.00023		
7/1/1993 9:56	55			64.09	2.25		0.00023		
7/1/1993 9:57	56			64.09	2.25		0.00024		
7/1/1993 9:58	57			64.10	2.26		0.00024		
7/1/1993 9:59	58			64.10	2.26		0.00024		
7/1/1993 10:00	60			64.11	2.27		0.00025		
7/1/1993 10:05	65			64.12	2.28		0.00027		
7/1/1993 10:08	68			64.05	2.21		0.00029		
7/1/1993 10:10	70			64.14	2.30		0.00029		
7/1/1993 10:12	72			64.15	2.31		0.0003		
7/1/1993 10:15	75			64.16	2.32		0.00031		
7/1/1993 10:18	78			64.16	2.32		0.00033		
7/1/1993 10:20	80			64.08	2.24		0.00034		
7/1/1993 10:23	83			64.18	2.34		0.00035		
7/1/1993 10:25	85			64.18	2.34		0.00036		
7/1/1993 10:28	88			64.20	2.36		0.00037		
7/1/1993 10:30	90			64.15	2.31		0.00038		
7/1/1993 10:35	95			64.20	2.36		0.0004		
7/1/1993 10:40	100			64.21	2.37		0.00042		
7/1/1993 10:45	105			64.15	2.31		0.00044		
7/1/1993 10:50	110			64.23	2.39		0.00046		
7/1/1993 10:55	115			64.24	2.40		0.00048		
7/1/1993 11:00	120			64.24	2.40		0.0005		
7/1/1993 11:35	155			64.26	2.42		0.00065		
7/1/1993 12:06	186			64.33	2.49		0.00078		
7/1/1993 12:36	216			64.36	2.52		0.00091		
7/1/1993 13:05	245			64.39	2.55		0.00103		
7/1/1993 14:05	305			64.04	2.20		0.00128		
7/1/1993 14:41	341			64.04	2.20		0.00143		
7/1/1993 15:12	372			64.39	2.55		0.00156		
7/1/1993 16:05	425			64.38	2.54		0.00178		
7/1/1993 17:01	481			64.36	2.52		0.00202		
7/1/1993 20:44	704			64.37	2.53		0.00296		
7/2/1993 7:48	1368			64.51	2.67		0.00574		
7/2/1993 8:05	1385			64.51	2.67		0.00582		
7/2/1993 8:25	1405			64.52	2.68		0.0059		
7/2/1993 8:45	1425			64.51	2.67		0.00598		
7/2/1993 8:55	1435			64.51	2.67		0.00603		
7/2/1993 8:58	1438			64.51	2.67		0.00604		
7/2/1993 9:00	1440	0		64.51	2.67	0.00			

7/2/1993 9:01	1441	1	1.00	63.94	2.10	0.57		4.2E-06	
7/2/1993 9:02	1442	2	2.00	63.80	1.96	0.71		8.4E-06	
7/2/1993 9:03	1443	3	3.00	63.66	1.82	0.85		1.26E-05	
7/2/1993 9:04	1444	4	4.00	63.56	1.72	0.95		1.68E-05	
7/2/1993 9:05	1445	5	5.00	63.48	1.64	1.03		2.1E-05	
7/2/1993 9:06	1446	6	6.00	63.41	1.57	1.10		2.52E-05	
7/2/1993 9:07	1447	7	7.00	63.34	1.50	1.17		2.94E-05	
7/2/1993 9:08	1448	8	7.99	63.29	1.45	1.22		3.36E-05	
7/2/1993 9:09	1449	9	8.99	63.24	1.40	1.27		3.78E-05	
7/2/1993 9:10	1450	10	9.99	63.19	1.35	1.32		4.2E-05	
7/2/1993 9:11	1451	11	10.99	63.15	1.31	1.36		4.62E-05	
7/2/1993 9:12	1452	12	11.99	63.11	1.27	1.40		5.04E-05	
7/2/1993 9:13	1453	13	12.99	63.08	1.24	1.43		5.46E-05	
7/2/1993 9:14	1454	14	13.99	63.05	1.21	1.46		5.88E-05	
7/2/1993 9:15	1455	15	14.99	63.02	1.18	1.49		6.3E-05	
7/2/1993 9:16	1456	16	15.99	62.99	1.15	1.52		6.72E-05	
7/2/1993 9:17	1457	17	16.99	62.95	1.11	1.56		7.14E-05	
7/2/1993 9:18	1458	18	17.99	62.94	1.10	1.57		7.56E-05	
7/2/1993 9:19	1459	19	18.99	62.92	1.08	1.59		7.98E-05	
7/2/1993 9:20	1460	20	19.99	62.89	1.05	1.62		8.4E-05	
7/2/1993 9:21	1461	21	20.99	62.87	1.03	1.64		8.82E-05	
7/2/1993 9:22	1462	22	21.98	62.85	1.01	1.66		9.24E-05	
7/2/1993 9:23	1463	23	22.98	62.84	1.00	1.67		9.66E-05	
7/2/1993 9:24	1464	24	23.98	62.82	0.98	1.69		0.000101	
7/2/1993 9:25	1465	25	24.98	62.80	0.96	1.71		0.000105	
7/2/1993 9:26	1466	26	25.98	62.79	0.95	1.72		0.000109	
7/2/1993 9:27	1467	27	26.98	62.77	0.93	1.74		0.000113	
7/2/1993 9:28	1468	28	27.98	62.76	0.92	1.75		0.000118	
7/2/1993 9:29	1469	29	28.98	62.75	0.91	1.76		0.000122	
7/2/1993 9:30	1470	30	29.98	62.75	0.91	1.76		0.000126	
7/2/1993 9:31	1471	31	30.98	62.73	0.89	1.78		0.00013	
7/2/1993 9:32	1472	32	31.98	62.72	0.88	1.79		0.000134	
7/2/1993 9:33	1473	33	32.98	62.71	0.87	1.80		0.000139	
7/2/1993 9:34	1474	34	33.98	62.70	0.86	1.81		0.000143	
7/2/1993 9:35	1475	35	34.98	62.68	0.84	1.83		0.000147	
7/2/1993 9:36	1476	36	35.98	62.67	0.83	1.84		0.000151	
7/2/1993 9:37	1477	37	36.97	62.66	0.82	1.85		0.000155	
7/2/1993 9:38	1478	38	37.97	62.65	0.81	1.86		0.00016	
7/2/1993 9:39	1479	39	38.97	62.65	0.81	1.86		0.000164	
7/2/1993 9:40	1480	40	39.97	62.64	0.80	1.87		0.000168	
7/2/1993 9:41	1481	41	40.97	62.64	0.80	1.87		0.000172	
7/2/1993 9:42	1482	42	41.97	62.63	0.79	1.88		0.000176	
7/2/1993 9:43	1483	43	42.97	62.62	0.78	1.89		0.000181	
7/2/1993 9:44	1484	44	43.97	62.61	0.77	1.90		0.000185	
7/2/1993 9:45	1485	45	44.97	62.60	0.76	1.91		0.000189	
7/2/1993 9:46	1486	46	45.97	62.60	0.76	1.91		0.000193	
7/2/1993 9:47	1487	47	46.97	62.59	0.75	1.92		0.000197	

7/2/1993 9:48	1488	48	47.97	62.58	0.74	1.93		0.000202	
7/2/1993 9:49	1489	49	48.97	62.57	0.73	1.94		0.000206	
7/2/1993 9:50	1490	50	49.97	62.57	0.73	1.94		0.00021	
7/2/1993 9:51	1491	51	50.97	62.56	0.72	1.95		0.000214	
7/2/1993 9:52	1492	52	51.97	62.56	0.72	1.95		0.000218	
7/2/1993 9:53	1493	53	52.96	62.55	0.71	1.96		0.000223	
7/2/1993 9:54	1494	54	53.96	62.54	0.70	1.97		0.000227	
7/2/1993 9:55	1495	55	54.96	62.53	0.69	1.98		0.000231	
7/2/1993 9:56	1496	56	55.96	62.52	0.68	1.99		0.000235	
7/2/1993 9:57	1497	57	56.96	62.52	0.68	1.99		0.000239	
7/2/1993 9:58	1498	58	57.96	62.51	0.67	2.00		0.000244	
7/2/1993 9:59	1499	59	58.96	62.51	0.67	2.00		0.000248	
7/2/1993 10:00	1500	60	59.96	62.51	0.67	2.00		0.000252	
7/2/1993 10:05	1505	65	64.78	62.47	0.63	2.04		0.000273	
7/2/1993 10:10	1510	70	69.77	62.47	0.63	2.04		0.000294	
7/2/1993 10:15	1515	75	74.75	62.45	0.61	2.06		0.000315	
7/2/1993 10:20	1520	80	79.74	62.43	0.59	2.08		0.000336	
7/2/1993 10:25	1525	85	84.72	62.41	0.57	2.10		0.000357	
7/2/1993 10:30	1530	90	89.71	62.41	0.57	2.10		0.000378	
7/2/1993 10:35	1535	95	94.69	62.40	0.56	2.11		0.000399	
7/2/1993 10:40	1540	100	99.68	62.39	0.55	2.12		0.00042	
7/2/1993 10:45	1545	105	104.66	62.38	0.54	2.13		0.000441	
7/2/1993 10:50	1550	110	109.65	62.37	0.53	2.14		0.000462	
7/2/1993 11:14	1574	134	131.96	62.31	0.47	2.20		0.000563	
7/2/1993 11:46	1606	166	162.69	62.29	0.45	2.22		0.000697	
7/2/1993 12:36	1656	216	209.48	62.26	0.42	2.25		0.000907	
7/2/1993 13:09	1689	249	244.13	62.25	0.41	2.26		0.001046	
7/2/1993 14:04	1744	304	294.41	62.23	0.39	2.28		0.001277	
7/2/1993 15:23	1823	383	366.40	62.17	0.33	2.34		0.001608	

datetime	etp	etr	agarwal	wl	dd	rec	t/r^2_p	t/r^2_r	r
7/1/1993 9:00	0			63.52					1124
7/1/1993 9:01	1			64.30	0.78		7.915E-07		**342.599**
7/1/1993 9:02	2			64.45	0.93		1.583E-06		
7/1/1993 9:03	3			64.52	1.00		2.375E-06		
7/1/1993 9:04	4			64.65	1.13		3.166E-06		
7/1/1993 9:05	5			64.74	1.22		3.958E-06		
7/1/1993 9:06	6			64.80	1.28		4.749E-06		
7/1/1993 9:07	7			64.89	1.37		5.541E-06		
7/1/1993 9:08	8			64.85	1.33		6.332E-06		
7/1/1993 9:09	9			64.92	1.40		7.124E-06		
7/1/1993 9:10	10			64.98	1.46		7.915E-06		
7/1/1993 9:11	11			64.99	1.47		8.707E-06		
7/1/1993 9:12	12			65.00	1.48		9.498E-06		
7/1/1993 9:13	13			65.01	1.49		1.029E-05		
7/1/1993 9:14	14			65.08	1.56		1.108E-05		
7/1/1993 9:15	15			65.11	1.59		1.187E-05		
7/1/1993 9:16	16			65.12	1.60		1.266E-05		
7/1/1993 9:17	17			65.16	1.64		1.346E-05		
7/1/1993 9:18	18			65.17	1.65		1.425E-05		
7/1/1993 9:19	19			65.18	1.66		1.504E-05		
7/1/1993 9:20	20			65.21	1.69		1.583E-05		
7/1/1993 9:21	21			65.21	1.69		1.662E-05		
7/1/1993 9:22	22			65.23	1.71		1.741E-05		
7/1/1993 9:24	24			65.35	1.83		1.9E-05		
7/1/1993 9:25	25			65.36	1.84		1.979E-05		
7/1/1993 9:26	26			65.29	1.77		2.058E-05		
7/1/1993 9:27	27			65.31	1.79		2.137E-05		
7/1/1993 9:28	28			65.31	1.79		2.216E-05		
7/1/1993 9:29	29			65.30	1.78		2.295E-05		
7/1/1993 9:30	30			65.34	1.82		2.375E-05		
7/1/1993 9:31	31			65.35	1.83		2.454E-05		
7/1/1993 9:32	32			65.36	1.84		2.533E-05		
7/1/1993 9:33	33			65.36	1.84		2.612E-05		
7/1/1993 9:34	34			65.36	1.84		2.691E-05		
7/1/1993 9:35	35			65.38	1.86		2.77E-05		
7/1/1993 9:36	36			65.38	1.86		2.85E-05		
7/1/1993 9:38	38			65.40	1.88		3.008E-05		
7/1/1993 9:39	39			65.42	1.90		3.087E-05		
7/1/1993 9:40	40			65.43	1.91		3.166E-05		
7/1/1993 9:41	41			65.46	1.94		3.245E-05		
7/1/1993 9:42	42			65.48	1.96		3.324E-05		
7/1/1993 9:43	43			65.52	2.00		3.404E-05		
7/1/1993 9:44	44			65.48	1.96		3.483E-05		
7/1/1993 9:45	45			65.48	1.96		3.562E-05		
7/1/1993 9:46	46			65.48	1.96		3.641E-05		
7/1/1993 9:47	47			65.48	1.96		3.72E-05		

7/1/1993 9:48	48			65.50	1.98		3.799E-05		
7/1/1993 9:49	49			65.53	2.01		3.878E-05		
7/1/1993 9:50	50			65.51	1.99		3.958E-05		
7/1/1993 9:51	51			65.51	1.99		4.037E-05		
7/1/1993 9:52	52			65.51	1.99		4.116E-05		
7/1/1993 9:53	53			65.55	2.03		4.195E-05		
7/1/1993 9:54	54			65.53	2.01		4.274E-05		
7/1/1993 9:55	55			65.56	2.04		4.353E-05		
7/1/1993 9:56	56			65.56	2.04		4.433E-05		
7/1/1993 9:58	58			65.50	1.98		4.591E-05		
7/1/1993 9:59	59			65.60	2.08		4.67E-05		
7/1/1993 10:00	60			65.60	2.08		4.749E-05		
7/1/1993 10:02	62			65.62	2.10		4.907E-05		
7/1/1993 10:04	64			65.58	2.06		5.066E-05		
7/1/1993 10:06	66			65.62	2.10		5.224E-05		
7/1/1993 10:08	68			65.63	2.11		5.382E-05		
7/1/1993 10:10	70			65.63	2.11		5.541E-05		
7/1/1993 10:12	72			65.61	2.09		5.699E-05		
7/1/1993 10:14	74			65.68	2.16		5.857E-05		
7/1/1993 10:16	76			65.70	2.18		6.016E-05		
7/1/1993 10:20	80			65.60	2.08		6.332E-05		
7/1/1993 10:25	85			65.65	2.13		6.728E-05		
7/1/1993 10:30	90			65.68	2.16		7.124E-05		
7/1/1993 10:35	95			65.65	2.13		7.52E-05		
7/1/1993 10:40	100			65.68	2.16		7.915E-05		
7/1/1993 10:45	105			65.72	2.20		8.311E-05		
7/1/1993 10:50	110			65.67	2.15		8.707E-05		
7/1/1993 10:55	115			65.72	2.20		9.103E-05		
7/1/1993 11:00	120			65.67	2.15		9.498E-05		
7/1/1993 11:05	125			65.73	2.21		9.894E-05		
7/1/1993 11:10	130			65.69	2.17		0.0001029		
7/1/1993 11:15	135			65.70	2.18		0.0001069		
7/1/1993 11:34	154			65.70	2.18		0.0001219		
7/1/1993 11:54	174			65.72	2.20		0.0001377		
7/1/1993 12:13	193			65.74	2.22		0.0001528		
7/1/1993 12:33	213			65.77	2.25		0.0001686		
7/1/1993 12:53	233			65.80	2.28		0.0001844		
7/1/1993 14:09	309			65.83	2.31		0.0002446		
7/1/1993 14:36	336			65.83	2.31		0.000266		
7/1/1993 15:19	379			65.80	2.28		0.0003		
7/1/1993 16:08	428			65.78	2.26		0.0003388		
7/1/1993 17:20	500			65.77	2.25		0.0003958		
7/1/1993 20:51	711			65.74	2.22		0.0005628		
7/2/1993 7:54	1374			65.84	2.32		0.0010876		
7/2/1993 8:18	1398			65.85	2.33		0.0011066		
7/2/1993 8:25	1405			65.84	2.32		0.0011121		
7/2/1993 8:32	1412			65.84	2.32		0.0011176		

7/2/1993 8:45	1425			65.85	2.33		0.0011279		
7/2/1993 8:51	1431			65.86	2.34		0.0011327		
7/2/1993 8:57	1437			65.86	2.34		0.0011374		
7/2/1993 9:00	1440	0		65.86	2.34	0.00			
7/2/1993 9:01	1441	1	1.00	65.33	1.81	0.53		7.9E-07	
7/2/1993 9:02	1442	2	2.00	65.18	1.66	0.68		1.6E-06	
7/2/1993 9:03	1443	3	3.00	65.07	1.55	0.79		2.4E-06	
7/2/1993 9:04	1444	4	4.00	64.95	1.43	0.91		3.2E-06	
7/2/1993 9:05	1445	5	5.00	64.90	1.38	0.96		4E-06	
7/2/1993 9:06	1446	6	6.00	64.84	1.32	1.02		4.7E-06	
7/2/1993 9:07	1447	7	7.00	64.79	1.27	1.07		5.5E-06	
7/2/1993 9:08	1448	8	7.99	64.73	1.21	1.13		6.3E-06	
7/2/1993 9:09	1449	9	8.99	64.67	1.15	1.19		7.1E-06	
7/2/1993 9:10	1450	10	9.99	64.63	1.11	1.23		7.9E-06	
7/2/1993 9:11	1451	11	10.99	64.60	1.08	1.26		8.7E-06	
7/2/1993 9:12	1452	12	11.99	64.57	1.05	1.29		9.5E-06	
7/2/1993 9:13	1453	13	12.99	64.54	1.02	1.32		1E-05	
7/2/1993 9:15	1455	15	14.98	64.43	0.91	1.43		1.2E-05	
7/2/1993 9:16	1456	16	15.99	64.00	0.48	1.86		1.3E-05	
7/2/1993 9:17	1457	17	16.99	64.43	0.91	1.43		1.3E-05	
7/2/1993 9:18	1458	18	17.99	64.40	0.88	1.46		1.4E-05	
7/2/1993 9:19	1459	19	18.99	64.39	0.87	1.47		1.5E-05	
7/2/1993 9:20	1460	20	19.99	64.36	0.84	1.50		1.6E-05	
7/2/1993 9:21	1461	21	20.99	64.34	0.82	1.52		1.7E-05	
7/2/1993 9:22	1462	22	21.98	64.33	0.81	1.53		1.7E-05	
7/2/1993 9:23	1463	23	22.98	64.32	0.80	1.54		1.8E-05	
7/2/1993 9:24	1464	24	23.98	64.31	0.79	1.55		1.9E-05	
7/2/1993 9:25	1465	25	24.98	64.29	0.77	1.57		2E-05	
7/2/1993 9:27	1467	27	26.96	64.26	0.74	1.60		2.1E-05	
7/2/1993 9:28	1468	28	27.98	64.26	0.74	1.60		2.2E-05	
7/2/1993 9:09	1449	9	9.12	64.24	0.72	1.62		7.1E-06	
7/2/1993 9:30	1470	30	29.57	64.22	0.70	1.64		2.4E-05	
7/2/1993 9:31	1471	31	30.98	64.22	0.70	1.64		2.5E-05	
7/2/1993 9:32	1472	32	31.98	64.19	0.67	1.67		2.5E-05	
7/2/1993 9:33	1473	33	32.98	64.18	0.66	1.68		2.6E-05	
7/2/1993 9:34	1474	34	33.98	64.18	0.66	1.68		2.7E-05	
7/2/1993 9:35	1475	35	34.98	64.17	0.65	1.69		2.8E-05	
7/2/1993 9:36	1476	36	35.98	64.17	0.65	1.69		2.8E-05	
7/2/1993 9:37	1477	37	36.97	64.16	0.64	1.70		2.9E-05	
7/2/1993 9:38	1478	38	37.97	64.15	0.63	1.71		3E-05	
7/2/1993 9:39	1479	39	38.97	64.13	0.61	1.73		3.1E-05	
7/2/1993 9:40	1480	40	39.97	64.12	0.60	1.74		3.2E-05	
7/2/1993 9:42	1482	42	41.94	64.11	0.59	1.75		3.3E-05	
7/2/1993 9:44	1484	44	43.94	64.09	0.57	1.77		3.5E-05	
7/2/1993 9:46	1486	46	45.94	64.09	0.57	1.77		3.6E-05	
7/2/1993 9:48	1488	48	47.94	64.08	0.56	1.78		3.8E-05	
7/2/1993 9:50	1490	50	49.93	64.06	0.54	1.80		4E-05	

7/2/1993 9:52	1492	52	51.93	64.04	0.52	1.82		4.1E-05	
7/2/1993 9:54	1494	54	53.93	64.03	0.51	1.83		4.3E-05	
7/2/1993 9:56	1496	56	55.93	64.02	0.50	1.84		4.4E-05	
7/2/1993 9:58	1498	58	57.92	64.01	0.49	1.85		4.6E-05	
7/2/1993 10:00	1500	60	59.92	64.00	0.48	1.86		4.7E-05	
7/2/1993 10:02	1502	62	61.92	64.00	0.48	1.86		4.9E-05	
7/2/1993 10:04	1504	64	63.91	64.00	0.48	1.86		5.1E-05	
7/2/1993 10:10	1510	70	69.72	63.93	0.41	1.93		5.5E-05	
7/2/1993 10:10	1510	70	70.00	63.96	0.44	1.90		5.5E-05	
7/2/1993 10:15	1515	75	74.75	63.92	0.40	1.94		5.9E-05	
7/2/1993 10:20	1520	80	79.74	63.90	0.38	1.96		6.3E-05	
7/2/1993 10:25	1525	85	84.72	63.89	0.37	1.97		6.7E-05	
7/2/1993 10:30	1530	90	89.71	63.88	0.36	1.98		7.1E-05	
7/2/1993 10:35	1535	95	94.69	63.86	0.34	2.00		7.5E-05	
7/2/1993 10:40	1540	100	99.68	63.85	0.33	2.01		7.9E-05	
7/2/1993 10:45	1545	105	104.66	63.83	0.31	2.03		8.3E-05	
7/2/1993 10:50	1550	110	109.65	63.81	0.29	2.05		8.7E-05	
7/2/1993 10:55	1555	115	114.63	63.82	0.30	2.04		9.1E-05	
7/2/1993 11:00	1560	120	119.62	63.80	0.28	2.06		9.5E-05	
7/2/1993 11:23	1583	143	140.92	63.77	0.25	2.09		0.00011	
7/2/1993 11:43	1603	163	160.97	63.76	0.24	2.10		0.00013	
7/2/1993 12:07	1627	187	184.24	63.75	0.23	2.11		0.00015	
7/2/1993 12:31	1651	211	207.93	63.75	0.23	2.11		0.00017	
7/2/1993 12:55	1675	235	231.63	63.74	0.22	2.12		0.00019	
7/2/1993 14:11	1751	311	297.50	63.70	0.18	2.16		0.00025	
7/2/1993 15:36	1836	396	377.67	63.65	0.13	2.21		0.00031	

datetime	etp	etr	agarwal	wl	dd	rec	t/r^2_p	t/r^2_r	r
7/1/1993 9:00	0			62.54					675
7/1/1993 9:01	1			63.14	0.60		2.2E-06		**205.74**
7/1/1993 9:02	2			63.35	0.81		4.4E-06		
7/1/1993 9:03	3			63.46	0.92		6.6E-06		
7/1/1993 9:04	4			63.66	1.12		8.8E-06		
7/1/1993 9:05	5			63.68	1.14		1.1E-05		
7/1/1993 9:06	6			63.75	1.21		1.3E-05		
7/1/1993 9:07	7			63.80	1.26		1.5E-05		
7/1/1993 9:08	8			63.85	1.31		1.8E-05		
7/1/1993 9:09	9			63.94	1.40		2E-05		
7/1/1993 9:10	10			63.97	1.43		2.2E-05		
7/1/1993 9:11	11			64.03	1.49		2.4E-05		
7/1/1993 9:12	12			64.06	1.52		2.6E-05		
7/1/1993 9:13	13			64.08	1.54		2.9E-05		
7/1/1993 9:14	14			64.00	1.46		3.1E-05		
7/1/1993 9:15	15			64.15	1.61		3.3E-05		
7/1/1993 9:16	16			64.18	1.64		3.5E-05		
7/1/1993 9:17	17			64.21	1.67		3.7E-05		
7/1/1993 9:18	18			64.23	1.69		4E-05		
7/1/1993 9:19	19			64.25	1.71		4.2E-05		
7/1/1993 9:20	20			64.27	1.73		4.4E-05		
7/1/1993 9:21	21			64.28	1.74		4.6E-05		
7/1/1993 9:22	22			64.32	1.78		4.8E-05		
7/1/1993 9:23	23			64.30	1.76		5E-05		
7/1/1993 9:24	24			64.39	1.85		5.3E-05		
7/1/1993 9:25	25			64.36	1.82		5.5E-05		
7/1/1993 9:26	26			64.38	1.84		5.7E-05		
7/1/1993 9:27	27			64.39	1.85		5.9E-05		
7/1/1993 9:28	28			64.41	1.87		6.1E-05		
7/1/1993 9:29	29			64.42	1.88		6.4E-05		
7/1/1993 9:30	30			64.42	1.88		6.6E-05		
7/1/1993 9:32	32			64.46	1.92		7E-05		
7/1/1993 9:34	34			64.47	1.93		7.5E-05		
7/1/1993 9:36	36			64.49	1.95		7.9E-05		
7/1/1993 9:38	38			64.51	1.97		8.3E-05		
7/1/1993 9:40	40			64.53	1.99		8.8E-05		
7/1/1993 9:42	42			64.56	2.02		9.2E-05		
7/1/1993 9:44	44			64.57	2.03		9.7E-05		
7/1/1993 9:46	46			64.59	2.05		0.0001		
7/1/1993 9:48	48			64.60	2.06		0.00011		
7/1/1993 9:50	50			64.62	2.08		0.00011		
7/1/1993 9:52	52			64.63	2.09		0.00011		
7/1/1993 9:54	54			64.64	2.10		0.00012		
7/1/1993 9:56	56			64.64	2.10		0.00012		
7/1/1993 9:58	58			64.65	2.11		0.00013		
7/1/1993 10:00	50			64.65	2.11		0.00011		

7/1/1993 10:05	65			64.68	2.14		0.00014		
7/1/1993 10:10	70			64.70	2.16		0.00015		
7/1/1993 10:15	75			64.70	2.16		0.00016		
7/1/1993 10:20	80			64.74	2.20		0.00018		
7/1/1993 10:25	85			64.75	2.21		0.00019		
7/1/1993 10:30	90			64.76	2.22		0.0002		
7/1/1993 10:35	95			64.77	2.23		0.00021		
7/1/1993 10:40	100			64.78	2.24		0.00022		
7/1/1993 10:45	105			64.78	2.24		0.00023		
7/1/1993 10:50	110			64.79	2.25		0.00024		
7/1/1993 10:55	115			64.80	2.26		0.00025		
7/1/1993 11:00	120			64.80	2.26		0.00026		
7/1/1993 11:10	130			64.82	2.28		0.00029		
7/1/1993 11:20	140			64.82	2.28		0.00031		
7/1/1993 11:40	160			64.85	2.31		0.00035		
7/1/1993 11:55	175			64.88	2.34		0.00038		
7/1/1993 12:22	202			64.90	2.36		0.00044		
7/1/1993 12:42	222			64.93	2.39		0.00049		
7/1/1993 13:02	242			64.94	2.40		0.00053		
7/1/1993 14:29	329			64.98	2.44		0.00072		
7/1/1993 15:15	375			64.98	2.44		0.00082		
7/1/1993 16:11	431			64.97	2.43		0.00095		
7/1/1993 17:15	495			64.96	2.42		0.00109		
7/1/1993 20:47	707			64.94	2.40		0.00155		
7/2/1993 7:50	1370			65.04	2.50		0.00301		
7/2/1993 8:08	1388			65.04	2.50		0.00305		
7/2/1993 8:20	1400			65.04	2.50		0.00307		
7/2/1993 8:30	1410			65.05	2.51		0.00309		
7/2/1993 8:45	1425			65.05	2.51		0.00313		
7/2/1993 8:55	1435			65.06	2.52		0.00315		
7/2/1993 9:00	1440	0		65.05	2.51	0.00			
7/2/1993 9:01	1441	1		64.50	1.96	0.55		2.2E-06	
7/2/1993 9:02	1442	2		64.36	1.82	0.69		4.4E-06	
7/2/1993 9:03	1443	3		64.19	1.65	0.86		6.6E-06	
7/2/1993 9:04	1444	4		64.14	1.60	0.91		8.8E-06	
7/2/1993 9:05	1445	5		64.05	1.51	1.00		1.1E-05	
7/2/1993 9:06	1446	6		63.98	1.44	1.07		1.3E-05	
7/2/1993 9:07	1447	7		63.96	1.42	1.09		1.5E-05	
7/2/1993 9:08	1448	8		63.87	1.33	1.18		1.8E-05	
7/2/1993 9:09	1449	9		63.80	1.26	1.25		2E-05	
7/2/1993 9:10	1450	10		63.76	1.22	1.29		2.2E-05	
7/2/1993 9:11	1451	11		63.75	1.21	1.30		2.4E-05	
7/2/1993 9:12	1452	12		65.70	3.16	-0.65		2.6E-05	
7/2/1993 9:13	1453	13		63.65	1.11	1.40		2.9E-05	
7/2/1993 9:14	1454	14		63.63	1.09	1.42		3.1E-05	
7/2/1993 9:15	1455	15		63.60	1.06	1.45		3.3E-05	
7/2/1993 9:16	1456	16		63.56	1.02	1.49		3.5E-05	

7/2/1993 9:17	1457	17		63.54	1.00	1.51		3.7E-05	
7/2/1993 9:18	1458	18		63.52	0.98	1.53		4E-05	
7/2/1993 9:19	1459	19		63.50	0.96	1.55		4.2E-05	
7/2/1993 9:20	1460	20		63.48	0.94	1.57		4.4E-05	
7/2/1993 9:21	1461	21		63.48	0.94	1.57		4.6E-05	
7/2/1993 9:22	1462	22		63.45	0.91	1.60		4.8E-05	
7/2/1993 9:23	1463	23		63.44	0.90	1.61		5E-05	
7/2/1993 9:24	1464	24		63.42	0.88	1.63		5.3E-05	
7/2/1993 9:25	1465	25		63.40	0.86	1.65		5.5E-05	
7/2/1993 9:26	1466	26		63.38	0.84	1.67		5.7E-05	
7/2/1993 9:27	1467	27		63.38	0.84	1.67		5.9E-05	
7/2/1993 9:28	1468	28		63.37	0.83	1.68		6.1E-05	
7/2/1993 9:29	1469	29		63.35	0.81	1.70		6.4E-05	
7/2/1993 9:30	1470	30		63.33	0.79	1.72		6.6E-05	
7/2/1993 9:32	1472	32		63.30	0.76	1.75		7E-05	
7/2/1993 9:34	1474	34		63.29	0.75	1.76		7.5E-05	
7/2/1993 9:36	1476	36		63.26	0.72	1.79		7.9E-05	
7/2/1993 9:38	1478	38		63.26	0.72	1.79		8.3E-05	
7/2/1993 9:40	1480	40		63.23	0.69	1.82		8.8E-05	
7/2/1993 9:42	1482	42		63.22	0.68	1.83		9.2E-05	
7/2/1993 9:44	1484	44		63.20	0.66	1.85		9.7E-05	
7/2/1993 9:46	1486	46		63.18	0.64	1.87		0.0001	
7/2/1993 9:49	1489	49		63.18	0.64	1.87		0.00011	
7/2/1993 9:50	1490	50		63.17	0.63	1.88		0.00011	
7/2/1993 9:52	1492	52		63.14	0.60	1.91		0.00011	
7/2/1993 9:54	1494	54		63.16	0.62	1.89		0.00012	
7/2/1993 9:56	1496	56		63.12	0.58	1.93		0.00012	
7/2/1993 9:58	1498	58		63.12	0.58	1.93		0.00013	
7/2/1993 10:00	1500	60		63.09	0.55	1.96		0.00013	
7/2/1993 10:05	1505	65		63.09	0.55	1.96		0.00014	
7/2/1993 10:10	1510	70		63.09	0.55	1.96		0.00015	
7/2/1993 10:15	1515	75		63.09	0.55	1.96		0.00016	
7/2/1993 10:20	1520	80		63.05	0.51	2.00		0.00018	
7/2/1993 10:25	1525	85		63.04	0.50	2.01		0.00019	
7/2/1993 10:30	1530	90		63.01	0.47	2.04		0.0002	
7/2/1993 10:35	1535	95		63.46	0.92	1.59		0.00021	
7/2/1993 10:40	1540	100		62.98	0.44	2.07		0.00022	
7/2/1993 10:49	1549	109		62.97	0.43	2.08		0.00024	
7/2/1993 10:50	1550	110		62.96	0.42	2.09		0.00024	
7/2/1993 10:55	1555	115		62.95	0.41	2.10		0.00025	
7/2/1993 11:05	1565	125		62.95	0.41	2.10		0.00027	
7/2/1993 11:27	1587	147		62.90	0.36	2.15		0.00032	
7/2/1993 11:48	1608	168		62.88	0.34	2.17		0.00037	
7/2/1993 12:11	1631	191		62.87	0.33	2.18		0.00042	
7/2/1993 12:36	1656	216		62.87	0.33	2.18		0.00047	
7/2/1993 13:01	1681	241		62.85	0.31	2.20		0.00053	
7/2/1993 14:02	1742	302		62.84	0.30	2.21		0.00066	

7/2/1993 15:29	1829	389		62.79	0.25	2.26		0.00085	

datetime	etp	etr	agarwal	wl	dd	rec	t/r^2_p	t/r^2_r	r
07/01/1993 09:00	0			59.5					601
07/01/2093 10:12	72			59.69	0.19		0.0002		
07/01/2093 10:33	93			59.7	0.2		0.00026		
07/01/2093 11:02	122			59.73	0.23		0.00034		
07/01/2093 11:33	153			59.74	0.24		0.00042		
07/01/2093 12:04	184			59.76	0.26		0.00051		
07/01/2093 12:33	213			59.77	0.27		0.00059		
07/01/2093 13:03	243			59.78	0.28		0.00067		
07/01/2093 14:02	302			59.78	0.28		0.00084		
07/01/2093 15:10	370			59.79	0.29		0.00102		
07/01/2093 16:02	422			59.79	0.29		0.00117		
07/01/2093 17:04	484			59.79	0.29		0.00134		
07/01/2093 20:27	687			59.79	0.29		0.0019		
07/02/2093 07:45	1365			59.99	0.49		0.00378		
07/02/2093 08:35	1415			60.01	0.51		0.00392		
07/02/1993 09:00	1440	0							
07/02/1993 10:01	1501	61		59.9	0.4	0.11		0.00017	
07/02/2093 10:12	1512	72		59.9	0.4	0.11		0.0002	
07/02/2093 10:27	1527	87		59.89	0.39	0.12		0.00024	
07/02/2093 10:52	1552	112		59.87	0.37	0.14		0.00031	
07/02/2093 11:22	1582	142		59.85	0.35	0.16		0.00039	
07/02/2093 11:49	1609	169		59.84	0.34	0.17		0.00047	
07/02/2093 12:33	1653	213		59.84	0.34	0.17		0.00059	
07/02/2093 13:12	1692	252		59.83	0.33	0.18		0.0007	
07/02/2093 14:02	1742	302		59.81	0.31	0.2		0.00084	
07/02/2093 15:19	1819	379		59.76	0.26	0.25		0.00105	

Unique Well Number **206673**

County Anoka
Quad Minneapolis North
Quad Id 120D

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

Entry Date 1991/04/15
Update Date 2016/05/13
Received Date

Well Name FRIDLEY 6

Township	Range	Dir	Section	Subsection	Field Located Elevation	MDH
30	24	W	14	DCABBB	877.00	ft.

well address FRIDLEY 6
600 63RD AV NE
FRIDLEY MN 55432 Changed

contact address CITY OF FRIDLEY
FRIDLEY MN 55432

Description	Color	Hardness	From	To (ft.)
MEDIUM SAND			0	13
SILT & CLAY			13	65
SAND & GRAVEL			65	115
ST. PETER SANDSTONE			115	125
ST. PETER SANDSTONE			125	130
SHAKOPEE LIMESTONE			130	233
SHAKOPEE LIMESTONE			233	248
JORDAN SANDSTONE			248	255

Remarks
GAMMA LOGGED 5-9-2016 BY JIM TRAEN. JIM TRAEN HAS 24 IN. CASING ENDING AT 144.3 FT.

First Bedrock OPDC
Last Strat CJDN
Aquifer Prairie Du Chien-Jordan
Depth to Bedrock 125.00 ft.

Well Depth 255.00 ft | **Depth Completed** 255.00 ft | **Date Well Completed** 1972/08/00

Drillhole Angle

Drilling Method Cable Tool

Drilling Fluid

Well Hydrofractured? ☐ YES ☐ NO From ft. to

Use community supply(municipal)

Casing Type Steel (black or low Drive Shoe? ☐ YES ☐ NO
Diameter 24 Depth 153
24.00 in. from 0.00 to 153.00 ft. lbs/ft

Hole Diameter (in.)

Screen No
Make Type
Diamter Slot Length Set

Open Hole(ft.) From 153.0 to 255.0

Static Water Level
56.50 ft. land surface Date measured 1972/08/00

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

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

Grouting Information Well grouted? ☒ YES ☐ NO ☐ NOT SPECIFIED
Material neat cement From 0.0 To ft. 7.00 Cubic yards

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

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

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

Variance
Was a variance granted from the MDH for this well? ☐ YES ☐ NO

Well Contractor Cerfication
Layne Well Co. 27010
License Business Name Lic. or Reg No.

Name of Driller Date

Unique Well Number **206678**

County Anoka
Quad Minneapolis North
Quad Id 120D

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

Entry Date 1991/04/15
Update Date 2016/11/15
Received Date

Well Name FRIDLEY 7

Township	Range	Dir	Section	Subsection	Field Located Elevation	MDH
30	24	W	14	DCADBC		885.00 ft.

well and contact address FRIDLEY 7
680 63RD AV NE
FRIDLEY MN Changed

Well Depth	Depth Completed	Date Well Completed
262.00 ft	262.00 ft	1970/01/14

Drillhole Angle

Drilling Method

Drilling Fluid

Well Hydrofractured? ☐ YES ☐ NO From ft. to

Use community supply(municipal)

Casing Type Drive Shoe? ☐ YES ☐ NO Hole Diameter (in.)
Diameter 12 Depth 138
16.00 in. from 0.00 to 67.00 ft. lbs/ft
12.00 in. from 0.00 to 138.00 ft. lbs/ft
24.00 in. from 0.00 to 27.70 ft. lbs/ft

Screen No
Make Type
Diamter Slot Length Set

Open Hole(ft.) From 138.0 to 262.0

Description	Color	Hardness	From	To (ft.)
FINE SAND			0	26
BLUE CLAY, LITTLE GRAVEL			26	60
GOOD WATER GRAVEL			60	73
MUDDY SAND			73	75
GRAVEL	LIGHT		75	110
ST. PETER	YELLOW		110	128
SHAKOPEE	RED		128	136
SHAKOPEE & ST. PETER	WHITE		136	150
SHAKOPEE	TAN		150	262

Static Water Level
65.00 ft. land surface Date measured 1970/01/14

Pumping Level (below land surface)
73.00 ft. after hrs. pumping 1600.00 g.p.m.

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

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

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

Pump
☐ Not Installed Date Installed
Manufacture's name JACUZZI
Model number SVB00 HP 75.00 Volts
Length of drop pipe 71.0 Material Capacity 1100 g.p.m
Type

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

Variance
Was a variance granted from the MDH for this well? ☐ YES ☐ NO

Well Contractor Cerfication
Renner E.H. & Sons 02015
License Business Name Lic. or Reg No.

Remarks
ORIGINAL NO. 206671 - COMPLETED IN DRIFT, DEEPENED 1970 BY KEYS INTO BEDROCK GAMMA LOGGED 10-20-2015 BY JIM TRAEN.

First Bedrock OSTP
Last Strat OPDC
Aquifer Prairie Du Chien Group
Depth to Bedrock 110.00 ft.

Name of Driller Date

Unique Well Number **206669**

County Anoka
Quad Minneapolis North
Quad Id 120D

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

Entry Date 1991/04/15
Update Date 2014/03/10
Received Date

Well Name FRIDLEY 8

Township	Range	Dir	Section	Subsection	Field Located Elevation	MDH
30	24	W	14	DCDCDA		885.00 ft.

well and contact address FRIDLEY 8
613 61ST AV NE
FRIDLEY MN Changed

Description	Color	Hardness	From	To (ft.)
NO RECORD			0	64
GRAVEL & STONES	GRAY		64	122
SHALE	BLACK		122	126
ST. PETER, DUSTY	WHITE		126	130
ST. PETER, SHAKOPEE	YELLOW		130	186
SHAKOPEE	TAN		186	195
SHAKOPEE	TAN		195	265
JORDAN	YELLOW		265	265

Remarks
M.G.S. NO. 526 0 TO 64 FEET IS 16" CASE HOLE, DRILLED BY OTHERS.

First Bedrock OSTP
Last Strat CJDN
Aquifer Prairie Du Chien Group
Depth to Bedrock 126.00 ft.

Well Depth 265.00 ft
Depth Completed 265.00 ft
Date Well Completed 1969/12/17

Drillhole Angle

Drilling Method

Drilling Fluid

Well Hydrofractured? ☐ YES ☐ NO
From ft. to

Use community supply(municipal)

Casing Type
Drive Shoe? ☐ YES ☐ NO
Diameter 12
Depth 138
16.00 in. from 0.00 to 64.00 ft. lbs/ft
12.00 in. from 0.00 to 138.00 ft. lbs/ft

Hole Diameter (in.)

Screen No
Make
Type
Diamter Slot Length Set

Open Hole(ft.) From 138.0 to 265.0

Static Water Level
70.00 ft. land surface Date measured 1969/12/17

Pumping Level (below land surface)
74.00 ft. after hrs. pumping 1160.00 g.p.m.

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

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

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

Pump
☐ Not Installed Date Installed
Manufacture's name JACUZZI
Model number 12MC24 HP 75.00 Volts
Length of drop pipe 125.0 Material Capacity 1150 g.p.m
Type Turbine

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

Variance
Was a variance granted from the MDH for this well? ☐ YES ☐ NO

Well Contractor Cerfication
Renner E.H. & Sons 02015
License Business Name Lic. or Reg No.

Name of Driller Date

Unique Well Number **206672**

County Anoka
Quad Minneapolis North
Quad Id 120D

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

Entry Date 1991/04/15
Update Date 2014/03/10
Received Date

Well Name FRIDLEY 9

Township	Range	Dir	Section	Subsection	Field Located Elevation	MDH
30	24	W	14	DCCAAB	882.00	ft.

well and contact address FRIDLEY 9
603 61ST AV NE
FRIDLEY MN Changed

Well Depth	Depth Completed	Date Well Completed
255.00 ft	255.00 ft	1965/12/22

Drillhole Angle

Drilling Method

Drilling Fluid

Well Hydrofractured? ☐ YES ☐ NO
From ft. to

Use community supply(municipal)

Casing Type Drive Shoe? ☐ YES ☐ NO
Diameter 24 Depth 153
30.00 in. from 0.00 to 67.00 ft. lbs/ft
24.00 in. from 0.00 to 153.00 ft. lbs/ft

Hole Diameter (in.)

Description	Color	Hardness	From	To (ft.)
SAND			0	15
SILT & CLAY			15	67
SAND & GRAVEL			67	117
ST. PETER SANDSTONE			117	132
DOLOMITE			132	250
JORDAN SANDROCK		SOFT	250	255

Screen No
Make Type
Diamter Slot Length Set

Open Hole(ft.) From 153.0 to 255.0

Static Water Level
56.00 ft. land surface Date measured 1965/12/22

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

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

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

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

Pump
☐ Not Installed Date Installed
Manufacture's name JACUZZI
Model number HP 75.00 Volts 220
Length of drop pipe Material Capacity 1100 g.p.m
Type Turbine

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

Variance
Was a variance granted from the MDH for this well? ☐ YES ☐ NO

Well Contractor Cerfication
Keys Well Co. 62012
License Business Name Lic. or Reg No.

Remarks
DEEPENED BY LAYNE MINN. CO. TO 255 FT. IN 1972.

First Bedrock OSTP
Last Strat CJDN
Aquifer Prairie Du Chien-Jordan
Depth to Bedrock 117.00 ft.

Name of Driller Date

Unique Well Number: **509090**

County: Anoka
Quad: Minneapolis North
Quad Id: 120D

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

Entry Date: 1992/10/01
Update Date: 2016/11/15
Received Date:

Well Name FRIDLEY MW-2

Township	Range	Dir	Section	Subsection	Field Located Elevation	MDH	
30	24	W	14	DDBBBB		879.30	ft.

well and contact address FRIDLEY MW-2
6431 UNIVERSITY AV
FRIDLEY MN 55432 Changed

Description	Color	Hardness	From	To (ft.)
SAND	BROWN	SOFT	0	24
CLAY	GRAY	SOFT	24	42
CLAY & GRAVEL	GRAY	SOFT	42	86
SAND & GRAVEL	BROWN	SOFT	86	107

Remarks
DRILLED FOR B.A LEISCH ASSOCIATES AND ENGINEERS. LOT 4-C 10.

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

Well Depth 107.00 ft
Depth Completed 107.00 ft
Date Well Completed 1990/09/14

Drillhole Angle

Drilling Method Non-specified Rotary

Drilling Fluid Bentonite

Well Hydrofractured? ☐ YES ☐ NO
From ft. to

Use monitor well

Casing Type Steel (black or low Drive Shoe? ☐ YES ☒ NO
Diameter 4 Depth 90
4.00 in. from 0.00 to 90.00 ft. 10.79 lbs/ft

Hole Diameter (in.) 9.00 To 107.0

Screen Yes
Make JOHNSON
Diamter Slot Length Set
10 10 90 ft. to 100 ft.

Open Hole(ft.) From to
Type

Static Water Level
62.00 ft. land surface Date measured 1990/08/27

Pumping Level (below land surface)
81.00 ft. after 3.00 hrs. pumping 10.00 g.p.m.

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

Grouting Information Well grouted? ☒ YES ☐ NO ☐ NOT SPECIFIED
Material neat cement From ____ To 90.0 ft. 18.00 Sacks

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

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

Abandoned Wells
Does property have any not in use and not sealed well(s)? ☐ YES ☒ NO

Variance
Was a variance granted from the MDH for this well? ☐ YES ☐ NO

Well Contractor Cerfication
Keys Well Co. 62012

License Business Name SAMPSON, B.
Lic. or Reg No.

Name of Driller **Date**

Memo

Minnesota Department of Health

Date: November 15, 2016

To: Fridley WHP Project File (PWSID: 1020031)

From: Justin Blum

Subject: Analysis of the Fridley 8 (206669) Pumping Test, July 15, 1993, Confined Prairie du Chien Aquifer

Test No. 2586

This test is the second of two tests performed in 1993 at the Fridley Commons Park well field by B.A. Liesch and Associates. Inc. The test of Fridley 8 (206669), was conducted as described below. The specifics of test location, scope, and timing are presented in Tables 2 and 3. Data were analyzed using standard methods cited in references. Individual analyses are presented in Appendix 1 and are summarized in Table 4. Appendix 2 includes maps, field notes, and any other test documentation.

Table 1. Summary of Results

Conceptual model: leaky-confined, radial porous-media flow, water-table aquifer is source of water to the pumped aquifer

Aquifer Properties Summary					
Representative Values		Unit	Range		+/- %
			Minimum	Maximum	
Top Stratigraphic Elev.	755	feet (MSL)			
Bottom Stratigraphic Elev.	620	feet (MSL)			
Transmissivity (T)	149,000	ft^2/day	147,000	154,000	
Aquifer Thickness (b)	135	Feet			
Saturated Thickness* (b)		Feet			
Hydraulic Conductivity (k)	1100	ft/day	1090	1140	
Primary Porosity (e_p)	0.05	0.00 %			
Secondary Porosity** (e_s)	?	0.00 %	Cavernous porosity indicated		
Storativity (S)	3.0e-4	dimensionless	7.0E-05	4.5E-04	
Characteristic Leakage (L)	7710	Feet	5000	9800	
Hydraulic Resistance (c)	400	Days	180	640	
Effective Well Radius (r_e)	5	Feet	1	5	
* hydraulically unconfined aquifer, ** dual porosity aquifer because of fractures or solution weathering					

Boundaries: leakage and enlarged effective borehole radius (cavernous flow)

Remarks: high quality test, lack of early-time data (< 1 minute) does not materially affect results. Unknown degree of secondary porosity development.

Table 2. Aquifer Test Information

Aquifer Test Number	2586
Test Location	Fridley 8 (206669)
Well Owner	City of Fridley
Test Conducted By / For	B.A. Liesch Assoc. for MPCA and Fridley
Aquifer	OPDC
Confined / Unconfined	Confined
Date/Time Monitoring Start	
Date/Time Pump off Before Test	--
Date/Time Pumping Start	7/15/1993 09:02
Date/Time Recovery Start	7/16/1993 09:00
Date/Time Test Finish	7/16/1993 16:00
Flow Rate	1550 gpm
Data Collection Methods	Manual, transducer in MW-1
Number of Observation Wells	4

Table 3. Wells Monitored During the Test

Well Name (Unique Well No.)	Radial Distance (feet)	Static Water Levels (feet below measuring point)			Change in Water Level (feet)	Aquifer
		Start	Mid-test	End		
Pumped Well:						
Fridley 8 (206669)	1				8.06	OPDC
Ob Wells:						
7 (206678)	574				2.98	OPDC
9 (206672)	702				2.86	OPDC
6 (206673)	1124				2.79	OPDC
MW-1 (509089)	820				0.58	QBAA

Table 4. Graphical Analysis Results

Transient Analysis

Well Name (Unique Well No.)	Transmissivity, T (ft^2/day)	Storage Coefficient, S	Analysis Method	Characteristic Leakage Factor, L (feet)	Plot No. Remarks
Pumped Well:					
Fridley 8 (206669)	23,700	--	Theis	--	1
	14,052	1.9E-05	Agarwal	--	10
	154,000	3.0E-04	Hunt-Scott	7840 [c=400 days]	11
Ob Wells:					
F-9 (206672)	53,900	5.9E-05	Theis	--	2
"	**149,000**	**2.5E-04**	Hunt-Scott	**7710 [c=400 days]**	**12**
F-7 (206678)	51,600	7.0E-05	Theis	--	3
"	140,000	3.0E-04	Hunt-Scott	7480 [c=400 days]	13
F-6 (206673)	49,400	3.6E-05	Theis	--	4
"	118,000	3.0E-04	Hunt-Scott	7020 [c=418 days]	14 – influence of cavernous porosity
MW-1 (509089)	198,000	2.0E-02	Theis	--	5 - good match
Distance – Drawdown	52,700	1.0E-04	Walton t/r^2	--	6 – efficient pumping well
	40,900	1.4E-04	Walton t/r^2	5000 to 9800	7 – effective borehole radius ~5 ft.
	22,600	4.5E-04	Cooper-Jacob	--	8 – Smallest credible T
	30,600	7.0E-05			8 – Largest credible T

Steady-state Analysis

Transmissivity, T (ft2/day)	Characteristic Leakage, L (feet)	Hydraulic Resistance, c (days)	Analysis Method	Plot No. Remarks
22,600	32,100	31,800	Hantush-Jacob	8 – L is far outside the reasonable range for setting and does not correspond to S value of 10^{-4}
43,100	8,000	1480	de Glee	9 - L is too large for setting

Representative values are bolded

Test Description

Purpose of Test

The test was conducted to investigate the source and concentration of VOC contamination in the public water supply (PWS) wells at the Fridley Commons Park well field. The distribution and construction of the wells is shown on Figure 1, Appendix 2. The test is documented in the B.A, Liesch & Assoc. report to the MPCA dated September, 1993 – see references.

Qualitative Aquifer Hydraulic Response:

The wells are constructed primarily as Prairie du Chien (PdC) wells. If they extend into the Jordan, it is for a limited distance. Therefore, it is assumed that the contribution of the Jordan to the production of these wells is insignificant.

The pumped well was not obviously over-efficient relative to the Theis-curve, Plot 6. This well is very likely open to one or more intervals of cavernous secondary porosity developed within the PdC but does not appear to be as well-connected to the cavernous porosity as Well 6. The response of the pumped well may also be slightly leaky. However, the hydraulic response at the observation wells is similar to the test of Well 6; as early-time drawdowns are too large relative to the Theis-curve and the later-time drawdowns converge on a leaky curve, Plot 6. This confirms the extent of the cavernous interval throughout the Commons Park well field; even though, it is not evident in the response of Well 8. The effective borehole radius of the pumped well may be as small as that described in the construction record and as great as 5 feet.

The responses of the wells were inspected for hydraulic distortions caused by fracture flow. The fracture flow response was not seen at any well. The only anomalous effect seen was the half-unit slope of the recovery of Well 9, plot 2. A half-unit slope is generally thought to be the result of borehole storage effects. (Gringarten, 2008) In a porous medium, the recovery phase of an observation well should not display this effect… therefore, it is interpreted to be an artifact of the cavernous porosity. Otherwise, the cavernous porosity has an effect on the drawdown observed at Well 6 during this test. The drawdown is too large for the radial distance as shown by the displacement of the well 6 point from the curve on the steady-state analyses, plots 8 and 9. Therefore, well 6 should not be included in these analyses as it skews the results to larger transmissivity, smaller storativity, and larger leakage factor.

Similar to the test of well 6, the storativities calculated by these techniques, plots 1 through 8, are within the range for a highly confined aquifer, even though the drift monitoring well, completed in the layer above, clearly responded to pumping and indicates a strongly leaky system. Values for storativity in a leaky system should be in the range of 10^{-3} to 10^{-4}, not 10^{-4} to 10^{-5}, as seen from analyses that use the Theis assumptions, plots 1 - 8.

All PdC observation wells show a leaky response relative to the Theis-curve. Both the steady-state and transient analyses show similar values for transmissivity. However, the values for the characteristic leakage factor are quite large, in the range of a tightly confined aquifer system. From the observed effect on the drift monitoring well, it would be expected that the hydraulic resistance should be in the range of hundreds of days.

Even though the pumping well is not over-efficient - as was seen in the first test at well 6, the large transmissivities from this test are consistent with one or more zones of cavernous porosity in the PdC. The degree of leakiness of the flow system and the confirmation of water level declines in the drift monitoring well, also requires the application of the Hunt-Scott (2007) conceptual model where the water table is contained in the leaky layer. The Hunt (2012) spreadsheet model was used to quantify the aquifer properties and verify the vertical hydraulic resistance.

The Hunt-Scott analyses, plots 11 through 14, show an extraordinarily large transmissivity, a corresponding large leakage factor, along with a reasonable storativity. The hydraulic resistance of the leaky-confining layer calculated from these parameters, L^2/T, is about 400 days; consistent with the leaky response of the drift observation well.

Quantitative Analysis

Conceptual Model

The conceptual model is of porous radial flow to a well in a leaky two-layered system. The pumped aquifer and an overlying leaky confining layer that contains the water table.

Analysis Results

Hydraulic response affected by:

A large effective borehole radius is used to account for the effects of conduit flow through secondary porosity in the pumped aquifer.

Consistency with conceptual model:

The results from the pumped well and various observation wells are quite consistent once the appropriate conceptual flow model was identified and only the large effective borehole radius is needed to compensate for differences with the Hunt-Scott conceptual model.

Representative aquifer properties best shown by:

Plots 11 through 14; nominal aquifer properties are shown in Table 1.

Selected References

Agarwal, R.G. 1980. A new method to account for producing time effects when drawdown type curves are used to analyze pressure buildup and other test data. SPE Paper 9289, presented at the 55th SPE Annual Technical Conference and Exhibition, Dallas, Texas, September 21–24, 1980.

Cooper, H.H. and Jacob, C.E. (1946) A Generalized Graphical Method for Evaluating Formation Constants and Summarizing Well-filed History, Trans. American Geophysical Union, V. 27, pp. 526 – 534.

de Glee, G. (1930) Over grondwaterstroomingen bij wateronttrekking door middle van putten. Ph.D. thesis, Delft Technische Hogeschool, Delft.

deGlee Method in:

Kruseman and De Ridder, (1991) Analysis and Evaluation of Pumping Test Data (2nd Edition), Publication 47, International Institute for Land Reclamation and Improvement, P.O. Box 45, 6700 AA Wageningen, The Netherlands, pp. 76-78.

Duffield, G.M. (2007) AQTESOLV for Windows Version 4.5 User's Guide, HydroSOLVE, Inc., Reston, VA.

Gringarten, A., 2008. From Straight Lines to Deconvolution: The Evolution of the State of the Art in Well Test Analysis. SPE Reservoir Evaluation & Engineering, 11(1).

Jacob, C.E. (1947) Drawdown Test to Determine the Effective Radius of Artesian Wells. Transactions of the American Society of Civil Engineers, 112, pp.1047–1170.

Hantush, M. S. and Jacob, C.E. (1955b) Steady Three-dimensional Flow to a Well in a Two-layered Aquifer, Trans. American Geophysical Union, Vol. 36, pp. 286-292.

Hantush, M. S. (1960) Modification of the Theory of Leaky Aquifers, Journal of Geophysical Research, Vol. 65, pp. 3713-25.

Hunt, B. (2012) Groundwater analysis using Function.xls. Bruce Hunt's Groundwater Website. Available at: https://sites.google.com/site/brucehuntsgroundwaterwebsite/.

Hunt, B. & Scott, D. (2007) Flow to a Well in a Two-Aquifer System. Journal of Hydrologic Engineering, 12(2), pp.146–155.

Theis, C. V. (1935) The Relation Between the Lowering of the Piezometric Surface and the Rate and Duration of Discharge of a Well Using Ground-Water Storage, Trans. American Geophysical Union, 16th Annual Meeting, April, 1935, pp. 519-24.

Walton, W.C. (1960) Leaky Artesian Aquifer Conditions In Illinois, Illinois State Water Survey, Bulletin 39, pp. 27.

Appendix 1 – Graphical Analysis

Test No: 2586
Pumped Well: Fridely 8 (206669)
Obwell: – (--)
Test Date: 7/15/1993
Data Series: Composite pumping and recovery
Discharge Rate (gpm): 1550
Effective Borehole Radius (feet): 5

Theis Analysis
Plot 1

$T = (1440 / 4 / pi() / 7.48) \bullet Q \bullet W_{(u)} / s_m$

$S = (4 / 1440) \bullet T \bullet t_m \bullet 1/u / r^2$

$T = 15.3 * 1550 / 1 = 23715\ ft^2/day$

$S = 23715 * 0.005 / (5^2 * 360) = 0.013175$

Match Pt. Values

$s_m =$ 0.005 ft.
$t_m =$ 1 min.

Match Point
W(u), 1/u = 1

Data Series
Recovery
Pumping

Change in Water Level (feet)

10^2 10^1 10^0 10^{-1}

10^{-3} 10^{-2} 10^{-1} 10^0 10^1 10^2

Time from Start of Pumping or Recovery (minutes)

Test No: 2586
Pumped Well: Fridely 8 (206669)
Obwell: Fridely 9 (206672)
Test Date: 7/15/1993
Data Series: Composite pumping and recovery
Discharge Rate (gpm): 1550
Radial Distance (feet): 574

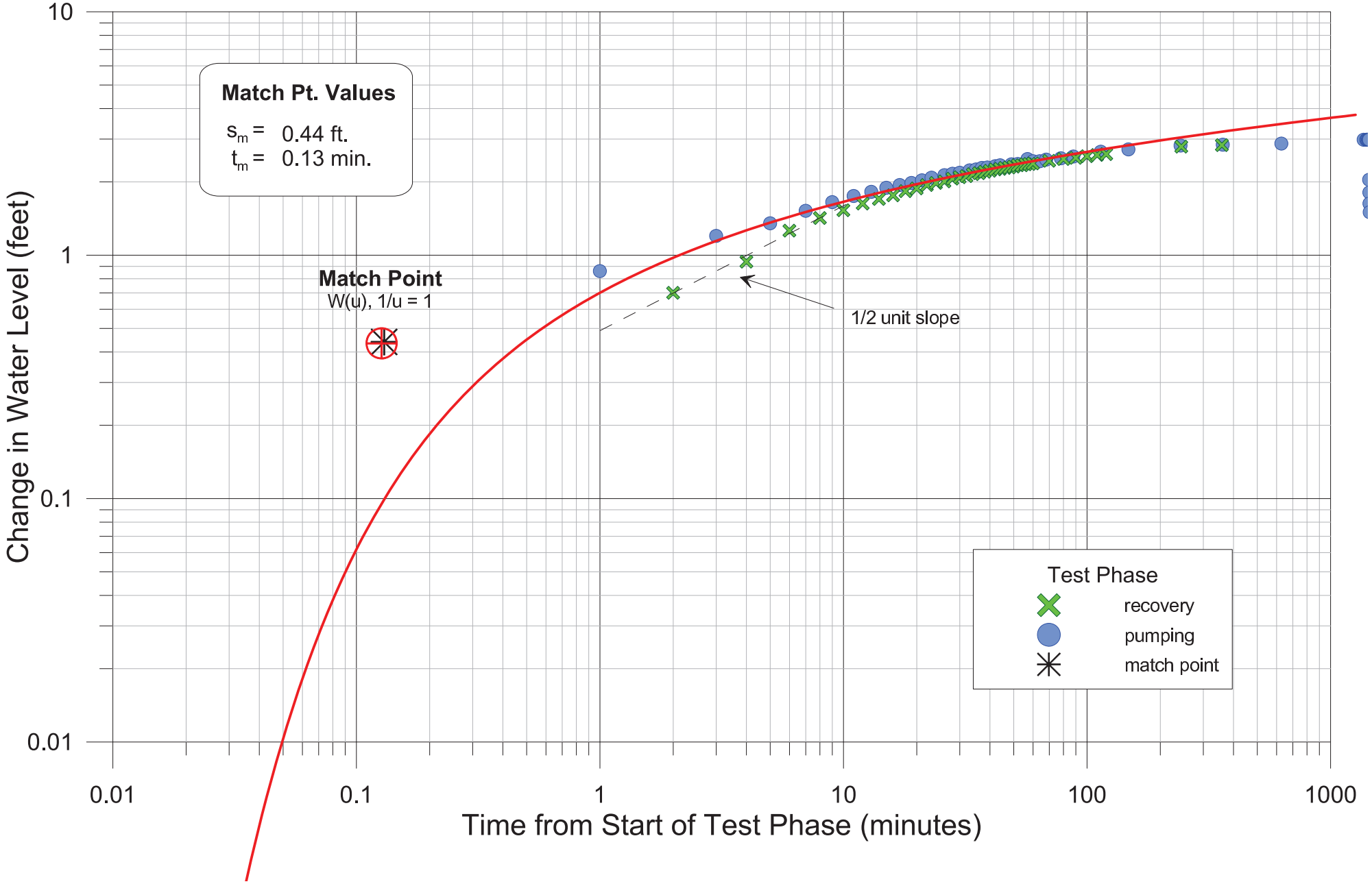
Theis Analysis
Plot 2

$T = (1440 / 4 / pi() / 7.48) \bullet Q \bullet W_{(u)} / s_m$

$S = (4 / 1440) \bullet T \bullet t_m \bullet 1/u / r^2$

$T = 15.3 * 1550 / 0.44 = 53897.7\ ft^2/day$

$S = 53897.7 * 0.13 / (574^2 * 360) = 5.90728e-005$



Test No: 2586
Pumped Well: Fridely 8 (206669)
Obwell: Fridely 7 (206678)
Test Date: 7/15/1993
Data Series: Composite pumping and recovery
Discharge Rate (gpm): 1550
Radial Distance (feet): 702

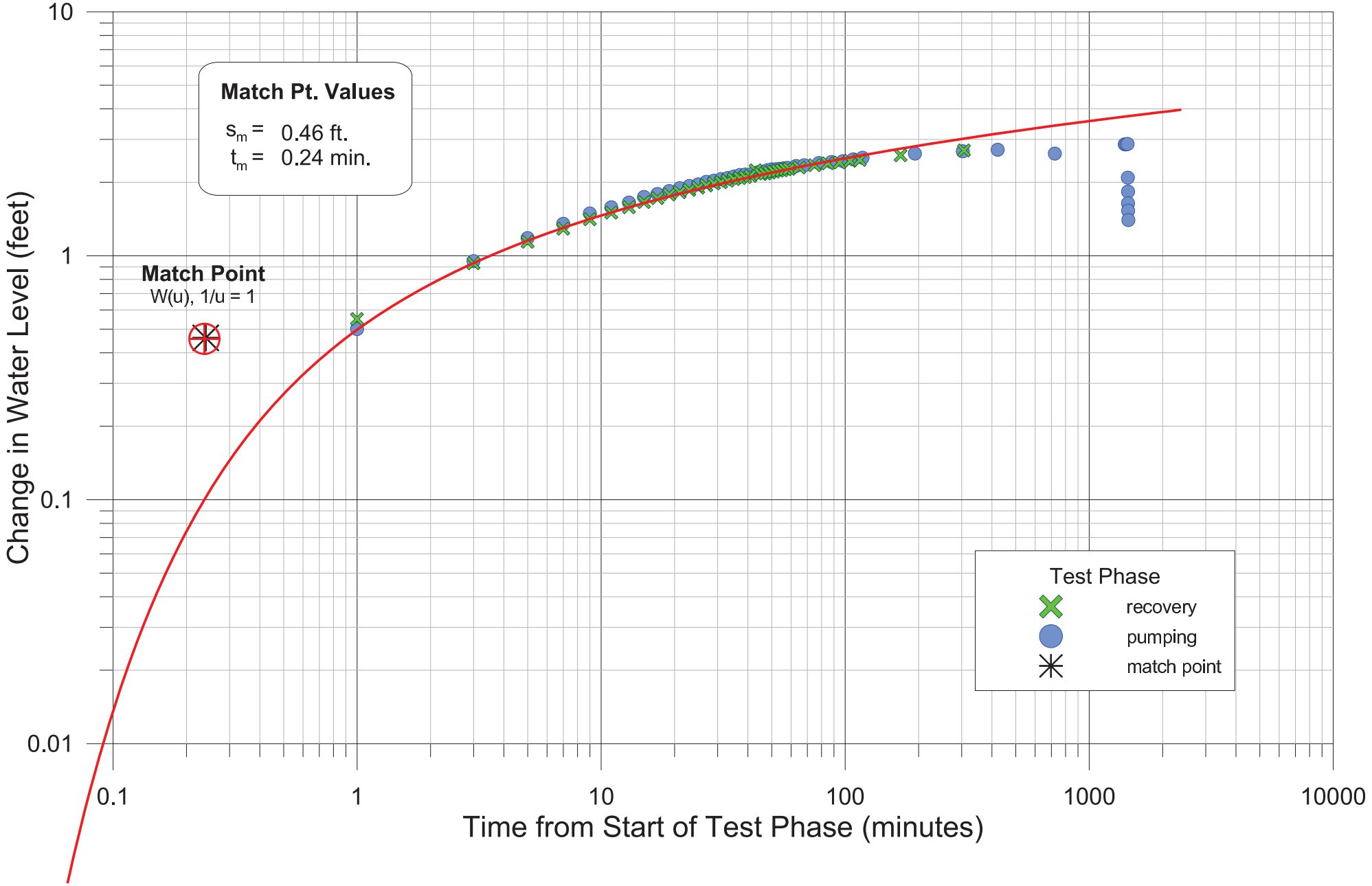
Theis Analysis
Plot 3

$T = (1440 / 4 / pi() / 7.48) \bullet Q \bullet W_{(u)} / s_m$

$S = (4 / 1440) \bullet T \bullet t_m \bullet 1/u / r^2$

$T = 15.3 * 1550 / 0.46 = 51554.3\ ft^2/day$

$S = 51554.3 * 0.24 / (702^2 * 360) = 6.97429e-005$



Test No: 2586
Pumped Well: Fridely 8 (206669)
Obwell: Fridely 6 (206673)
Test Date: 7/15/1993
Data Series: Composite pumping and recovery
Discharge Rate (gpm): 1550
Radial Distance (feet): 1124

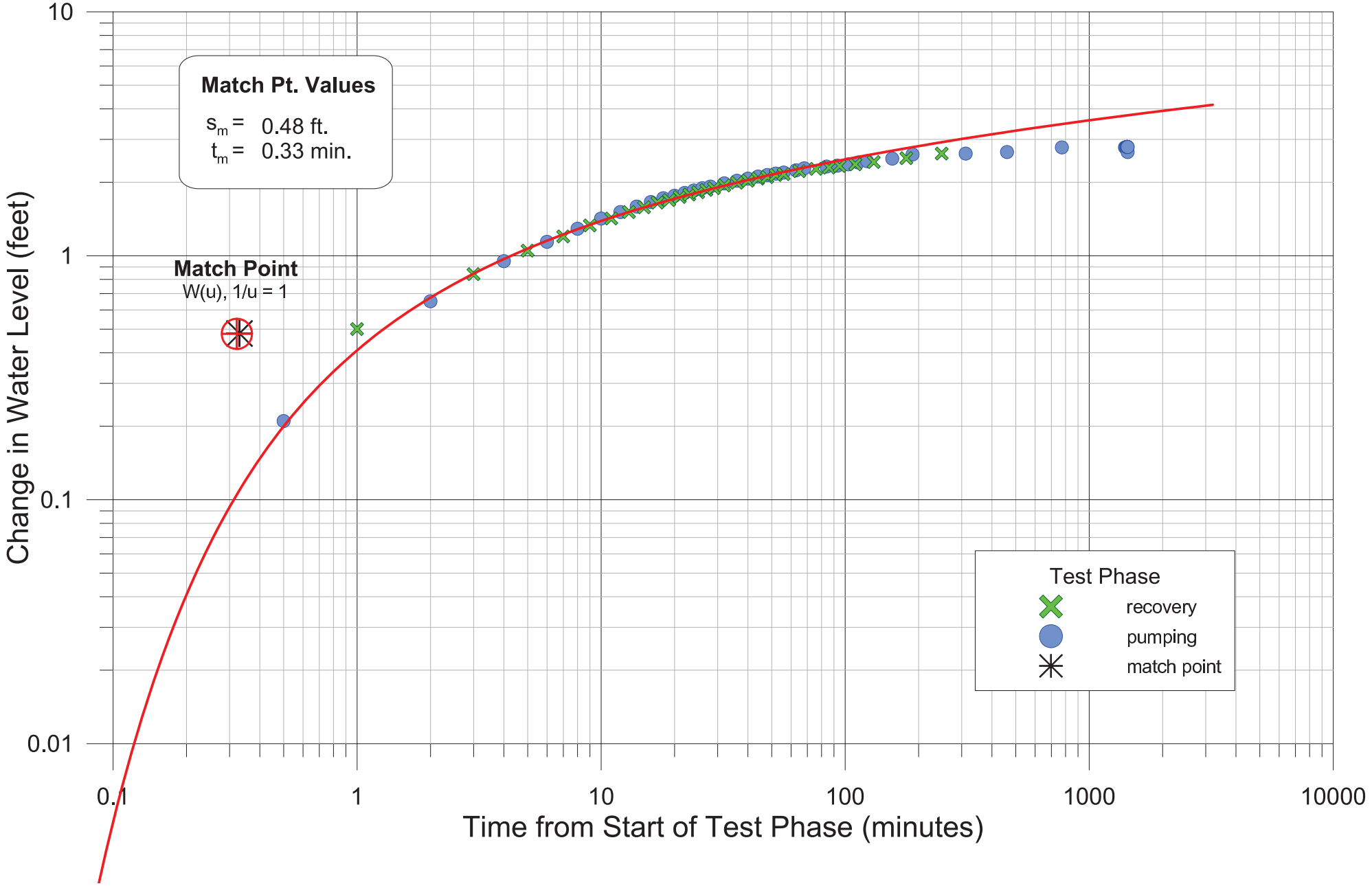
Theis Analysis
Plot 4

$T = (1440 / 4 / pi() / 7.48) \bullet Q \bullet W_{(u)} / s_m$

$S = (4 / 1440) \bullet T \bullet t_m \bullet 1/u / r^2$

$T = 15.3 * 1550 / 0.48 = 49406.3\ ft^2/day$

$S = 49406.3 * 0.33 / (1124^2 * 360) = 3.58477e-005$



Test No: 2586
Pumped Well: Fridely 8 (206669)
Obwell: MW-1 (509089)
Test Date: 7/15/1993
Data Series: Composite pumping and recovery
Discharge Rate (gpm): 1550
Radial Distance (feet): 820

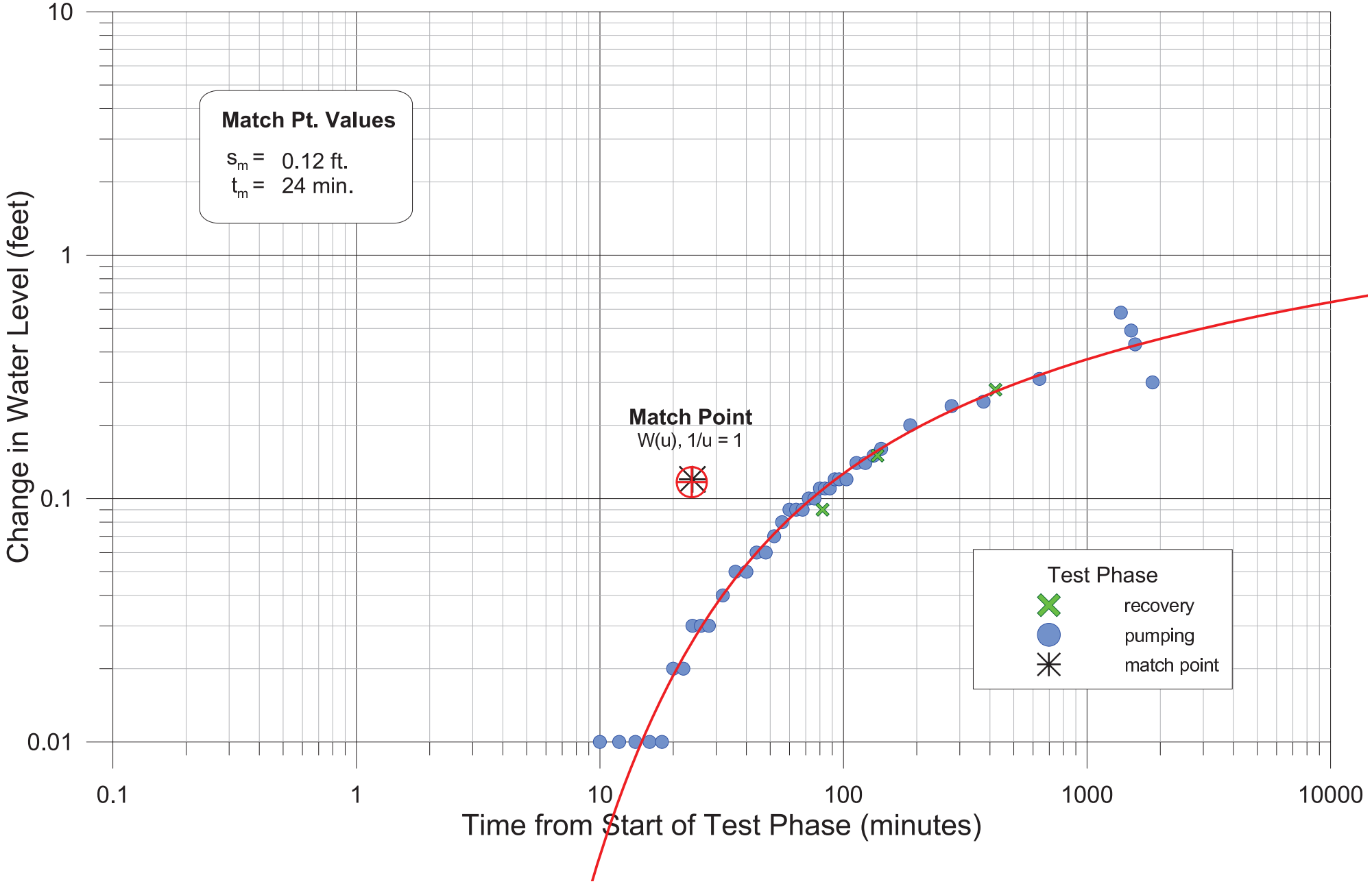
Theis Analysis
Plot 5

$T = (1440 / 4 / pi() / 7.48) \bullet Q \bullet W_{(u)} / s_m$

$S = (4 / 1440) \bullet T \bullet t_m \bullet 1/u / r^2$

$T = 15.3 * 1550 / 0.12 = 197625\ ft^2/day$

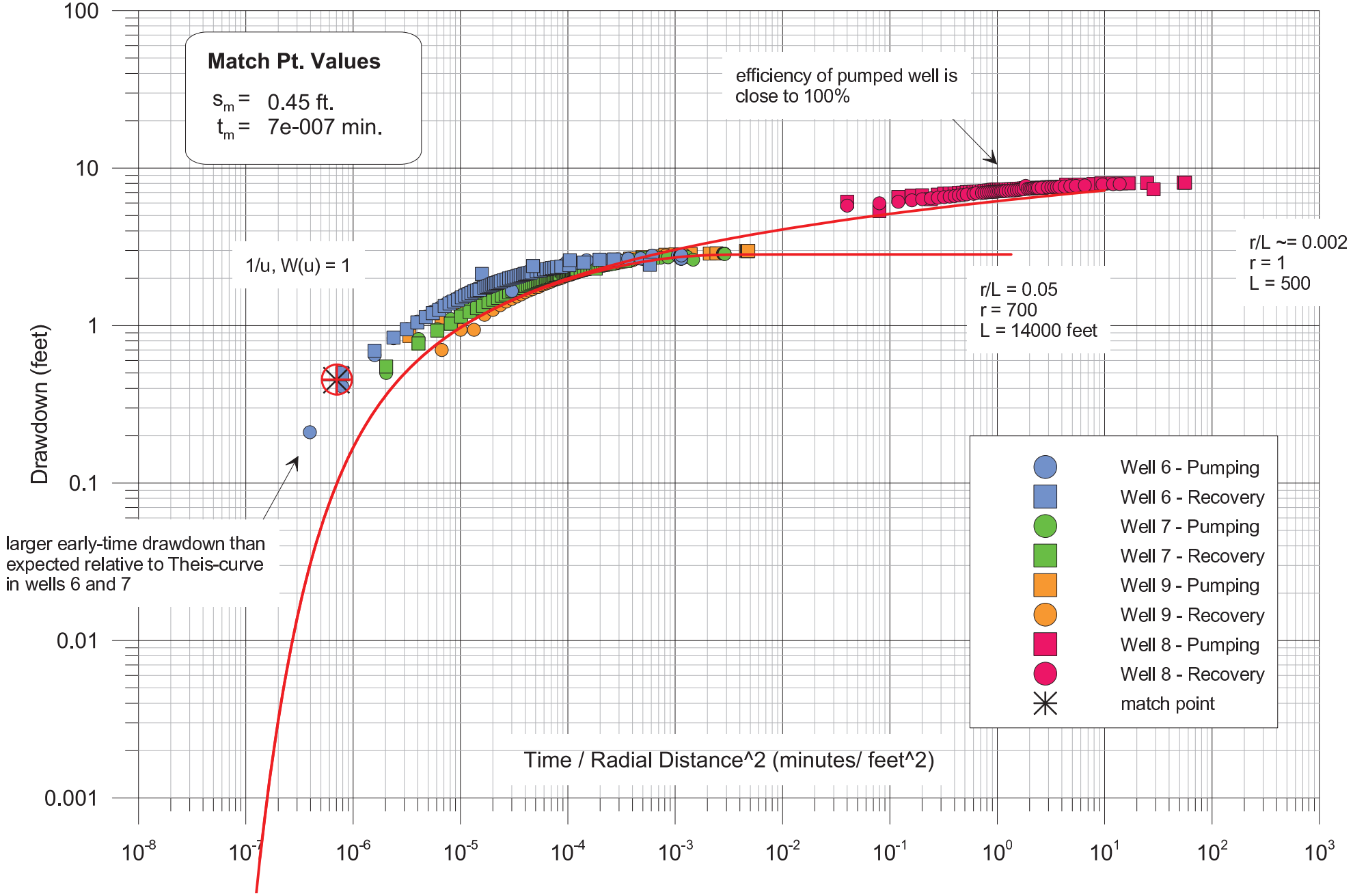
$S = 197625 * 24 / (820^2 * 360) = 0.019594$



Test No: 2586
Pumped Well: Fridely 8 (206669)
Ob Well: All (--)
Date: 7/15/1993
Data Series: Composite pumping and recovery
Rate (gpm): 1550

Walton Distance-Drawdown Analysis
Plot 6

$T = (1440 / 4 / pi() / 7.48) \bullet Q \bullet W_{(u)} / s_m$
$S = (4 / 1440) \bullet T \bullet t_m \bullet 1/u$
$T = 15.3 * 1550 / 0.45 = 52700\ ft^2/day$
$S = 52700 * 7e\text{-}007 / 360 = 0.000102472$

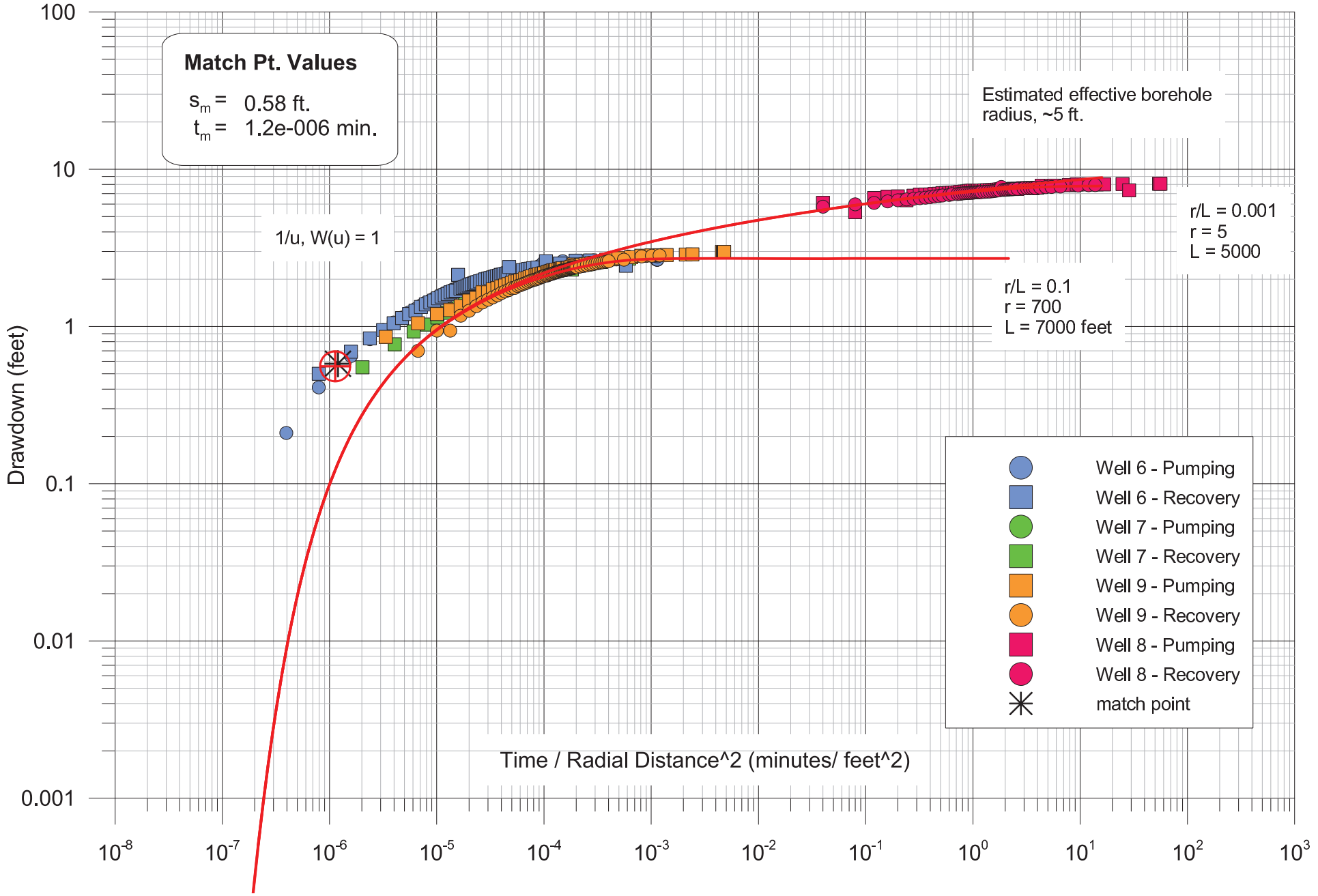


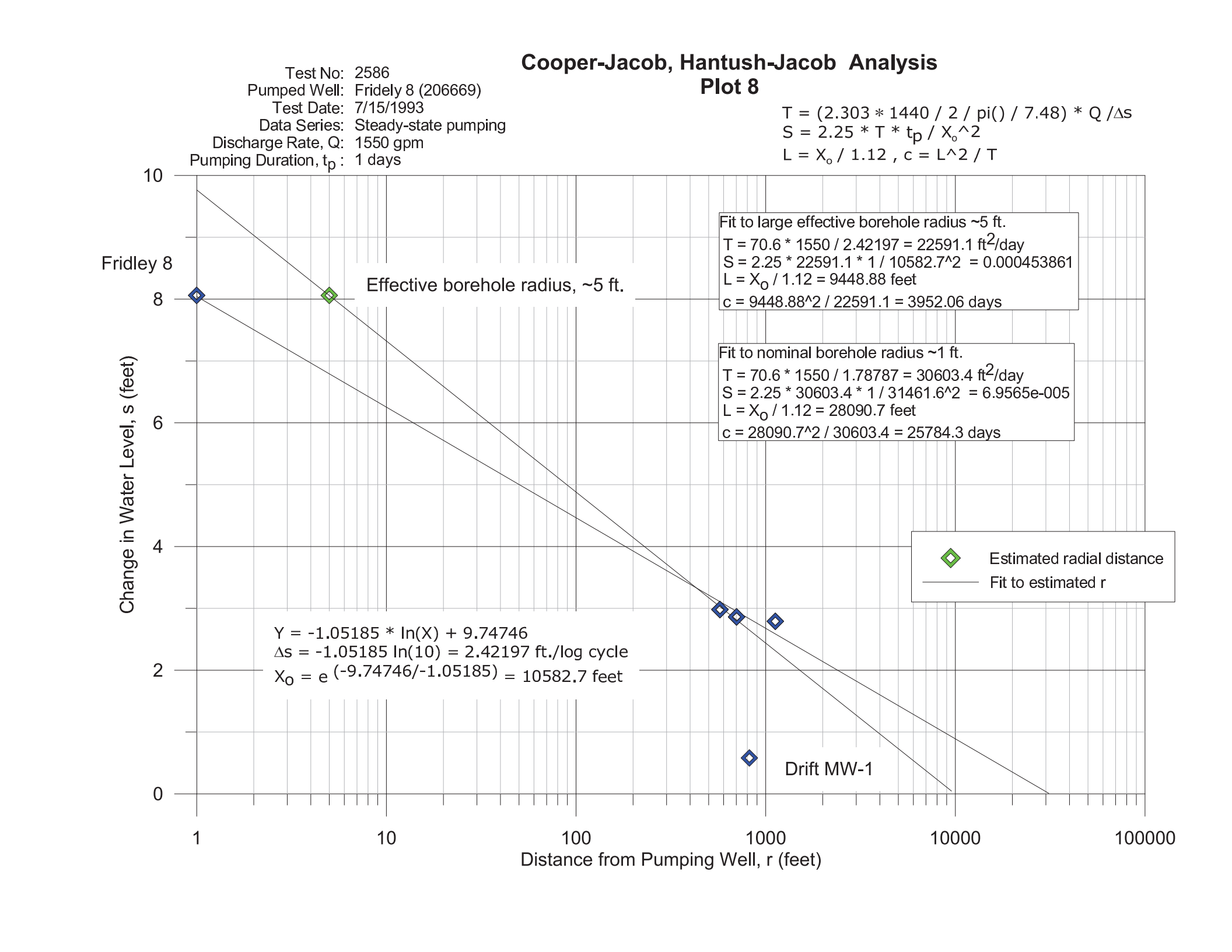
Test No: 2586
Pumped Well: Fridely 8 (206669)
Ob Well: All (--)
Date: 7/15/1993
Data Series: Composite pumping and recovery
Rate (gpm): 1550

Walton Distance-Drawdown Analysis
Plot 7

$T = (1440 / 4 / pi() / 7.48) \bullet Q \bullet W_{(u)} / s_m$
$S = (4 / 1440) \bullet T \bullet t_m \bullet 1/u$

$T = 15.3 * 1550 / 0.58 = 40887.9\ ft^2/day$
$S = 40887.9 * 1.2e\text{-}006 / 360 = 0.000136293$

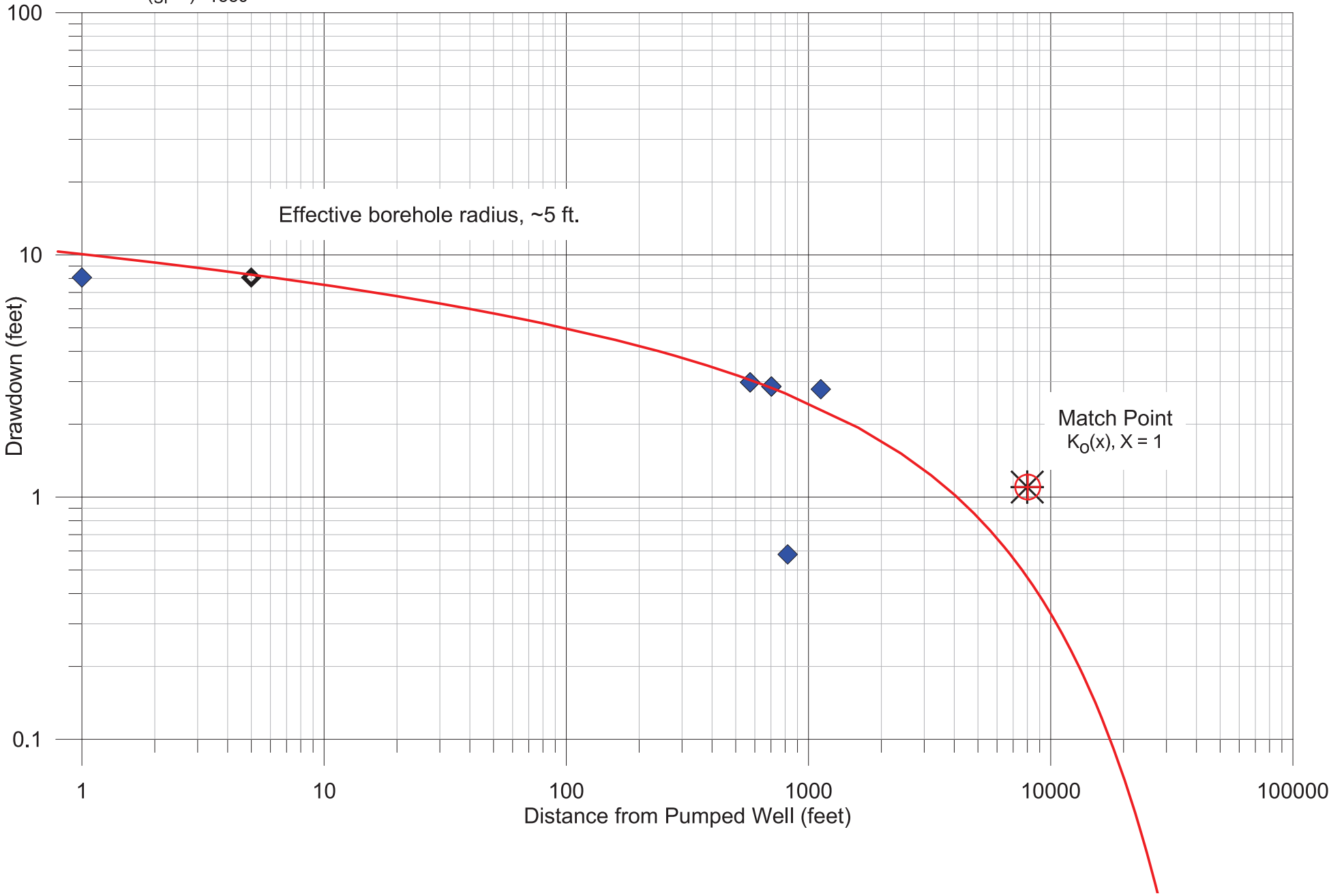



Cooper-Jacob, Hantush-Jacob Analysis
Plot 8
Test No: 2586
Pumped Well: Fridely 8 (206669)
Test Date: 7/15/1993
Data Series: Steady-state pumping
Discharge Rate, Q: 1550 gpm
Pumping Duration, tp : 1 days
T = (2.303 * 1440 / 2 / pi() / 7.48) * Q /Δs
S = 2.25 * T * tp / Xo^2
L = Xo / 1.12 , c = L^2 / T
Fridley 8
Effective borehole radius, ~5 ft.
Fit to large effective borehole radius ~5 ft.
T = 70.6 * 1550 / 2.42197 = 22591.1 ft2/day
S = 2.25 * 22591.1 * 1 / 10582.7^2 = 0.000453861
L = Xo / 1.12 = 9448.88 feet
c = 9448.88^2 / 22591.1 = 3952.06 days
Fit to nominal borehole radius ~1 ft.
T = 70.6 * 1550 / 1.78787 = 30603.4 ft2/day
S = 2.25 * 30603.4 * 1 / 31461.6^2 = 6.9565e-005
L = Xo / 1.12 = 28090.7 feet
c = 28090.7^2 / 30603.4 = 25784.3 days
Estimated radial distance
Fit to estimated r
Y = -1.05185 * ln(X) + 9.74746
Δs = -1.05185 ln(10) = 2.42197 ft./log cycle
Xo = e (-9.74746/-1.05185) = 10582.7 feet
Drift MW-1
Change in Water Level, s (feet)
Distance from Pumping Well, r (feet)
0
2
4
6
8
10
1
10
100
1000
10000
100000

Test No: 2586
Pumped Well: Fridely 8 (206669)
Ob Well: All (--)
Date: 7/15/1993
Data Series: Steady-state pumping
Rate (gpm): 1550

de Glee Analysis
Plot 9

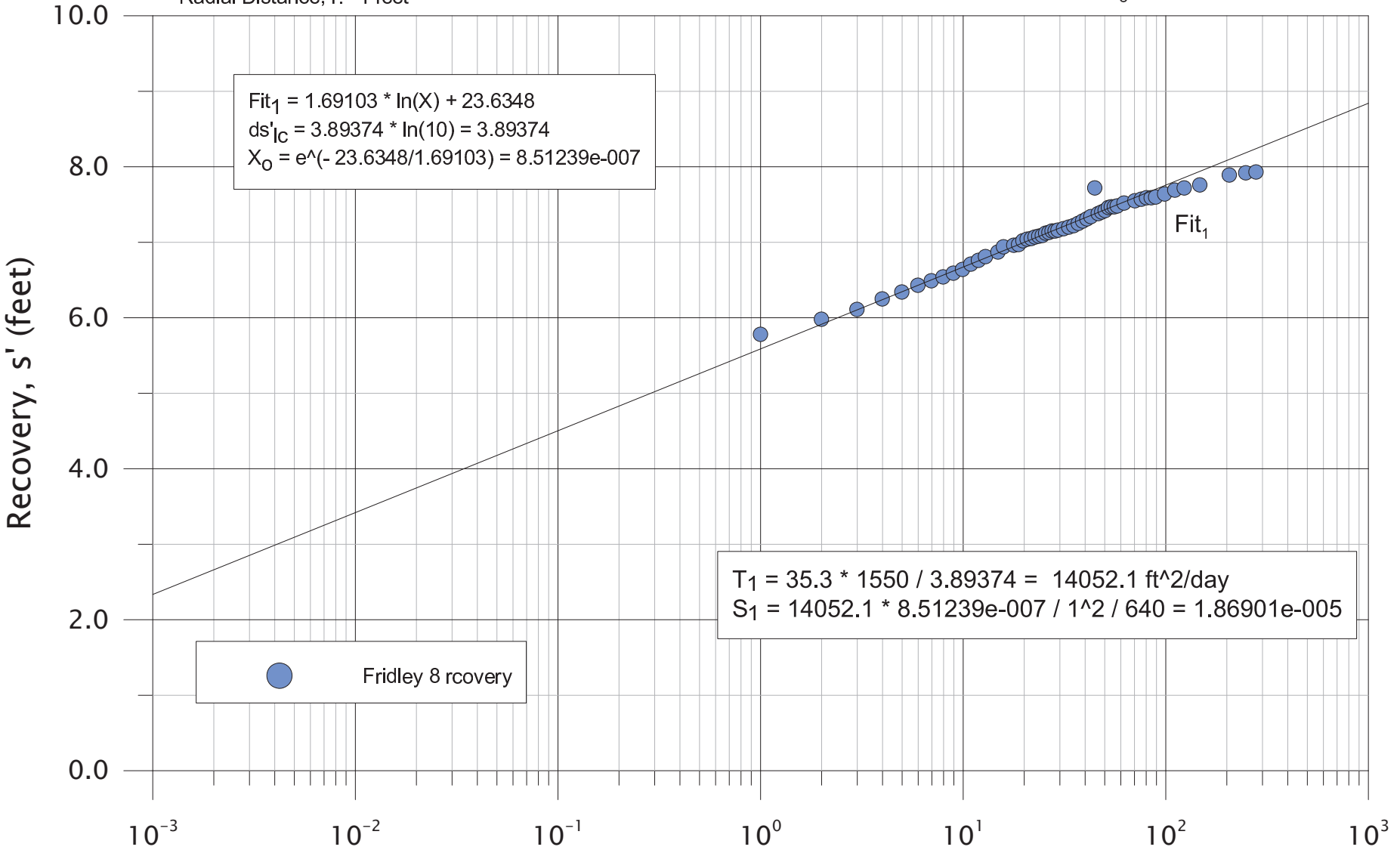
$T = (1440 / 2 / pi() / 7.48) \bullet Q \bullet K_0(x)_m / s_m$
$L = X_m , c = L^2 / T$
$T = 30.6 * 1550 / 1.1 = 43118.2 \text{ ft}^2/\text{day}$
$L = 8000 , c = (8000^2/43118.2) = 1484.29 \text{ days}$



Test No: 2586
Pumped Well: Fridely 8 (206669)
Observation Well: -- (--)
Test Date: 7/15/1993
Discharge Rate, Q: 1550 gpm
Radial Distance, r: 1 feet

Agarwal Analysis
Plot 10

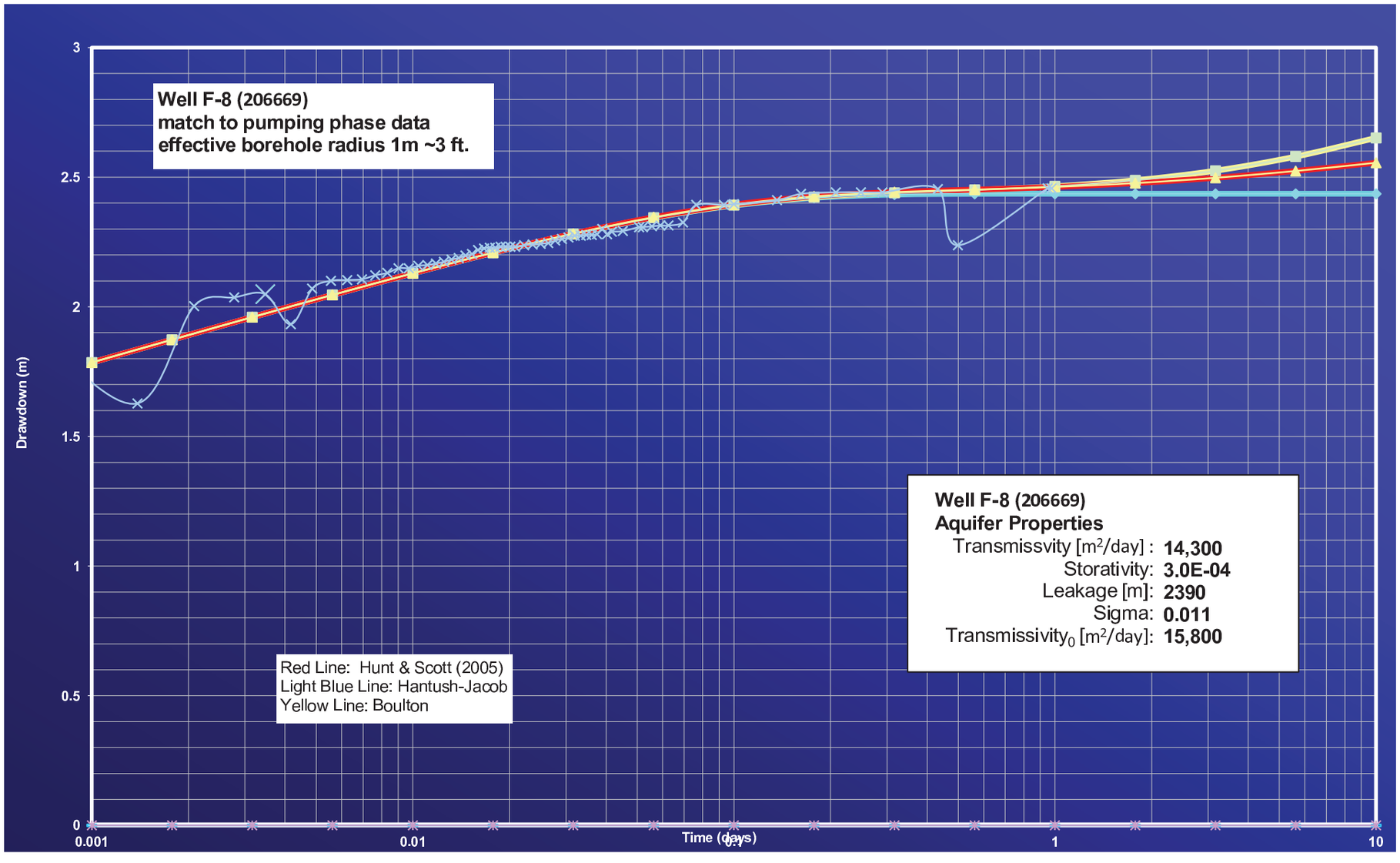
$T = (2.303 * 1440 / 7.48 / 4 / pi()) * Q / ds'_{lc}$
$S = 2.25 * T * X_o / r^2 / 1440$

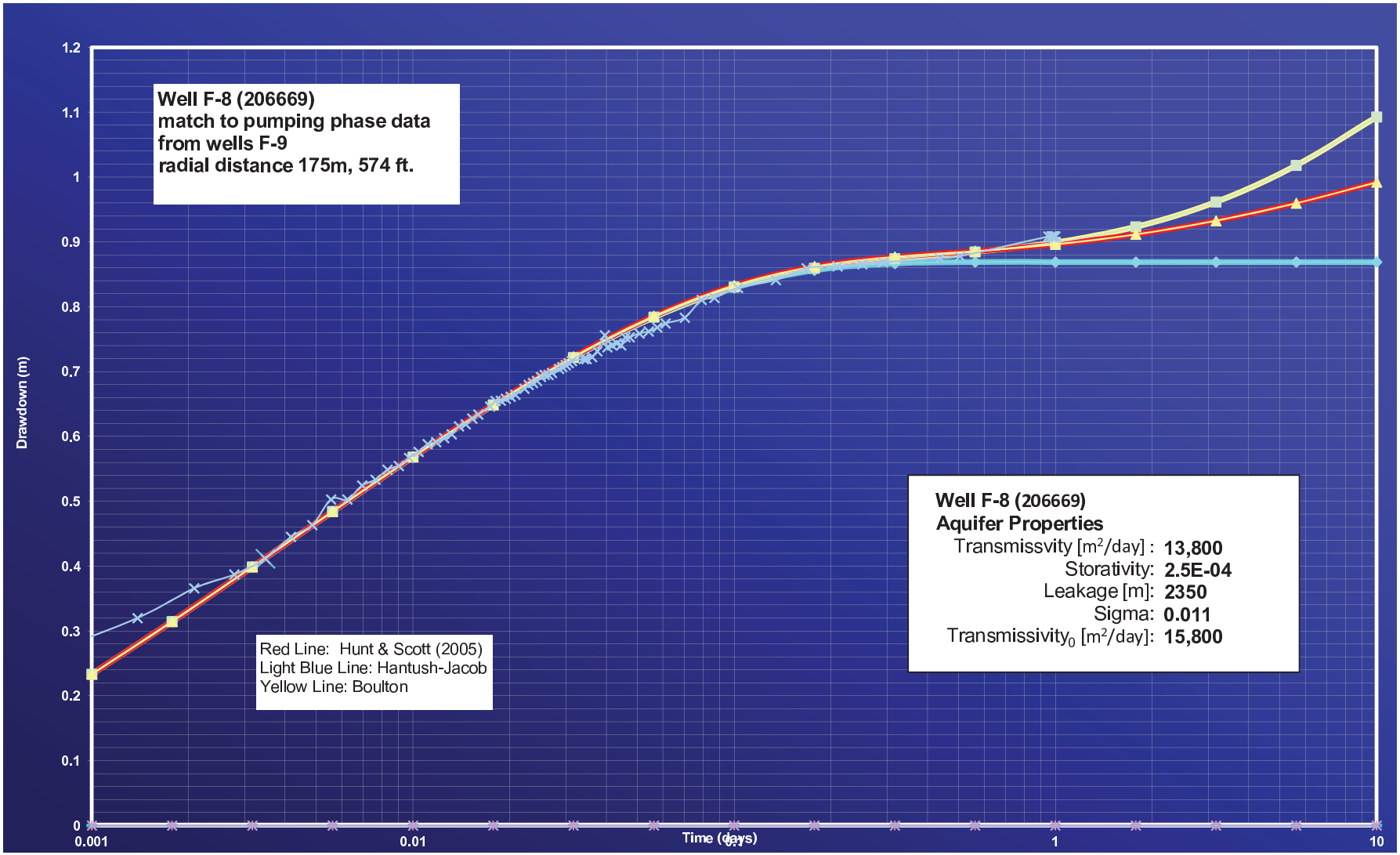


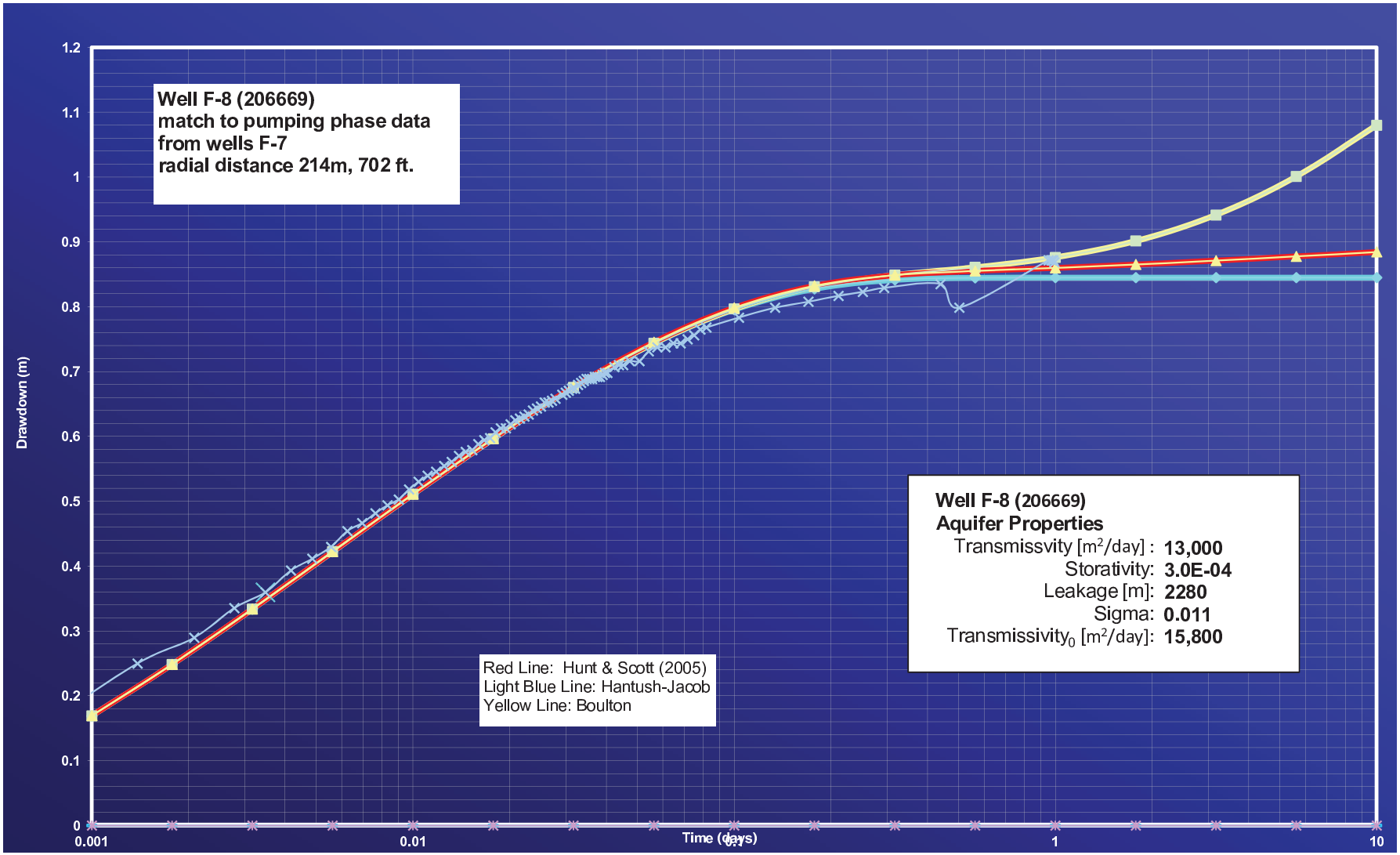
Agarwal Equivlalent Time

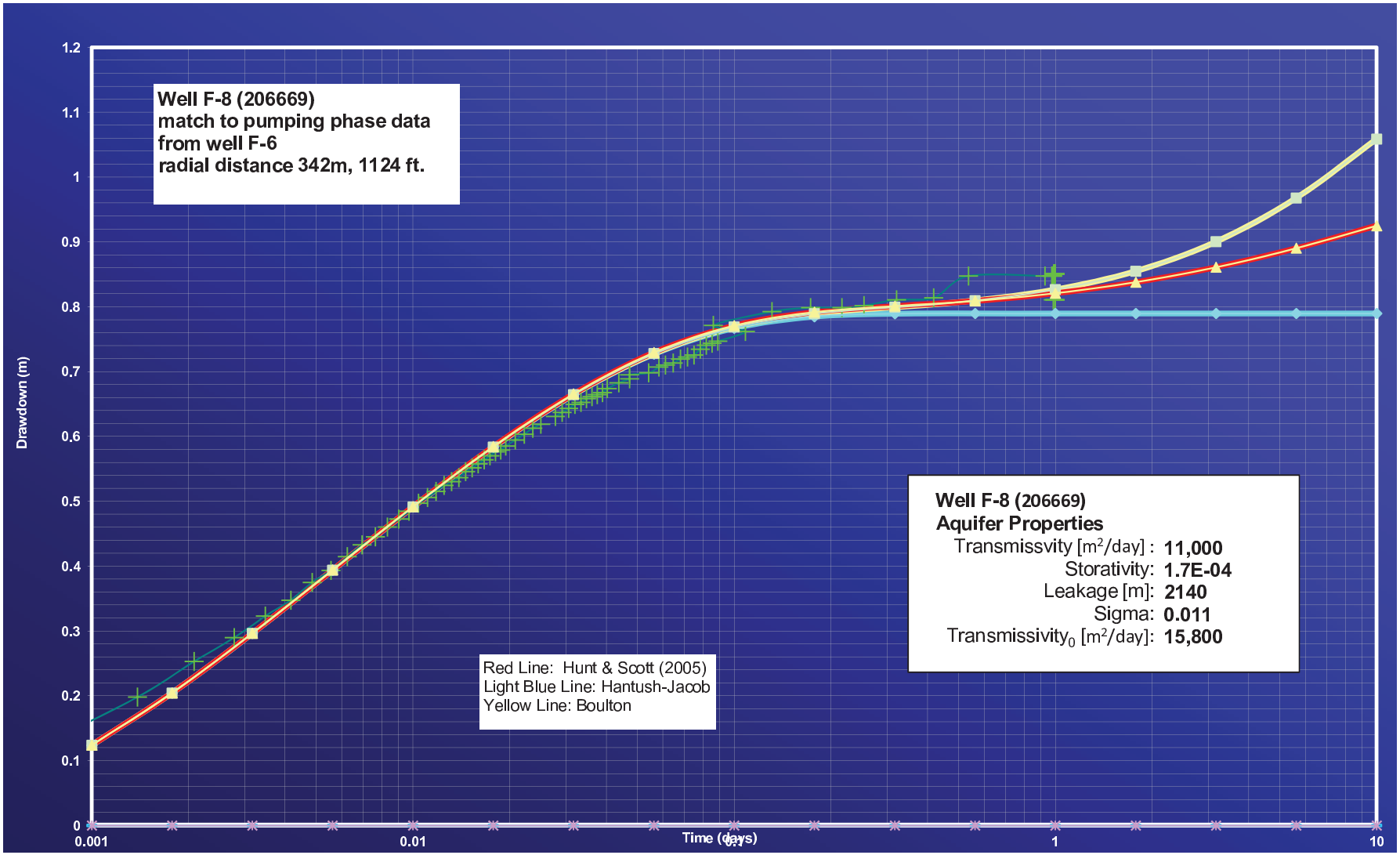
t_p=pumping time (fixed), t'=elapsed recovery time

$(t_p * t') / (t_p + t')$


Well F-8 (206669)
match to pumping phase data
effective borehole radius 1m ~3 ft.
Drawdown (m)
3
2.5
2
1.5
1
0.5
0
0.001
0.01
Time (days)
1
10
Red Line: Hunt & Scott (2005)
Light Blue Line: Hantush-Jacob
Yellow Line: Boulton
Well F-8 (206669)
Aquifer Properties
Transmissvity [m²/day] : 14,300
Storativity: 3.0E-04
Leakage [m]: 2390
Sigma: 0.011
Transmissivity0 [m²/day]: 15,800


Well F-8 (206669)
match to pumping phase data
from wells F-9
radial distance 175m, 574 ft.
Red Line: Hunt & Scott (2005)
Light Blue Line: Hantush-Jacob
Yellow Line: Boulton
Well F-8 (206669)
Aquifer Properties
Transmissvity [m²/day] : 13,800
Storativity: 2.5E-04
Leakage [m]: 2350
Sigma: 0.011
Transmissivity0 [m²/day]: 15,800
Drawdown (m)
Time (days)
1.2
1.1
1
0.9
0.8
0.7
0.6
0.5
0.4
0.3
0.2
0.1
0
0.001
0.01
1
10


Well F-8 (206669)
match to pumping phase data
from wells F-7
radial distance 214m, 702 ft.
Drawdown (m)
Time (days)
1.2
1.1
1
0.9
0.8
0.7
0.6
0.5
0.4
0.3
0.2
0.1
0
0.001
0.01
1
10
Red Line: Hunt & Scott (2005)
Light Blue Line: Hantush-Jacob
Yellow Line: Boulton
Well F-8 (206669)
Aquifer Properties
Transmissvity [m²/day] : 13,000
Storativity: 3.0E-04
Leakage [m]: 2280
Sigma: 0.011
Transmissivity0 [m²/day]: 15,800


Well F-8 (206669)
match to pumping phase data
from well F-6
radial distance 342m, 1124 ft.
Drawdown (m)
Time (days)
1.2
1.1
1
0.9
0.8
0.7
0.6
0.5
0.4
0.3
0.2
0.1
0
0.001
0.01
1
10
Red Line: Hunt & Scott (2005)
Light Blue Line: Hantush-Jacob
Yellow Line: Boulton
Well F-8 (206669)
Aquifer Properties
Transmissvity [m²/day] : 11,000
Storativity: 1.7E-04
Leakage [m]: 2140
Sigma: 0.011
Transmissivity0 [m²/day]: 15,800

Appendix 2 – Documentation

Fridley Commons Park

WELLID		distance	effective r	drawdowr	x-diff^2	y-diff^2	rms_mete	reported dista
206669	8	1	5	8.06			1.5	
206672	9	574	574	2.98	11881	18769	175.0714	574.374295
206678	7	702	702	2.86	441	45369	214.0327	702.198508
206673	6	1124	1124	2.79	3721	113569	342.4763	1123.59617
509089	MW-1	820		0.58	62001	484	249.97	820.10157

datetime	etp	etr	agarwal	wl	dd	rec	t/r^2_p	t/r^2_r	r
07/15/1993 09:02	0			53.34					1124
07/15/1993 09:02:30	0.50			53.55	0.21		3.96E-07		**342.599**
07/15/1993 09:03	1			53.75	0.41		7.92E-07		
07/15/1993 09:04	2			53.99	0.65		1.58E-06		
07/15/1993 09:05	3			54.17	0.83		2.37E-06		
07/15/1993 09:06	4			54.29	0.95		3.17E-06		
07/15/1993 09:07	5			54.40	1.06		3.96E-06		
07/15/1993 09:08	6			54.48	1.14		4.75E-06		
07/15/1993 09:09	7			54.57	1.23		5.54E-06		
07/15/1993 09:10	8			54.63	1.29		6.33E-06		
07/15/1993 09:11	9			54.70	1.36		7.12E-06		
07/15/1993 09:12	10			54.76	1.42		7.92E-06		
07/15/1993 09:13	11			54.80	1.46		8.71E-06		
07/15/1993 09:14	12			54.85	1.51		9.50E-06		
07/15/1993 09:15	13			54.89	1.55		1.03E-05		
07/15/1993 09:16	14			54.93	1.59		1.11E-05		
07/15/1993 09:17	15			54.97	1.63		1.19E-05		
07/15/1993 09:18	16			55.00	1.66		1.27E-05		
07/15/1993 09:19	17			55.03	1.69		1.35E-05		
07/15/1993 09:20	18			55.06	1.72		1.42E-05		
07/15/1993 09:21	19			55.08	1.74		1.50E-05		
07/15/1993 09:22	20			55.10	1.76		1.58E-05		
07/15/1993 09:23	21			55.13	1.79		1.66E-05		
07/15/1993 09:24	22			55.15	1.81		1.74E-05		
07/15/1993 09:25	23			55.17	1.83		1.82E-05		
07/15/1993 09:26	24			55.19	1.85		1.90E-05		
07/15/1993 09:27	25			55.21	1.87		1.98E-05		
07/15/1993 09:28	26			55.23	1.89		2.06E-05		
07/15/1993 09:29	27			55.24	1.90		2.14E-05		
07/15/1993 09:30	28			55.26	1.92		2.22E-05		
07/15/1993 09:32	30			55.29	1.95		2.37E-05		
07/15/1993 09:34	32			55.32	1.98		2.53E-05		
07/15/1993 09:36	34			55.35	2.01		2.69E-05		
07/15/1993 09:38	36			55.37	2.03		2.85E-05		
07/15/1993 09:40	38			55.00	1.66		3.01E-05		
07/15/1993 09:42	40			55.41	2.07		3.17E-05		
07/15/1993 09:44	42			55.43	2.09		3.32E-05		
07/15/1993 09:46	44			55.45	2.11		3.48E-05		
07/15/1993 09:48	46			55.47	2.13		3.64E-05		
07/15/1993 09:50	48			55.48	2.14		3.80E-05		
07/15/1993 09:52	50			55.50	2.16		3.96E-05		
07/15/1993 09:54	52			55.51	2.17		4.12E-05		
07/15/1993 09:56	54			55.52	2.18		4.27E-05		
07/15/1993 09:58	56			55.53	2.19		4.43E-05		
07/15/1993 09:00	58			55.55	2.21		4.59E-05		
07/15/1993 10:05	63			55.58	2.24		4.99E-05		

07/15/1993 10:10	68			55.60	2.26		5.38E-05		
07/15/1993 10:10	68			55.62	2.28		5.38E-05		
07/15/1993 10:20	78			55.63	2.29		6.17E-05		
07/15/1993 10:26	84			55.66	2.32		6.65E-05		
07/15/1993 10:30	88			55.67	2.33		6.97E-05		
07/15/1993 10:35	93			55.68	2.34		7.36E-05		
07/15/1993 10:40	98			55.70	2.36		7.76E-05		
07/15/1993 10:45	103			55.71	2.37		8.15E-05		
07/15/1993 10:50	108			55.72	2.38		8.55E-05		
07/15/1993 10:55	113			55.75	2.41		8.94E-05		
07/15/1993 11:00	118			55.77	2.43		9.34E-05		
07/15/1993 11:05	123			55.78	2.44		9.74E-05		
07/15/1993 11:10	128			55.79	2.45		1.01E-04		
07/15/1993 11:38	156			55.84	2.50		1.23E-04		
07/15/1993 11:06	124			55.87	2.53		9.81E-05		
07/15/1993 12:11	189			55.94	2.60		1.50E-04		
07/15/1993 13:11	249			55.96	2.62		1.97E-04		
07/15/1993 14:14	312			55.96	2.62		2.47E-04		
07/15/1993 15:07	365			55.97	2.63		2.89E-04		
07/15/1993 16:43	461			56.00	2.66		3.65E-04		
07/15/1993 19:04	602			56.01	2.67		4.77E-04		
07/15/1993 21:55	773			56.12	2.78		6.12E-04		
07/16/1993 07:18	1336			56.12	2.78		1.06E-03		
07/16/1993 08:25	1403			56.12	2.78		1.11E-03		
07/16/1993 08:30	1408			56.12	2.78		1.11E-03		
07/16/1993 08:35	1413			56.12	2.78		1.12E-03		
07/16/1993 08:40	1418			56.00	2.66		1.12E-03		
07/16/1993 08:45	1423			56.13	2.79		1.13E-03		
07/16/1993 08:50	1428			56.13	2.79		1.13E-03		
07/16/1993 08:55	1433			56.13	2.79		1.13E-03		
07/16/1993 08:56	1434			56.13	2.79		1.14E-03		
07/16/1993 08:57	1435			56.13	2.79		1.14E-03		
07/16/1993 08:58	1436			56.00	2.66		1.14E-03		
07/16/1993 08:59	1437			56.13	2.79		1.14E-03		
07/16/1993 08:45	1423			56.13	2.79		1.13E-03		
07/16/1993 08:50	1428			56.13	2.79		1.13E-03		
07/16/1993 08:55	1433			56.13	2.79		1.13E-03		
07/16/1993 08:56	1434			56.13	2.79		1.14E-03		
07/16/1993 08:57	1435			56.13	2.79		1.14E-03		
07/16/1993 08:58	1436			56.00	2.66		1.14E-03		
07/16/1993 08:59	1437			56.13	2.79		1.14E-03		
07/16/1993 08:45	1423			56.13	2.79		1.13E-03		
07/16/1993 08:50	1428			56.13	2.79		1.13E-03		
07/16/1993 08:55	1433			56.13	2.79		1.13E-03		
07/16/1993 08:56	1434			56.13	2.79		1.14E-03		
07/16/1993 08:57	1435			56.13	2.79		1.14E-03		
07/16/1993 08:58	1436			56.00	2.66		1.14E-03		

07/16/1993 08:59	1437			56.13	2.79		1.14E-03		
07/16/1993 09:00	1438	0	0.00	56.13	2.79	0.00			
07/16/1993 09:01	1439	1	1.00	55.63	2.29	0.50		7.92E-07	
07/16/1993 09:02	1440	2	2.00	55.44	2.10	0.69		1.58E-06	
07/16/1993 09:03	1441	3	2.99	55.29	1.95	0.84		2.37E-06	
07/16/1993 09:04	1442	4	3.99	55.18	1.84	0.95		3.17E-06	
07/16/1993 09:05	1443	5	4.98	55.08	1.74	1.05		3.96E-06	
07/16/1993 09:06	1444	6	5.97	55.00	1.66	1.13		4.75E-06	
07/16/1993 09:07	1445	7	6.96	54.93	1.59	1.20		5.54E-06	
07/16/1993 09:08	1446	8	7.95	54.87	1.53	1.26		6.33E-06	
07/16/1993 09:09	1447	9	8.94	54.80	1.46	1.33		7.12E-06	
07/16/1993 09:10	1448	10	9.92	54.75	1.41	1.38		7.92E-06	
07/16/1993 09:11	1449	11	10.91	54.71	1.37	1.42		8.71E-06	
07/16/1993 09:12	1450	12	11.89	54.67	1.33	1.46		9.50E-06	
07/16/1993 09:13	1451	13	12.87	54.62	1.28	1.51		1.03E-05	
07/16/1993 09:14	1452	14	13.86	54.58	1.24	1.55		1.11E-05	
07/16/1993 09:15	1453	15	14.83	54.55	1.21	1.58		1.19E-05	
07/16/1993 09:16	1454	16	15.81	54.52	1.18	1.61		1.27E-05	
07/16/1993 09:17	1455	17	16.79	54.48	1.14	1.65		1.35E-05	
07/16/1993 09:18	1456	18	17.77	54.46	1.12	1.67		1.42E-05	
07/16/1993 09:19	1457	19	18.74	54.44	1.10	1.69		1.50E-05	
07/16/1993 09:20	1458	20	19.71	54.00	0.66	2.13		1.58E-05	
07/16/1993 09:21	1459	21	20.68	54.39	1.05	1.74		1.66E-05	
07/16/1993 09:22	1460	22	21.65	54.37	1.03	1.76		1.74E-05	
07/16/1993 09:23	1461	23	22.62	54.35	1.01	1.78		1.82E-05	
07/16/1993 09:24	1462	24	23.59	54.33	0.99	1.80		1.90E-05	
07/16/1993 09:25	1463	25	24.56	54.31	0.97	1.82		1.98E-05	
07/16/1993 09:26	1464	26	25.52	54.29	0.95	1.84		2.06E-05	
07/16/1993 09:27	1465	27	26.48	54.27	0.93	1.86		2.14E-05	
07/16/1993 09:28	1466	28	27.45	54.26	0.92	1.87		2.22E-05	
07/16/1993 09:29	1467	29	28.41	54.24	0.90	1.89		2.30E-05	
07/16/1993 09:30	1468	30	29.37	54.22	0.88	1.91		2.37E-05	
07/16/1993 09:32	1470	32	31.28	54.19	0.85	1.94		2.53E-05	
07/16/1993 09:34	1472	34	33.19	54.17	0.83	1.96		2.69E-05	
07/16/1993 09:36	1474	36	35.10	54.14	0.80	1.99		2.85E-05	
07/16/1993 09:38	1476	38	37.00	54.12	0.78	2.01		3.01E-05	
07/16/1993 09:40	1478	40	38.89	54.10	0.76	2.03		3.17E-05	
07/16/1993 09:42	1480	42	40.78	54.08	0.74	2.05		3.32E-05	
07/16/1993 09:44	1482	44	42.66	54.06	0.72	2.07		3.48E-05	
07/16/1993 09:46	1484	46	44.54	54.04	0.70	2.09		3.64E-05	
07/16/1993 09:48	1486	48	46.42	54.03	0.69	2.10		3.80E-05	
07/16/1993 09:50	1488	50	48.29	54.00	0.66	2.13		3.96E-05	
07/16/1993 09:52	1490	52	50.15	53.99	0.65	2.14		4.12E-05	
07/16/1993 09:54	1492	54	52.01	53.98	0.64	2.15		4.27E-05	
07/16/1993 09:56	1494	56	53.86	53.97	0.63	2.16		4.43E-05	
07/16/1993 09:58	1496	58	55.71	53.95	0.61	2.18		4.59E-05	
07/16/1993 09:00	1438	0	0.00	53.94	0.60	2.19		0.00E+00	

07/16/1993 10:05	1503	65	62.15	53.91	0.57	2.22		5.14E-05	
07/16/1993 10:10	1508	70	66.70	53.89	0.55	2.24		5.54E-05	
07/16/1993 10:16	1514	76	72.13	53.86	0.52	2.27		6.02E-05	
07/16/1993 10:20	1518	80	75.73	53.85	0.51	2.28		6.33E-05	
07/16/1993 10:26	1524	86	81.09	53.83	0.49	2.30		6.81E-05	
07/16/1993 10:30	1528	90	84.64	53.81	0.47	2.32		7.12E-05	
07/16/1993 10:35	1533	95	89.05	53.80	0.46	2.33		7.52E-05	
07/16/1993 10:40	1538	100	93.43	53.78	0.44	2.35		7.92E-05	
07/16/1993 10:50	1548	110	102.11	53.76	0.42	2.37		8.71E-05	
07/16/1993 10:00	1498	60	57.56	53.74	0.40	2.39		4.75E-05	
07/16/1993 11:11	1569	131	119.98	53.71	0.37	2.42		1.04E-04	
07/16/1993 21:15	2173	735	486.05	53.70	0.36	2.43		5.82E-04	
07/16/1993 11:58	1616	178	158.28	53.62	0.28	2.51		1.41E-04	
07/16/1993 11:12	1570	132	120.82	53.53	0.19	2.60		1.04E-04	
07/16/1993 13:09	1687	249	212.10	53.51	0.17	2.62		1.97E-04	
07/16/1993 14:40	1778	339	273.98	53.50	0.16	2.63		2.68E-04	

datetime	etp	etr	agarwal	wl	dd	rec	t/r^2_p	t/r^2_r	r
07/15/1993 09:01	0			61.38	0.00				702
07/15/1993 09:03	1			61.88	0.50		2.029E-06		**213.97**
07/15/1993 09:04	2			62.20	0.82		4.058E-06		
07/15/1993 09:05	3			62.33	0.95		6.088E-06		
07/15/1993 09:06	4			62.48	1.10		8.117E-06		
07/15/1993 09:07	5			62.56	1.18		1.015E-05		
07/15/1993 09:08	6			62.67	1.29		1.218E-05		
07/15/1993 09:09	7			62.73	1.35		1.42E-05		
07/15/1993 09:10	8			62.79	1.41		1.623E-05		
07/15/1993 09:11	9			62.87	1.49		1.826E-05		
07/15/1993 09:12	10			62.91	1.53		2.029E-05		
07/15/1993 09:13	11			62.96	1.58		2.232E-05		
07/15/1993 09:14	12			63.00	1.62		2.435E-05		
07/15/1993 09:15	13			63.03	1.65		2.638E-05		
07/15/1993 09:16	14			63.08	1.70		2.841E-05		
07/15/1993 09:17	15			63.12	1.74		3.044E-05		
07/15/1993 09:18	16			63.15	1.77		3.247E-05		
07/15/1993 09:19	17			63.17	1.79		3.45E-05		
07/15/1993 09:20	18			63.20	1.82		3.653E-05		
07/15/1993 09:21	19			63.22	1.84		3.855E-05		
07/15/1993 09:22	20			63.25	1.87		4.058E-05		
07/15/1993 09:23	21			63.27	1.89		4.261E-05		
07/15/1993 09:24	22			63.28	1.90		4.464E-05		
07/15/1993 09:25	23			63.31	1.93		4.667E-05		
07/15/1993 09:26	24			63.33	1.95		4.87E-05		
07/15/1993 09:09	25			63.34	1.96		5.073E-05		
07/15/1993 09:28	26			63.37	1.99		5.276E-05		
07/15/1993 09:29	27			63.39	2.01		5.479E-05		
07/15/1993 09:30	28			63.39	2.01		5.682E-05		
07/15/1993 09:31	29			63.41	2.03		5.885E-05		
07/15/1993 09:32	30			63.43	2.05		6.088E-05		
07/15/1993 09:33	31			63.44	2.06		6.291E-05		
07/15/1993 09:34	32			63.45	2.07		6.493E-05		
07/15/1993 09:35	33			63.46	2.08		6.696E-05		
07/15/1993 09:36	34			63.48	2.10		6.899E-05		
07/15/1993 09:37	35			63.49	2.11		7.102E-05		
07/15/1993 09:38	36			63.50	2.12		7.305E-05		
07/15/1993 09:39	37			63.52	2.14		7.508E-05		
07/15/1993 09:40	38			63.52	2.14		7.711E-05		
07/15/1993 09:41	39			63.53	2.15		7.914E-05		
07/15/1993 09:42	40			63.54	2.16		8.117E-05		
07/15/1993 09:44	42			63.56	2.18		8.523E-05		
07/15/1993 09:45	43			63.57	2.19		8.726E-05		
07/15/1993 09:46	44			63.58	2.20		8.928E-05		
07/15/1993 09:09	45			63.59	2.21		9.131E-05		
07/15/1993 09:48	46			63.59	2.21		9.334E-05		

07/15/1993 09:49	47			63.61	2.23		9.537E-05		
07/15/1993 09:50	48			63.62	2.24		9.74E-05		
07/15/1993 09:51	49			63.63	2.25		9.943E-05		
07/15/1993 09:52	50			63.64	2.26		0.0001015		
07/15/1993 09:53	51			63.64	2.26		0.0001035		
07/15/1993 09:54	52			63.64	2.26		0.0001055		
07/15/1993 09:55	53			63.65	2.27		0.0001075		
07/15/1993 09:56	54			63.65	2.27		0.0001096		
07/15/1993 09:57	55			63.65	2.27		0.0001116		
07/15/1993 09:58	56			63.66	2.28		0.0001136		
07/15/1993 09:59	57			63.67	2.29		0.0001157		
07/15/1993 10:00	58			63.67	2.29		0.0001177		
07/15/1993 10:03	61			63.70	2.32		0.0001238		
07/15/1993 10:05	63			63.71	2.33		0.0001278		
07/15/1993 10:07	65			63.71	2.33		0.0001319		
07/15/1993 10:10	68			63.73	2.35		0.000138		
07/15/1993 10:15	73			63.73	2.35		0.0001481		
07/15/1993 10:20	78			63.78	2.40		0.0001583		
07/15/1993 10:25	83			63.80	2.42		0.0001684		
07/15/1993 10:30	88			63.80	2.42		0.0001786		
07/15/1993 10:35	93			63.82	2.44		0.0001887		
07/15/1993 10:40	98			63.82	2.44		0.0001989		
07/15/1993 10:45	103			63.84	2.46		0.000209		
07/15/1993 10:50	108			63.86	2.48		0.0002192		
07/15/1993 10:55	113			63.89	2.51		0.0002293		
07/15/1993 11:00	118			63.90	2.52		0.0002394		
07/15/1993 11:31	149			63.95	2.57		0.0003024		
07/15/1993 12:15	193			64.00	2.62		0.0003916		
07/15/1993 13:07	245			64.03	2.65		0.0004972		
07/15/1993 14:06	304			64.06	2.68		0.0006169		
07/15/1993 15:04	362			64.08	2.70		0.0007346		
07/15/1993 16:04	422			64.10	2.72		0.0008563		
07/15/1993 19:34	632			64.12	2.74		0.0012825		
07/15/1993 21:05	723			64.00	2.62		0.0014671		
07/16/1993 07:53	1371			64.24	2.86		0.002782		
07/16/1993 08:20	1398			64.24	2.86		0.0028368		
07/16/1993 08:30	1408			64.24	2.86		0.0028571		
07/16/1993 08:40	1418			64.24	2.86		0.0028774		
07/16/1993 08:50	1428			64.23	2.85		0.0028977		
07/16/1993 09:00	1438	0	0.00	64.25	2.87	0.00			
07/16/1993 09:01	1439	1	1.00	63.69	2.31	0.55		2.03E-06	
07/16/1993 09:02	1440	2	2.00	63.47	2.09	0.77		4.06E-06	
07/16/1993 09:03	1441	3	2.99	63.31	1.93	0.93		6.09E-06	
07/16/1993 09:04	1442	4	3.99	63.21	1.83	1.03		8.12E-06	
07/16/1993 09:05	1443	5	4.98	63.10	1.72	1.14		1.01E-05	
07/16/1993 09:06	1444	6	5.98	63.02	1.64	1.22		1.22E-05	
07/16/1993 09:07	1445	7	6.97	62.95	1.57	1.29		1.42E-05	

07/16/1993 09:08	1446	8	7.96	62.91	1.53	1.33		1.62E-05	
07/16/1993 09:09	1447	9	8.94	62.83	1.45	1.41		1.83E-05	
07/16/1993 09:10	1448	10	9.93	62.78	1.40	1.46		2.03E-05	
07/16/1993 09:11	1449	11	10.92	62.74	1.36	1.50		2.23E-05	
07/16/1993 09:12	1450	12	11.90	62.69	1.31	1.55		2.44E-05	
07/16/1993 09:13	1451	13	12.88	62.66	1.28	1.58		2.64E-05	
07/16/1993 09:14	1452	14	13.87	62.61	1.23	1.63		2.84E-05	
07/16/1993 09:15	1453	15	14.85	62.58	1.20	1.66		3.04E-05	
07/16/1993 09:16	1454	16	15.82	62.55	1.17	1.69		3.25E-05	
07/16/1993 09:17	1455	17	16.80	62.52	1.14	1.72		3.45E-05	
07/16/1993 09:18	1456	18	17.78	62.50	1.12	1.74		3.65E-05	
07/16/1993 09:19	1457	19	18.75	62.46	1.08	1.78		3.86E-05	
07/16/1993 09:20	1458	20	19.73	62.44	1.06	1.80		4.06E-05	
07/16/1993 09:21	1459	21	20.70	62.42	1.04	1.82		4.26E-05	
07/16/1993 09:22	1460	22	21.67	62.39	1.01	1.85		4.46E-05	
07/16/1993 09:23	1461	23	22.64	62.38	1.00	1.86		4.67E-05	
07/16/1993 09:24	1462	24	23.61	62.36	0.98	1.88		4.87E-05	
07/16/1993 09:25	1463	25	24.57	62.34	0.96	1.90		5.07E-05	
07/16/1993 09:26	1464	26	25.54	62.32	0.94	1.92		5.28E-05	
07/16/1993 09:27	1465	27	26.50	62.30	0.92	1.94		5.48E-05	
07/16/1993 09:28	1466	28	27.47	62.28	0.90	1.96		5.68E-05	
07/16/1993 09:29	1467	29	28.43	62.26	0.88	1.98		5.88E-05	
07/16/1993 09:30	1468	30	29.39	62.26	0.88	1.98		6.09E-05	
07/16/1993 09:31	1469	31	30.35	62.24	0.86	2.00		6.29E-05	
07/16/1993 09:32	1470	32	31.30	62.22	0.84	2.02		6.49E-05	
07/16/1993 09:33	1471	33	32.26	62.21	0.83	2.03		6.7E-05	
07/16/1993 09:34	1472	34	33.21	62.20	0.82	2.04		6.9E-05	
07/16/1993 09:35	1473	35	34.17	62.18	0.80	2.06		7.1E-05	
07/16/1993 09:36	1474	36	35.12	62.17	0.79	2.07		7.31E-05	
07/16/1993 09:37	1475	37	36.07	62.16	0.78	2.08		7.51E-05	
07/16/1993 09:38	1476	38	37.02	62.14	0.76	2.10		7.71E-05	
07/16/1993 09:39	1477	39	37.97	62.14	0.76	2.10		7.91E-05	
07/16/1993 09:40	1478	40	38.92	62.13	0.75	2.11		8.12E-05	
07/16/1993 09:41	1479	41	39.86	62.12	0.74	2.12		8.32E-05	
07/16/1993 09:42	1480	42	40.81	62.11	0.73	2.13		8.52E-05	
07/16/1993 09:43	1481	43	41.75	62.00	0.62	2.24		8.73E-05	
07/16/1993 09:44	1482	44	42.69	62.00	0.62	2.24		8.93E-05	
07/16/1993 09:45	1483	45	43.63	62.08	0.70	2.16		9.13E-05	
07/16/1993 09:46	1484	46	44.57	62.08	0.70	2.16		9.33E-05	
07/16/1993 09:47	1485	47	45.51	62.07	0.69	2.17		9.54E-05	
07/16/1993 09:48	1486	48	46.45	62.06	0.68	2.18		9.74E-05	
07/16/1993 09:49	1487	49	47.39	62.05	0.67	2.19		9.94E-05	
07/16/1993 09:50	1488	50	48.32	62.04	0.66	2.20		0.000101	
07/16/1993 09:51	1489	51	49.25	62.03	0.65	2.21		0.000103	
07/16/1993 09:52	1490	52	50.19	62.02	0.64	2.22		0.000106	
07/16/1993 09:53	1491	53	51.12	62.01	0.63	2.23		0.000108	
07/16/1993 09:54	1492	54	52.05	62.00	0.62	2.24		0.00011	

07/16/1993 09:55	1493	55	52.97	62.00	0.62	2.24		0.000112	
07/16/1993 09:56	1494	56	53.90	61.99	0.61	2.25		0.000114	
07/16/1993 09:57	1495	57	54.83	61.98	0.60	2.26		0.000116	
07/16/1993 09:58	1496	58	55.75	61.97	0.59	2.27		0.000118	
07/16/1993 09:59	1497	59	56.67	61.97	0.59	2.27		0.00012	
07/16/1993 10:00	1498	60	57.60	61.96	0.58	2.28		0.000122	
07/16/1993 10:05	1503	65	62.19	61.94	0.56	2.30		0.000132	
07/16/1993 10:10	1508	70	66.75	61.91	0.53	2.33		0.000142	
07/16/1993 10:15	1513	75	71.28	61.89	0.51	2.35		0.000152	
07/16/1993 10:20	1518	80	75.78	61.87	0.49	2.37		0.000162	
07/16/1993 10:25	1523	85	80.26	61.85	0.47	2.39		0.000172	
07/16/1993 10:30	1528	90	84.70	61.94	0.56	2.30		0.000183	
07/16/1993 10:35	1533	95	89.11	61.83	0.45	2.41		0.000193	
07/16/1993 10:40	1538	100	93.50	61.81	0.43	2.43		0.000203	
07/16/1993 10:45	1543	105	97.85	61.79	0.41	2.45		0.000213	
07/16/1993 10:50	1548	110	102.18	61.78	0.40	2.46		0.000223	
07/16/1993 10:55	1553	115	106.48	61.77	0.39	2.47		0.000233	
07/16/1993 11:00	1558	120	110.76	61.76	0.38	2.48		0.000244	
07/16/1993 11:49	1607	169	151.23	61.66	0.28	2.58		0.000343	
07/16/1993 13:07	1685	247	210.79	61.55	0.17	2.69		0.000501	
07/16/1993 14:07	1745	307	252.99	61.54	0.16	2.70		0.000623	

datetime	etp	etr	agarwal	wl	dd	rec	t/r^2_p	t/r^2_r	r
07/15/1993 09:01				62.66					5
07/15/1993 09:02	0			62.66	0.00		0		**1.524**
07/15/1993 09:03	1			68.78	6.12		0.04		
07/15/1993 09:04	2			68.00	5.34		0.08		
07/15/1993 09:05	3			69.23	6.57		0.12		
07/15/1993 09:06	4			69.34	6.68		0.16		
07/15/1993 09:07	5			69.38	6.72		0.2		
07/15/1993 09:08	6			69.00	6.34		0.24		
07/15/1993 09:09	7			69.45	6.79		0.28		
07/15/1993 09:10	8			69.55	6.89		0.32		
07/15/1993 09:11	9			69.56	6.90		0.36		
07/15/1993 09:12	10			69.57	6.91		0.4		
07/15/1993 09:13	11			69.62	6.96		0.44		
07/15/1993 09:14	12			69.65	6.99		0.48		
07/15/1993 09:15	13			69.71	7.05		0.52		
07/15/1993 09:16	14			69.71	7.05		0.56		
07/15/1993 09:17	15			69.74	7.08		0.6		
07/15/1993 09:18	16			69.75	7.09		0.64		
07/15/1993 09:19	17			69.77	7.11		0.68		
07/15/1993 09:20	18			69.79	7.13		0.72		
07/15/1993 09:21	19			69.82	7.16		0.76		
07/15/1993 09:22	20			69.84	7.18		0.8		
07/15/1993 09:23	21			69.87	7.21		0.84		
07/15/1993 09:24	22			69.89	7.23		0.88		
07/15/1993 09:25	23			69.94	7.28		0.92		
07/15/1993 09:26	24			69.96	7.30		0.96		
07/15/1993 09:27	25			69.97	7.31		1		
07/15/1993 09:28	26			69.97	7.31		1.04		
07/15/1993 09:29	27			69.98	7.32		1.08		
07/15/1993 09:30	28			69.98	7.32		1.12		
07/15/1993 09:31	29			69.98	7.32		1.16		
07/15/1993 09:32	30			69.98	7.32		1.2		
07/15/1993 09:34	32			70.00	7.34		1.28		
07/15/1993 09:36	34			70.01	7.35		1.36		
07/15/1993 09:38	36			70.02	7.36		1.44		
07/15/1993 09:40	38			70.03	7.37		1.52		
07/15/1993 09:42	40			70.06	7.40		1.6		
07/15/1993 09:44	42			70.08	7.42		1.68		
07/15/1993 09:46	44			70.10	7.44		1.76		
07/15/1993 09:48	46			70.12	7.46		1.84		
07/15/1993 09:50	48			70.12	7.46		1.92		
07/15/1993 09:52	50			70.13	7.47		2		
07/15/1993 09:54	52			70.13	7.47		2.08		
07/15/1993 09:56	54			70.14	7.48		2.16		
07/15/1993 09:58	56			56.00	-6.66		2.24		
07/15/1993 10:00	58			70.14	7.48		2.32		

07/15/1993 10:02	60			70.17	7.51		2.4		
07/15/1993 10:07	65			70.18	7.52		2.6		
07/15/1993 10:15	73			70.23	7.57		2.92		
07/15/1993 10:17	75			70.23	7.57		3		
07/15/1993 10:22	80			70.24	7.58		3.2		
07/15/1993 10:27	85			70.25	7.59		3.4		
07/15/1993 10:32	90			70.25	7.59		3.6		
07/15/1993 10:42	100			70.29	7.63		4		
07/15/1993 10:52	110			70.51	7.85		4.4		
07/15/1993 11:16	134			70.51	7.85		5.36		
07/15/1993 11:26	144			70.52	7.86		5.76		
07/15/1993 12:18	196			70.57	7.91		7.84		
07/15/1993 12:55	233			70.65	7.99		9.32		
07/15/1993 14:01	299			70.67	8.01		11.96		
07/15/1993 15:00	358			70.67	8.01		14.32		
07/15/1993 16:00	418			70.67	8.01		16.72		
07/15/1993 19:24	622			70.71	8.05		24.88		
07/15/1993 21:00	718			70.00	7.34		28.72		
07/16/1993 07:48	1366			70.72	8.06		54.64		
07/16/1993 08:28	1406			70.72	8.06		56.24		
07/16/1993 09:00	1438								
07/16/1993 09:01	1439	1	1.00	64.94	2.28	5.78		0.04	
07/16/1993 09:02	1440	2	2.00	64.74	2.08	5.98		0.08	
07/16/1993 09:03	1441	3	2.99	64.61	1.95	6.11		0.12	
07/16/1993 09:04	1442	4	3.99	64.47	1.81	6.25		0.16	
07/16/1993 09:05	1443	5	4.98	64.38	1.72	6.34		0.2	
07/16/1993 09:06	1444	6	5.98	64.29	1.63	6.43		0.24	
07/16/1993 09:07	1445	7	6.97	64.23	1.57	6.49		0.28	
07/16/1993 09:08	1446	8	7.96	64.18	1.52	6.54		0.32	
07/16/1993 09:09	1447	9	8.94	64.13	1.47	6.59		0.36	
07/16/1993 09:10	1448	10	9.93	64.08	1.42	6.64		0.4	
07/16/1993 09:11	1449	11	10.92	64.01	1.35	6.71		0.44	
07/16/1993 09:12	1450	12	11.90	63.96	1.30	6.76		0.48	
07/16/1993 09:13	1451	13	12.88	63.91	1.25	6.81		0.52	
07/16/1993 09:15	1453	15	14.85	63.85	1.19	6.87		0.6	
07/16/1993 09:16	1454	16	15.82	63.78	1.12	6.94		0.64	
07/16/1993 09:18	1456	18	17.78	63.76	1.10	6.96		0.72	
07/16/1993 09:19	1457	19	18.75	63.75	1.09	6.97		0.76	
07/16/1993 09:20	1458	20	19.73	63.70	1.04	7.02		0.8	
07/16/1993 09:21	1459	21	20.70	63.68	1.02	7.04		0.84	
07/16/1993 09:22	1460	22	21.67	63.67	1.01	7.05		0.88	
07/16/1993 09:23	1461	23	22.64	63.65	0.99	7.07		0.92	
07/16/1993 09:24	1462	24	23.61	63.64	0.98	7.08		0.96	
07/16/1993 09:25	1463	25	24.57	63.63	0.97	7.09		1	
07/16/1993 09:26	1464	26	25.54	63.60	0.94	7.12		1.04	
07/16/1993 09:27	1465	27	26.50	63.59	0.93	7.13		1.08	
07/16/1993 09:28	1466	28	27.47	63.57	0.91	7.15		1.12	

07/16/1993 09:29	1467	29	28.43	63.57	0.91	7.15		1.16	
07/16/1993 09:30	1468	30	29.39	63.56	0.90	7.16		1.2	
07/16/1993 09:32	1470	32	31.30	63.54	0.88	7.18		1.28	
07/16/1993 09:34	1472	34	33.21	63.52	0.86	7.20		1.36	
07/16/1993 09:36	1474	36	35.12	63.50	0.84	7.22		1.44	
07/16/1993 09:38	1476	38	37.02	63.47	0.81	7.25		1.52	
07/16/1993 09:40	1478	40	38.92	63.44	0.78	7.28		1.6	
07/16/1993 09:42	1480	42	40.81	63.41	0.75	7.31		1.68	
07/16/1993 09:44	1482	44	42.69	63.38	0.72	7.34		1.76	
07/16/1993 09:46	1484	46	44.57	63.00	0.34	7.72		1.84	
07/16/1993 09:48	1486	48	46.45	63.34	0.68	7.38		1.92	
07/16/1993 09:50	1488	50	48.32	63.32	0.66	7.40		2	
07/16/1993 09:52	1490	52	50.19	63.30	0.64	7.42		2.08	
07/16/1993 09:54	1492	54	52.05	63.26	0.60	7.46		2.16	
07/16/1993 09:56	1494	56	53.90	63.25	0.59	7.47		2.24	
07/16/1993 09:58	1496	58	55.75	63.25	0.59	7.47		2.32	
07/16/1993 10:00	1498	60	57.60	63.24	0.58	7.48		2.4	
07/16/1993 10:05	1503	65	62.19	63.20	0.54	7.52		2.6	
07/16/1993 10:14	1512	74	70.38	63.17	0.51	7.55		2.96	
07/16/1993 10:20	1518	80	75.78	63.15	0.49	7.57		3.2	
07/16/1993 10:25	1523	85	80.26	63.13	0.47	7.59		3.4	
07/16/1993 10:30	1528	90	84.70	63.13	0.47	7.59		3.6	
07/16/1993 10:35	1533	95	89.11	63.12	0.46	7.60		3.8	
07/16/1993 10:46	1544	106	98.72	63.08	0.42	7.64		4.24	
07/16/1993 11:00	1558	120	110.76	63.03	0.37	7.69		4.8	
07/16/1993 11:15	1573	135	123.41	63.00	0.34	7.72		5.4	
07/16/1993 11:44	1602	164	147.21	62.96	0.30	7.76		6.56	
07/16/1993 13:00	1678	240	205.67	62.83	0.17	7.89		9.6	
07/16/1993 14:00	1738	300	248.22	62.80	0.14	7.92		12	
07/16/1993 14:46	1784	346	278.89	62.79	0.13	7.93		13.84	

datetime	etp	etr	agarwal	wl	dd	rec	t/r^2_p	t/r^2_r	r
07/15/1993 09:01	0			62.18					547
07/15/1993 09:02	0			62.71	0.53				**166.73**
07/15/1993 09:03	1			63.04	0.86		3.34E-06		
07/15/1993 09:04	2			63.23	1.05		6.68E-06		
07/15/1993 09:05	3			63.38	1.20		1E-05		
07/15/1993 09:06	4			63.45	1.27		1.34E-05		
07/15/1993 09:07	5			63.53	1.35		1.67E-05		
07/15/1993 09:08	6			63.64	1.46		2.01E-05		
07/15/1993 09:09	7			63.70	1.52		2.34E-05		
07/15/1993 09:10	8			63.83	1.65		2.67E-05		
07/15/1993 09:11	9			63.83	1.65		3.01E-05		
07/15/1993 09:12	10			63.90	1.72		3.34E-05		
07/15/1993 09:13	11			63.93	1.75		3.68E-05		
07/15/1993 09:14	12			63.98	1.80		4.01E-05		
07/15/1993 09:15	13			64.00	1.82		4.34E-05		
07/15/1993 09:16	14			64.04	1.86		4.68E-05		
07/15/1993 09:17	15			64.07	1.89		5.01E-05		
07/15/1993 09:18	16			64.11	1.93		5.35E-05		
07/15/1993 09:19	17			64.12	1.94		5.68E-05		
07/15/1993 09:20	18			64.14	1.96		6.02E-05		
07/15/1993 09:21	19			64.16	1.98		6.35E-05		
07/15/1993 09:22	20			64.20	2.02		6.68E-05		
07/15/1993 09:23	21			64.21	2.03		7.02E-05		
07/15/1993 09:24	22			64.24	2.06		7.35E-05		
07/15/1993 09:25	23			64.26	2.08		7.69E-05		
07/15/1993 09:27	25			64.30	2.12		8.36E-05		
07/15/1993 09:28	26			64.00	1.82		8.69E-05		
07/15/1993 09:29	27			64.33	2.15		9.02E-05		
07/15/1993 09:30	28			64.34	2.16		9.36E-05		
07/15/1993 09:31	29			64.35	2.17		9.69E-05		
07/15/1993 09:32	30			64.36	2.18		0.0001		
07/15/1993 09:34	32			64.39	2.21		0.000107		
07/15/1993 09:35	33			64.41	2.23		0.00011		
07/15/1993 09:36	34			64.42	2.24		0.000114		
07/15/1993 09:37	35			64.43	2.25		0.000117		
07/15/1993 09:38	36			64.45	2.27		0.00012		
07/15/1993 09:39	37			64.46	2.28		0.000124		
07/15/1993 09:40	38			64.46	2.28		0.000127		
07/15/1993 09:41	39			64.47	2.29		0.00013		
07/15/1993 09:43	41			64.49	2.31		0.000137		
07/15/1993 09:44	42			64.50	2.32		0.00014		
07/15/1993 09:45	43			64.51	2.33		0.000144		
07/15/1993 09:46	44			64.52	2.34		0.000147		
07/15/1993 09:47	45			64.53	2.35		0.00015		
07/15/1993 09:51	49			64.54	2.36		0.000164		
07/15/1993 09:52	50			64.54	2.36		0.000167		

07/15/1993 09:54	52			64.55	2.37		0.000174		
07/15/1993 09:56	54			64.58	2.40		0.00018		
07/15/1993 09:59	57			64.66	2.48		0.000191		
07/15/1993 10:00	58			64.60	2.42		0.000194		
07/15/1993 10:02	60			64.61	2.43		0.000201		
07/15/1993 10:04	62			64.62	2.44		0.000207		
07/15/1993 10:06	64			64.61	2.43		0.000214		
07/15/1993 10:08	66			64.65	2.47		0.000221		
07/15/1993 10:10	68			64.65	2.47		0.000227		
07/15/1993 10:15	73			64.67	2.49		0.000244		
07/15/1993 10:20	78			64.68	2.50		0.000261		
07/15/1993 10:25	83			64.70	2.52		0.000277		
07/15/1993 10:30	88			64.72	2.54		0.000294		
07/15/1993 10:43	101			64.75	2.57		0.000338		
07/15/1993 10:56	114			64.84	2.66		0.000381		
07/15/1993 11:07	125			64.85	2.67		0.000418		
07/15/1993 11:30	148			64.90	2.72		0.000495		
07/15/1993 12:16	194			64.94	2.76		0.000648		
07/15/1993 13:04	242			65.00	2.82		0.000809		
07/15/1993 14:04	302			65.01	2.83		0.001009		
07/15/1993 15:03	361			65.02	2.84		0.001207		
07/15/1993 16:00	418			65.03	2.85		0.001397		
07/15/1993 19:30	628			65.05	2.87		0.002099		
07/15/1993 21:08	726			65.06	2.88		0.002426		
07/16/1993 07:50	1368			65.16	2.98		0.004572		
07/16/1993 08:20	1398			65.16	2.98		0.004672		
07/16/1993 08:25	1403			65.16	2.98		0.004689		
07/16/1993 08:30	1408			65.16	2.98		0.004706		
07/16/1993 08:35	1413			65.16	2.98		0.004722		
07/16/1993 08:40	1418			65.16	2.98		0.004739		
07/16/1993 08:45	1423			65.16	2.98		0.004756		
07/16/1993 08:50	1428			65.16	2.98		0.004773		
07/16/1993 08:55	1433			65.16	2.98		0.004789		
07/16/1993 09:00	1438			65.16	2.98		0.004806		
07/16/1993 09:01	1439	1	1.00	65.16	2.98				
07/16/1993 09:02	1440	2	2.00	64.46	2.28	0.70		6.7E-06	
07/16/1993 09:03	1441	3	2.99	64.22	2.04	0.94		1E-05	
07/16/1993 09:04	1442	4	3.99	64.22	2.04	0.94		1.3E-05	
07/16/1993 09:05	1443	5	4.98	63.99	1.81	1.17		1.7E-05	
07/16/1993 09:06	1444	6	5.98	63.90	1.72	1.26		2E-05	
07/16/1993 09:07	1445	7	6.97	63.81	1.63	1.35		2.3E-05	
07/16/1993 09:08	1446	8	7.96	63.74	1.56	1.42		2.7E-05	
07/16/1993 09:09	1447	9	8.94	63.68	1.50	1.48		3E-05	
07/16/1993 09:10	1448	10	9.93	63.63	1.45	1.53		3.3E-05	
07/16/1993 09:11	1449	11	10.92	63.58	1.40	1.58		3.7E-05	
07/16/1993 09:12	1450	12	11.90	63.53	1.35	1.63		4E-05	
07/16/1993 09:13	1451	13	12.88	63.49	1.31	1.67		4.3E-05	

07/16/1993 09:14	1452	14	13.87	63.46	1.28	1.70		4.7E-05	
07/16/1993 09:15	1453	15	14.85	63.41	1.23	1.75		5E-05	
07/16/1993 09:16	1454	16	15.82	63.40	1.22	1.76		5.3E-05	
07/16/1993 09:17	1455	17	16.80	63.35	1.17	1.81		5.7E-05	
07/16/1993 09:18	1456	18	17.78	63.33	1.15	1.83		6E-05	
07/16/1993 09:19	1457	19	18.75	63.30	1.12	1.86		6.4E-05	
07/16/1993 09:20	1458	20	19.73	63.28	1.10	1.88		6.7E-05	
07/16/1993 09:21	1459	21	20.70	63.25	1.07	1.91		7E-05	
07/16/1993 09:22	1460	22	21.67	63.22	1.04	1.94		7.4E-05	
07/16/1993 09:23	1461	23	22.64	63.20	1.02	1.96		7.7E-05	
07/16/1993 09:24	1462	24	23.61	63.18	1.00	1.98		8E-05	
07/16/1993 09:25	1463	25	24.57	63.17	0.99	1.99		8.4E-05	
07/16/1993 09:26	1464	26	25.54	63.15	0.97	2.01		8.7E-05	
07/16/1993 09:27	1465	27	26.50	63.13	0.95	2.03		9E-05	
07/16/1993 09:28	1466	28	27.47	63.10	0.92	2.06		9.4E-05	
07/16/1993 09:29	1467	29	28.43	63.09	0.91	2.07		9.7E-05	
07/16/1993 09:30	1468	30	29.39	63.07	0.89	2.09		0.0001	
07/16/1993 09:31	1469	31	30.35	63.05	0.87	2.11		0.0001	
07/16/1993 09:32	1470	32	31.30	63.05	0.87	2.11		0.00011	
07/16/1993 09:33	1471	33	32.26	63.03	0.85	2.13		0.00011	
07/16/1993 09:34	1472	34	33.21	63.01	0.83	2.15		0.00011	
07/16/1993 09:35	1473	35	34.17	63.00	0.82	2.16		0.00012	
07/16/1993 09:36	1474	36	35.12	62.99	0.81	2.17		0.00012	
07/16/1993 09:37	1475	37	36.07	62.97	0.79	2.19		0.00012	
07/16/1993 09:38	1476	38	37.02	62.96	0.78	2.20		0.00013	
07/16/1993 09:39	1477	39	37.97	62.95	0.77	2.21		0.00013	
07/16/1993 09:40	1478	40	38.92	62.94	0.76	2.22		0.00013	
07/16/1993 09:41	1479	41	39.86	62.93	0.75	2.23		0.00014	
07/16/1993 09:42	1480	42	40.81	62.91	0.73	2.25		0.00014	
07/16/1993 09:43	1481	43	41.75	62.90	0.72	2.26		0.00014	
07/16/1993 09:44	1482	44	42.69	62.90	0.72	2.26		0.00015	
07/16/1993 09:45	1483	45	43.63	62.89	0.71	2.27		0.00015	
07/16/1993 09:46	1484	46	44.57	62.88	0.70	2.28		0.00015	
07/16/1993 09:47	1485	47	45.51	62.88	0.70	2.28		0.00016	
07/16/1993 09:48	1486	48	46.45	62.87	0.69	2.29		0.00016	
07/16/1993 09:49	1487	49	47.39	62.86	0.68	2.30		0.00016	
07/16/1993 09:50	1488	50	48.32	62.85	0.67	2.31		0.00017	
07/16/1993 09:51	1489	51	49.25	62.84	0.66	2.32		0.00017	
07/16/1993 09:52	1490	52	50.19	62.82	0.64	2.34		0.00017	
07/16/1993 09:53	1491	53	51.12	62.82	0.64	2.34		0.00018	
07/16/1993 09:54	1492	54	52.05	62.82	0.64	2.34		0.00018	
07/16/1993 09:55	1493	55	52.97	62.81	0.63	2.35		0.00018	
07/16/1993 09:56	1494	56	53.90	62.80	0.62	2.36		0.00019	
07/16/1993 09:57	1495	57	54.83	62.80	0.62	2.36		0.00019	
07/16/1993 09:58	1496	58	55.75	62.79	0.61	2.37		0.00019	
07/16/1993 09:59	1497	59	56.67	62.78	0.60	2.38		0.0002	
07/16/1993 10:00	1498	60	57.60	62.78	0.60	2.38		0.0002	

07/16/1993 10:05	1503	65	62.19	62.75	0.57	2.41		0.00022	
07/16/1993 10:10	1508	70	66.75	62.72	0.54	2.44		0.00023	
07/16/1993 10:15	1513	75	71.28	62.71	0.53	2.45		0.00025	
07/16/1993 10:20	1518	80	75.78	62.68	0.50	2.48		0.00027	
07/16/1993 10:25	1523	85	80.26	62.67	0.49	2.49		0.00028	
07/16/1993 10:30	1528	90	84.70	62.65	0.47	2.51		0.0003	
07/16/1993 10:35	1533	95	89.11	62.63	0.45	2.53		0.00032	
07/16/1993 10:40	1538	100	93.50	62.61	0.43	2.55		0.00033	
07/16/1993 10:45	1543	105	97.85	62.60	0.42	2.56		0.00035	
07/16/1993 10:50	1548	110	102.18	62.58	0.40	2.58		0.00037	
07/16/1993 10:55	1553	115	106.48	62.57	0.39	2.59		0.00038	
07/16/1993 11:00	1558	120	110.76	62.56	0.38	2.60		0.0004	
07/16/1993 11:46	1604	166	148.82	62.50	0.32	2.66		0.00055	
07/16/1993 13:04	1682	244	208.60	62.37	0.19	2.79		0.00082	
07/16/1993 14:04	1742	304	250.95	62.34	0.16	2.82		0.00102	
07/16/1993 14:58	1796	358	286.64	62.33	0.15	2.83		0.0012	

fridley8testwells.xlsxMW-1(509089)

datetime	etp	etr	wl	dd	rec
07/15/1993 09:02	0		45.45		
07/15/1993 09:03	1		45.46		
07/15/1993 09:04	2		45.46		
07/15/1993 09:09	7		45.46		
07/15/1993 09:06	4		45.46		
07/15/1993 09:07	5		45.46		
07/15/1993 09:08	6		45.46		
07/15/1993 09:09	7		45.46		
07/15/1993 09:10	8		45.46		
07/15/1993 09:11	9		45.47		
07/15/1993 09:12	10		45.47	0.01	
07/15/1993 09:13	11		45.47	0.01	
07/15/1993 09:14	12		45.47	0.01	
07/15/1993 09:15	13		45.47	0.01	
07/15/1993 09:16	14		45.47	0.01	
07/15/1993 09:17	15		45.47	0.01	
07/15/1993 09:18	16		45.47	0.01	
07/15/1993 09:19	17		45.47	0.01	
07/15/1993 09:20	18		45.47	0.01	
07/15/1993 09:21	19		45.47	0.01	
07/15/1993 09:22	20		45.48	0.02	
07/15/1993 09:23	21		45.48	0.02	
07/15/1993 09:24	22		45.48	0.02	
07/15/1993 09:25	23		45.48	0.02	
07/15/1993 09:26	24		45.49	0.03	
07/15/1993 09:27	25		45.49	0.03	
07/15/1993 09:28	26		45.49	0.03	
07/15/1993 09:29	27		45.49	0.03	
07/15/1993 09:30	28		45.49	0.03	
07/15/1993 09:32	30		45.50	0.04	
07/15/1993 09:34	32		45.50	0.04	
07/15/1993 09:36	34		45.50	0.04	
07/15/1993 09:38	36		45.51	0.05	
07/15/1993 09:40	38		45.51	0.05	
07/15/1993 09:42	40		45.51	0.05	
07/15/1993 09:44	42		45.52	0.06	
07/15/1993 09:46	44		45.52	0.06	
07/15/1993 09:48	46		45.52	0.06	
07/15/1993 09:50	48		45.52	0.06	
07/15/1993 09:52	50		45.53	0.07	
07/15/1993 09:54	52		45.53	0.07	
07/15/1993 09:56	54		45.54	0.08	
07/15/1993 09:58	56		45.54	0.08	
07/15/1993 10:00	58		45.54	0.08	
07/15/1993 10:02	60		45.55	0.09	
07/15/1993 10:04	62		45.55	0.09	

fridley8testwells.xlsxMW-1(509089)

07/15/1993 10:06	64		45.55	0.09	
07/15/1993 10:08	66		45.55	0.09	
07/15/1993 10:10	68		45.55	0.09	
07/15/1993 10:12	70		45.56	0.10	
07/15/1993 10:14	72		45.56	0.10	
07/15/1993 10:16	74		45.56	0.10	
07/15/1993 10:18	76		45.56	0.10	
07/15/1993 10:20	78		45.56	0.10	
07/15/1993 10:22	80		45.57	0.11	
07/15/1993 10:24	82		45.57	0.11	
07/15/1993 10:26	84		45.57	0.11	
07/15/1993 10:28	86		45.57	0.11	
07/15/1993 10:30	88		45.57	0.11	
07/15/1993 10:32	90		45.57	0.11	
07/15/1993 10:34	92		45.58	0.12	
07/15/1993 10:36	94		45.58	0.12	
07/15/1993 10:38	96		45.58	0.12	
07/15/1993 10:40	98		45.58	0.12	
07/15/1993 10:45	103		45.58	0.12	
07/15/1993 10:50	108		45.59	0.13	
07/15/1993 10:55	113		45.60	0.14	
07/15/1993 11:00	118		45.60	0.14	
07/15/1993 11:05	123		45.60	0.14	
07/15/1993 11:10	128		45.61	0.15	
07/15/1993 11:15	133		45.61	0.15	
07/15/1993 11:20	138		45.61	0.15	
07/15/1993 11:25	143		45.62	0.16	
07/15/1993 11:30	148		45.62	0.16	
07/15/1993 12:10	188		45.66	0.20	
07/15/1993 13:14	252		45.69	0.23	
07/15/1993 13:40	278		45.70	0.24	
07/15/1993 14:15	313		45.70	0.24	
07/15/1993 15:18	376		45.71	0.25	
07/15/1993 16:11	429		45.71	0.25	
07/15/1993 19:40	638		45.77	0.31	
07/15/1993 21:02	720		45.79	0.33	
07/16/1993 07:59	1377		46.04	0.58	
07/16/1993 08:49	1427		46.04	0.58	
07/16/1993 09:00	1438				
07/16/1993 10:22	1520	82	45.95	0.49	0.09
07/16/1993 10:50	1548	110	45.93	0.47	0.11
07/16/1993 11:18	1576	138	45.89	0.43	0.15
07/16/1993 12:02	1620	182	45.84	0.38	0.20
07/16/1993 16:01	1859	421	45.76	0.30	0.28
07/16/1993 14:12	1750	312	45.75	0.29	0.29

Unique Well Number **206673**

County Anoka
Quad Minneapolis North
Quad Id 120D

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

Entry Date 1991/04/15
Update Date 2016/05/13
Received Date

Well Name FRIDLEY 6

Township	Range	Dir	Section	Subsection	Field Located Elevation	MDH
30	24	W	14	DCABBB	877.00	ft.

well address FRIDLEY 6
600 63RD AV NE
FRIDLEY MN 55432 Changed

contact address CITY OF FRIDLEY
FRIDLEY MN 55432

Description	Color	Hardness	From	To (ft.)
MEDIUM SAND			0	13
SILT & CLAY			13	65
SAND & GRAVEL			65	115
ST. PETER SANDSTONE			115	125
ST. PETER SANDSTONE			125	130
SHAKOPEE LIMESTONE			130	233
SHAKOPEE LIMESTONE			233	248
JORDAN SANDSTONE			248	255

Remarks
GAMMA LOGGED 5-9-2016 BY JIM TRAEN. JIM TRAEN HAS 24 IN. CASING ENDING AT 144.3 FT.

First Bedrock OPDC
Last Strat CJDN
Aquifer Prairie Du Chien-Jordan
Depth to Bedrock 125.00 ft.

Well Depth 255.00 ft | **Depth Completed** 255.00 ft | **Date Well Completed** 1972/08/00

Drillhole Angle

Drilling Method Cable Tool

Drilling Fluid

Well Hydrofractured? ☐ YES ☐ NO From ft. to

Use community supply(municipal)

Casing Type Steel (black or low Drive Shoe? ☐ YES ☐ NO
Diameter 24 Depth 153
24.00 in. from 0.00 to 153.00 ft. lbs/ft

Hole Diameter (in.)

Screen No
Make Type
Diamter Slot Length Set

Open Hole(ft.) From 153.0 to 255.0

Static Water Level
56.50 ft. land surface Date measured 1972/08/00

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

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

Grouting Information Well grouted? ☒ YES ☐ NO ☐ NOT SPECIFIED
Material neat cement From 0.0 To ft. 7.00 Cubic yards

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

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

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

Variance
Was a variance granted from the MDH for this well? ☐ YES ☐ NO

Well Contractor Cerfication
Layne Well Co. 27010
License Business Name Lic. or Reg No.

Name of Driller Date

Unique Well Number **206678**

County Anoka
Quad Minneapolis North
Quad Id 120D

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

Entry Date 1991/04/15
Update Date 2016/11/15
Received Date

Well Name FRIDLEY 7

Township	Range	Dir	Section	Subsection	Field Located Elevation	MDH
30	24	W	14	DCADBC		885.00 ft.

well and contact address FRIDLEY 7
680 63RD AV NE
FRIDLEY MN Changed

Well Depth	Depth Completed	Date Well Completed
262.00 ft	262.00 ft	1970/01/14

Drillhole Angle

Drilling Method

Drilling Fluid

Well Hydrofractured? ☐ YES ☐ NO From ft. to

Use community supply(municipal)

Casing Type Drive Shoe? ☐ YES ☐ NO Hole Diameter (in.)
Diameter 12 Depth 138
16.00 in. from 0.00 to 67.00 ft. lbs/ft
12.00 in. from 0.00 to 138.00 ft. lbs/ft
24.00 in. from 0.00 to 27.70 ft. lbs/ft

Screen No
Make Type
Diamter Slot Length Set

Open Hole(ft.) From 138.0 to 262.0

Description	Color	Hardness	From	To (ft.)
FINE SAND			0	26
BLUE CLAY, LITTLE GRAVEL			26	60
GOOD WATER GRAVEL			60	73
MUDDY SAND			73	75
GRAVEL	LIGHT		75	110
ST. PETER	YELLOW		110	128
SHAKOPEE	RED		128	136
SHAKOPEE & ST. PETER	WHITE		136	150
SHAKOPEE	TAN		150	262

Static Water Level
65.00 ft. land surface Date measured 1970/01/14

Pumping Level (below land surface)
73.00 ft. after hrs. pumping 1600.00 g.p.m.

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

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

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

Pump
☐ Not Installed Date Installed
Manufacture's name JACUZZI
Model number SVB00 HP 75.00 Volts
Length of drop pipe 71.0 Material Capacity 1100 g.p.m
Type

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

Variance
Was a variance granted from the MDH for this well? ☐ YES ☐ NO

Well Contractor Cerfication
Renner E.H. & Sons 02015
License Business Name Lic. or Reg No.

Remarks
ORIGINAL NO. 206671 - COMPLETED IN DRIFT, DEEPENED 1970 BY KEYS INTO BEDROCK GAMMA LOGGED 10-20-2015 BY JIM TRAEN.

First Bedrock OSTP
Last Strat OPDC
Aquifer Prairie Du Chien Group
Depth to Bedrock 110.00 ft.

Name of Driller Date

Unique Well Number: **206669**

County: Anoka
Quad: Minneapolis North
Quad Id: 120D

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

Entry Date: 1991/04/15
Update Date: 2014/03/10
Received Date:

Well Name FRIDLEY 8

Township	Range	Dir	Section	Subsection	Field Located Elevation	MDH
30	24	W	14	DCDCDA	885.00	ft.

well and contact address FRIDLEY 8
613 61ST AV NE
FRIDLEY MN Changed

Description	Color	Hardness	From	To (ft.)
NO RECORD			0	64
GRAVEL & STONES	GRAY		64	122
SHALE	BLACK		122	126
ST. PETER, DUSTY	WHITE		126	130
ST. PETER, SHAKOPEE	YELLOW		130	186
SHAKOPEE	TAN		186	195
SHAKOPEE	TAN		195	265
JORDAN	YELLOW		265	265

Remarks
M.G.S. NO. 526 0 TO 64 FEET IS 16" CASE HOLE, DRILLED BY OTHERS.

First Bedrock OSTP
Last Strat CJDN
Aquifer Prairie Du Chien Group
Depth to Bedrock 126.00 ft.

Well Depth 265.00 ft
Depth Completed 265.00 ft
Date Well Completed 1969/12/17

Drillhole Angle

Drilling Method

Drilling Fluid

Well Hydrofractured? ☐ YES ☐ NO
From ft. to

Use community supply(municipal)

Casing Type
Drive Shoe? ☐ YES ☐ NO
Diameter 12
Depth 138
16.00 in. from 0.00 to 64.00 ft. lbs/ft
12.00 in. from 0.00 to 138.00 ft. lbs/ft

Hole Diameter (in.)

Screen No
Make
Type
Diamter Slot Length Set

Open Hole(ft.) From 138.0 to 265.0

Static Water Level
70.00 ft. land surface Date measured 1969/12/17

Pumping Level (below land surface)
74.00 ft. after hrs. pumping 1160.00 g.p.m.

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

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

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

Pump
☐ Not Installed Date Installed
Manufacture's name JACUZZI
Model number 12MC24 HP 75.00 Volts
Length of drop pipe 125.0 Material Capacity 1150 g.p.m
Type Turbine

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

Variance
Was a variance granted from the MDH for this well? ☐ YES ☐ NO

Well Contractor Cerfication
Renner E.H. & Sons 02015
License Business Name Lic. or Reg No.

Name of Driller Date

Unique Well Number: **206672**

County: Anoka
Quad: Minneapolis North
Quad Id: 120D

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

Entry Date: 1991/04/15
Update Date: 2014/03/10
Received Date:

Well Name FRIDLEY 9

Township	Range	Dir	Section	Subsection	Field Located Elevation	MDH
30	24	W	14	DCCAAB	882.00	ft.

well and contact address FRIDLEY 9
603 61ST AV NE
FRIDLEY MN Changed

Well Depth	Depth Completed	Date Well Completed
255.00 ft	255.00 ft	1965/12/22

Drillhole Angle

Drilling Method

Drilling Fluid

Well Hydrofractured? ☐ YES ☐ NO
From ft. to

Use community supply(municipal)

Casing Type — Drive Shoe? ☐ YES ☐ NO — Hole Diameter (in.)
Diameter 24 — Depth 153
30.00 in. from 0.00 to 67.00 ft. ____ lbs/ft
24.00 in. from 0.00 to 153.00 ft. ____ lbs/ft

Description	Color	Hardness	From	To (ft.)
SAND			0	15
SILT & CLAY			15	67
SAND & GRAVEL			67	117
ST. PETER SANDSTONE			117	132
DOLOMITE			132	250
JORDAN SANDROCK		SOFT	250	255

Screen No — **Open Hole(ft.)** From 153.0 to 255.0
Make — Type
Diamter — Slot — Length — Set

Static Water Level
56.00 ft. land surface — Date measured 1965/12/22

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

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

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

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

Pump
☐ Not Installed — Date Installed ____
Manufacture's name JACUZZI
Model number ____ HP 75.00 Volts 220
Length of drop pipe ____ Material ____ Capacity 1100 g.p.m
Type Turbine

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

Variance
Was a variance granted from the MDH for this well? ☐ YES ☐ NO

Well Contractor Cerfication
Keys Well Co. 62012
License Business Name — Lic. or Reg No.

Remarks
DEEPENED BY LAYNE MINN. CO. TO 255 FT. IN 1972.

First Bedrock OSTP
Last Strat CJDN
Aquifer Prairie Du Chien-Jordan
Depth to Bedrock 117.00 ft.

Name of Driller — Date

Unique Well Number: **509089**

County: Anoka
Quad: Minneapolis North
Quad Id: 120D

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

Entry Date: 1992/10/01
Update Date: 2016/11/15
Received Date:

Well Name FRIDLEY MW-1

Township	Range	Dir	Section	Subsection	Field Located Elevation	MDH	
30	24	W	14	DCCCCD		862.90	ft.

well and contact address FRIDLEY MW-1
6431 UNIVERSITY AV
FRIDLEY MN 55432 Changed

Well Depth	Depth Completed	Date Well Completed
95.00 ft	95.00 ft	1990/08/25

Drillhole Angle

Drilling Method Non-specified Rotary

Drilling Fluid Bentonite

Well Hydrofractured? ☐ YES ☐ NO
From ft. to

Use monitor well

Casing Type Steel (black or low Drive Shoe? ☐ YES ☐ NO
Diameter 4 Depth 75
4.00 in. from 0.00 to 75.00 ft. 10.79 lbs/ft

Hole Diameter (in.) 9.00 To 95.0

Description	Color	Hardness	From	To (ft.)
SAND	BROWN	SOFT	0	49
CLAY	BLUE	SOFT	49	61
ROCKS			61	62
SAND	BROWN		62	68
GRAVEL & CLAY	BROWN		68	95

Screen Yes
Make JOHNSON
Diamter Slot Length Set
10 10 75 ft. to 85 ft.

Open Hole(ft.) From to
Type

Static Water Level
50.00 ft. land surface Date measured 1990/08/27

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

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

Grouting Information Well grouted? ☒ YES ☐ NO ☐ NOT SPECIFIED
Material neat cement From To 75.0 ft. 20.00 Sacks

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

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

Abandoned Wells
Does property have any not in use and not sealed well(s)? ☐ YES ☒ NO

Variance
Was a variance granted from the MDH for this well? ☐ YES ☐ NO

Well Contractor Cerfication
Keys Well Co. 62012

License Business Name / **Lic. or Reg No.**
SAMPSON, C.

Remarks
CONTAMINATION SOURCE: STORM SEWER WELL DRILLED FOR B.A. LEISCH + ASSOCIATES ENGINEERS. LOT 4-C 10.

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

Name of Driller Date

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

Determination of Aquifer Properties and Aquifer Test Plan (DAP-ATP) Form

Public Water Supply ID:	1020031	PWS Name:	Fridley

Contact Information for Person Completing this Form

Name:	Adam Janzen
Address:	4300 MarketPointe Drive
	Suite 200
City, State, Zip:	Bloomington, MN, 55435
Phone, Fax, e-mail:	(952) 842-3596 (p), (952) 832-2601 (f), ajanzen@barr.com

Aquifer Properties Determination Methods

For Methods 1 - 5, check all that apply - attach Summary of Aquifer Properties Based on Existing Data

- ☐ 1. An existing pumping test that meets the requirements of wellhead protection rule part 4720.5520 and that was previously conducted on a well connected to the public water supply system.
- ☑ 2. An existing pumping test that meets the requirements of wellhead protection rule part 4720.5520 and that was previously conducted on another well in a hydrogeologic setting determined by the department to be equivalent.
- ☐ 3. An existing pumping test that does not meet the requirements of wellhead protection rule part 4720.5520 and that was previously conducted on: 1) a public water supply well or 2) another well in a hydrogeologic setting determined by the department to be equivalent.
- ☐ 4. Existing specific capacity test(s) conducted on the public water supply well(s) or specific capacity tests conducted on other wells in a hydrogeologic setting determined by the department to be equivalent.
- ☐ 5. An existing published transmissivity value.

For Method 6 or 7 - attach detailed Aquifer Test Plan for Proposed Test

- ☐ 6. A proposed new test to be conducted on a new or existing well connected to the public water supply system and that meets the requirements for larger-sized water systems (wellhead protection rule part 4720.5520). The test plan must be approved before conducting the test.
- ☐ 7. A proposed new test to be conducted on a new or existing public well connected to the public water supply system and that meets the requirements for smaller-sized water systems (wellhead protection rule part 4720.5530). The test plan must be approved before conducting the test.

List the unique number of each public water supply well to which this DAP-ATP Form applies

206673					
206672					
209207					

Submitted by: Adam Janzen	Prof. License: 53665	Date: 5/1/2018
Reviewed by: Amal Djerrari	Approved: ◉ Yes ○ No	Approval Date: 5/2/2018

Summary of Aquifer Properties Based on Existing Data

Aquifer Name: Jordan | **Aquifer Code:** CJDN

Hydraulic Confinement ☑ Confined ☐ Unconfined ☐ Fractured Rock

Aquifer Test Number of test(s) on file used to compile the information tabulated below:

1

Aquifer Properties Summary Table

Representative Values		Unit	Range		+/- %
			Minimum	Maximum	
Top Stratigraphic Elev.	642	feet (MSL)	626	653	+1.7/-2.5
Bottom Stratigraphic Elev.	555	feet (MSL)	541	563	+1.4/-2.5
Transmissivity (T)	2689	ft^2/day	1309	4250	+58/-51
Aquifer Thickness (b)	87.3	feet	85	92	+5.4/-2.6
Saturated Thickness* (b)		feet			
Hydraulic Conductivity (k)	30.8	ft/day	15.4	46.2	+50/-50
Primary Porosity (e_p)	0.2	0.00 %			
Secondary Porosity** (e_s)		0.00 %			
Storativity (S)		dimensionless			
Characteristic Leakage (L)		feet			
Hydraulic Resistance (c)		days			

Notes: Shaded fields are required - * hydraulically unconfined aquifer - ** dual porosity aquifer because of fractures or solution weathering

Describe rationale for selected method(s). Attach documentation and analysis.

Analysis of an aquifer test conducted at Brooklyn Center Well 9 (unique number 110493) estimated a CJDN transmissivity (T) of 2773 ft**2/day. Brooklyn Center Well 9 is screened exclusively in the CJDN. The MDH already has the data for this test. Per the Minnesota Well Record for Brooklyn Center Well 9, the CJDN thickness at the well is 90 feet (27.4 m), resulting in a K value for the CJDN at this location of 30.8 ft/day.

For the model sensitivity analysis, the hydraulic conductivity of the CJDN will each be adjusted +/- 50%. The CJDN range will therefore be 15.4-46.2 ft/day.

The logs for Fridley Wells 3, 4, and 11 were used to determine the range of Jordan thicknesses and contact elevations. The representative values shown are averages of these data.

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

Determination of Aquifer Properties and Aquifer Test Plan (DAP-ATP) Form

Public Water Supply ID:	1020031	PWS Name:	Fridley

Contact Information for Person Completing this Form

Name:	Adam Janzen
Address:	4300 MarketPointe Drive
	Suite 200
City, State, Zip:	Bloomington, MN 55435
Phone, Fax, e-mail:	(952) 842-3596 (p), (952) 832-2601 (f), ajanzen@barr.com

Aquifer Properties Determination Methods

For Methods 1 - 5, check all that apply - attach Summary of Aquifer Properties Based on Existing Data

- ☐ 1. An existing pumping test that meets the requirements of wellhead protection rule part 4720.5520 and that was previously conducted on a well connected to the public water supply system.
- ☑ 2. An existing pumping test that meets the requirements of wellhead protection rule part 4720.5520 and that was previously conducted on another well in a hydrogeologic setting determined by the department to be equivalent.
- ☐ 3. An existing pumping test that does not meet the requirements of wellhead protection rule part 4720.5520 and that was previously conducted on: 1) a public water supply well or 2) another well in a hydrogeologic setting determined by the department to be equivalent.
- ☐ 4. Existing specific capacity test(s) conducted on the public water supply well(s) or specific capacity tests conducted on other wells in a hydrogeologic setting determined by the department to be equivalent.
- ☐ 5. An existing published transmissivity value.

For Method 6 or 7 - attach detailed Aquifer Test Plan for Proposed Test

- ☐ 6. A proposed new test to be conducted on a new or existing well connected to the public water supply system and that meets the requirements for larger-sized water systems (wellhead protection rule part 4720.5520). The test plan must be approved before conducting the test.
- ☐ 7. A proposed new test to be conducted on a new or existing public well connected to the public water supply system and that meets the requirements for smaller-sized water systems (wellhead protection rule part 4720.5530). The test plan must be approved before conducting the test.

List the unique number of each public water supply well to which this DAP-ATP Form applies

206657					

Submitted by: Adam Janzen	Prof. License: 53665	Date: 5/1/2018
Reviewed by: Amal Djerrari	Approved: ◉ Yes ○ No	Approval Date: 5/2/2018

Summary of Aquifer Properties Based on Existing Data

Aquifer Name: Tunnel City Group - Wonewoc Sandstone **Aquifer Code:** CTCW

Hydraulic Confinement ☑ **Confined** ☐ **Unconfined** ☐ **Fractured Rock**

Aquifer Test Number of test(s) on file used to compile the information tabulated below:

1

Aquifer Properties Summary Table

Representative Values		Unit	Range		+/- %
			Minimum	Maximum	
Top Stratigraphic Elev.	511	feet (MSL)	511	544	+1.7/-0
Bottom Stratigraphic Elev.	313	feet (MSL)	309	331	+5.8/-1.3
Transmissivity (T)	1348	ft^2/day	904	9330	+592/-33
Aquifer Thickness (b)	198	feet	188	235	+19/-5
Saturated Thickness* (b)		feet			
Hydraulic Conductivity (k)	6.81	ft/day	4.81	39.7	+483/-29
Primary Porosity (e_p)	0.2	0.00 %			
Secondary Porosity** (e_s)		0.00 %			
Storativity (S)		dimensionless			
Characteristic Leakage (L)		feet			
Hydraulic Resistance (c)		days			

Notes: Shaded fields are required - * hydraulically unconfined aquifer - ** dual porosity aquifer because of fractures or solution weathering

Describe rationale for selected method(s). Attach documentation and analysis.

The MDH conducted a 24.7-hour pumping test at Blaine Well 7 (unique number 208616) in May 1998. Blaine Well 5 (unique number 208615) was used as an observation well. See attached for details and two sets of MDH analyses (1998 and 2011).

The 1998 analysis arrived at a representative Tunnel City-Wonewoc (TCW) transmissivity of 1,300 ft**2/day (120.8 m**2/day). The data provided from the pumping test at Blaine Well 7 does not allowing the hydraulic conductivities of the Tunnel City Group and Wonewoc to be separated. Therefore, a constant hydraulic conductivity will be applied to both units. According to the Well 7 log, the combined Tunnel City Group and Wonewoc thickness is 191 ft, resulting in a combined hydraulic conductivity of 6.81 ft/day. This value will be used in the base case model.

The model sensitivity analysis will use a lower hydraulic conductivity bound of 4.81 ft/day and an upper hydraulic conductivity bound of 39.7 ft/day. These values were calculated from the 918 ft**2/day (85.3 m**2/day) T value from the 2011 analysis and the 7,580 ft**2/day (704.2 m**2/day) T value from the 1998 analysis.

The logs for Fridley Wells 2, 3, 4, 5, and 11 were used to determine the range of Tunnel City-Wonewoc thicknesses and contact elevations. The representative values shown are from the Well 11 log.

Analysis of the Blaine #7 (208616) Pumping Test
May 28, 1998
Franconia/Ironton-Galesville Aquifer

Introduction

The MDH was requested to assist in the delineation of wellhead protection areas by the City of Blaine, Minnesota, around the public water supply wells serving the community. An important part of the delineation process is to determine aquifer properties at the well site as accurately as possible. This is normally accomplished by performing a pumping test. Because of the need to test most public water supply wells, the MDH agreed to help with the pumping test as a part of technical assistance for communities, and program and staff development.

The pumping test at the Blaine Well #7 was conducted by the MDH, as described below. The results were analyzed using standard nonequilibrium and semisteady-state methods, cited in references. Data plots are included in Appendix 1 and test results are summarized on Table 1. Field data sheets are included in Appendix 2. The analysis shows that the aquifer responds as generally expected from the geologic setting.

Description of the Test

A pressure transducer was placed in Well #7 beginning on May 19, 1998 at 10:30 to obtain background readings. The pumping well was turned off when the transducer was installed providing a long resting period before the start of the test. Well 5 was turned off two days before the start of the test and the data from the pumping well clearly shows the interference between these two wells. No other wells were identified that possibly could cause interference during the test. The test started at 09:00:04.0 on May 28, 1998. Well #7 was pumped at an average rate of 1200 gallons per minute. The flowmeter on the well was used to monitor the discharge. The pumping rate declined during the test from about a maximum of 1300 at the beginning of the test to 1140 gpm at the end. The pump was turned off at 09:40:02.0 on May 29, 1998 to start the recovery period. The recovery period was carried out for 24 hours and the well recovered to pre-pumping levels.

Problems were encountered in the placement of transducers in well numbers 5 and 9. The transducer in Well 5 could not be set deep enough initially and was exposed during part of the pumping period but was re-set for the recovery and good recovery data were obtained for this well. Well 9 was inaccessible for transducer placement and was monitored by hand. The drawdown in farther away wells, 8 and 9, did not stabilize during the pumping period.

Summary of Results

A transmisivity value of 1,300 ft2/day and storage coefficient of 2.0e-5 are chosen as being representative of aquifer properties in the area of the well field for the capture zone analysis. The results are quite consistent between the pumping and recovery periods and are show that the aquifer is quite confined. Little information about leakage can be gained from this analysis because a negative boundary was encountered about 200 minutes into the test. Therefore any influence of leakage on water levels is over shadowed by the effects of variations in permeability.

In addition the farther away wells, 8 and 9, were too far away to clearly show the influence of Well 7 for a 24-hour test. A longer test would be needed to verify the connection with these wells, on the order of

200-hours in duration. A steady state analysis technique used for recovery data gave comparable transmissivity results as the late time recovery from nearby wells and provides an estimate of leakage of 4,850 days. This analysis technique is still being evaluated and Health Department staff are not yet comfortable with its' application for wellhead protection delineation.

Problems with the Analysis

The multiple aquifer construction of Well 5 introduces a level of uncertainty to the interpretation of the results of this test. However, both the pumping and observation wells show similar results and therefore, the test is not unduly affected by the multi-aquifer construction of Well 5.

References:

Jacob, C. E. and Lohman, S. W., (1952) Nonsteady Flow to a Well of Constant Drawdown in an Extensive Aquifer, Trans. American Geophysical Union, Vol. 33, No. 4, August, 1952, pp. 559-69.

Theis, C. V., (1935) The Relation Between the Lowering of the Piezometric Surface and the Rate and Duration of Discharge of a Well Using Ground-Water Storage, Trans. American Geophysical Union, 16th Annual Meeting, April, 1935, pp. 519-24.

Table 1.

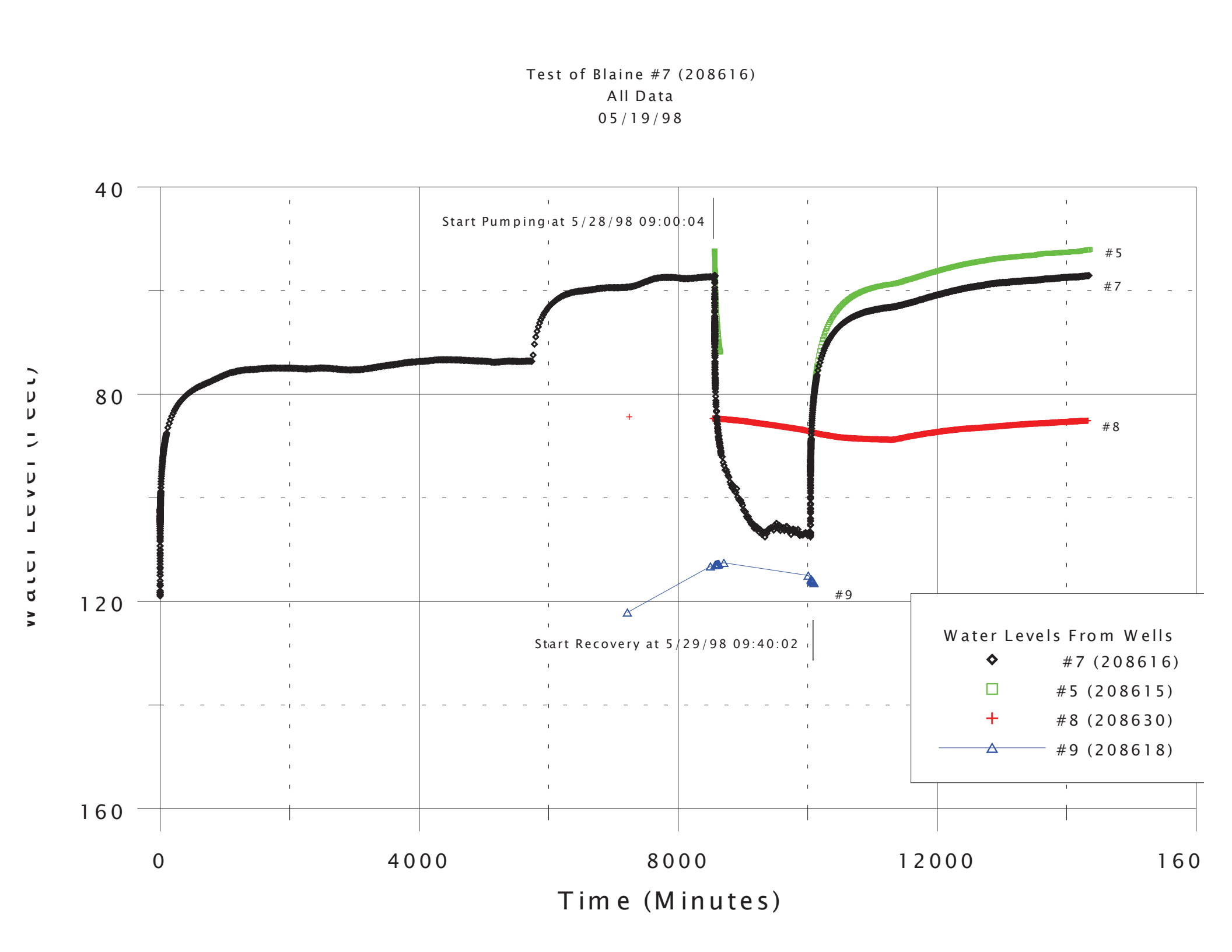
Blaine #7 Pumping Test
May 28, 1998

	Transmissivity T (gpd/ft)	Storage Time Coefficient S	Period Emphasized	Analysis Method
	---	---	---	---
Pumping Well #7 (208616)	5,100	NA	Early Pumping	Theis
	2,860	NA	Late Pumping	Jacob
	3,450	NA	Early Recovery	Theis
	1,510	NA	Late Recovery	Jacob t/t'
Observation Well #5 (208615)	13,100	6.1e-6	Early Pumping	Theis
	2,240	1.8e-5	Late Pumping	Jacob
	7,580	5.6e-5	Early Recovery	Theis
	1,180	1.8e-6	Late Recovery	Jacob t/t'

Steady State analysis using recovery data from wells 5 and 8 (208630)

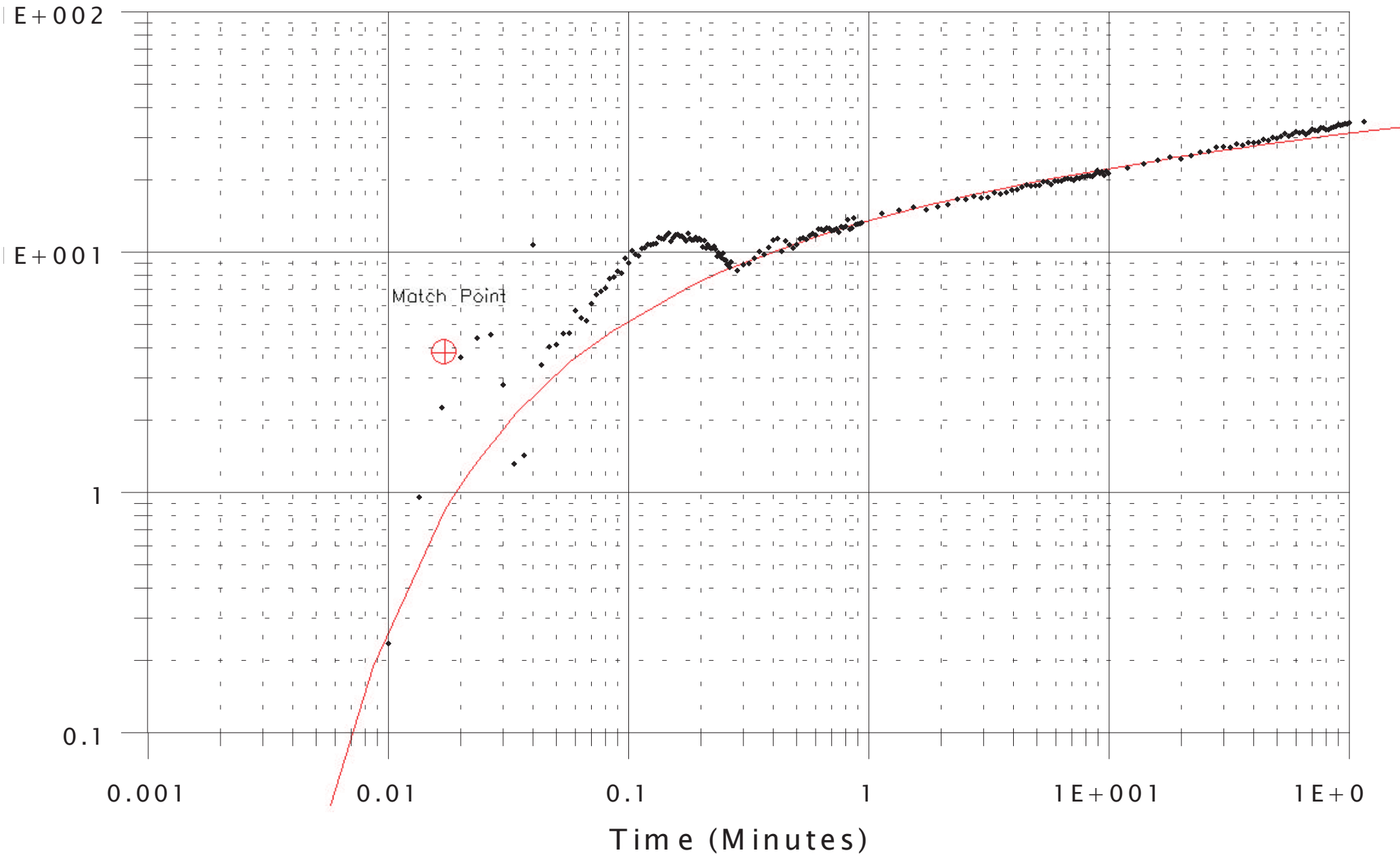
	2010	4,850 days resistance	DeGlee

Representative aquifer values are best shown by the late-time recovery values, giving an average T of 1,300 ft^2/day and a storage coefficient of 2.0e-5


Test of Blaine #7 (208616)
All Data
05/19/98
Start Pumping at 5/28/98 09:00:04
Start Recovery at 5/29/98 09:40:02
#5
#7
#8
#9
Water Levels From Wells
#7 (208616)
#5 (208615)
#8 (208630)
#9 (208618)
40
80
120
160
0
4000
8000
12000
160
Time (Minutes)

Test of Blaine #7 (208616)
Pumping Data
05/28/98

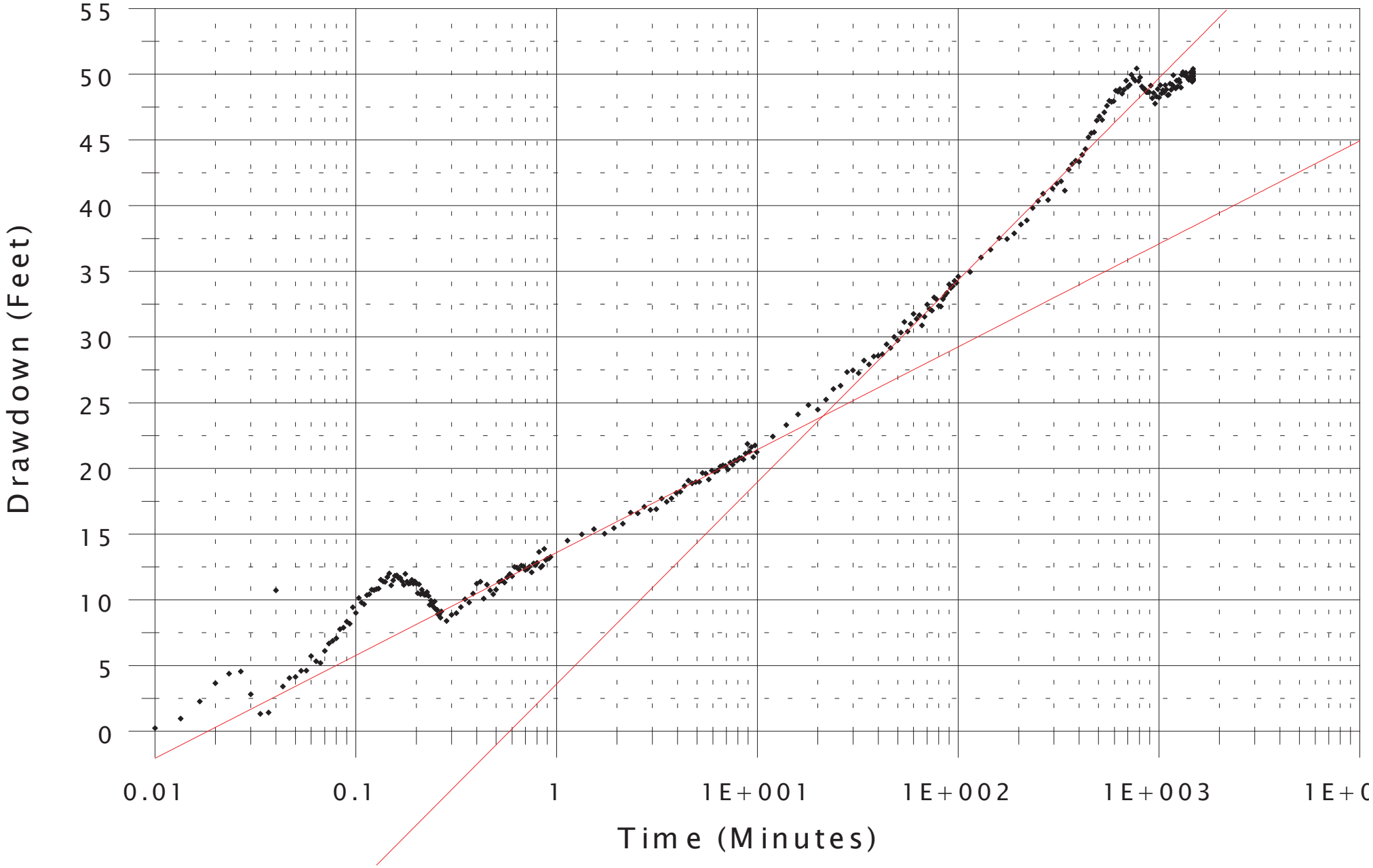
T = 15.3 1300 / 3.9 = 5,100 ft^2/day



Test of Blaine #7 (208616)
Pumping Data
05/21/98

T! = 35.3 1280 / 7.9 = 5,720 ft^2/day

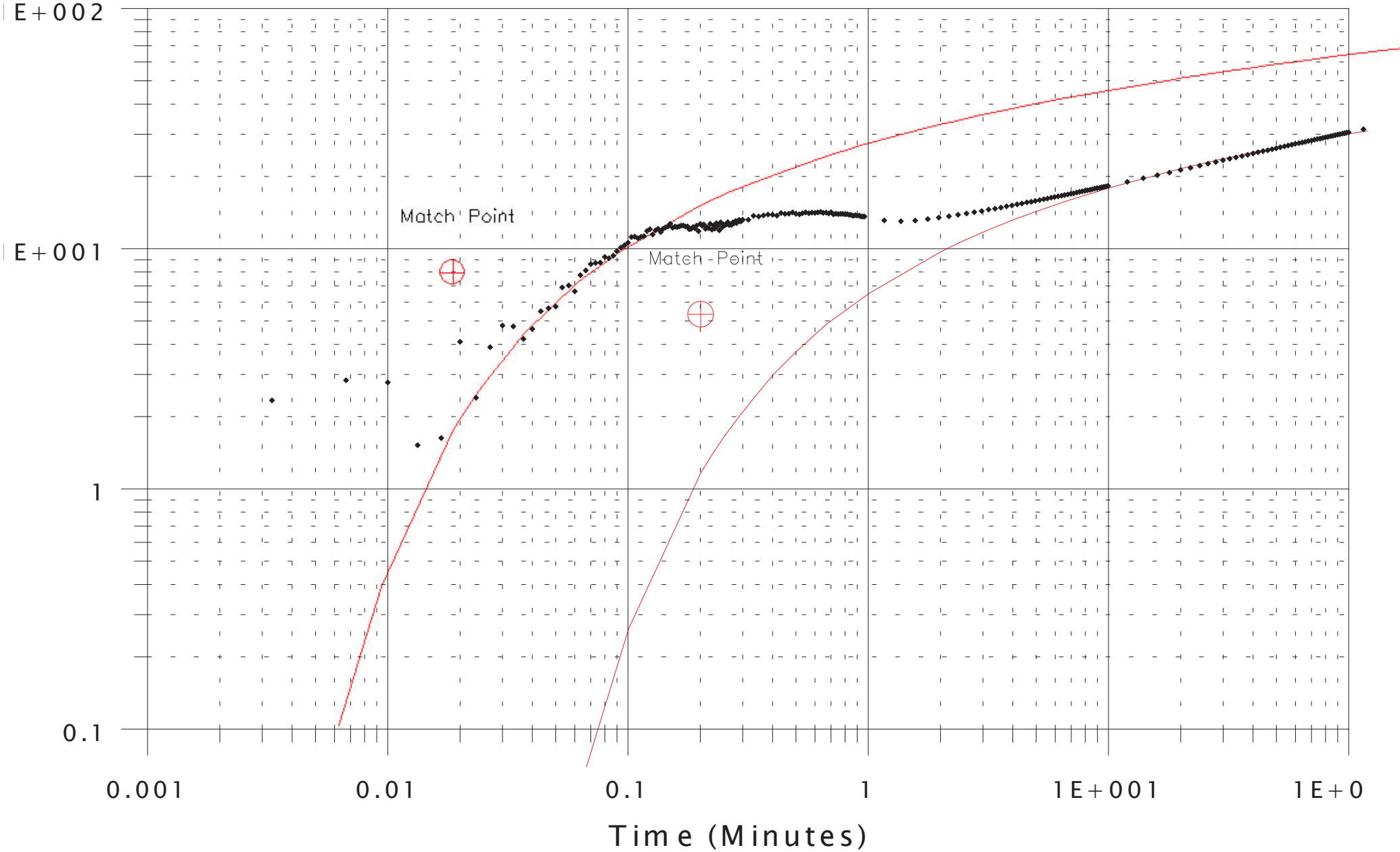
T2 = 35.3 1240 / 15.3 = 2860 ft^2/day

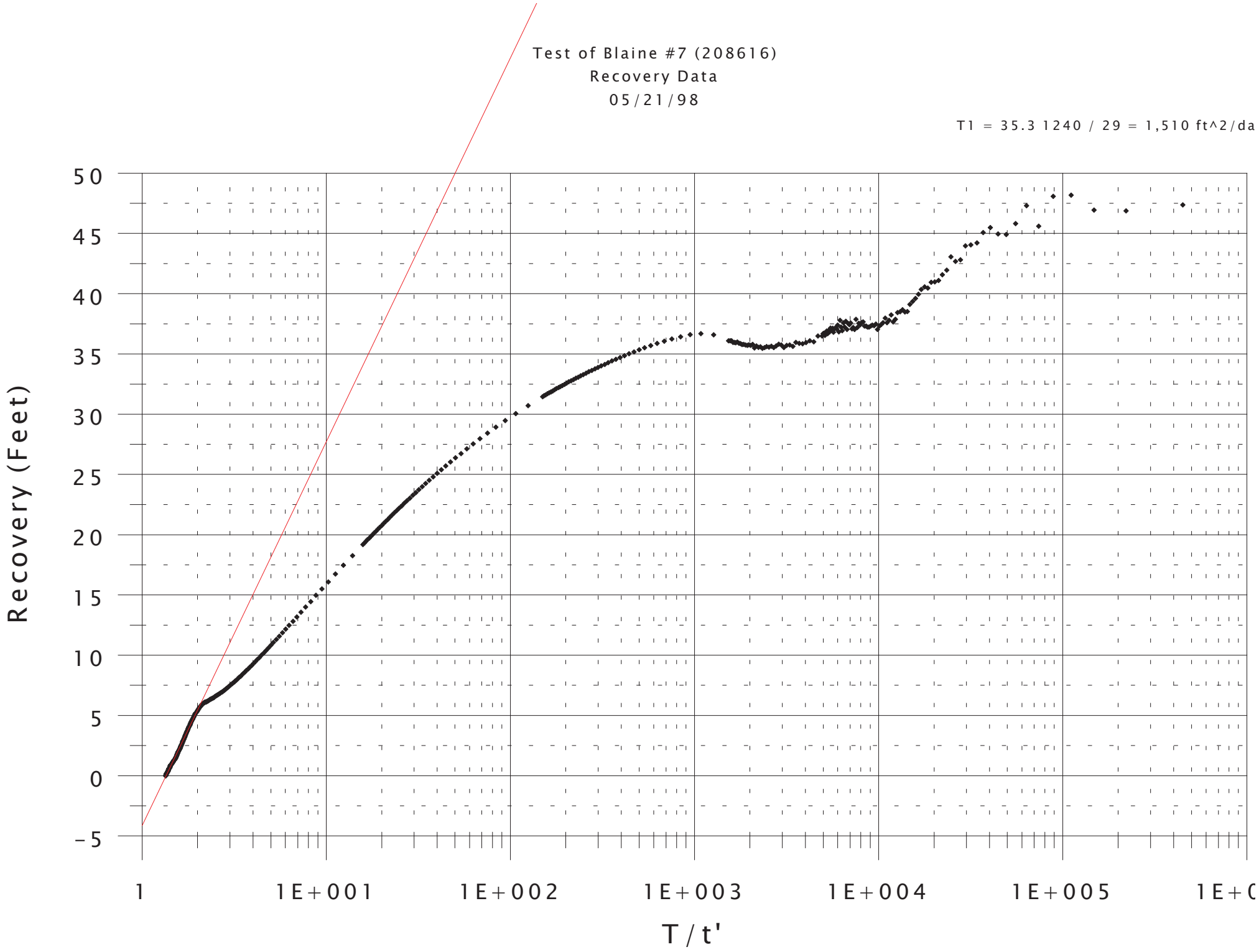


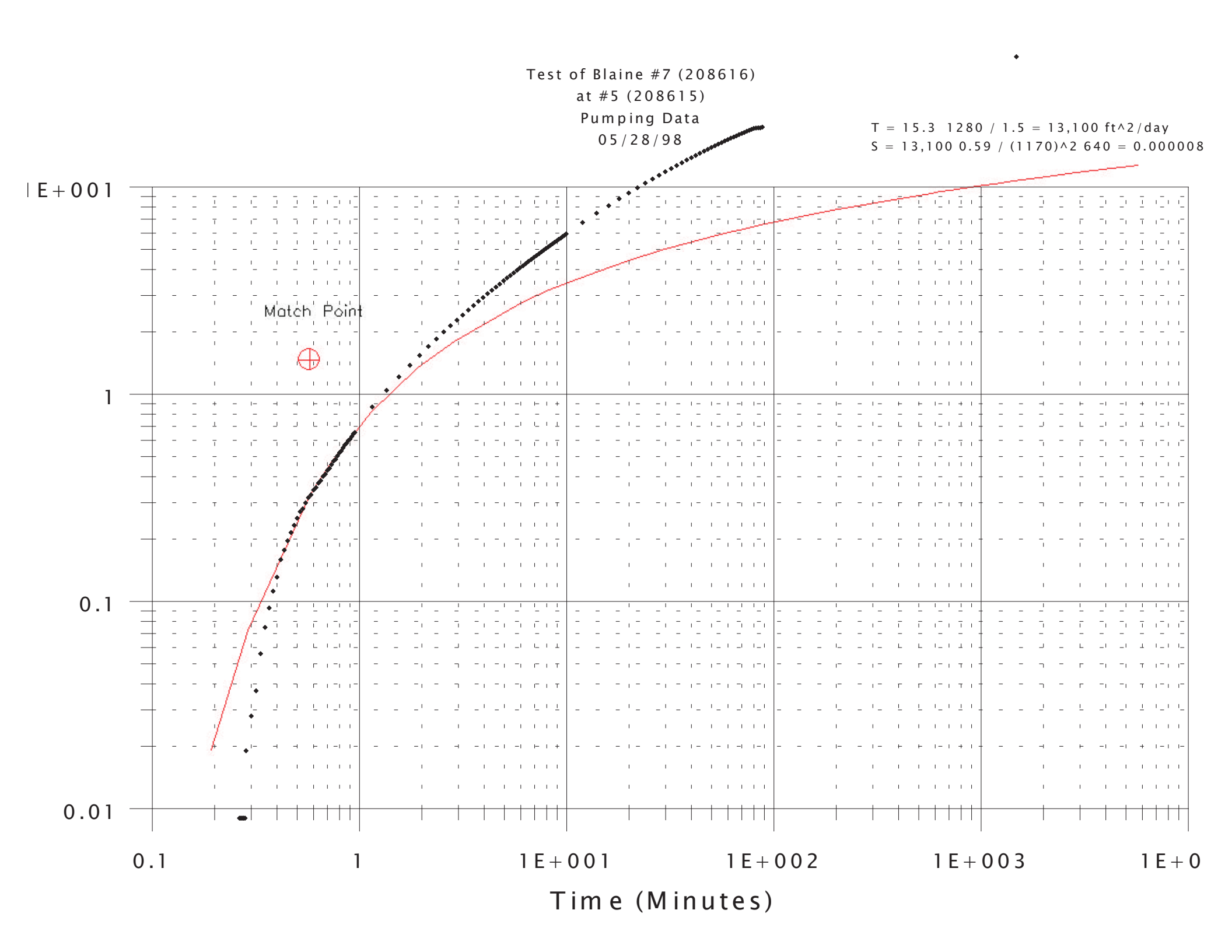
Test of Blaine #7 (208616)
Recovery Data
05/19/98

T1 = 15.3 1280 / 8 = 2,450 ft^2/day

T2 = 15.3 1240 / 5.5 = 3,450 ft^2/day

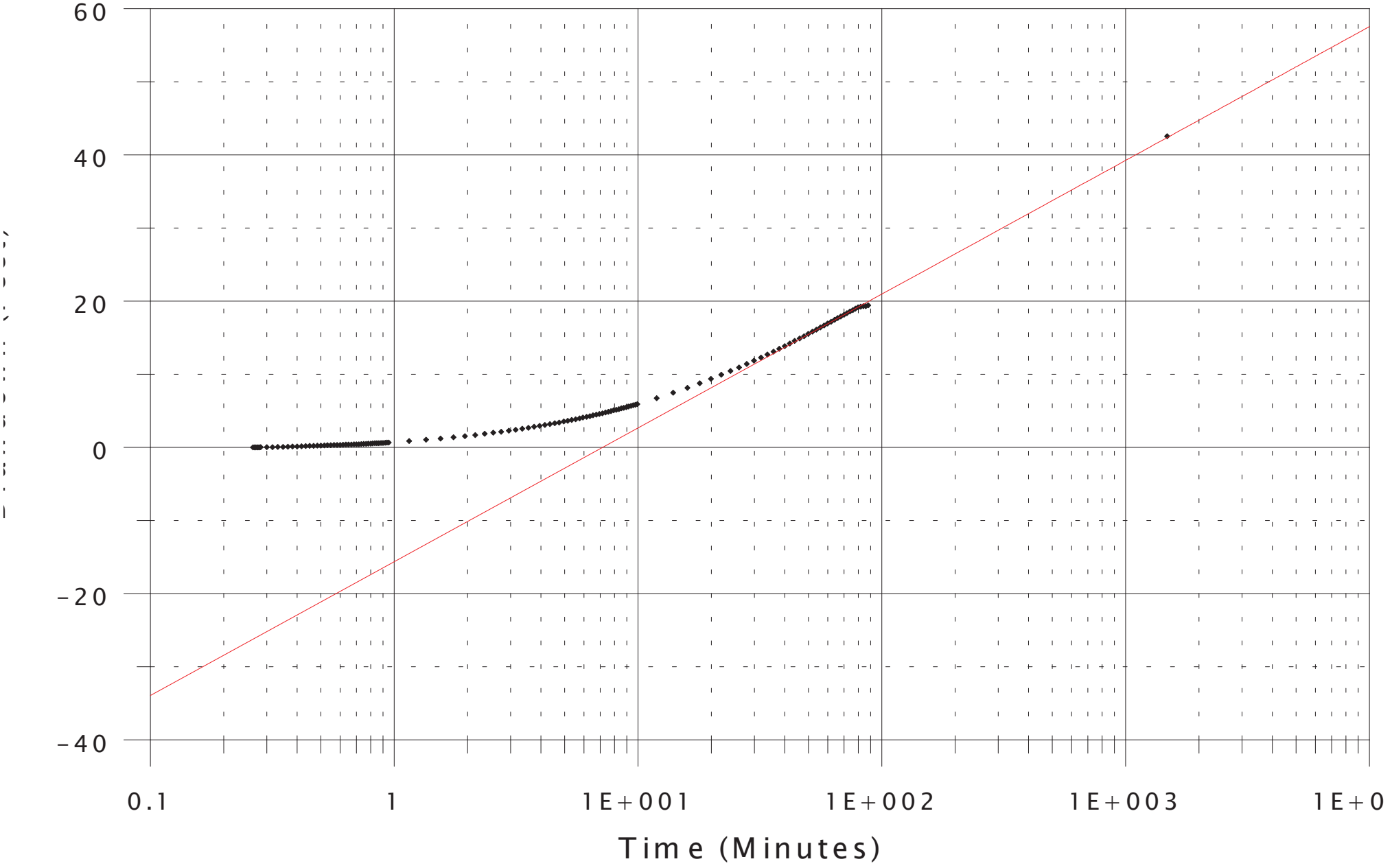


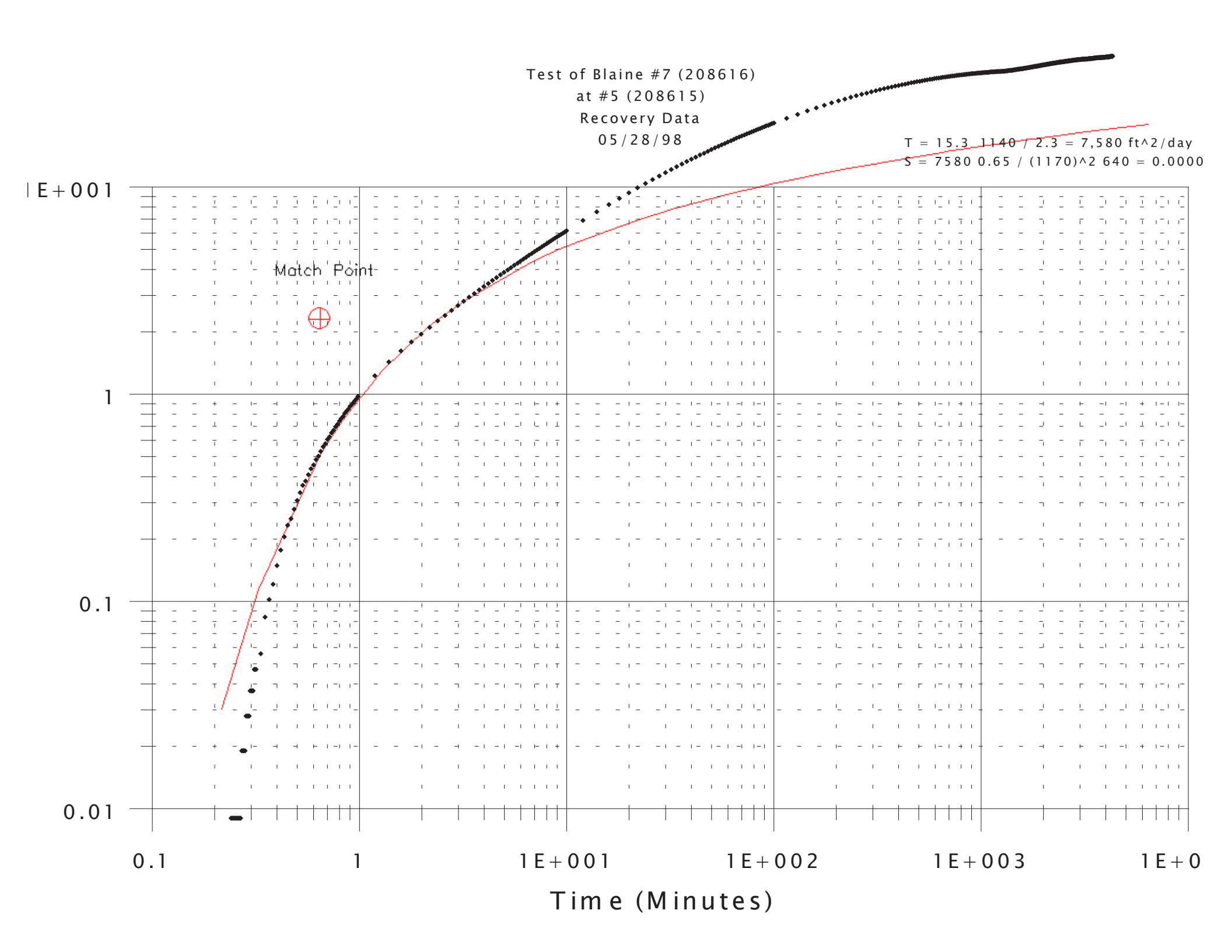

Test of Blaine #7 (208616)
Recovery Data
05/21/98
T1 = 35.3 1240 / 29 = 1,510 ft^2/da
Recovery (Feet)
50
45
40
35
30
25
20
15
10
5
0
-5
1
1E+001
1E+002
1E+003
1E+004
1E+005
T/t'

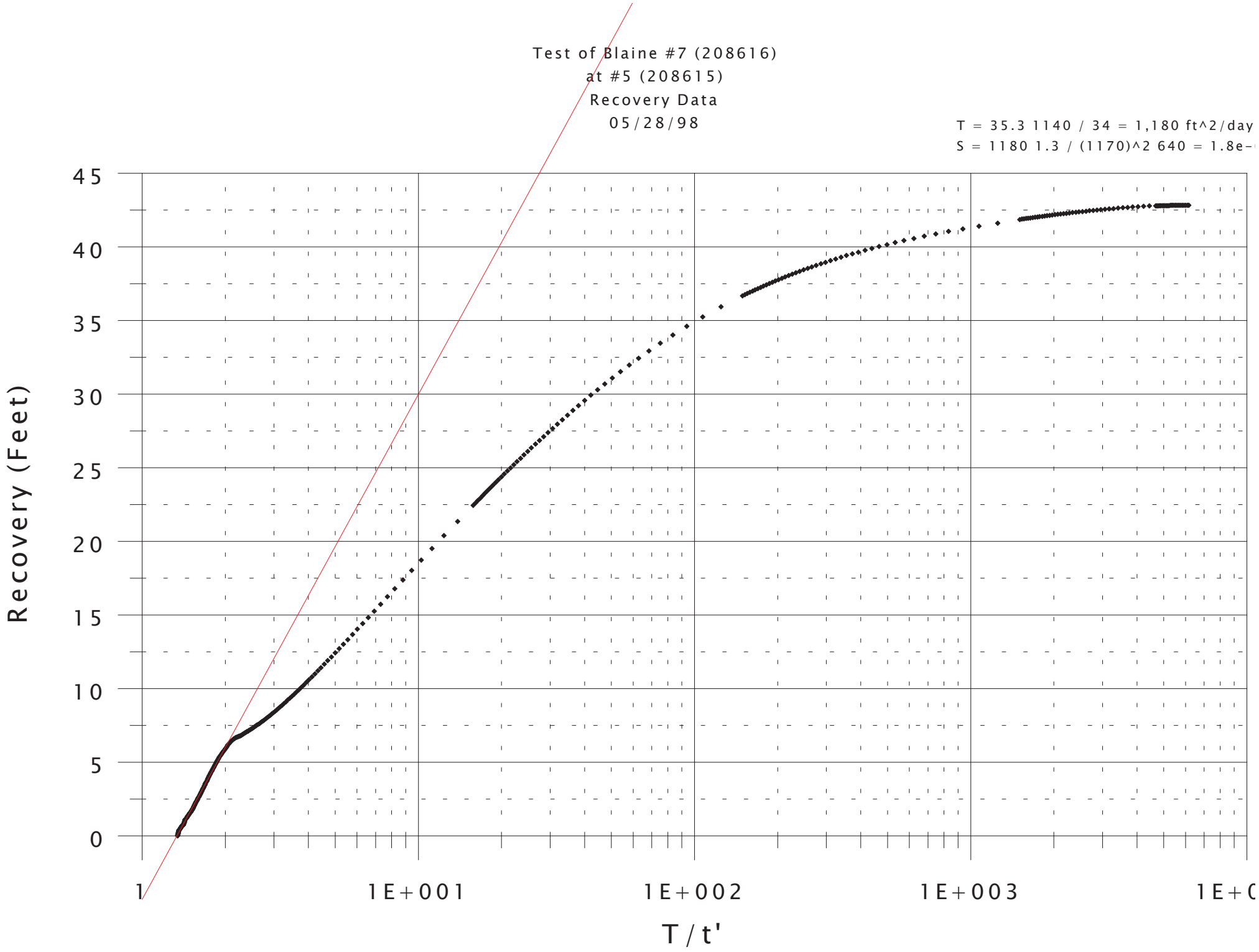

Test of Blaine #7 (208616)
at #5 (208615)
Pumping Data
05/28/98
T = 15.3 1280 / 1.5 = 13,100 ft^2/day
S = 13,100 0.59 / (1170)^2 640 = 0.000008
Match Point
E+001
1
0.1
0.01
0.1
1
1E+001
1E+002
1E+003
1E+0
Time (Minutes)

Test of Blaine #7 (208616)
at #5 (208615)
Pumping Data
05/28/98

T = 35.3 1140 / 18 = 2,240 ft^2/day
S = 2240 7 / (1170)^2 640 = 0.000018

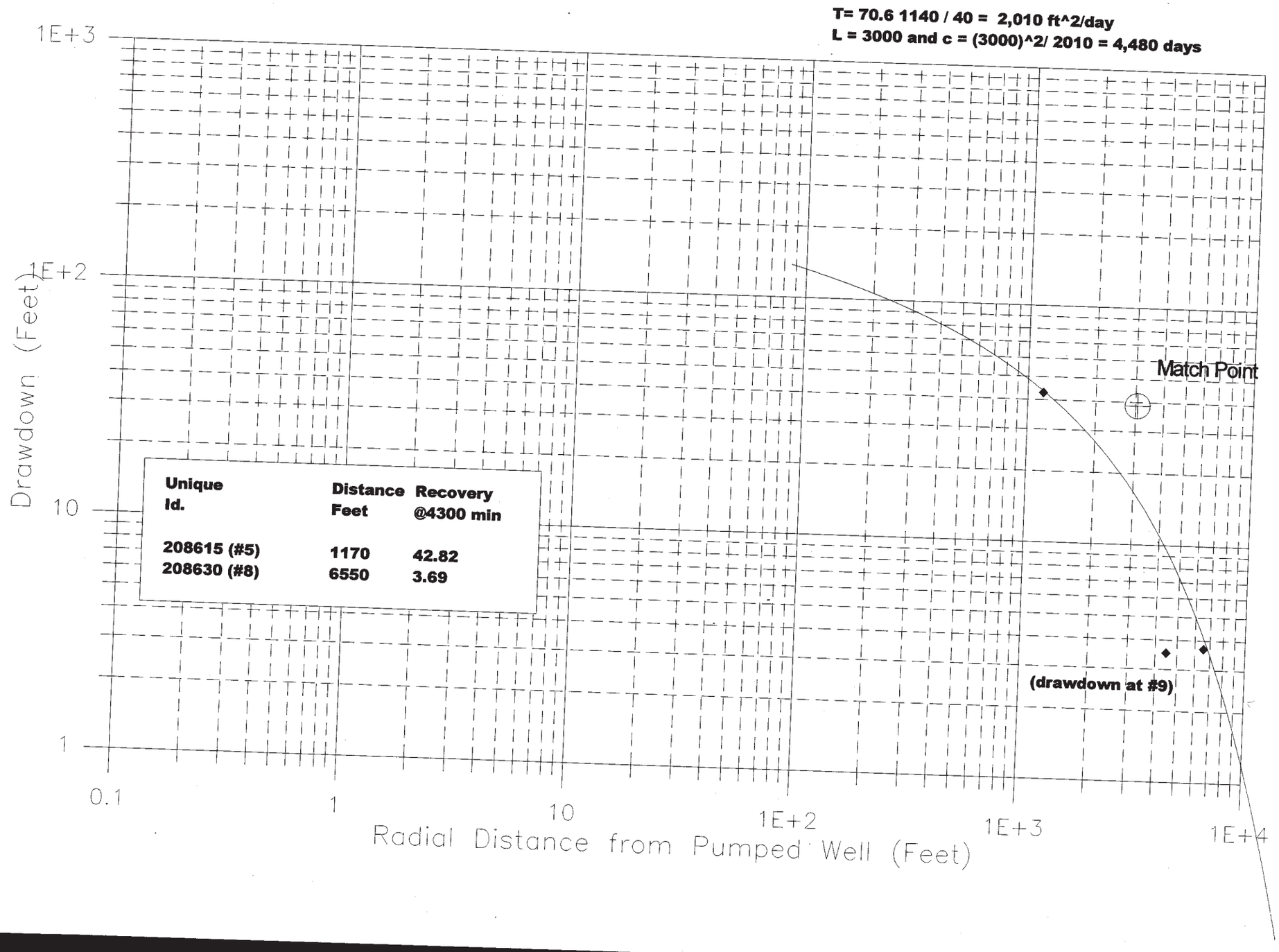



Test of Blaine #7 (208616)
at #5 (208615)
Recovery Data
05/28/98
T = 15.3 1140 / 2.3 = 7,580 ft^2/day
S = 7580 0.65 / (1170)^2 640 = 0.0000
Match Point
E+001
1
0.1
0.01
0.1
1
1E+001
1E+002
1E+003
1E+0
Time (Minutes)


Test of Blaine #7 (208616)
at #5 (208615)
Recovery Data
05/28/98
T = 35.3 1140 / 34 = 1,180 ft^2/day
S = 1180 1.3 / (1170)^2 640 = 1.8e-
Recovery (Feet)
45
40
35
30
25
20
15
10
5
0
1
1E+001
1E+002
1E+003
T / t'

May 28, 1998

Distance Drawdown Plot after 4300 Minutes of Pumping



Unique Id.	Distance Feet	Recovery @4300 min
208615 (#5)	1170	42.82
208630 (#8)	6550	3.69

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

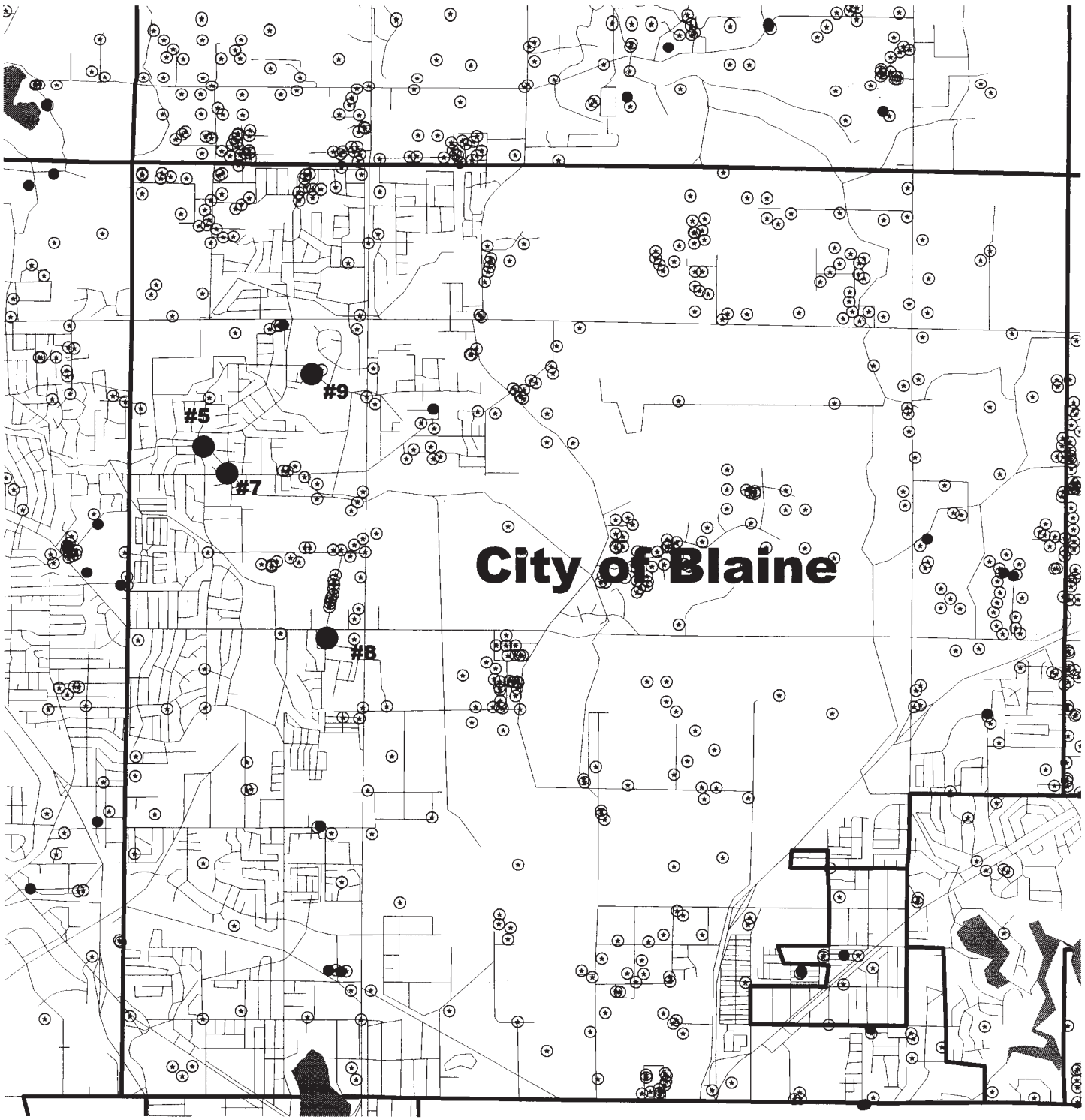
Test No.

Aquifer Test Information

Test Location	Well Owner	Test Conducted By
Blaine #7	City of Blaine	J. Blum (MDH)
Date/Time Test Start	**Flow Rate (Units)**	**Pump Type**
5/28/98 09:00:04.0	1200 gpm	Turbine
Date/Time Recovery Start	**Flow Rate Measuring Device**	**Pump Intake Depth**
5/29/98 09:40:02.0	Turbine Flowmeter	
Date/Time Test Finish	**Totalizer: End**	**Pumped Well Inner Casing Diameter**
	11,691,800	
Notes	**Totalizer: Start**	**Confined/Unconfined**
pre lube 1:06 min	9,922,200	confined
	Total Pumped (Units)	**Quad Sheet Name/Number**
	1,769,600 gallons	

Unique Well Numbers	Location T, R, S, Quarters	Location N, E	Radial Distance	Open Depth	Transducer Setting	Measuring Point Location	Elevation, Datum
Pumped Well #7 (208616)		N E					
Observation Wells #5 (208615)		N E	1170				
#9 (208618)		N E	4470				
#8 (208620)		N E	6550				
		N E					
		N E					

Sketch Map of Well Locations



Location of Public Water Supply Wells in the Ironton-Galesville Aquifer, Blaine, MN

IC #140-0523 (5/96)

Aquifer Test Data Form

Test: Blume #7				By: J. Blum							Test Date: 05/28/98	Page ____ of ____
Location (Unique Well No.)	Date Month	Day	Year	Time Hour	Minute	Sec.	Elapsed Time (Minutes)	Depth to Water	Drawdown/ Recovery	Discharge	Remarks Totalizer	
#7 (203616	05	28	98	09	00	04				0	9922200	start test
					05	—				~1320	9928600	1280
					10	—				1320	9,935,100	1300
					15	—				1300	9,941,700	1320
					20	—				1300	9,948,100	
					25	—				1280	9,954,500	
					30	—				1280	9,961,000	
					35	—				1280	9,967,400	
					40					1300	9,973,800	
					45							
					52	—				1280	9,989,000	
					55						~~9,995,100~~	
				10	—					1280	9,999,100	
				11	30					1250	10,110,400	
				~~12~~	~~—~~							
				15	—					1210	10,365,000	
				21	—					1280	10,813,000	
	05	29	98	09	18	—				1150	11,664,500	1160
				09	35	—					11,686,100	1130
				09	40	02	1480				11,697,800	end 1140

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

Notes:

IC #140-0523 (5/96)

Aquifer Test Data Form

Test:	By:	Test Date:	Page ____ of ____

Location (Unique Well No.)	Date Month	Day	Year	Time Hour	Minute	Sec.	Elapsed Time (Minutes)	Depth to Water	Drawdown/ Recovery	Discharge	Remarks
#9 (208618)	05	28	98	07	55	–		113.22			
#8 (208630)				08	20	–		84.66			xD_0 = 11.04
#5 (208615)				08	40	–		52.41			xD_0 = 19.80
#7 (208616)											xD_0 = 57.25 xD_0 = 71.24
				09	00	04			start test		9922 gpm ⑤
#9	05	27	98	10	30	–		122.12			
#5								61.55			
#8								84.37			
#5	05	29	98	09	31	–		94.90			reset probe xD_0 4.91
#7	05	29	98	09	40	02					Stop pumping xD_0 = 1.94
#9				10	35			116.44			

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

Notes: Pre lube 1:04 min
8:58:55 manual on/pump

Aquifer Test Data Form

Test: Blair #7	By: J. Blair	Test Date:	Page ____ of ____

Location (Unique Well No.)	Date Month	Day	Year	Time Hour	Minute	Sec.	Elapsed Time (Minutes)	Depth to Water	Drawdown/ Recovery	Discharge	Remarks
#3 208630	06	01	98	09	10	—		85.14			48.67 XD_R 10.60 XD_o
#7				09	25	—		57.17			57.08 XD_R 71.84 XD_o
				09	40	—		51.81			52.07 XD_R 47.02 XD_o

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

Notes:

IC #140-0523 (5/96)

IC #140-0523 (5/96)

Aquifer Test Data Form

Test:	By:	Test Date:	Page ____ of ____

Location (Unique Well No.)	Date Month	Day	Year	Time Hour	Minute	Sec.	Elapsed Time (Minutes)	Depth to Water	Drawdown/ Recovery	Discharge	Remarks
#9	05	28	98	09	00			113.22			static (time ~ 7:50 AM)
				09	06			112.92			Solinist line left in well between
				09	10			112.92			↓ measurements
				09	15			112.91			Blaine Utilities flow
				09	20			112.89			↓ meter record indicates:
				09	25			112.88			5/26/98 (8:30) 338,798
				09	30			112.87			↓ 5/27 (10:00) 339,290
				09	35			112.85			5/28 (9:00) 339,290
				09	40			112.84			↓
				09	45			112.83			
				09	50			112.81			
				09	55			112.79			
				10	00			112.78			
				10	05			112.76			
				11	23			112.53			
	05	29	98	09	05			114.98			
				09	46			115.70			
				09	50			115.75			
				09	55			115.85			
				10	02			115.94			
				10	10			116.08			
				10	15			116.15			
				10	20			116.22			

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

Notes: 1

Memo

Date: June 14, 2011 (revised)

To: Blaine WHP Project File (PWSID: 1020006)

From: Justin Blum

Subject: Analysis of the Blaine Well 7 (208616) Pumping Test, May 28, 1998, Ironton-Galesville Aquifer

---

The pumping test performed on Blaine Well 7 (208616) was conducted as described below and summarized in Tables 1 and 2. The data were analyzed using standard methods cited in the references. Analysis graphs are presented in Appendix 1 and are summarized in Table 3. Field data sheets and other documentation are included in Appendix 2.

Test Description

Collection of background data:

A pressure transducer was placed in Well 7 beginning on May 19, 1998 at 10:30 to obtain background readings. The pumping well was turned off when the transducer was installed providing a long resting period (nine days) before the start of the test. Well 5 was turned off two days before the start of the test and the background data from the pumping well clearly shows the interference between these two wells.

Other interfering wells/weather conditions/test setup:

No other wells were identified that possibly could cause interference during the test

Pumping rate:

Well 7 was pumped at an average rate of 1200 gallons per minute. The flowmeter on the well was used to monitor the discharge. The pumping rate declined during the test from a maximum at the beginning of the test of about 1300 gpm to 1140 gpm at the end of pumping.

End of data collection:

The recovery period was carried out for 24 hours and the well recovered to pre-pumping levels

Issues encountered during data collection:

Problems were encountered in the placement of transducers in well numbers 5 and 9. The transducer in Well 5 could not be set deep enough initially and was exposed during part of the pumping period but was re-set for the recovery and good recovery data were obtained for this well. Well 9 was inaccessible for transducer placement and was monitored by hand. The drawdown in farther away wells, 8 and 9, did not stabilize during the pumping period.

Problems with the analysis

The multiple aquifer construction of Well 5 introduces a level of uncertainty to the interpretation of the results of this test. Also, the response in well 5 to changing pumping conditions of well 7 was so rapid, 0.5 minute at a distance of 1170 feet, that fracture-flow conditions are strongly indicated. The strong influence of fracture-flow on the drawdown in well 7 is demonstrated by the enhanced efficiency of the well on the distance-drawdown plot. Approximate predicted drawdown at well 7 is 300 feet and observed was about 50 feet.

Because of the influence of fracture-flow, the transient analysis of well 5 data was not based on very early-time data. If later-time transient data are used from Well 5, both well 7 (pumping) and Well 5 (nearest observation well) show similar results and therefore, the test is not unduly affected by the multi-aquifer construction of Well 5 or the communication of the wellbores via fracture(s).

However, a negative boundary was encountered about 250 minutes into the test. Therefore, the influence of leakage on water levels is partly obscured by the effects of variations in permeability. The direction to this boundary from well 7 is not clear, but it is likely to be between well 7 and 9 based on the lack of response in well 9.

The farther away wells, 8 and 9, were too far away to reach steady-state conditions for a 24-hour test of Well 7. The recovery data from well 8 was adjusted to remove regional trends in water levels, which provide an adequate curve match and a high transmissivity value. The steady state analysis of recovery data gave comparable, if low, transmissivity results.

Selected References

Cooper, H.H. and Jacob, C.E. (1946) A Generalized Graphical Method for Evaluating Formation Constants and Summarizing Well-filed History, Trans. American Geophysical Union, V. 27, pp. 526 – 534.

Theis, C. V., (1935) The Relation Between the Lowering of the Piezometric Surface and the Rate and Duration of Discharge of a Well Using Ground-Water Storage, Trans. American Geophysical Union, 16th Annual Meeting, April, 1935, pp. 519-24.

deGlee Method [English] in:
Kruseman and De Ridder, (1991) Analysis and Evaluation of Pumping Test Data (2nd Edition), Publication 47, International Institute for Land Reclamation and Improvement, P.O. Box 45, 6700 AA Wageningen, The Netherlands, pp. 76-78.

Walton, W.C., (1960) Leaky Artesian Aquifer Conditions In Illinois, Illinois State Water Survey, Bulletin 39, pp. 27.

Agarwal, R.G. 1980. A new method to account for producing time effects when drawdown type curves are used to analyze pressure buildup and other test data. SPE Paper 9289, presented at the 55th SPE Annual Technical Conference and Exhibition, Dallas, Texas, September 21–24, 1980.

Jenkins, D. and Prentice, J. (1982) Theory for Aquifer Test Analysis in Fractured Rocks Under Linear (Nonradial) Flow Conditions, Ground Water, Vol. 20, No. 1, p. 12-21.

Sen, Z. (1986) Aquifer Test Analysis in Fractured Rocks with Linear Flow Pattern, Ground Water, Vol. 24, No. 1, p. 72-78.

Table 1. Aquifer Test Information

Test Location	Blaine 7 (208616)
Well Owner	City of Blaine
Test Conducted By	J. Blum (MDH)
Aquifer	Ironton-Galesville
Confined / Unconfined	Confined
Date/Time Monitoring Start	May 19, 1998 10:30
Date/Time Pump off Before Test	48 hours
Date/Time Test Start	May 28, 1998 09:00:04.0
Date/Time Recovery Start	May 29, 1998 09:40:02.0
Date/Time Test Finish	May 30, 1998
Flow Rate	1300 to 1140 gpm, average 1200 gpm
WL Data Collection Method	Transducer, manual
Number of Observation Wells	3

Table 2. Wells Monitored During the Test

Well Name	Unique Well No.	Radial Distance (feet)	Static Water Levels (feet below measuring point)			Aquifer
			Start	Mid-test	End	
Pumped Well: 7	208616	1	57.11	106.73	57.08	
Ob Wells: 5	208615	1170	52.36	94.92	52.08	
8	208630	6550	84.68	87.10	85.09	
9	208618	4470				

Test Type:

☒ **Constant Rate** ☐ **Variable Rate** ☐ **Recovery** ☐ **Step Drawdown**

☐ **Other (Describe)** _____

☐ **Data scanned** ☐ **Data entered into database**

Table 3. Analysis Results

Unique Well No.	Transmissivity ft^2/day	Storage Coefficient	Analysis Method	Remarks
Pumped Well: 7 (208616)	5680	NA	Theis	
	3140		Cooper Jacob	
Ob Wells: 5 (208615)	3160	3.6e-5	Theis	
	2600	2.0e-5	Cooper Jacob	
8 (208630)	12500	7.7e-5	Theis	Adjusted to remove regional water level trend
Steady-state Distance Drawdown Analysis		**L (feet)**	**C (days)**	
	918	3000	9800	de Glee

Representative Aquifer Characteristics:

Transient Analysis

Transmissivity : 3000 (ft^2/day)
Storage Coefficient : 3.0e-5

Steady-state Analysis

Transmissivity : 918 (ft^2/day)
Leakage Factor : 3000 feet
Hydraulic Resistance : 9800 days

Boundaries:

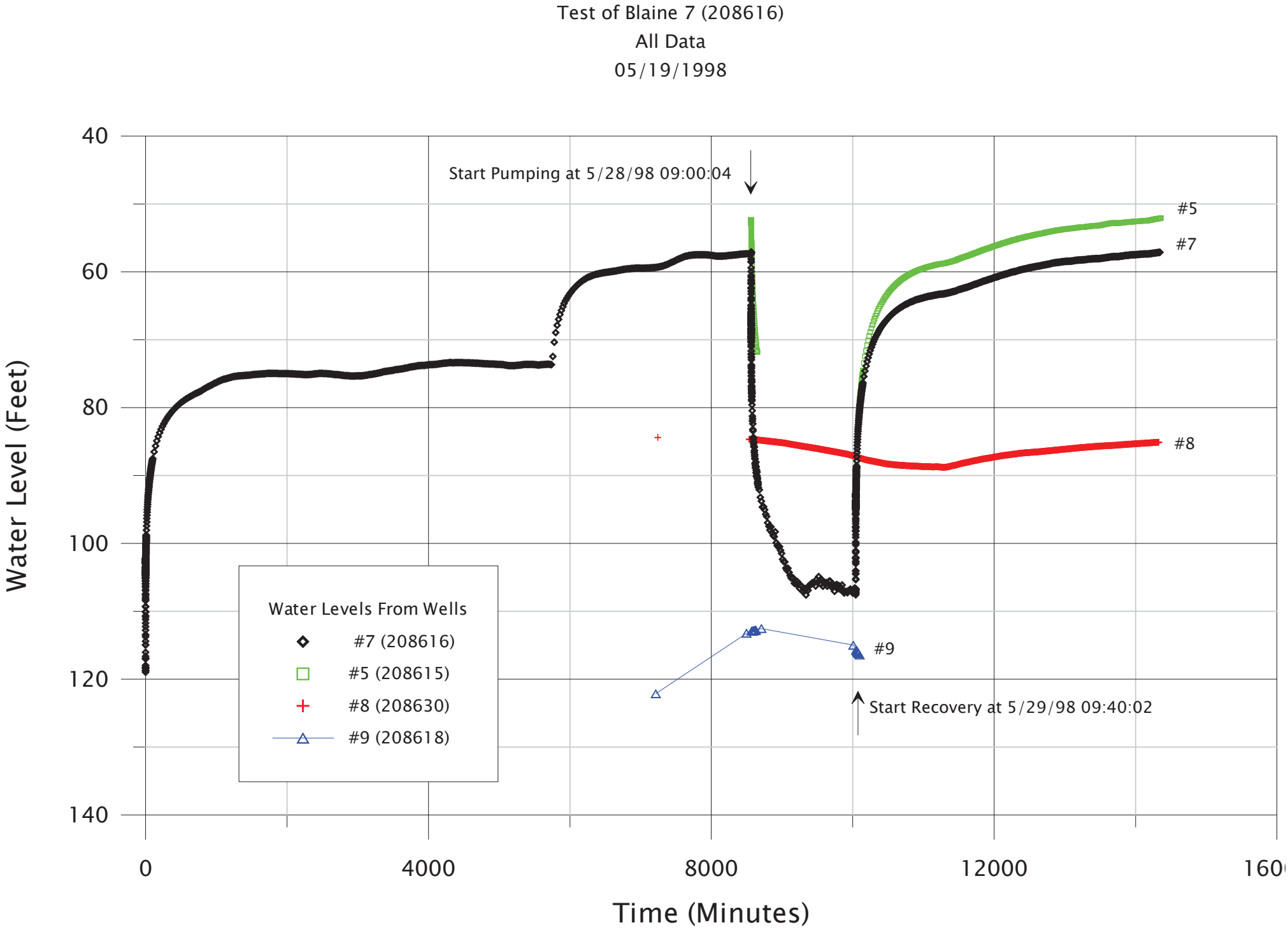
A negative boundary was encountered within 250 minutes of pumping start. It appears that the boundary is between wells 7 and 9 because of the lack of drawdown in well 9.

Conceptual model:

The results are quite consistent between the pumping and recovery periods and show that the aquifer is highly confined.

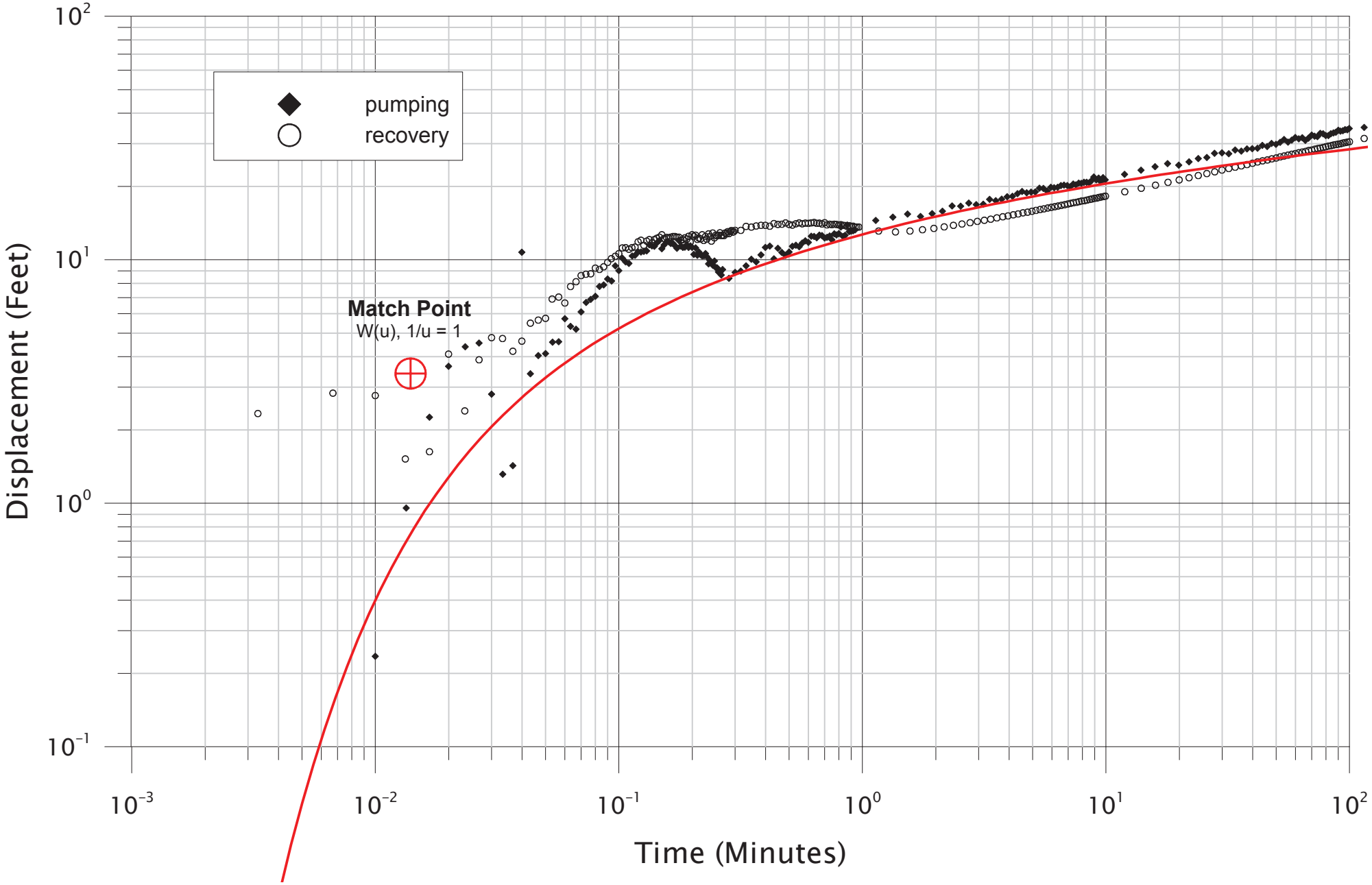
Appendix 1

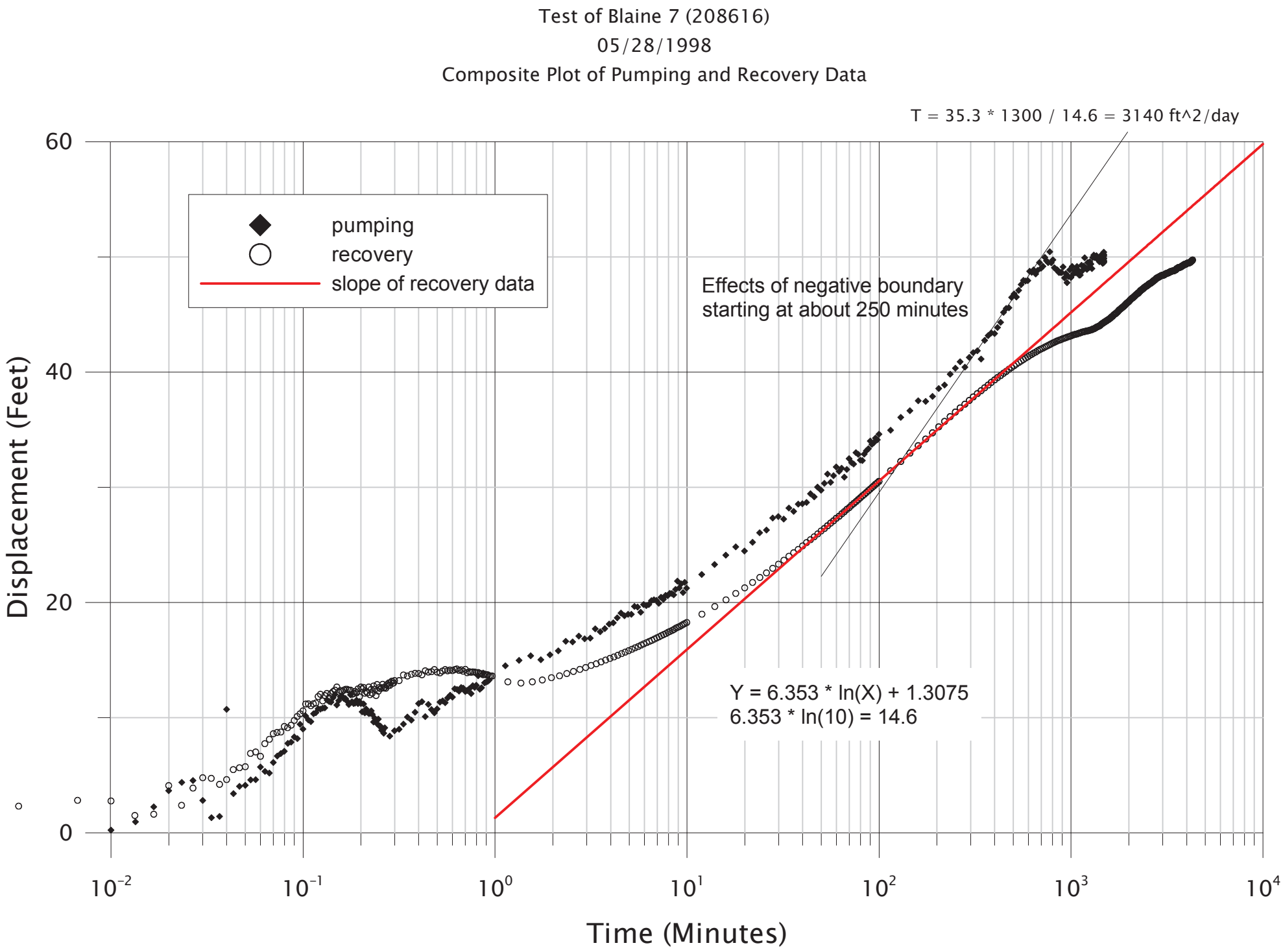
Graphical Analysis


Test of Blaine 7 (208616)
All Data
05/19/1998
Start Pumping at 5/28/98 09:00:04
Start Recovery at 5/29/98 09:40:02
#5
#7
#8
#9
Water Levels From Wells
#7 (208616)
#5 (208615)
#8 (208630)
#9 (208618)
Water Level (Feet)
40
60
80
100
120
140
0
4000
8000
12000
160
Time (Minutes)

Test of Blaine 7 (208616)
05/28/1998
Composite Plot of Pumping and Recovery Data

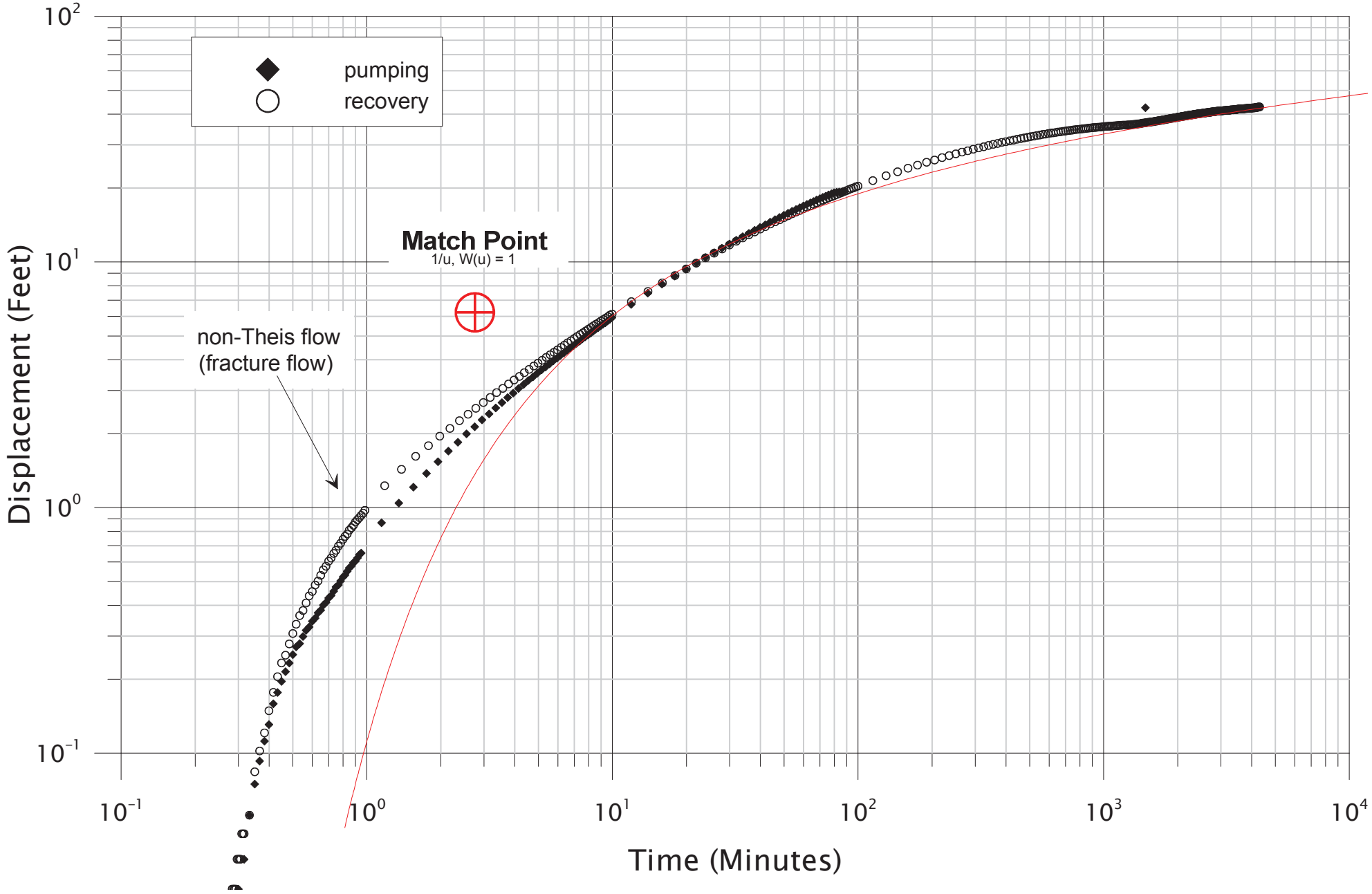
T = 15.3 * 1300 / 3.5 = 5,680 ft^2/day




Test of Blaine 7 (208616)
05/28/1998
Composite Plot of Pumping and Recovery Data
T = 35.3 * 1300 / 14.6 = 3140 ft^2/day
pumping
recovery
slope of recovery data
Effects of negative boundary
starting at about 250 minutes
Y = 6.353 * ln(X) + 1.3075
6.353 * ln(10) = 14.6
Displacement (Feet)
Time (Minutes)
60
40
20
0
10^-2
10^-1
10^0
10^1
10^2
10^3
10^4

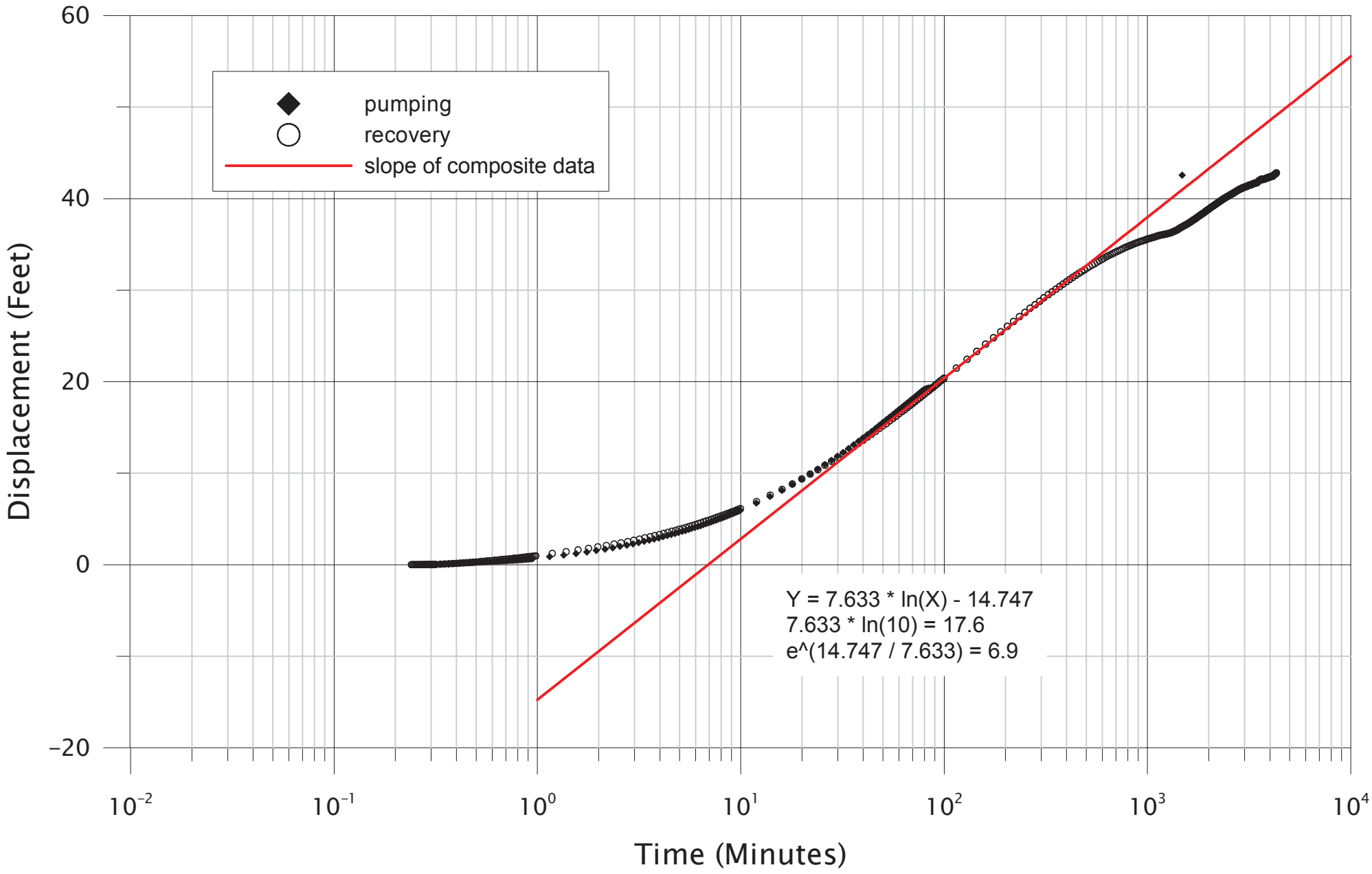
Test of Blaine 7 (208616)
Observations from 5 (208615)
Composite of Pumping and Recovery Data
05/28/1998

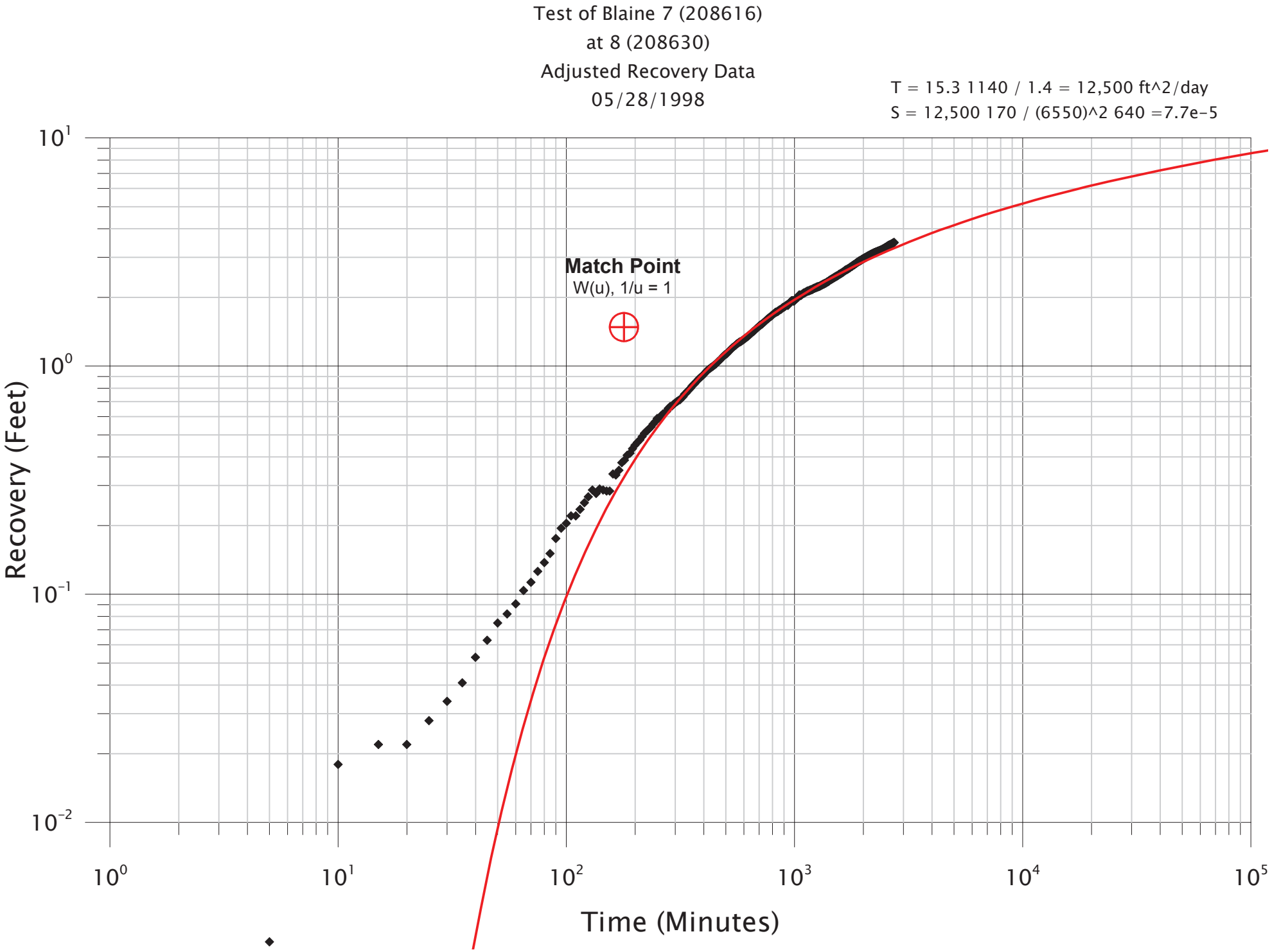
T = 15.3 1280 / 6.2 = 3160 ft^2/day
S = 3160 2.8 / (1170)^2 / 640 = 3.6e-5



Test of Blaine 7 (208616)
Obsevations at Blaine 5 (208615)
05/28/1998
Composite Plot of Pumping and Recovery Data

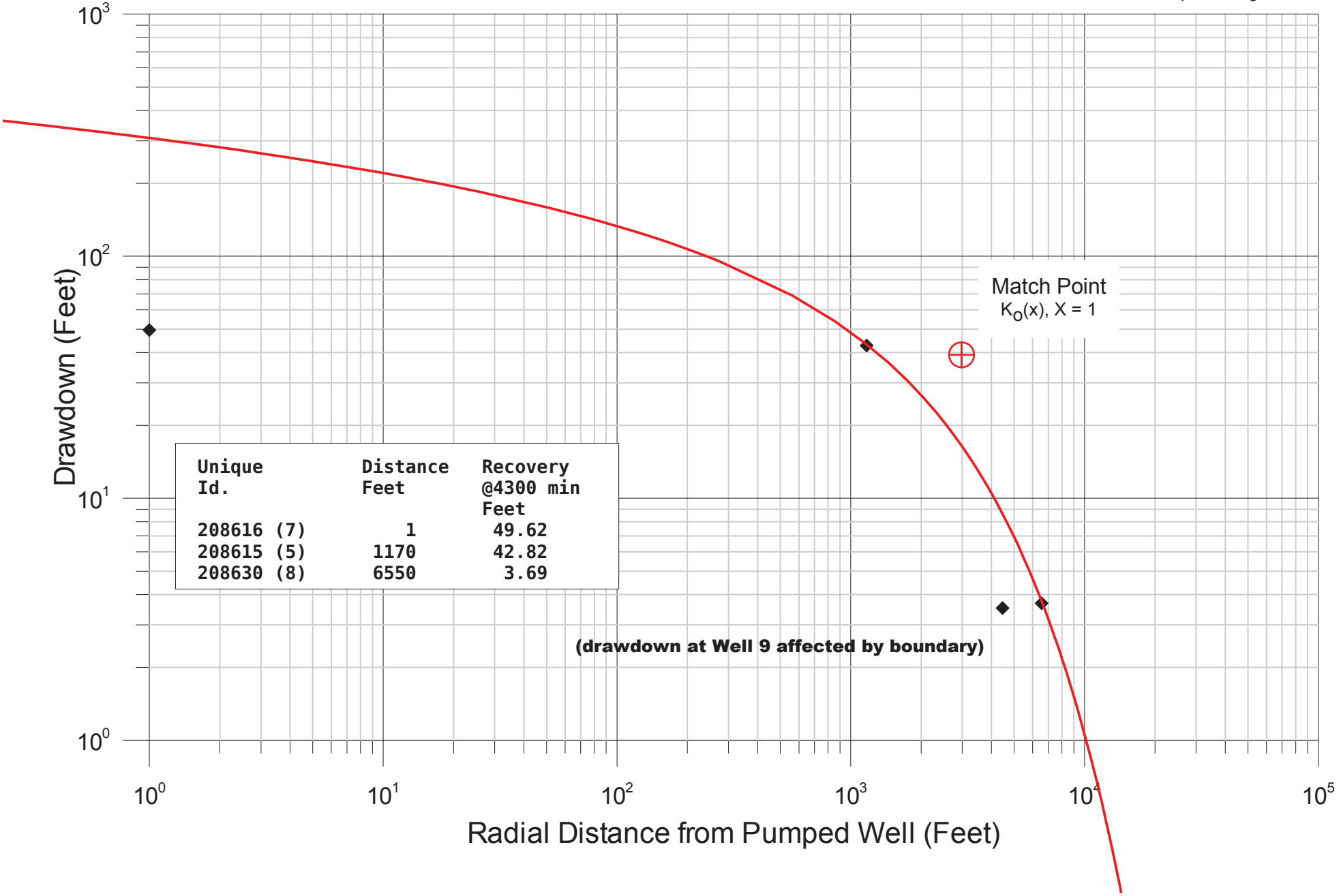
T = 35.3 * 1300 / 17.6 = 2,600 ft^2/day
S = 2600 * 6.9 / (1170)^2 / 640 = 0.00002




Test of Blaine 7 (208616)
at 8 (208630)
Adjusted Recovery Data
05/28/1998
T = 15.3 1140 / 1.4 = 12,500 ft^2/day
S = 12,500 170 / (6550)^2 640 =7.7e-5
Match Point
W(u), 1/u = 1
Recovery (Feet)
Time (Minutes)
10^1
10^0
10^-1
10^-2
10^0
10^1
10^2
10^3
10^4
10^5

Test of Blaine 7 (208616)
May 28, 1998
Distance Drawdown Plot after 4300 Minutes of Pumping

T= 30.6 * 1140 / 38 = 918 ft^2/day
L = 3000 and c = 3000^2/ 918 = 9,800 days



Unique Id.	Distance Feet	Recovery @4300 min Feet
208616 (7)	1	49.62
208615 (5)	1170	42.82
208630 (8)	6550	3.69

Appendix 2

Documentation

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

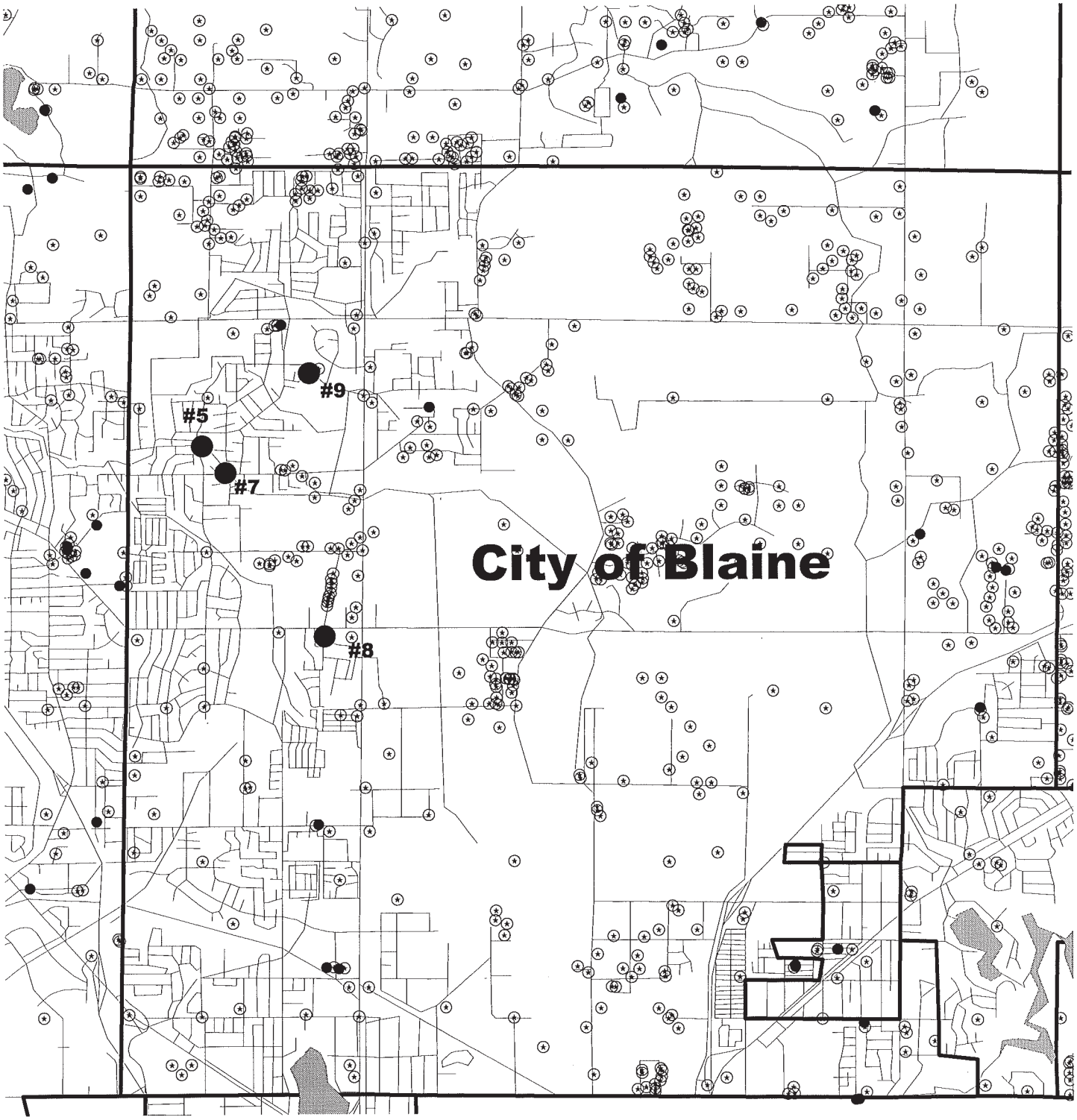
Test No.

Aquifer Test Information

Test Location: Blaine #7	Well Owner: City of Blaine	Test Conducted By: J. Blum (MDH)
Date/Time Test Start: 5/28/98 09:00:04.0	Flow Rate (Units): 1200 gpm	Pump Type: Turbine
Date/Time Recovery Start: 5/29/98 09:40:02.0	Flow Rate Measuring Device: Turbine Flowmeter	Pump Intake Depth
Date/Time Test Finish	Totalizer: End: 11,691,800	Pumped Well Inner Casing Diameter
Notes: pre lube 1:06 min	Totalizer: Start: 9,922,200	Confined/Unconfined: confined
	Total Pumped (Units): 1,769,600 gallons	Quad Sheet Name/Number

Unique Well Numbers	Location T, R, S, Quarters	Location N, E	Radial Distance	Open Depth	Transducer Setting	Measuring Point Location	Elevation, Datum
Pumped Well #7 (208616)		N E					
Observation Wells #5 (208615)		N E	1170				
#9 (208618)		N E	4470				
#8 (208620)		N E	6550				
		N E					
		N E					

Sketch Map of Well Locations



Location of Public Water Supply Wells in the Ironton-Galesville Aquifer, Blaine, MN

IC #140-0523 (5/96)

Aquifer Test Data Form

Test: Blume #7 | By: J. Blum | Test Date: 05/28/98 | Page ____ of ____

Location (Unique Well No.)	Date Month	Day	Year	Time Hour	Minute	Sec.	Elapsed Time (Minutes)	Depth to Water	Drawdown/ Recovery	Discharge	Remarks
											Totalizer
#7 (208616	05	28	98	09	00	04				0	9922200 start test
					05	—				~1320	9928600 1280
					10	—				1320	9935100 1300
					15	—				1300	9941700 1320
					20	—				1300	9948100
					25	—				1280	9954500
					30	—				1280	9961000
					35	—				1280	9967400
					40					1300	9973800
					45						
					52	—				1280	9989000
					55						~~9995100~~
				10	—					1280	9995100
				11	30					1250	10110400
				~~12~~	—						
				15	—					1210	10365000
				21	—					1280	10813000
	05	29	98	09	18	—				1150	11664500 1160
				09	35	—					11686100 1130
				09	40	02	1450				11697800 end 1140

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

Notes:

IC #140-0523 (5/96)

Aquifer Test Data Form

Test:	By:	Test Date:	Page ____ of ____

Location (Unique Well No.)	Date Month	Day	Year	Time Hour	Minute	Sec.	Elapsed Time (Minutes)	Depth to Water	Drawdown/ Recovery	Discharge	Remarks
#9 (208618)	05	28	98	07	55	–		113.22			
#8 (208630)				08	20	–		84.66			xD_o = 11.04
#5 (208615)				08	40	–		52.41			xD_o = 19.80
#7 (208616)											xD_A = 57.25 xD_B = 71.24
				09	00	04			start test		9922208 ⏲
#9	05	27	98	10	30	–		122.12			
#5								61.55			
#8								84.37			
#5	05	29	98	09	31	–		94.90			reset probe xD_o 4.91
#7	05	29	98	09	40	02					stop pumping xD_o = 21.94
#9				10	35			116.44			

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

Notes: Pre lube 1:06 min
8:58:55 transducer/pump

Aquifer Test Data Form

Test: Blum #7	By: J. Blum	Test Date:	Page ____ of ____

Location (Unique Well No.)	Date Month	Date Day	Date Year	Time Hour	Time Minute	Time Sec.	Elapsed Time (Minutes)	Depth to Water	Drawdown/ Recovery	Discharge	Remarks
#3 208630	06	01	98	09	10	—		85.14			48.67 XD_f 10.60 XD_c
#7				09	25	—		57.17			57.08 XD_f 71.84 XD_c
				09	45	—		51.31			52.87 XD_f 47.02 XD_c

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

Notes:

IC #140-0523 (5/96)

IC #140-0523 (5/96)

Aquifer Test Data Form

Test:	By:	Test Date:	Page ____ of ____

Location (Unique Well No.)	Date Month	Day	Year	Time Hour	Minute	Sec.	Elapsed Time (Minutes)	Depth to Water	Drawdown/ Recovery	Discharge	Remarks
#9	05	28	98	09	00			113.22			static (time ~ 7:50 AM)
				09	06			112.92			Solinist line left in well between
				09	10			112.92			↓ measurements
				09	15			112.91			Blaine Utilities flow
				09	20			112.89			↓ meter record indicates:
				09	25			112.88			5/26/98 (8:30) 338,798
				09	30			112.87			↓ 5/27 (10:00) 339,290
				09	35			112.85			5/28 (9:00) 339,290
				09	40			112.84			↓
				09	45			112.83			
				09	50			112.81			
				09	55			112.79			
				10	00			112.78			
				10	05			112.76			
				11	23			112.53			
	05	29	98	09	05			114.98			
				09	46			115.70			
				09	50			115.75			
				09	55			115.85			
				10	02			115.94			
				10	10			116.08			
				10	15			116.16			
				10	20			116.22			

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

Notes: 1

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

Determination of Aquifer Properties and Aquifer Test Plan (DAP-ATP) Form

Public Water Supply ID:	1020031	PWS Name:	Fridley

Contact Information for Person Completing this Form

Name:	Adam Janzen
Address:	4300 MarketPointe Drive
	Suite 200
City, State, Zip:	Bloomington, MN 55435
Phone, Fax, e-mail:	(952) 842-3596 (p), (952) 832-2601 (f), ajanzen@barr.com

Aquifer Properties Determination Methods

For Methods 1 - 5, check all that apply - attach Summary of Aquifer Properties Based on Existing Data

- ☐ 1. An existing pumping test that meets the requirements of wellhead protection rule part 4720.5520 and that was previously conducted on a well connected to the public water supply system.
- ☐ 2. An existing pumping test that meets the requirements of wellhead protection rule part 4720.5520 and that was previously conducted on another well in a hydrogeologic setting determined by the department to be equivalent.
- ☐ 3. An existing pumping test that does not meet the requirements of wellhead protection rule part 4720.5520 and that was previously conducted on: 1) a public water supply well or 2) another well in a hydrogeologic setting determined by the department to be equivalent.
- ☑ 4. Existing specific capacity test(s) conducted on the public water supply well(s) or specific capacity tests conducted on other wells in a hydrogeologic setting determined by the department to be equivalent.
- ☐ 5. An existing published transmissivity value.

For Method 6 or 7 - attach detailed Aquifer Test Plan for Proposed Test

- ☐ 6. A proposed new test to be conducted on a new or existing well connected to the public water supply system and that meets the requirements for larger-sized water systems (wellhead protection rule part 4720.5520). The test plan must be approved before conducting the test.
- ☐ 7. A proposed new test to be conducted on a new or existing public well connected to the public water supply system and that meets the requirements for smaller-sized water systems (wellhead protection rule part 4720.5530). The test plan must be approved before conducting the test.

List the unique number of each public water supply well to which this DAP-ATP Form applies

206674	206657				
206670					
201158					
206675					

Submitted by: Adam Janzen	Prof. License: 53665	Date: 5/1/2018
Reviewed by: Amal Djerrari	Approved: ◉ Yes ○ No	Approval Date: 5/2/2018

Summary of Aquifer Properties Based on Existing Data

Aquifer Name: Mt. Simon Sandstone | **Aquifer Code:** CMTS

Hydraulic Confinement ☑ Confined ☐ Unconfined ☐ Fractured Rock

Aquifer Test Number of test(s) on file used to compile the information tabulated below:

5

Aquifer Properties Summary Table

Representative Values		Unit	Range		+/- %
			Minimum	Maximum	
Top Stratigraphic Elev.	227.5	feet (MSL)	225	243	+6.8/-1.1
Bottom Stratigraphic Elev.	21	feet (MSL)	15	53	+152/-29
Transmissivity (T)	5048	ft^2/day	2242	10605	+110/-56
Aquifer Thickness (b)	206.5	feet	190	210	+1.7/-8
Saturated Thickness* (b)		feet			
Hydraulic Conductivity (k)	24.4	ft/day	11.8	50.5	+107/-52
Primary Porosity (e_p)	0.2	0.00 %			
Secondary Porosity** (e_s)		0.00 %			
Storativity (S)		dimensionless			
Characteristic Leakage (L)		feet			
Hydraulic Resistance (c)		days			

Notes: Shaded fields are required - * hydraulically unconfined aquifer - ** dual porosity aquifer because of fractures or solution weathering

Describe rationale for selected method(s). Attach documentation and analysis.

Production tests were conducted on Fridley Well 2 (206674) and Fridley Well 3 (206670). Three production tests were conducted on Fridley Well 2. Of these three tests, two were found to be acceptable for analysis. Five production tests were performed on Fridley Well 3. Of these five tests, three were found to be acceptable for analysis (see attached sheet provided by MDH).

Below is a summary of the results from the two tests for Fridley Well 2 (206674):

Flow Rate (gpm)	T(ft**2/day)
1018	2389
1319	2855

Below is a summary of the results from the three tests for Fridley Well 3 (206670):

Flow Rate (gpm)	T(ft**2/day)
935	8890
1016	9671
1212	10602

The representative hydraulic conductivity of the Mt. Simon of 24.4 ft/day was calculated from the geometric mean of the average transmissivities from Well 2 and Well 3 (5048 ft**2/day) and the average Mt. Simon thickness of 206.5 feet at Wells 2 and 3. For the model sensitivity analysis, the upper hydraulic conductivity of the CMTS will be set to the maximum result from the production tests (50.5 ft/day) and the lower hydraulic conductivity of the CMTS will be set to the minimum result from the production tests (11.8 ft/day).

The logs for Fridley Wells 2, 3, 4, and 5 were used to determine the range of Mt. Simon thicknesses and contact elevations. The representative values are arithmetic means of the values at Wells 2 and 3.

DRAFT / Beta Version 1

Worksheet for Estimating Transmissivity and Hydraulic Conductivity from Specific Capacity Test Data

Explanation and notes attached.

		Field Data										*Estimated Parameters*			*Calculated Results*							
			Depth to Water				Aquifer			Screened Interval						Saturated		Partial				
		inches	feet	gpm	hours	feet		feet	feet	feet	feet	-	sec^2/ft^5	feet	feet	feet	feet	-	gpm/ft	sq ft/sec	sq ft/day	ft/day
Location	Unique ID	Well Diam.	Initial	Mean Pumping Rate	Test Duration	Final	Aquifer	Depth to Top	Depth to Bottom	Depth to Top	Depth to Bottom	Storage Coeff. (S)	Well loss Coeff. (C)	Aquifer Thickness (b)	Measured Drawdown (sm)						Transmissivity (T)	Conductivity (K)
FRIDLEY 11	**206657**	24.00	52.0	1000	16	144.0	**CJMS**	**325**	**669**	**325**	**669**	0.001	0	**344**	92.00	344.0	0.0E+00	0.00	10.87	**2.9E-02**	**2521.9**	**7.3**
FRIDLEY 3	**206670**	10.00	150.0	1600.0	4.0	248.0	**CMTS**	**660**	**870**	**784**	**836**	0.001	0	**210**	98.00	52.0	0.0E+00	13.57	16.33	**1.3E-01**	**11037.4**	**52.6**
FRIDLEY 3	**206670**	10.00	150.0	800.0	2.5	226.0	**CMTS**	**660**	**870**	**784**	**836**	0.001	0	**210**	76.00	52.0	0.0E+00	13.57	10.53	**8.1E-02**	**6966.3**	**33.2**
FRIDLEY 3	**206670**	10.00	150.0	935.0	2.5	220.0	**CMTS**	**660**	**870**	**784**	**836**	0.001	0	**210**	70.00	52.0	0.0E+00	13.57	13.36	**1.0E-01**	**8889.5**	**42.3**
FRIDLEY 3	**206670**	10.00	150.0	1016.0	4.5	221.0	**CMTS**	**660**	**870**	**784**	**836**	0.001	0	**210**	71.00	52.0	0.0E+00	13.57	14.31	**1.1E-01**	**9670.9**	**46.1**
FRIDLEY 3	**206670**	10.00	150.0	1212.0	2.0	226.0	**CMTS**	**660**	**870**	**784**	**836**	0.001	0	**210**	76.00	52.0	0.0E+00	13.57	15.95	**1.2E-01**	**10601.9**	**50.5**
FRIDLEY 2	**206674**	16.00	130.0	400.0	8.5	236.0	**CMTS**	**635**	**838**	**675**	**838**	0.001	0	**203**	106.00	163.0	0.0E+00	0.91	3.77	**1.1E-02**	**934.1**	**4.6**
FRIDLEY 2	**206674**	16.00	130.0	1018.0	10.5	243.0	**CMTS**	**635**	**838**	**675**	**838**	0.001	0	**203**	113.00	163.0	0.0E+00	0.91	9.01	**2.8E-02**	**2388.6**	**11.8**
FRIDLEY 2	**206674**	16.00	130.0	1319.0	3.5	246.0	**OPDC**	**635**	**838**	**675**	**838**	0.001	0	**203**	116.00	163.0	0.0E+00	0.91	11.37	**3.3E-02**	**2854.5**	**14.1**
																			FRIDLEY 3 MEAN		**9720.8**	**46.3**
																			FRIDLEY 2 MEAN		**2621.6**	**12.9**
																				GEOMEAN	**5048.2**	**24.4**

Appendix C

Groundwater Model Details

Table C1
Hydraulic Conductivity Summary
Fridley WHPP Amendment

Aquifer	Base Model Transmissivity (ft^2/day)	Unit Thickness (ft)	Base Model Kx (ft/day)	Base Model Kz (ft/day)	Upper Bound Kx (ft/day)	Upper Bound Kz (ft/day)	Lower Bound Kx (ft/day)	Lower Bound Kz (ft/day)
Quaternary	64000	161	398	39.8	596	59.6	199	19.9
Prairie du Chien Group	149000	135	1104	16.7	1252	19.0	205	3.11
Jordan Sandstone	2689	87.3	30.8	3.08	46.2	4.62	15.4	1.54
Tunnel City Group	953	140	6.81	0.068	39.7	0.397	4.81	0.048
Wonewoc Sandstone	395	58	6.81	0.68	39.7	3.97	4.81	0.48
Mt. Simon Sandstone	5048	207	24.4	2.44	50.5	5.05	11.8	1.18

Aquifer	Base Model Transmissivity (m^2/day)	Unit Thickness (m)	Base Model Kx (m/day)	Base Model Kz (m/day)	Upper Bound Kx (m/day)	Upper Bound Kz (m/day)	Lower Bound Kx (m/day)	Lower Bound Kz (m/day)
Quaternary	5946	49	121	12.1	182	18.2	60.6	6.06
Prairie du Chien Group	13843	41	336	5.10	382	5.78	62.5	0.95
Jordan Sandstone	250	27	9.39	0.94	14.1	1.41	4.69	0.47
Tunnel City Group	89	43	2.08	0.021	12.1	0.121	1.47	0.015
Wonewoc Sandstone	37	18	2.08	0.21	12.1	1.21	1.47	0.15
Mt. Simon Sandstone	469	63	7.45	0.75	15.4	1.54	3.60	0.36

Table C2
High-Capacity Pumping Updates
Fridley WHPP Amendment

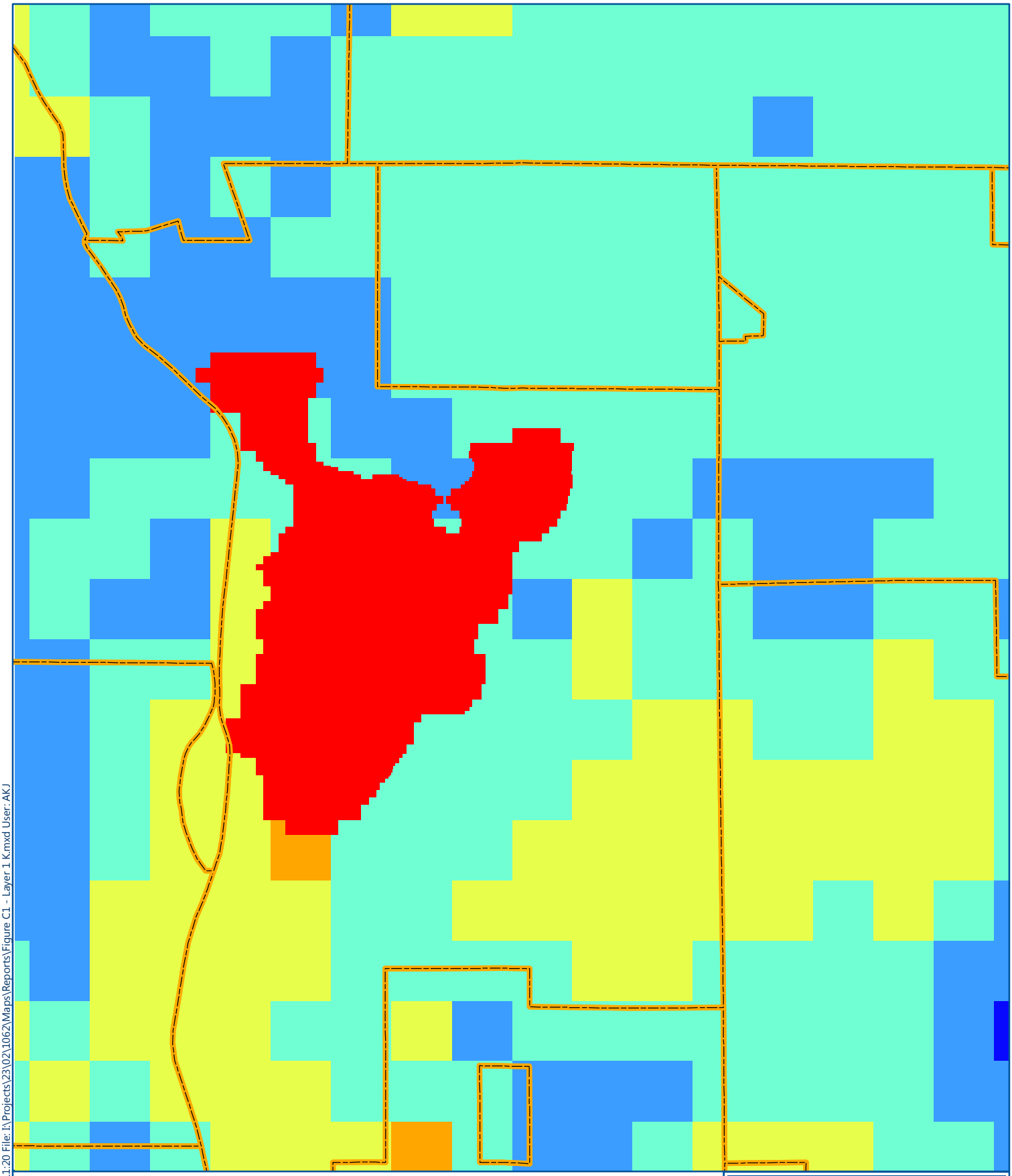
Unique Number	Permittee	DNR Permit Number	2012-2016 Average Annual Volume of Water Pumped (MG)	Existing MM3 Rate (m^3/day)	Updated Rate (m^3/day)
110485	New Brighton, City Of	1970-0157	69.82	96.47	724.13
110488	BNSF Railway	1986-6292	0.99	50.82	10.23
110493	Brooklyn Center, City of	1976-6396	71.74	1348.13	744.12
127269	Brooklyn Center, City of	1976-6396	1.38	38.04	14.34
151587	Blaine, City of	1976-6227	20.43	403.89	211.86
180920	Spring Lake Park, City Of	1972-0123	27.68	698.88	287.14
184900	Brooklyn Park, City of - Public Works Dept	1976-6046	0.00	202.25	0.00
200252	Marshall Concrete Products	1965-1355	1.46	27.94	15.18
200524	St Anthony, City Of	1960-0907	153.87	1716.30	1595.91
200588	Xcel Energy	1978-6037	0.00	144.46	0.00
203026	Brooklyn Park, City of - Public Works Dept	1976-6046	0.00	25.41	0.00
203257	Brooklyn Center, City of	1976-6396	123.56	2193.27	1281.58
203258	Brooklyn Center, City of	1976-6396	183.85	2930.36	1906.79
203259	Brooklyn Center, City of	1976-6396	28.98	1818.75	300.56
203260	Brooklyn Center, City of	1976-6396	1.05	17.62	10.93
203321	Brooklyn Center, City of	1976-6396	408.11	2816.93	4232.84
203424	Brookdale Mall HH, LLC	1975-6259	0.00	10.91	0.00
203577	Minneapolis Parks & Rec Board	1978-6334	0.78	46.10	8.13
206638	Spring Lake Park, City Of	1972-0123	62.35	708.57	646.65
206659	Brand-Broadway Assoc	1963-1021	6.56	0.00	67.99
206660	Brand-Broadway Assoc	1963-1021	37.41	395.57	388.01
206679	Ind School District 14	1991-6160	3.62	51.65	37.54
206680	Stylmark INC	1960-0717	0.51	7.63	5.27
206683	Ind School District 14	1968-1184	4.65	71.22	48.24
206716	Mounds View, City Of	1976-6253	103.44	78.86	1072.81
206717	Mounds View, City Of	1976-6253	154.75	1502.18	1604.99
206720	Mounds View, City Of	1976-6253	19.60	759.46	203.32
206721	Mounds View, City Of	1976-6253	21.13	1117.06	219.13
206722	Mounds View, City Of	1976-6253	139.44	1793.40	1446.28
206761	New Brighton, City Of	1969-1220	3.56	48.55	36.93
206792	New Brighton, City Of	1970-0157	85.73	3579.83	889.12
206793	New Brighton, City Of	1970-0157	152.16	1487.93	1578.13
206795	New Brighton, City Of	1970-0157	31.67	80.00	328.44
206796	New Brighton, City Of	1970-0157	151.02	1083.82	1566.34
206797	New Brighton, City Of	1970-0157	103.06	873.34	1068.88
208645	Blaine, City of	1976-6227	338.63	2474.02	3512.13
208646	Blaine, City of	1976-6227	394.07	2406.03	4087.16
223294	Spring Lake Park, City Of	1972-0123	59.13	684.12	613.27
255337	Cemstone Products Company	1986-6056	0.00	25.91	0.00
255921	GAF Corporation	1985-6009	39.26	641.57	407.18
255950	Hard Chrome Inc	2003-3153	14.51	187.57	150.53
415905	Brooklyn Park, City Of - Edinburgh Golf Course	1985-6270	15.32	126.28	158.93
415906	Brooklyn Park, City Of - Edinburgh Golf Course	1985-6270	30.65	458.35	317.85
431653	BAE Systems	1987-6280	2.67	89.62	27.66

Table C2
High-Capacity Pumping Updates
Fridley WHPP Amendment

Unique Number	Permittee	DNR Permit Number	2012-2016 Average Annual Volume of Water Pumped (MG)	Existing MM3 Rate (m^3/day)	Updated Rate (m^3/day)
431654	BAE Systems	1987-6280	19.74	169.04	204.72
431655	BAE Systems	1987-6280	18.37	201.95	190.54
431656	BAE Systems	1987-6280	12.60	114.85	130.67
439723	Bell Lumber And Pole Co	1986-6104	0.00	0.35	0.00
468118	Brooklyn Center, City of	1976-6396	232.05	1331.12	2406.77
478398	Metropolitan Council	1992-6089	0.00	14.14	0.00
480297	Metropolitan Council	1992-6089	0.00	14.18	0.00
482891	Minneapolis Parks & Rec Board	1993-6159	15.05	243.38	156.05
509083	New Brighton, City Of	1970-0157	37.39	125.52	387.76
520931	New Brighton, City Of	1970-0157	0.00	37.51	0.00
538076	Kurt Manufacturing	1996-6184	14.30	155.16	148.33
538124	Medtronic Inc	2004-3110	11.75	56.64	121.83
554216	New Brighton, City Of	1970-0157	58.20	2501.92	603.67
559393	BNSF Railway	1986-6292	1.10	56.09	11.41
559394	BNSF Railway	1986-6292	0.40	30.56	4.15
561185	US Navy	1992-6127	46.71	570.29	484.50
561186	US Navy	1992-6127	15.14	377.35	157.00
563006	Spring Lake Park, City Of	1972-0123	99.19	972.60	1028.81
582628	New Brighton, City Of	1970-0157	269.12	4478.14	2791.21
592308	MN Pollution Control Agency - St Paul	1999-6094	0.46	13.17	4.77
611095	US Navy	1992-6127	11.81	146.56	122.50
611096	US Navy	1992-6127	6.22	94.32	64.47
611097	US Navy	1992-6127	19.69	482.54	204.25
611098	US Navy	1992-6127	4.86	55.60	50.39
616482	MN Pollution Control Agency - St Paul	1999-6094	0.00	5.86	0.00
616483	MN Pollution Control Agency - St Paul	1999-6094	0.41	5.27	4.23
616485	MN Pollution Control Agency - St Paul	1999-6094	2.18	21.22	22.60
616486	MN Pollution Control Agency - St Paul	1999-6094	3.66	51.50	37.96
616507	MN Pollution Control Agency - St Paul	1999-6094	0.00	8.31	0.00
616512	MN Pollution Control Agency - St Paul	1999-6094	0.99	34.49	10.23
623328	MN Pollution Control Agency - St Paul	1999-6094	0.37	13.54	3.85
623340	MN Pollution Control Agency - St Paul	1999-6094	3.02	49.48	31.28
628907	MN Pollution Control Agency - St Paul	1999-6094	0.05	1.91	0.52
628911	MN Pollution Control Agency - St Paul	1999-6094	0.05	3.42	0.47
628999	MN Pollution Control Agency - St Paul	1999-6094	0.79	20.82	8.21
645009	Brooklyn Center, City of	2004-3239	103.70	657.17	1075.58
660019	Hard Chrome Inc	2003-3005	0.04	4.55	0.38
660020	Hard Chrome Inc	2003-3005	0.11	2.93	1.14
660021	Hard Chrome Inc	2003-3005	0.12	4.25	1.21
683303	MN Pollution Control Agency - St Paul	1999-6094	0.78	20.53	8.10
717750	Ashland Petroleum Company	2007-0285	2.67	9.41	27.68
717754	Ashland Petroleum Company	2007-0285	0.96	7.56	10.00
735054	Xcel Energy	1978-6037	37.61	240.57	390.13

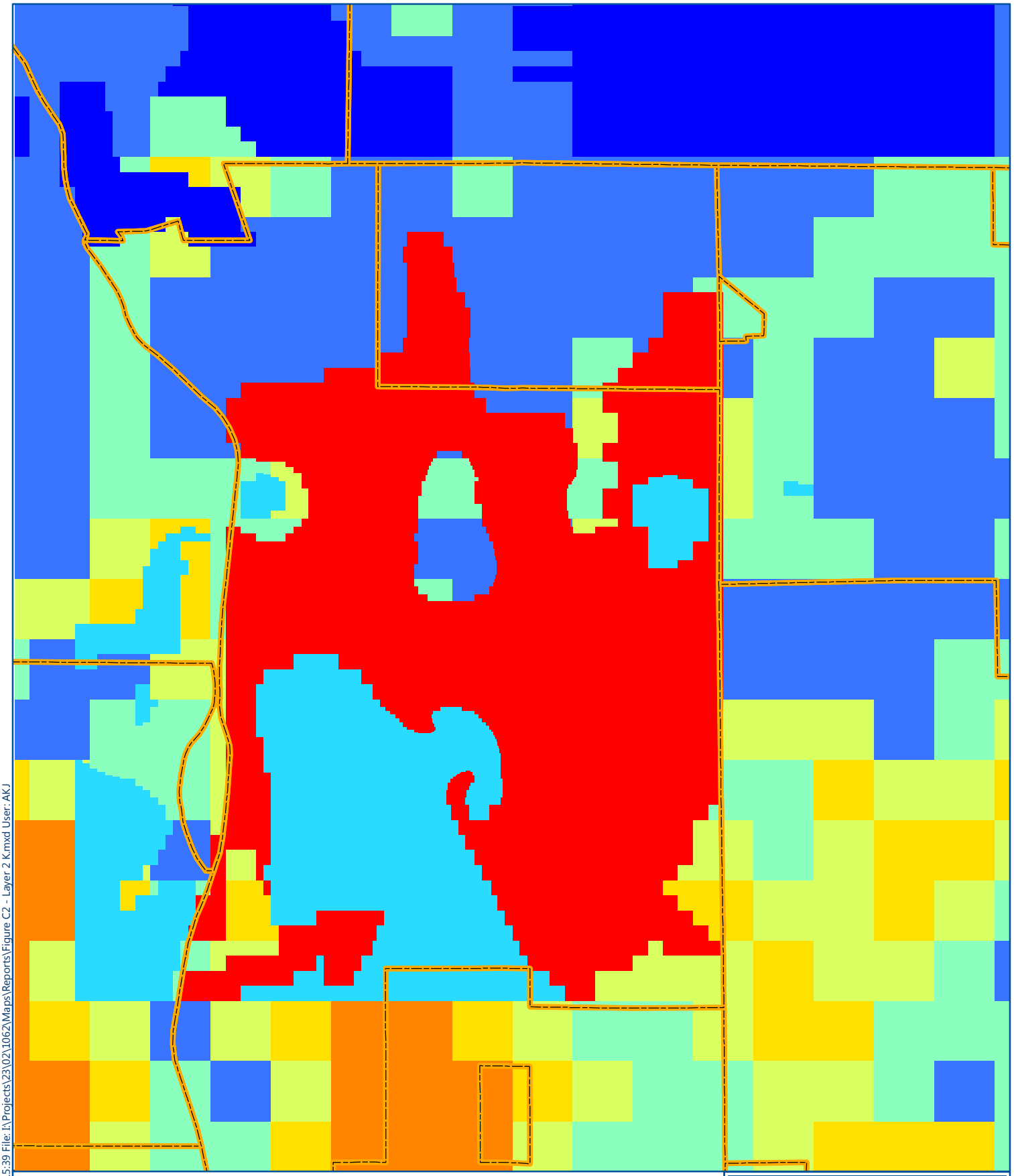
Table C2
High-Capacity Pumping Updates
Fridley WHPP Amendment

Unique Number	Permittee	DNR Permit Number	2012-2016 Average Annual Volume of Water Pumped (MG)	Existing MM3 Rate (m^3/day)	Updated Rate (m^3/day)
737627	Soo Line Railroad Company dba Canadian Pacific	2007-0727	6.76	28.95	70.15
737634	Soo Line Railroad Company dba Canadian Pacific	2007-0211	9.21	51.02	95.50
737636	Soo Line Railroad Company dba Canadian Pacific	2007-0727	1.86	8.17	19.34
751349	Soo Line Railroad Company dba Canadian Pacific	2007-0727	4.52	17.10	46.91
751350	Soo Line Railroad Company dba Canadian Pacific	2007-0727	0.83	5.26	8.59
755058	Soo Line Railroad Company dba Canadian Pacific	2007-0727	1.00	3.98	10.35
755059	Soo Line Railroad Company dba Canadian Pacific	2007-0211	9.09	40.27	94.26
756598	Ashland Petroleum Company	2007-0285	0.00	0.05	0.00



HORIZONTAL HYDRAULIC CONDUCTIVITY (Kx)
MODEL LAYER 1
Fridley WHPP Amendment
City of Fridley, MN

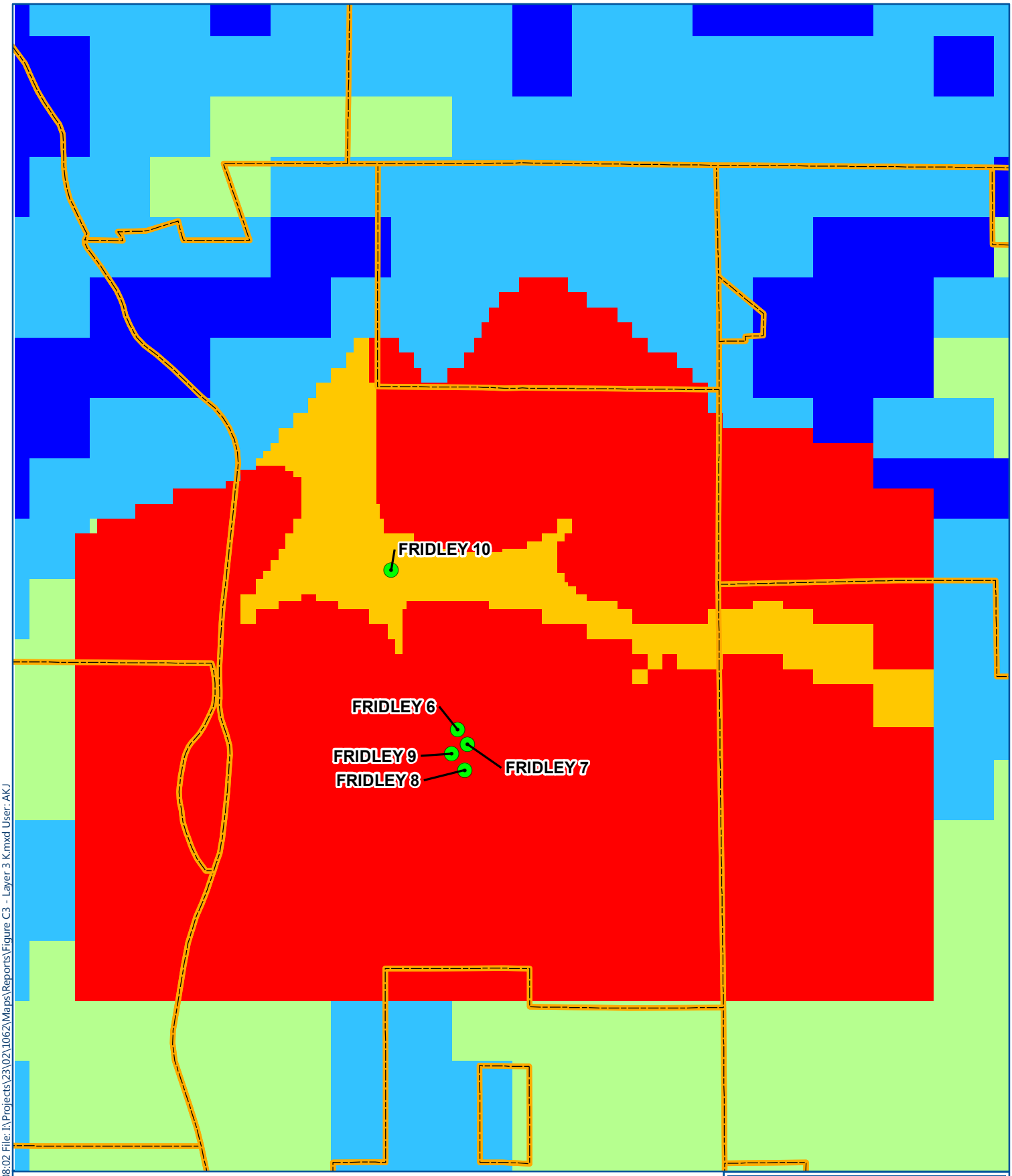
FIGURE C1



BARR

HORIZONTAL HYDRAULIC CONDUCTIVITY (Kx)
MODEL LAYER 2
Fridley WHPP Amendment
City of Fridley, MN

FIGURE C2



Fridley Municipal Well Open to Prairie du Chien or Quaternary

Municipal Boundary

Kx3 (m/day)

- 1.00 - 10.00
- 10.01 - 50.00
- 50.01 - 120.99
- 121.00
- 336.00

N

0 3,500

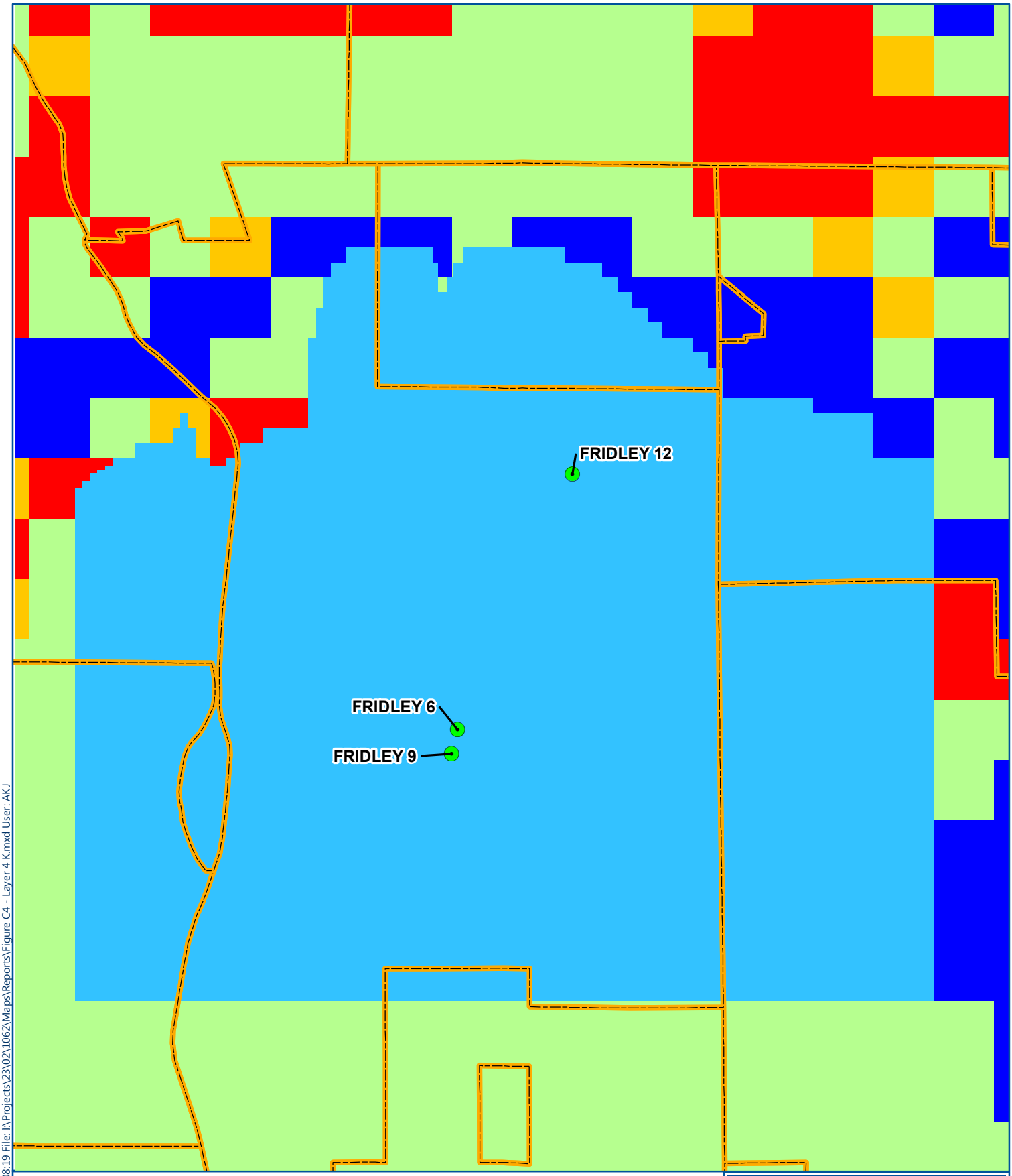
Feet

HORIZONTAL HYDRAULIC CONDUCTIVITY (Kx)
MODEL LAYER 3
Fridley WHPP Amendment
City of Fridley, MN

FIGURE C3

BARR

Barr Footer: ArcGIS 10.6, 2018-05-01 08:02 File: I:\Projects\23\02\1062\Maps\Reports\Figure C3 - Layer 3 K.mxd User: AKJ



Fridley Municipal Well Open to Jordan

Municipal Boundary

Kx4 (m/day)

- 1.02 - 9.38
- 9.39
- 9.40 - 20.00
- 20.01 - 30.00
- 30.01 - 50.00

N

0 3,500

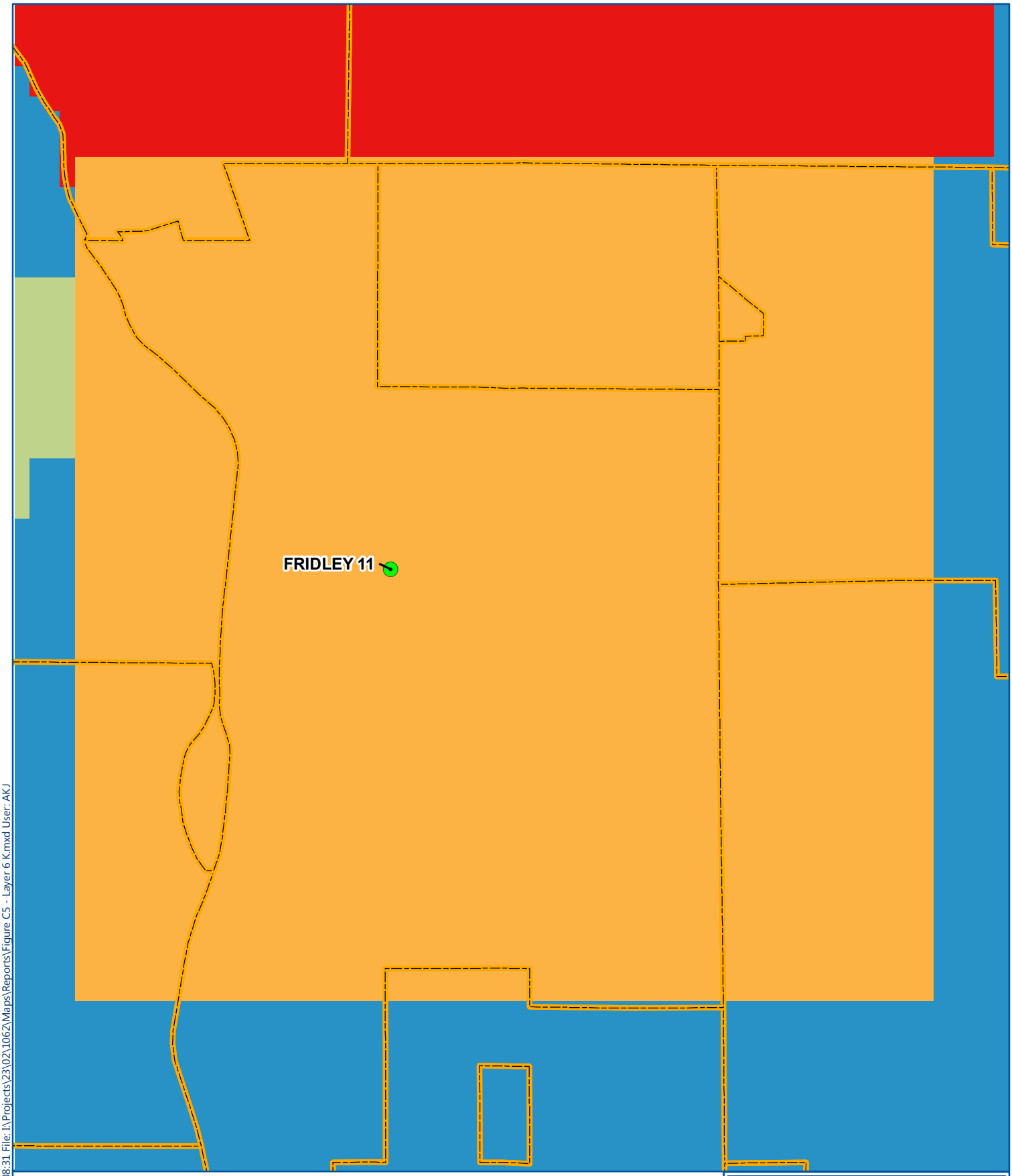
Feet

BARR

HORIZONTAL HYDRAULIC CONDUCTIVITY (Kx)
MODEL LAYER 4
Fridley WHPP Amendment
City of Fridley, MN

FIGURE C4

Barr Footer: ArcGIS 10.6, 2018-05-01 08:19 File: I:\Projects\23\02\1062\Maps\Reports\Figure C4 - Layer 4 K.mxd User: AKJ



Fridley Municipal Well Open to Tunnel City Group

Municipal Boundary

Kx6 (m/day)

- 0.33 - 0.43
- 1.62 - 1.65
- 2.08
- 14.8

N

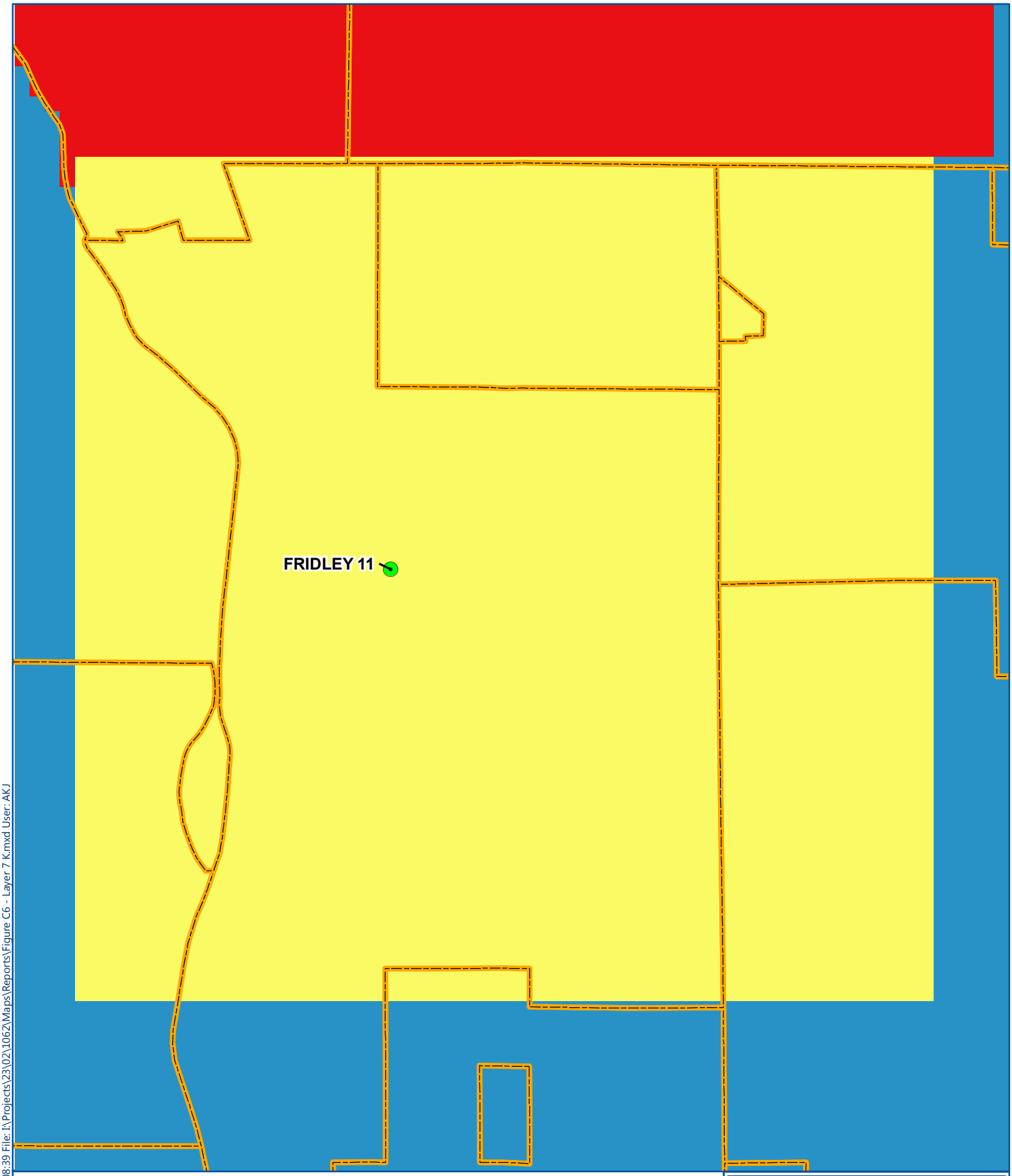
0 3,500

Feet

BARR

HORIZONTAL HYDRAULIC CONDUCTIVITY (Kx)
MODEL LAYER 6
Fridley WHPP Amendment
City of Fridley, MN

FIGURE C5



Fridley Municipal Well Open to Wonewoc Sandstone

Municipal Boundary

Kx7 (m/day)

0.35 - 0.57

2.08

11.1

N

0 3,500

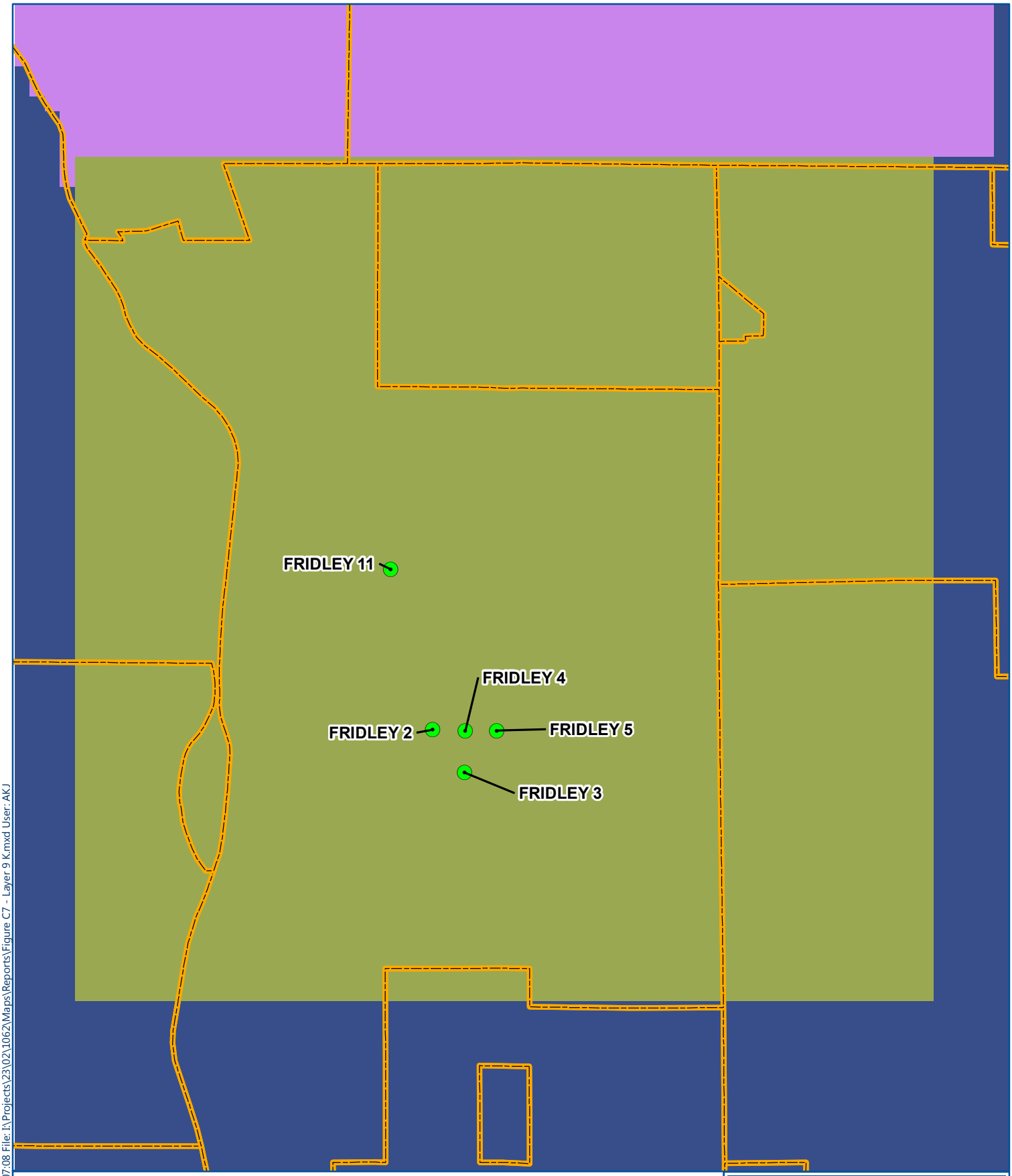
Feet

BARR

HORIZONTAL HYDRAULIC CONDUCTIVITY (Kx)
MODEL LAYER 7
Fridley WHPP Amendment
City of Fridley, MN

FIGURE C6

Barr Footer: ArcGIS 10.6, 2018-05-01 08:39 File: I:\Projects\23\02\1062\Maps\Reports\Figure C6 - Layer 7 K.mxd User: AKJ



Fridley Municipal Well Open to Mt. Simon

Municipal Boundary

Kx9 (m/day)

0.87 - 1.1

3.60

7.45

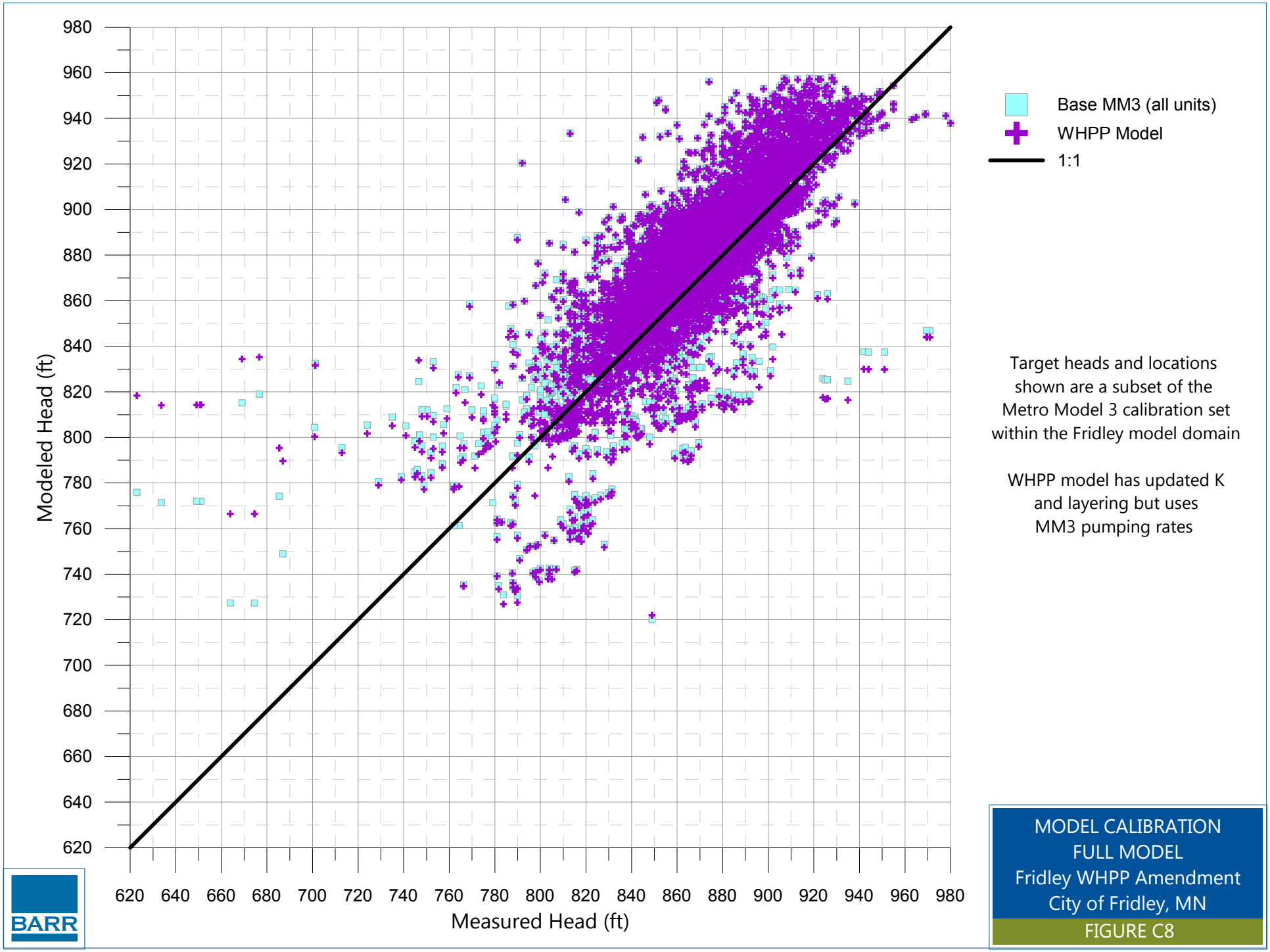
0 3,500

Feet

HORIZONTAL HYDRAULIC CONDUCTIVITY (Kx)
MODEL LAYER 9
Fridley WHPP Amendment
City of Fridley, MN

FIGURE C7

Barr Footer: ArcGIS 10.6, 2018-05-01 07:08 File: I:\Projects\23\02\1062\Maps\Reports\Figure C7 - Layer 9 K.mxd User: AKJ

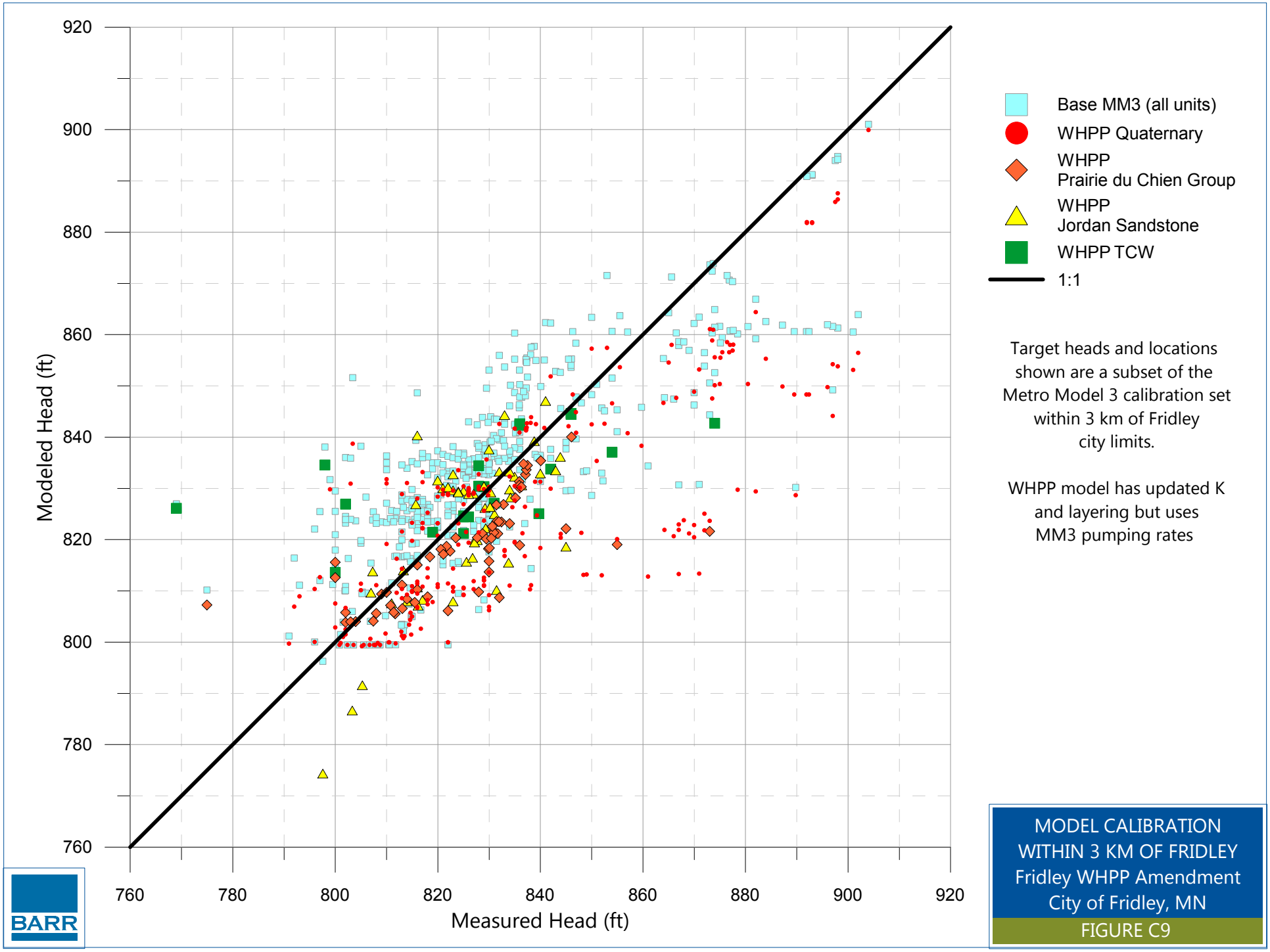


BARR

MODEL CALIBRATION
FULL MODEL
Fridley WHPP Amendment
City of Fridley, MN

FIGURE C8

P:\Mpls\23 MN\02\23021062 Fridley WHPP Amendment\WorkFiles\Report\Appendices\Appendix C - Groundwater Model Details\support\Figure C8 - Calibration Comparison_all.grf



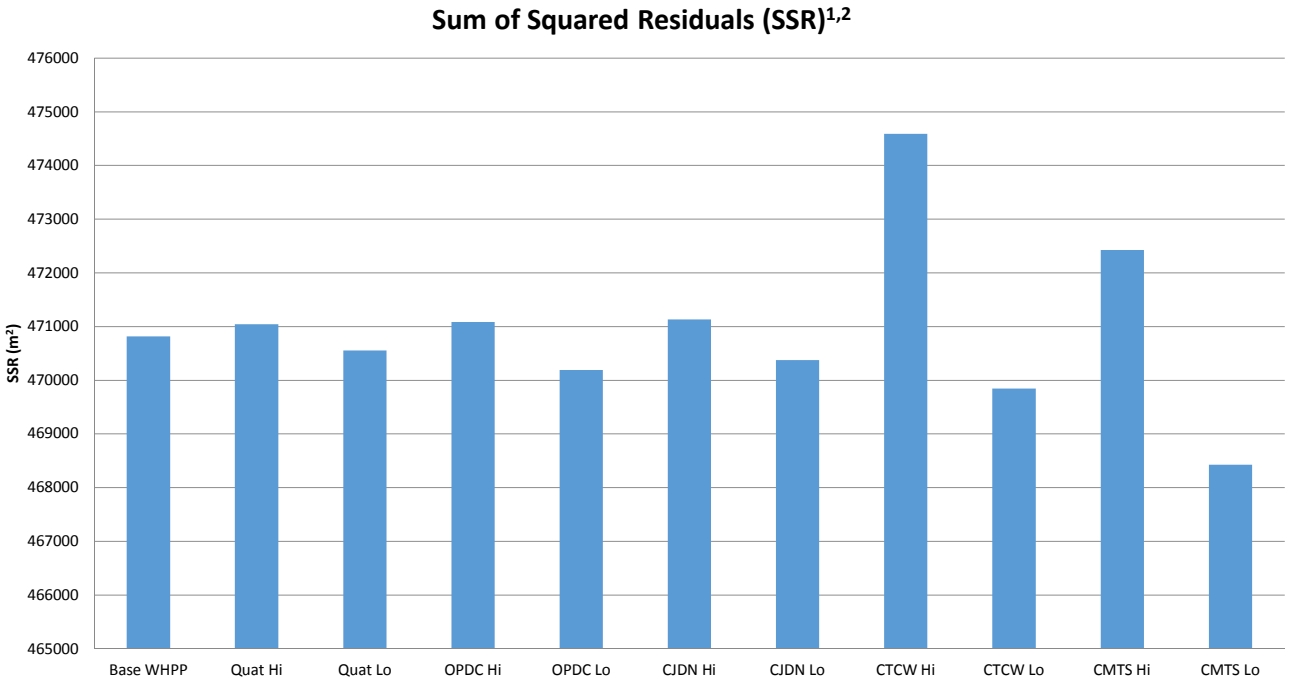
BARR

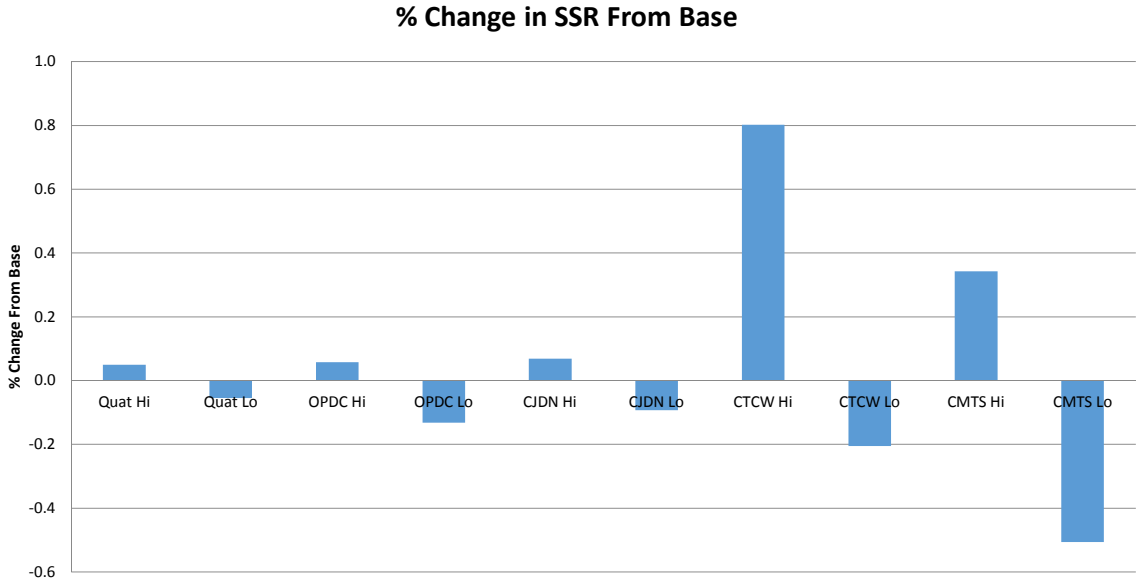
MODEL CALIBRATION
WITHIN 3 KM OF FRIDLEY
Fridley WHPP Amendment
City of Fridley, MN

FIGURE C9

P:\Mpls\23 MN\02\23021062 Fridley WHPP Amendment\WorkFiles\Report\Appendices\Appendix C - Groundwater Model Details\support\Figure C9 - Calibration Comparison_3km.grf

Figure C10
Sensitivity Analysis Results
Fridley WHPP Amendment





P:\Mpls\23 MN\02\23021062 Fridley WHPP Amendment\WorkFiles\Report\Appendices\Appendix C - Groundwater Model Details\support\fridley_target_heads.xlsx

Appendix D

Fracture Flow Delineation

OPDC Thicknesses

Well	OPDC Thickness from Log (ft)	Thickness to Use in Delineations (ft)	Thickness to Use in Delineations (m)
Fridley 6	108	123.75	37.7
Fridley 7	134		
Fridley 8	135		
Fridley 9	118		
Fridley 12	72	72	21.9

Combined Wells 6, 7, 8, and 9 Center of Pumping

Well	UTM X	UTM Y	Pumping Rate (m^3/day)
6	479923	4992127	1610
7	480005	4992003	356
8	479984	4991790	2973
9	479875	4991927	1559
Combined	479943.8853	4991918.036	6498

OPDC Contribution to Well 12

Total Well 12 Pumping Rate	3055	m^3/day
Flow from L3 to L4 in Well 12 capture zone	1578.9	m^3/day
Flow from L4 to L3 in Well 12 capture zone	45.559	m^3/day
Net Contribution from OPDC	1533.341	m^3/day
Percentage from OPDC	50.2%	

> 10%, fracture flow delineation required

Combined Wells 6, 7, 8, and 9: 1-Year

Calculation for Fixed Radius with No Upgradient Extension

See method 1 of Guidance for Delineating Wellhead Protection Area in Fractured and Solution-Weathered Bedrock in Minnesota (MDH, 2005)

Input Variables	
Well Pumping Rate m^3/day	6498
Pumping Period (years)	1
Effective porosity, n	0.056
Thickness of saturated portion of aquifer, L (m)	37.7

Calculated Fixed Radius (m)	Volume (m^3)
598	42,353,036

$$R = \sqrt{\frac{Q}{nL\pi}}$$

Where:

Q = Well Discharge (L^3)=(Well pumping rate)(pumping time period)

n = effective porosity

L = thickness of saturated portion of aquifer (L) note: lesser of open borehole or 200 ft

Combined Wells 6, 7, 8, and 9: 5-Year

Calculation for Ratio of Well Discharge to the Discharge Vector (Q/Qs)

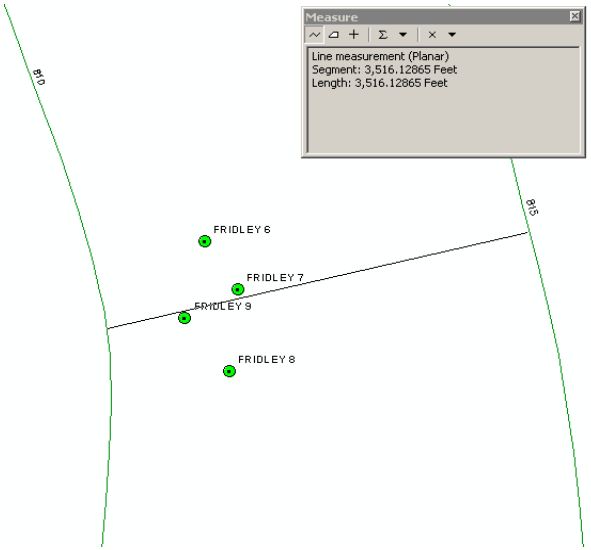
See: Appendix 2 of Guidance for Delineating Wellhead Protection Area in Fractured and Solution-Weathered Bedrock in Minnesota (MDH, 2005)

If well is open to both a porous media aquifer and a fractured or solution-weathered bedrock aquifer then delineation Technique 3 should be used

Input variables	
Well Discharge, Q (m^3/day)	6498
Well Discharge, Q (gpm)	1192
Aquifer Thickness, H (ft)	124
Aquifer Hydraulic Conductivity K (m/day)	336.00
Hydraulic Gradient, I (ft/ft)	0.0014

Calculated Q/Qs (m)

360



Equation listed in Appendix 2 of Guidance for Delineating Wellhead Protection Area in Fractured and Solution-Weathered Bedrock in Minnesota (MDH, 2005)

$$Q/Qs = \frac{Q\left(\frac{1\,ft^3}{7.48\,gal}\right)\left(\frac{1440\,\min}{1day}\right)\left(\frac{0.0283m^3}{1\,ft^3}\right)}{(H)\left(\frac{0.3048m}{1\,ft}\right)(K)(i)}$$

Calculation for Fixed Radius with No Upgradient Extension

See method 1 of Guidance for Delineating Wellhead Protection Area in Fractured and Solution-Weathered Bedrock in Minnesota (MDH, 2005)

Input Variables	
Well Pumping Rate m^3/day	6498
Pumping Period (years)	5
Effective porosity, n	0.056
Thickness of saturated portion of aquifer, L (m)	37.7

Calculated 5-yr Fixed Radius (m)

1337

Volume (m^3)

211,765,179

$$R = \sqrt{\frac{Q}{nL\pi}}$$

Where:

Q = Well Discharge (L^3/T)=(Well pumping rate)(pumping time period)

n = effective porosity

L = thickness of saturated portion of aquifer (L) note: lesser of open borehole or 200 ft

Well 12: 1-Year

Calculation for Fixed Radius with No Upgradient Extension

See method 1 of Guidance for Delineating Wellhead Protection Area in Fractured and Solution-Weathered Bedrock in Minnesota (MDH, 2005)

Input Variables	
Well Pumping Rate m^3/day	1533
Pumping Period (years)	1
Effective porosity, n	0.056
Thickness of saturated portion of aquifer, L (m)	21.9

Calculated Fixed Radius (m)	Volume (m^3)
381	9,994,098

$$R = \sqrt{\frac{Q}{nL\pi}}$$

Where:

Q = Well Discharge (L^3)=(Well pumping rate)(pumping time period)

n = effective porosity

L = thickness of saturated portion of aquifer (L) note: lesser of open borehole or 200 ft

Well 12: 5-Year

Calculation for Ratio of Well Discharge to the Discharge Vector (Q/Qs)

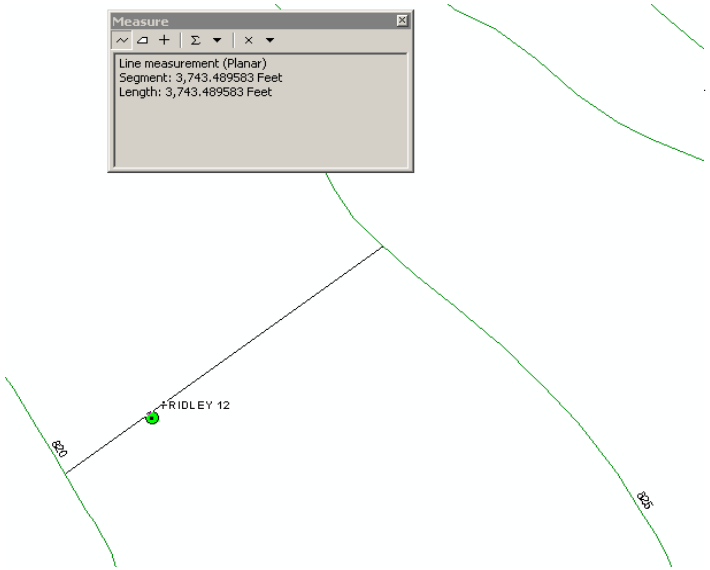
See: Appendix 2 of Guidance for Delineating Wellhead Protection Area in Fractured and Solution-Weathered Bedrock in Minnesota (MDH, 2005)

If well is open to both a porous media aquifer and a fractured or solution-weathered bedrock aquifer then delineation Technique 3 should be used

Input variables	
Well Discharge, Q (m^3/day)	1533
Well Discharge, Q (gpm)	281
Aquifer Thickness, H (ft)	72
Aquifer Hydraulic Conductivity K (m/day)	336.00
Hydraulic Gradient, I (ft/ft)	0.0013

Calculated Q/Qs (m)

156



Equation listed in Appendix 2 of Guidance for Delineating Wellhead Protection Area in Fractured and Solution-Weathered Bedrock in Minnesota (MDH, 2005)

$$Q/Qs = \frac{Q\left(\frac{1\,ft^3}{7.48\,gal}\right)\left(\frac{1440\,\min}{1day}\right)\left(\frac{0.0283m^3}{1\,ft^3}\right)}{(H)\left(\frac{0.3048m}{1\,ft}\right)(K)(i)}$$

Calculation for Fixed Radius with No Upgradient Extension

See method 1 of Guidance for Delineating Wellhead Protection Area in Fractured and Solution-Weathered Bedrock in Minnesota (MDH, 2005)

Input Variables	
Well Pumping Rate m^3/day	1533
Pumping Period (years)	5
Effective porosity, n	0.056
Thickness of saturated portion of aquifer, L (m)	21.9

Calculated 5-yr Fixed Radius (m)

851

Volume (m^3)

49,970,488

$$R = \sqrt{\frac{Q}{nL\pi}}$$

Where:

Q = Well Discharge (L^3/T)=(Well pumping rate)(pumping time period)

n = effective porosity

L = thickness of saturated portion of aquifer (L) note: lesser of open borehole or 200 ft

Appendix E

MDH Well Vulnerability Assessments

625 Robert St. N. St. Paul MN 55155
P.O. Box 64975 St. Paul MN 55164 - 0975

MINNESOTA DEPARTMENT OF HEALTH
SECTION OF DRINKING WATER PROTECTION
SWP Vulnerability Rating

PWSID: 1020031 TIER: 2
SYSTEM NAME: Fridley WHP RANK:
WELL NAME: Well #1 UNIQUE WELL #: 00206685

COUNTY: Anoka TOWNSHIP NUMBER: 30 RANGE: 24 W SECTION: 23 QUARTERS: DCAA

CRITERIA		DESCRIPTION	POINTS
Aquifer Name(s)	:	Tunnel City-Mt.Simon	
DNR Geologic Sensitivity Rating	:	Low	20
L Score	:	0	
Geologic Data From	:	Well Record	
Year Constructed	:	1956	
Construction Method	:	Cable Tool/Bored	0
Casing Depth	:	389	5
Well Depth	:	925	
Casing grouted into borehole?		Yes	0
Cement grout between casings?		Yes	0
All casings extend to land surface?		Yes	0
Gravel - packed casings?		No	0
Wood or masonry casing?		No	0
Holes or cracks in casing?		No	0
Isolation distance violations?			0
Pumping Rate	:	700	10
Pathogen Detected?			0
Surface Water Characteristics?			0
Maximum nitrate detected	:	<1 01/01/1976	0
Maximum tritium detected	:	Unknown	0
Non-THMS VOCs detected?			0
Pesticides detected?			0
Carbon 14 age	:	Unknown	0
Wellhead Protection Score	:		35
Wellhead Protection Vulnerability Rating	:		NOT VULNERABLE
Vulnerability Overridden	:		

COMMENTS

Low vulnerability rating is based on the presence of the basal St. Peter Sandstone.
Well construction details regarding grout between casings phoned in by John Flora at city of Fridley on 1/26/99.

625 Robert St. N. St. Paul MN 55155
P.O. Box 64975 St. Paul MN 55164 - 0975

MINNESOTA DEPARTMENT OF HEALTH
SECTION OF DRINKING WATER PROTECTION
SWP Vulnerability Rating

PWSID: 1020031 TIER: 2
SYSTEM NAME: Fridley WHP RANK:
WELL NAME: Well #2 UNIQUE WELL #: 00206674

COUNTY: Anoka TOWNSHIP NUMBER: 30 RANGE: 24 W SECTION: 14 QUARTERS: DCBB

CRITERIA		DESCRIPTION	POINTS
Aquifer Name(s)	:	Mt. Simon	
DNR Geologic Sensitivity Rating	:	Very low	10
L Score	:	11	
Geologic Data From	:	Well Record	
Year Constructed	:	1960	
Construction Method	:	Cable Tool/Bored	0
Casing Depth	:	675	0
Well Depth	:	842	
Casing grouted into borehole?		No	0
Cement grout between casings?		Yes	0
All casings extend to land surface?		Yes	0
Gravel - packed casings?		No	0
Wood or masonry casing?		No	0
Holes or cracks in casing?		Unknown	0
Isolation distance violations?			0
Pumping Rate	:	700	10
Pathogen Detected?			0
Surface Water Characteristics?			0
Maximum nitrate detected	:	.3 01/01/1976	0
Maximum tritium detected	:	Unknown	0
Non-THMS VOCs detected?			0
Pesticides detected?			0
Carbon 14 age	:	Unknown	0
Wellhead Protection Score	:		20
Wellhead Protection Vulnerability Rating	:		NOT VULNERABLE
Vulnerability Overridden	:		

COMMENTS
Very low rating is based on an L-11 score of the combined thicknesses of the St. Lawrence and Eau Claire confining layers.

625 Robert St. N. St. Paul MN 55155
P.O. Box 64975 St. Paul MN 55164 - 0975

MINNESOTA DEPARTMENT OF HEALTH
SECTION OF DRINKING WATER PROTECTION
SWP Vulnerability Rating

PWSID: 1020031 TIER: 2
SYSTEM NAME: Fridley WHP RANK:
WELL NAME: Well #3 UNIQUE WELL #: 00206670

COUNTY: Anoka TOWNSHIP NUMBER: 30 RANGE: 24 W SECTION: 14 QUARTERS: DCDD

CRITERIA		DESCRIPTION	POINTS
Aquifer Name(s)	:	Mt. Simon	
DNR Geologic Sensitivity Rating	:	Very low	10
L Score	:	11	
Geologic Data From	:	Well Record	
Year Constructed	:	1961	
Construction Method	:	Cable Tool/Bored	0
Casing Depth	:	752	0
Well Depth	:	870	
Casing grouted into borehole?		No	0
Cement grout between casings?		Yes	0
All casings extend to land surface?		Yes	0
Gravel - packed casings?		No	0
Wood or masonry casing?		No	0
Holes or cracks in casing?		Unknown	0
Isolation distance violations?			0
Pumping Rate	:	750	10
Pathogen Detected?			0
Surface Water Characteristics?			0
Maximum nitrate detected	:	<.4	0
Maximum tritium detected	:	Unknown	0
Non-THMS VOCs detected?			0
Pesticides detected?			0
Carbon 14 age	:	Unknown	0
Wellhead Protection Score	:		20
Wellhead Protection Vulnerability Rating	:		NOT VULNERABLE
Vulnerability Overridden	:		

COMMENTS
Very low vulnerability is based on a composite L-11 score from the combined thicknesses of the St. Lawrence and Eau Claire confining layers.

625 Robert St. N. St. Paul MN 55155
P.O. Box 64975 St. Paul MN 55164 - 0975

MINNESOTA DEPARTMENT OF HEALTH
SECTION OF DRINKING WATER PROTECTION
SWP Vulnerability Rating

PWSID: 1020031 TIER: 2
SYSTEM NAME: Fridley WHP RANK:
WELL NAME: Well #4 UNIQUE WELL #: 00201158

COUNTY: Anoka TOWNSHIP NUMBER: 30 RANGE: 24 W SECTION: 14 QUARTERS: DCAA

CRITERIA		DESCRIPTION	POINTS
Aquifer Name(s)	:	Mt. Simon	
DNR Geologic Sensitivity Rating	:	Very low	0
L Score	:	17	
Geologic Data From	:	Well Record	
Year Constructed	:	1961	
Construction Method	:	Cable Tool/Bored	0
Casing Depth	:	663	0
Well Depth	:	831	
Casing grouted into borehole?		No	0
Cement grout between casings?		Yes	0
All casings extend to land surface?		Yes	0
Gravel - packed casings?		No	0
Wood or masonry casing?		No	0
Holes or cracks in casing?		Unknown	0
Isolation distance violations?			0
Pumping Rate	:	650	10
Pathogen Detected?			0
Surface Water Characteristics?			0
Maximum nitrate detected	:	.1 06/05/1987	0
Maximum tritium detected	:	Unknown	0
Non-THMS VOCs detected?			0
Pesticides detected?			0
Carbon 14 age	:	A	-20
Wellhead Protection Score	:		-10
Wellhead Protection Vulnerability Rating	:		NOT VULNERABLE
Vulnerability Overridden	:		

COMMENTS

625 Robert St. N. St. Paul MN 55155
P.O. Box 64975 St. Paul MN 55164 - 0975

MINNESOTA DEPARTMENT OF HEALTH
SECTION OF DRINKING WATER PROTECTION
SWP Vulnerability Rating

PWSID: 1020031 TIER: 2
SYSTEM NAME: Fridley WHP RANK:
WELL NAME: Well #5 UNIQUE WELL #: 00206675

COUNTY: Anoka TOWNSHIP NUMBER: 30 RANGE: 24 W SECTION: 14 QUARTERS: DDBA

CRITERIA		DESCRIPTION	POINTS
Aquifer Name(s)	:	Mt. Simon	
DNR Geologic Sensitivity Rating	:	Very low	0
L Score	:	12	
Geologic Data From	:	Well Record	
Year Constructed	:	1961	
Construction Method	:	Cable Tool/Bored	0
Casing Depth	:	656	0
Well Depth	:	845	
Casing grouted into borehole?		Yes	0
Cement grout between casings?		Unknown	5
All casings extend to land surface?		Yes	0
Gravel - packed casings?		No	0
Wood or masonry casing?		No	0
Holes or cracks in casing?		Unknown	0
Isolation distance violations?			0
Pumping Rate	:	1000	10
Pathogen Detected?			0
Surface Water Characteristics?			0
Maximum nitrate detected	:	.3 01/01/1976	0
Maximum tritium detected	:	Unknown	0
Non-THMS VOCs detected?			0
Pesticides detected?			0
Carbon 14 age	:	Unknown	0
Wellhead Protection Score	:		15
Wellhead Protection Vulnerability Rating	:		NOT VULNERABLE
Vulnerability Overridden	:		

COMMENTS

625 Robert St. N. St. Paul MN 55155
P.O. Box 64975 St. Paul MN 55164 - 0975

MINNESOTA DEPARTMENT OF HEALTH
SECTION OF DRINKING WATER PROTECTION
SWP Vulnerability Rating

PWSID: 1020031 TIER: 2
SYSTEM NAME: Fridley WHP RANK:
WELL NAME: Well #6 UNIQUE WELL #: 00206673

COUNTY: Anoka TOWNSHIP NUMBER: 30 RANGE: 24 W SECTION: 14 QUARTERS: DCAB

CRITERIA		DESCRIPTION		POINTS
Aquifer Name(s)	:	Prairie Du Chien-Jordan		
DNR Geologic Sensitivity Rating	:	Medium		25
L Score	:	0		
Geologic Data From	:	Well Record		
Year Constructed	:	1972		
Construction Method	:	Cable Tool/Bored		0
Casing Depth	:	153		10
Well Depth	:	255		
Casing grouted into borehole?		Yes		0
Cement grout between casings?		Not applicable		0
All casings extend to land surface?		Yes		0
Gravel - packed casings?		No		0
Wood or masonry casing?		No		0
Holes or cracks in casing?		Unknown		0
Isolation distance violations?				0
Pumping Rate	:	1350		20
Pathogen Detected?				0
Surface Water Characteristics?				0
Maximum nitrate detected	:	.1 01/01/1976		0
Maximum tritium detected	:	Unknown		0
Non-THMS VOCs detected?		1,1,2-Trichloroethane	08/12/1989	VULNERABLE
Pesticides detected?				0
Carbon 14 age	:	Unknown		0
Wellhead Protection Score	:			55
Wellhead Protection Vulnerability Rating	:			VULNERABLE
Vulnerability Overridden	:			

COMMENTS

625 Robert St. N. St. Paul MN 55155
P.O. Box 64975 St. Paul MN 55164 - 0975

MINNESOTA DEPARTMENT OF HEALTH
SECTION OF DRINKING WATER PROTECTION
SWP Vulnerability Rating

PWSID: 1020031 TIER: 2
SYSTEM NAME: Fridley WHP RANK:
WELL NAME: Well #7 UNIQUE WELL #: 00206678

COUNTY: Anoka TOWNSHIP NUMBER: 30 RANGE: 24 W SECTION: 14 QUARTERS: DCAD

CRITERIA		DESCRIPTION		POINTS
Aquifer Name(s)	:	Prairie Du Chien Group		
DNR Geologic Sensitivity Rating	:	Low		20
L Score	:	3		
Geologic Data From	:	Well Record		
Year Constructed	:	1970		
Construction Method	:	Cable Tool/Bored		0
Casing Depth	:	138		10
Well Depth	:	262		
Casing grouted into borehole?		Unknown		0
Cement grout between casings?		Unknown		5
All casings extend to land surface?		Yes		0
Gravel - packed casings?		No		0
Wood or masonry casing?		No		0
Holes or cracks in casing?		Unknown		0
Isolation distance violations?				0
Pumping Rate	:	700		10
Pathogen Detected?				0
Surface Water Characteristics?				0
Maximum nitrate detected	:	.2 01/01/1976		0
Maximum tritium detected	:	Unknown		0
Non-THMS VOCs detected?		1,1,2-Trichloroethane	08/12/1989	VULNERABLE
Pesticides detected?				0
Carbon 14 age	:	Unknown		0
Wellhead Protection Score	:			45
Wellhead Protection Vulnerability Rating	:			VULNERABLE
Vulnerability Overridden	:			

COMMENTS
Well originally drilled in 1966. Deepened to bedrock in 1970.

625 Robert St. N. St. Paul MN 55155
P.O. Box 64975 St. Paul MN 55164 - 0975

MINNESOTA DEPARTMENT OF HEALTH
SECTION OF DRINKING WATER PROTECTION
SWP Vulnerability Rating

PWSID: 1020031 TIER: 2
SYSTEM NAME: Fridley WHP RANK:
WELL NAME: Well #8 UNIQUE WELL #: 00206669

COUNTY: Anoka TOWNSHIP NUMBER: 30 RANGE: 24 W SECTION: 14 QUARTERS: DCDD

CRITERIA		DESCRIPTION		POINTS
Aquifer Name(s)	:	Prairie Du Chien Group		
DNR Geologic Sensitivity Rating	:	High		VULNERABLE
L Score	:	0		
Geologic Data From	:	Well Record		
Year Constructed	:	1969		
Construction Method	:	Cable Tool/Bored		0
Casing Depth	:	138		10
Well Depth	:	265		
Casing grouted into borehole?		Unknown		0
Cement grout between casings?		Unknown		5
All casings extend to land surface?		Yes		0
Gravel - packed casings?		No		0
Wood or masonry casing?		No		0
Holes or cracks in casing?		Unknown		0
Isolation distance violations?				0
Pumping Rate	:	1400		20
Pathogen Detected?				0
Surface Water Characteristics?				0
Maximum nitrate detected	:	.2 08/12/1989		0
Maximum tritium detected	:	Unknown		0
Non-THMS VOCs detected?		1,1,2-Trichloroethane	08/12/1989	VULNERABLE
Pesticides detected?				0
Carbon 14 age	:	Unknown		0
Wellhead Protection Score	:			35
Wellhead Protection Vulnerability Rating	:			VULNERABLE
Vulnerability Overridden	:			

COMMENTS

625 Robert St. N. St. Paul MN 55155
P.O. Box 64975 St. Paul MN 55164 - 0975

MINNESOTA DEPARTMENT OF HEALTH
SECTION OF DRINKING WATER PROTECTION
SWP Vulnerability Rating

PWSID: 1020031 TIER: 2
SYSTEM NAME: Fridley WHP RANK:
WELL NAME: Well #9 UNIQUE WELL #: 00206672

COUNTY: Anoka TOWNSHIP NUMBER: 30 RANGE: 24 W SECTION: 14 QUARTERS: DCBD

CRITERIA		DESCRIPTION		POINTS
Aquifer Name(s)	:	Prairie Du Chien-Jordan		
DNR Geologic Sensitivity Rating	:	Low		20
L Score	:	0		
Geologic Data From	:	Well Record		
Year Constructed	:	1972		
Construction Method	:	Cable Tool/Bored		0
Casing Depth	:	145		10
Well Depth	:	262		
Casing grouted into borehole?		Unknown		0
Cement grout between casings?		Unknown		5
All casings extend to land surface?		Yes		0
Gravel - packed casings?		No		0
Wood or masonry casing?		No		0
Holes or cracks in casing?		Unknown		0
Isolation distance violations?				0
Pumping Rate	:	1350		20
Pathogen Detected?				0
Surface Water Characteristics?				0
Maximum nitrate detected	:	.2 01/01/1976		0
Maximum tritium detected	:	Unknown		0
Non-THMS VOCs detected?		1,1,2-Trichloroethane	08/12/1989	VULNERABLE
Pesticides detected?				0
Carbon 14 age	:	Unknown		0
Wellhead Protection Score	:			55
Wellhead Protection Vulnerability Rating	:			VULNERABLE
Vulnerability Overridden	:			

COMMENTS
Low rating is based on the presence of the basal St. Peter confining layer.

625 Robert St. N. St. Paul MN 55155
P.O. Box 64975 St. Paul MN 55164 - 0975

MINNESOTA DEPARTMENT OF HEALTH
SECTION OF DRINKING WATER PROTECTION
SWP Vulnerability Rating

PWSID: 1020031 TIER: 2
SYSTEM NAME: Fridley WHP RANK:
WELL NAME: Well #10 UNIQUE WELL #: 00206658

COUNTY: Anoka TOWNSHIP NUMBER: 30 RANGE: 24 W SECTION: 11 QUARTERS: CDCC

CRITERIA		DESCRIPTION	POINTS
Aquifer Name(s)	:	Quaternary Buried Artesian Aquifer	
DNR Geologic Sensitivity Rating	:	Low	20
L Score	:	2	
Geologic Data From	:	Well Record	
Year Constructed	:	1969	
Construction Method	:	Cable Tool/Bored	0
Casing Depth	:	128	10
Well Depth	:	199	
Casing grouted into borehole?		Yes	0
Cement grout between casings?		Yes	0
All casings extend to land surface?		Yes	0
Gravel - packed casings?		No	0
Wood or masonry casing?		No	0
Holes or cracks in casing?		No	0
Isolation distance violations?			0
Pumping Rate	:	700	10
Pathogen Detected?			0
Surface Water Characteristics?			0
Maximum nitrate detected	:	<.4	0
Maximum tritium detected	:	6.5 11/04/1999	VULNERABLE
Non-THMS VOCs detected?			0
Pesticides detected?			0
Carbon 14 age	:	Unknown	0
Wellhead Protection Score	:		40
Wellhead Protection Vulnerability Rating	:		VULNERABLE
Vulnerability Overridden	:		

COMMENTS

Well construction details regarding presence of grout between casings and absence of holes or cracks in casing, in addition to absence of isolation distance violations phoned in by John Flora of city of Fridley on 1/26/99.

625 Robert St. N. St. Paul MN 55155
P.O. Box 64975 St. Paul MN 55164 - 0975

MINNESOTA DEPARTMENT OF HEALTH
SECTION OF DRINKING WATER PROTECTION
SWP Vulnerability Rating

PWSID: 1020031 TIER: 2
SYSTEM NAME: Fridley WHP RANK:
WELL NAME: Well #11 UNIQUE WELL #: 00206657

COUNTY: Anoka TOWNSHIP NUMBER: 30 RANGE: 24 W SECTION: 11 QUARTERS: CDCC

CRITERIA		DESCRIPTION	POINTS
Aquifer Name(s)	:	Jordan-Mt.Simon	
DNR Geologic Sensitivity Rating	:	Low	20
L Score	:	1	
Geologic Data From	:	Data Inferred From Nearby Wells	
Year Constructed	:	1970	
Construction Method	:	Cable Tool/Bored	0
Casing Depth	:	325	5
Well Depth	:	669	
Casing grouted into borehole?		Yes	0
Cement grout between casings?		Unknown	5
All casings extend to land surface?		Yes	0
Gravel - packed casings?		No	0
Wood or masonry casing?		No	0
Holes or cracks in casing?		Unknown	0
Isolation distance violations?			0
Pumping Rate	:	750	10
Pathogen Detected?			0
Surface Water Characteristics?			0
Maximum nitrate detected	:	<.4	0
Maximum tritium detected	:	1.1 04/23/1997	VULNERABLE
Non-THMS VOCs detected?			0
Pesticides detected?			0
Carbon 14 age	:	Unknown	0
Wellhead Protection Score	:		40
Wellhead Protection Vulnerability Rating	:		VULNERABLE
Vulnerability Overridden	:		

COMMENTS
Low vulnerability rating is based on the geologic log of well #10 (206658).

625 Robert St. N. St. Paul MN 55155
P.O. Box 64975 St. Paul MN 55164 - 0975

MINNESOTA DEPARTMENT OF HEALTH
SECTION OF DRINKING WATER PROTECTION
SWP Vulnerability Rating

PWSID: 1020031 TIER: 2
SYSTEM NAME: Fridley WHP RANK:
WELL NAME: Well #12 UNIQUE WELL #: 00209207

COUNTY: Anoka TOWNSHIP NUMBER: 30 RANGE: 24 W SECTION: 12 QUARTERS: BDCC

CRITERIA		DESCRIPTION		POINTS
Aquifer Name(s)	:	Jordan		
DNR Geologic Sensitivity Rating	:	Very low		15
L Score	:	5		
Geologic Data From	:	Public Water File		
Year Constructed	:	1970		
Construction Method	:	Cable Tool/Bored		0
Casing Depth	:	234		5
Well Depth	:	276		
Casing grouted into borehole?		Yes		0
Cement grout between casings?		Yes		0
All casings extend to land surface?		Yes		0
Gravel - packed casings?		No		0
Wood or masonry casing?		No		0
Holes or cracks in casing?		No		0
Isolation distance violations?				0
Pumping Rate	:	1200		20
Pathogen Detected?				0
Surface Water Characteristics?				0
Maximum nitrate detected	:	.38 05/20/2014		0
Maximum tritium detected	:	Unknown		0
Non-THMS VOCs detected?		Xylenes	01/26/1999	VULNERABLE
Pesticides detected?				0
Carbon 14 age	:	Unknown		0
Wellhead Protection Score	:			40
Wellhead Protection Vulnerability Rating	:			VULNERABLE
Vulnerability Overridden	:			

COMMENTS

Well construction details regarding drilling method, presence of grout around borehole and between casings, and absence of holes or cracks in casing and isolation distance violations phoned in by John Flora of the city of Fridley on 1/26/99. Vulnerable status based on tritium result from nearby well 206657 (Fridley Well No. 11).

625 Robert St. N. St. Paul MN 55155
P.O. Box 64975 St. Paul MN 55164 - 0975

MINNESOTA DEPARTMENT OF HEALTH
SECTION OF DRINKING WATER PROTECTION
SWP Vulnerability Rating

PWSID: 1020031 TIER: 2
SYSTEM NAME: Fridley WHP RANK:
WELL NAME: Well #13 UNIQUE WELL #: 00206696

COUNTY: Anoka TOWNSHIP NUMBER: 30 RANGE: 24 W SECTION: 27 QUARTERS: BADC

CRITERIA		DESCRIPTION	POINTS
Aquifer Name(s)	:	Prairie Du Chien-Jordan	
DNR Geologic Sensitivity Rating	:	High	0
L Score	:	0	
Geologic Data From	:	Well Record	
Year Constructed	:	1970	
Construction Method	:	Cable Tool/Bored	0
Casing Depth	:	191	10
Well Depth	:	332	
Casing grouted into borehole?		Yes	0
Cement grout between casings?		Yes	0
All casings extend to land surface?		Yes	0
Gravel - packed casings?		No	0
Wood or masonry casing?		No	0
Holes or cracks in casing?		No	0
Isolation distance violations?			0
Pumping Rate	:	825	10
Pathogen Detected?			0
Surface Water Characteristics?			0
Maximum nitrate detected	:	<.4	0
Maximum tritium detected	:	5.9 01/01/1999	VULNERABLE
Non-THMS VOCs detected?			0
Pesticides detected?			0
Carbon 14 age	:	Unknown	0
Wellhead Protection Score	:		20
Wellhead Protection Vulnerability Rating	:		VULNERABLE
Vulnerability Overridden	:		

COMMENTS

Well construction details regarding presence of grout between casings and absence of holes or cracks in casing and isolation distance violations phoned in by John Flora of the city of Fridley on 1/26/99.

Appendix F

Aquifer Vulnerability Supporting Information

Anoka County

Ramsey County

FRIDLEY 12

FRIDLEY 10

FRIDLEY 11

FRIDLEY 6

FRIDLEY 2

FRIDLEY 4

FRIDLEY 5

FRIDLEY 9

FRIDLEY 7

FRIDLEY 8

FRIDLEY 3

00468368
L-1

00206720
L-0

00206718
L-8

00453830
L-6

00206723
L-22

00234138
L-0

00206761
L-2

00426853
L-0

00447900
L-3

00409549
L-2

County Boundary

DWSMA

L Score Well

Geologic Sensitivity

- High
- Moderate
- Low
- Fridley Municipal Well

DWSMA Geologic Sensitivity

- Very High
- High
- Moderate
- Low

Note: Because the L score tool does not have a "very low" geologic sensitivity rating, the "low" and "very low" ratings from the Anoka County map were lumped together as "low".

N

0 2,000

Feet

DWSMA GEOLOGIC SENSITIVITY
Fridley WHPP Amendment
City of Fridley, MN

FIGURE F1

BARR

Barr Footer: ArcGIS 10.6, 2018-06-18 15:57 File: I:\Projects\23\02\1062\Maps\Reports\Figure F1 - DWSMA Geologic Sensitivity.mxd User: AKJ

Appendix G

Groundwater Model Files and GIS Shapefiles

Appendix C

Data Elements Assessment

Appendix C

Data Elements Assessment

Contents

List of Tables

List of Figures

List of Attachments

C1.0 Data Elements Assessment

The data elements and their assessments required to be included in the Wellhead and Source Water Protection Plan (WHPP) amendment for the City of Fridley (Public Water Supply 1020031) are discussed in this appendix. Data elements related to the physical environment, land use, water quantity, and water quality required for this WHPP for the City of Fridley (City) were specified in the September 25, 2018 Scoping 2 Decision Notice from the Minnesota Department of Health (MDH, 2018).

A Drinking Water Supply Management Area (DWSMA) has been delineated for Fridley that encompasses the Wellhead Protection Area (WHPA) for the Fridley water supply wells (Barr, 2018). The DWSMA extends east of the Fridley city limits into New Brighton and Mounds View and north into Spring Lake Park. Location of the Fridley DWSMA is shown on Figure C-1.

C1.1 Physical Environment Data Elements

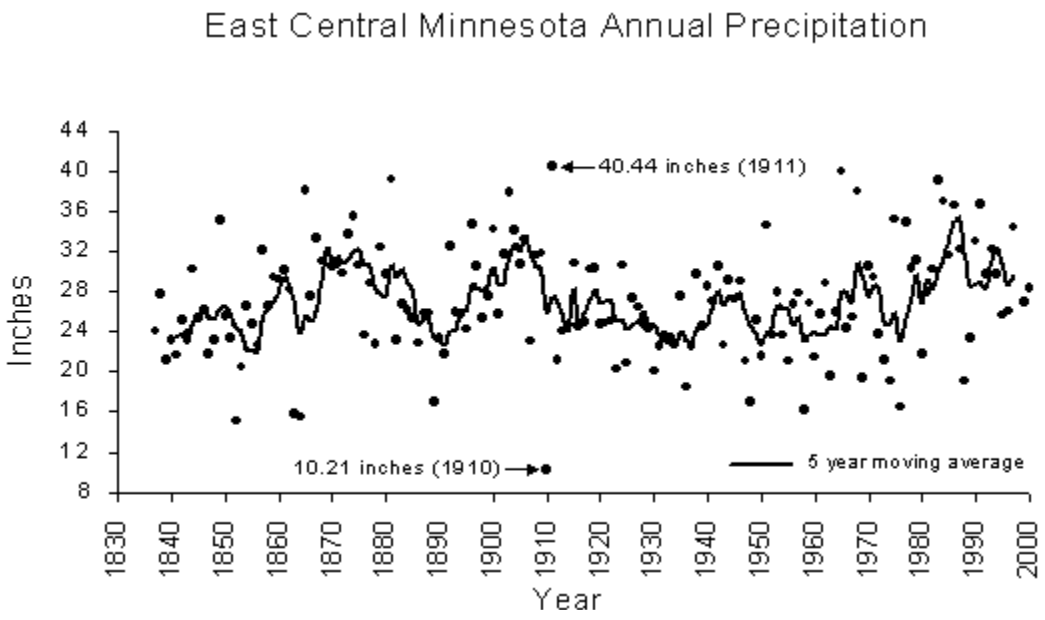
Physical data elements required to be considered for this Plan amendment are identified in the Scoping 2 Decision Notice (MDH, 2018). Per the Scoping 2 Decision Notice, soils and water resources data elements were required to be considered during development of the Plan.

C1.1.1 Precipitation

Management of the Fridley DWSMAs must consider and reflect available precipitation information.

As shown in Attachment C-1, there were/are a number of precipitation gaging stations in Anoka County that reported measurements to the State Climatology Office during the period 2013-2017. In addition, there were/are a number of precipitation gaging stations in Ramsey County that reported measurements to the State Climatology Office during the period 2013-2017. Locations of these precipitation gaging stations are identified by township, range, and section in the Minnesota Climatology Working Group tables in Attachment C-1. These tables also show the monthly and annual precipitation measured at these stations in Anoka and Ramsey Counties for the period 2013 through 2017.

Annual precipitation in east-central Minnesota from the late 1830s to 2000 is shown in the following graph:



Source: Minnesota Dept. of Natural Resources website

The amount of precipitation affects recharge to the groundwater system and the potential for contaminant loading to the groundwater system. This is particularly important in areas of high aquifer vulnerability where the aquifer is not protected from infiltration of precipitation by significant confining units between the ground surface and the top of the source water aquifer. Recharge to the groundwater system affects the size of the WHPA. Recharge was included in the groundwater flow model used to identify the porous media flow portion of the WHPAs (e.g., Barr, 2018; Metropolitan Council, 2012 and 2014). In addition, the amount of precipitation also affects the amount of surface runoff. As noted in Barr (2018), the Fridley DWSMA includes areas where aquifer vulnerability is classified as High. No surface water surface water contribution area was included in the delineation but it was recommended that stable isotope sampling be conducted prior to the next WHPP update to assess groundwater/surface water interaction and determine the need for a conjunctive delineation (Barr, 2018). (Surface water contribution areas are areas of higher topography from which surface runoff drains onto areas within the WHPA where aquifer vulnerability is classified as High.)

C1.1.2 Geology and Hydrogeology

Existing information on the geology and hydrogeology in the vicinity of Fridley was used to define the extent of the source water aquifers used by the City, delineate the WHPAs, and to assess the vulnerability of the public water supply wells and the aquifers in the DWSMA.

The regional conceptual hydrogeologic model is described in detail by Metropolitan Council (2009; 2014) and hydrogeologic conditions in the vicinity of Fridley are discussed by Barr (2018). Information pertinent to the Fridley area is summarized below.

The Quaternary-aged unconsolidated sediments that overlie the bedrock in Fridley were deposited by multiple glacial advances during the Pleistocene Epoch (Meyer et al., 2013) and vary in thickness from approximately 50 to nearly 300 feet. The Quaternary sediments include gravel, sand, silt, and clay.

As shown on Figure C-2, the Fridley DWSMA overlies two buried bedrock valleys. The uppermost bedrock unit beneath the DWSMA varies by location and ranges from the St. Peter Sandstone to the St. Lawrence Formation. The reader is referred to Mossler (2012) for additional information on the details of the bedrock in the Fridley area.

The regional groundwater flow system in the vicinity of Fridley includes the following aquifers: Quaternary glacial drift deposits, St. Peter Sandstone, Prairie du Chien Group, Jordan Sandstone, Tunnel City Group and Wonewoc Sandstone (considered a single aquifer known as the Tunnel City-Wonewoc aquifer), and Mt. Simon Sandstone. The St. Lawrence Formation, which overlies the Tunnel City Group, is considered to be a regional aquitard but it can support domestic wells. The Eau Claire Formation aquitard hydraulically separates the Wonewoc Sandstone from the Mt. Simon Sandstone.

As shown in Table C-1 , the Fridley municipal water supply wells are completed in various aquifers including Quaternary sand and gravel, the Prairie du Chien Group, Jordan Sandstone, and Mt. Simon Sandstone. These aquifers are also referred to in this Plan amendment as the source water aquifers.

The important bedrock hydrostratigraphic units relative to the Fridley DWSMA are described in more detail by Barr (2018).

Information regarding the geology and hydrogeology of the area was used to assess the vulnerability to contamination of the source water aquifers within the DWSMA. The information is consistent with the classification of the susceptibility to contamination of the source water aquifers within the DWSMA varying from Low to High depending upon location.

C1.1.3 Soils

Management of the Fridley DWSMA must consider and reflect available soils information.

Review of available information from the U.S. Department of Agriculture – Natural Resources Conservation Service SSURGO database (USDA-NRCS, 2012) indicates that there are a variety of surficial soil types within the DWSMA. Surficial soil types within the DWSMA are shown on Figure C-3. The soil permeability classifications are shown on Figure C-4. As indicated on Figure C-4, the urban development in Fridley has resulted in the soil permeability classification in much of the City being identified as "not rated or not available". Available data from the Minnesota Board of Water and Soil Resources (BWSR) indicates there are some areas of elevated soil erosion risk within the DWSMA. The City is aware of erosion in the vicinity of some surface water bodies but the erosion has not caused significant sedimentation problems within the DWSMA.

Based on the aquifer vulnerability assessment results, issues related to surficial soil characteristics or the surficial soil types may potentially have an effect on the management strategies developed for the DWSMA. The City is well aware that land development and land use activity may have an impact on the source water aquifers, particularly in areas of high aquifer vulnerability within the DWSMA.

C1.1.4 Water Resources

Management of the Fridley DWSMA must consider and reflect available water resources information and surface water resources must be evaluated to determine if they could potentially apply to this Plan.

The Fridley DWSMA includes portions of the Mississippi River-Twin Cities watershed and the Rice Creek watershed. The Fridley DWSMA overlaps areas administered by the Coon Creek Watershed District, the Rice Creek Watershed District, and the Mississippi Watershed Management Organization. The Mississippi River is the regional discharge zone for groundwater and surface water in the vicinity of Fridley. Flow directions in and boundaries of the watersheds in the area do not indicate any reasons for concern.

Surface water bodies within or that cross the DWSMA include lakes, ponds, stormwater basins, wetlands, and a portion of Rice Creek. There are water bodies in the DWSMA that meet the definition of public waters in Minnesota Statutes Section 103G.005, subdivision 15. In addition, there are water bodies in the DWSMA that have shoreland classifications pursuant to Minnesota Statutes Sections 103F.201 to 103F.221 and consistent with Minnesota Rules part 6120.3300. Section 205.32 of the City code specifies requirements for the use, development, and alteration of shoreland areas. Floodplain areas in the City are shown on Figure C-1. Section 205.27 of the Fridley zoning code regulates designated floodplain areas in the City. Fridley does not currently have an appropriations permit to withdraw water from surface water bodies. Water quality management for the surface water bodies in Fridley is addressed in the City's Surface Water Management Plan.

There are wetlands within the DWSMA. Approximately 66 percent of these wetlands within the DWSMA are small in size (i.e., <1 acre) and are not definable by the Minnesota Statute for Public Waters Wetlands (i.e., Section 103G.221 to 103G.2373). Locations of wetlands in Fridley are identified in the City's Surface Water Management Plan.

Per the September 25, 2018 Scoping 2 Decision Notice from the MDH, submission of data elements related to water resources are not required for this WHPP amendment.

Based on geologic conditions in the City's DWSMA, the aquifer vulnerability in approximately 5.4 percent of the area encompassed by the DWSMA is classified as High. Aquifer vulnerability in approximately 93 percent of the area in the DWSMA is classified as Moderate. The aquifer vulnerability in approximately 1.6 percent of the DWSMA is classified as Low. Based on the aquifer vulnerability classifications, it considered to be possible that issues related to surface water resources could have some effect on the water quality in the source water aquifers and should be considered in the development of the management strategies for the DWSMA, particularly in areas where aquifer vulnerability is classified as High. The quality of the source water is dependent on the quality of its recharge. Recharge sources/mechanisms are noted above. Existing surface water management programs in the DWSMA address water quality and, therefore, reduce the potential negative effects that infiltrating surface waters may have on the source water aquifers. The City believes that existing surface water management programs are adequate to address surface water quality in the DWSMA and to ensure that aquifer recharge and water availability do not become an issue for the City.

C1.2 Land Use Data Elements

The Scoping 2 Decision Notice required land use data elements to be considered during development of this Plan amendment. Land use and public utility services within the DWSMA are discussed in this section. In Part 1 of this Plan amendment, property parcel boundaries and quarter-quarter section lines were used in the delineation of the DWSMA (Barr, 2018).

C1.2.1 Current Land Use

Figure C-5 shows the current (year 2010) land use map within the DWSMA. Numerous land uses are found within the DWSMA. Land uses in the DWSMA that cover 1 percent or more of the area in the DWSMA include Residential of various types, Park/Recreational or Preserve, Industrial and Utility, Institutional, Major Highway, Retail and Other Commercial, Open Water, Undeveloped land, Office, and Golf Course. As shown on Figure C-5, residential land use, which includes Single Family (detached and attached), Multifamily, and Manufactured Housing Parks is the most common land use occupying approximately 55 percent of the area in the DWSMA. Figure C-6 shows the current Fridley zoning within the DWSMA. Zoning maps for Mounds View, New Brighton, and Spring Lake Park are presented in Attachment C-4.

C.1.2.1.1 Potential Contaminant Source Inventory

As shown on Figure C-1, the aquifer vulnerability in the DWSMA includes the following classifications: Low, Moderate, and High. The aquifer vulnerability in approximately 5.4 percent of the area encompassed by the DWSMA was classified as High. Aquifer vulnerability in approximately 93 percent of the area in the DWSMA was classified as Moderate. The aquifer vulnerability in approximately 1.6 percent of the area in the DWSMA was classified as Low.

A potential contaminant source inventory (PCSI) was conducted within the DWSMA. The types of potential contaminant sources that must be inventoried vary by vulnerability classification. The September 25, 2018 Scoping 2 Decision Notice identifies the types of potential contaminant sources that must be inventoried for each vulnerability classification in the DWSMA.

Information on potential contaminant source locations was obtained from the following sources: Anoka County, Minnesota Department of Agriculture (MDA), Minnesota Department of Health (MDH), Minnesota Department of Natural Resources (MDNR), Minnesota Department of Public Safety (MnDPS), Minnesota Geological Survey (MGS), Minnesota Office of Pipeline Safety (MnOPS), Minnesota Pollution Control Agency (MPCA), Metropolitan Council, Minnesota Geospatial Information Office (MGIO), and U.S. Environmental Protection Agency (USEPA) databases. These data sources are summarized in

Table C-2. Data on potential contaminant source locations was requested from Ramsey County but the information provided did not include any potential contaminant source locations within the DWSMA. Information from the various sources was compared to identify overlaps/duplications. During the preparation of this WHPP amendment, identified potential contaminant source locations within the DWSMA limits were verified to the extent possible. As part of location verification, locations identified during the PCSI that mapped incorrectly were corrected to the extent possible based on available data.

For future updates of this Plan, the City will access available data sources and maintain as accurate and up to date a potential contaminant source database as possible in its wellhead protection file.

A potential contaminant source inventory for in the Inner Wellhead Management Zone (IWMZ) around each of the municipal supply wells was completed in August 2017. Copies of the IWMZ inventory reports are presented in Attachment C-2.

Properties identified as potential sources of contamination were identified during the PCSI. Information on these properties is presented in Tables C-3 through C-11 as follows:

- Wells – Table C-3
- Potential Class V wells – Table C-4
- Storage tanks and LUST sites – Table C-5
- Chemical storage sites – Table C-6
- Wastewater treatment and disposal sites – Table C-7
- Potential contamination sites – Table C-8
- Hazardous waste generators – Table C-9
- Dump sites - Table C-10
- Spill sites – Table C-11

Results of this inventory indicate the presence of several potential contaminant source properties within the DWSMA. Locations of potential contaminant sources are shown on Figures C-7 through C-14 as follows:

- Well locations – Figure C-7
- Potential Class V well locations – Figure C-8
- Storage tank and LUST site locations – Figure C-9
- Chemical storage site locations – Figure C-10
- Wastewater treatment and disposal sites – Figure C-11
- Potential contaminant sites – Figure C-12
- Hazardous waste generators – Figure C-13
- Dump and spill sites – Figure C-14

These potential contaminant sources have been considered in the development of the management strategies for the DWSMA.

Potential contaminant source locations were verified, to the extent possible, during preparation of this Plan amendment (Table C-3 through Table C-11). Verification procedures used included matching mapped locations with, as appropriate, addresses on MDH Well Records or State/County-issued permits or in County/State/Federal databases, published business addresses, property parcel addresses, local knowledge of City staff, or information from City files (note that not all verification procedures were used for each type of potential contaminant source). The data tables indicate the status of verification for each potential contaminant source location. New information developed on contaminant sources in the future will be verified as they are discovered as part of the WHPP implementation.

C.1.2.1.1.1 Wells

Wells located within the DWSMA, in particular wells completed in or below the source water aquifers from which the City's wells pump have the potential for being a pathway via which contamination could more rapidly reach a source water aquifer and the Fridley municipal wells; especially if the wells were not properly installed or have not been adequately maintained. Data obtained from the Minnesota County Well Index (CWI) and the MDNR Permit and Reporting System (MPARS) during the PCSI indicate that there are 291 wells within the Fridley DWSMA (Figure C-7). This number includes 172 active wells and 119 wells whose status is unknown. Eleven of the active wells are the Fridley municipal water supply wells. Table C-3 lists the wells that were identified in the DWSMA and indicates the aquifer in which each well is completed (if known), the date the well was completed (if known), and the status of the well (if known).

During the search for wells in the DWSMA 1,056 sealed wells were identified. Per previous direction from the MDH, the sealed well locations are not included in the PCSI. However, since an improperly sealed well could act as a pathway for contaminants to migrate from the surface into the groundwater system the City believes it is important to maintain a record of sealed well locations. Therefore, sealed well locations in the DWSMA are shown in Attachment C-3 .

As indicated in Table C-3, uses for the 172 known active wells in the DWSMA include monitor well (67), test well (26), piezometer (21), community supply (municipal) (16, which includes the 11 Fridley water supply wells), domestic (16), irrigation (4), industrial (3), two classes of non-community public water supply (3), and recovery well (3) along with other uses. Eighteen of the active wells in the DWSMA (not counting the Fridley municipal supply wells) extend into or through one or more of the source water aquifers. Mounds View Well 6 and New Brighton Well 12 are the only active non-Fridley wells in the DWSMA that extend into the Mt. Simon aquifer. Wells located within the DWSMA, particularly those wells completed in or below the source water aquifers, have the potential to provide a pathway for contamination to reach the source water aquifers and the Fridley municipal water supply wells.

Available information from the MPARS database indicates that there are 57 high capacity wells within a zone that includes the Fridley DWSMA and extends one mile beyond the DWSMA boundaries (note: this number does not include the 11 Fridley primary municipal water supply wells). High capacity wells are defined as wells that pump more than 1,000,000 gallons per year or more than 10,000 gallons per day. Owners of these wells are required to obtain a groundwater appropriation permit from the MDNR. High capacity wells outside of the DWSMA were identified because changes in operation of these wells could, potentially, affect the DWSMA boundaries. Of these 57 wells, 26 are used for municipal water supply (two of these wells are Fridley emergency supply wells 1 and 13), 20 are used for pollution containment, five are used for some type of irrigation, two are used for private water supply, one is used for commercial/institutional water supply, one is used for industrial processing two are permitted for construction dewatering (Table C-12). The construction dewatering wells would not be expected to remain active long term. As shown in Table C-12, 37 of the non-Fridley high capacity wells extend into or through one or more of the City's source water aquifers.

C.1.2.1.1.2 Potential Class V Well Locations

An inventory of locations where Class V wells may be present, or may have been present, within the DWSMA was done as part of the PCSI. A typical land use associated with the presence of Class V wells is automobile service stations and repair shops. As defined by the U.S. Environmental Protection Agency (EPA), cesspools and large-scale septic systems that serve more than 20 people also are included in the Class V well classification. For the PCSI, the EPA's Class V Wells database was accessed. In addition, hazardous waste generator data was reviewed for properties related to automobile repair.

The PCSI identified 28 separate property parcels where Class V wells may be present, or may have been present, based on the type of business that is or had operated there or the use of the property (see Table C-4 and Figure C-8). For all 28 properties, the assessment of potential for presence of a Class V well is due to a currently active or inactive hazardous waste generator permit for a business related to auto repair being associated with the properties. It should be noted that none of these properties are found in the EPA's Class V Wells database. The status shown in Table C-4 is the status of the hazardous waste generator permit(s) associated with each property. The MDH did not require that the City determine if Class V wells are actually present on any of these properties. Results of the location verification are summarized in Table C-4.

C.1.2.1.1.3 Storage Tanks

The PCSI identified 89 property parcels within the portions of the DWSMA in which aquifer vulnerability is classified as Moderate or High on which storage tanks are or have been located (see Table C-5 and Figure C-9). These properties include a total of 485 current or former storage tanks. There are 100 storage tanks whose status is identified as "Active" located on a total of 34 of the properties (Table C-5). Products stored in the active storage tanks vary from site to site and include various fuels, oils, antifreeze, and unspecified substances. As indicated in Table C-5, releases from the tanks were reported at 63 of the properties. Available information indicates that the MPCA has closed the tank release responses at all 63 of the properties for which releases were reported.

C.1.2.1.1.4 Chemical Storage Sites

The PCSI identified 32 separate property parcels within the portions of the DWSMA where aquifer vulnerability is classified as Moderate or High on which chemical storage occurs (Table C-6 and Figure C-10). Information on the chemicals stored at these locations is presented in Table C-6. Three of these properties are the locations of the Fridley water treatment plants and one is the location of the City's Public Works garage.

C.1.2.1.1.5 Wastewater Locations

The PCSI identified one property parcel within the portions of the DWSMA where aquifer vulnerability is classified as High on which the MPCA identifies a wastewater facility as being located (Table C-7 and Figure C-11). As shown in Table C-7, the facility is owned by Kurt Manufacturing.

C.1.2.1.1.6 Potential Contaminant Site Locations

The PCSI identified 19 separate property parcels within the portions of the DWSMA where aquifer vulnerability is classified as Moderate or High that include sites where contamination may be present (Table C-8 and Figure C-12). Several of these properties were also identified in other site categories included in the PCSI. As shown in Table C-8, there are a total of 20 sites on these properties. Eighteen of the sites are identified as brownfields sites and two are identified as State Superfund sites. One of these sites is the Fridley Commons Park Well Field Superfund Site. Two of the brownfields sites are identified as inactive.

C.1.2.1.1.7 Hazardous Waste Generators

The PCSI identified 37 property parcels within the portions of the DWSMA where aquifer vulnerability is classified as High on which a total of 46 hazardous waste generators are or were present (Table C-9 and Figure C-13). Note that 28 of these property parcels were also identified under section C.1.2.1.1.2 as potential locations of Class V wells. As shown in Table C-9, there are 36 active hazardous waste generator permits in this portion of the DWSMA. Table C-9 also shows that there are 10 hazardous waste generator permits classified as inactive in these portions of the DWSMA.

C.1.2.1.1.8 Dump Locations

The PCSI identified five property parcels within the portions of the DWSMA where aquifer vulnerability is classified as High where dump sites are located (Table C-10 and Figure C-14).

C.1.2.1.1.9 Spill Locations

The PCSI identified 39 property parcels within the portions of the DWSMA where aquifer vulnerability is classified as Moderate or High where a contaminant spill occurred. Note that some, but not all, of these properties were also identified in the review of leaking underground storage tank locations (section C.1.2.1.1.3) or potential contaminant site locations (section C.1.2.1.1.6) (Table C-11 and Figure C-14). As shown in Table C-11, site status for all the spills is identified as closed.

C1.2.2 Historical Land Use

Initially, farming was a primary industry for many early settlers in the area now occupied by Fridley. Fridley Township was established in 1879. In 1949 the Village of Fridley was incorporated. Fridley became a city in 1957. A significant portion of Fridley was damaged or destroyed when two tornadoes hit the City in May 1965. Summaries of Fridley's history can be found at https://en.wikipedia.org/wiki/Fridley,_Minnesota , and http://www.ci.fridley.mn.us/334/Fridley-History, and https://fridleymn.gov/DocumentCenter/View/659/Chapter-2-History-Current-Demographics-and-Projections.

In 1950 the population of Fridley was 3,796. By 1970 the population of Fridley had grown to 29,233. Between 1970 and 2000 the population of Fridley declined approximately 6 percent to 27,449. The 2010 census counted 27,208 people in Fridley. The Metropolitan Council estimated the 2017 population of Fridley to be 28,667 (Metropolitan Council, 2018a).

Historical land use shown on Figure C-15 is based on pre-1984 land use data from the Metropolitan Council. As indicated on Figure C-15, the majority of the pre-1984 land use in the areas that fall within the limits of the DWSMA was residential (single family or multi-family). Metadata associated with ArcView shapefiles of pre-1984 land use maps available from the Metropolitan Council indicate that the maps are not considered reliable for determining land use of individual properties. Based on available information, historical land uses that might significantly affect the management strategies for the DWSMA that are not currently present within the DWSMA were not identified.

While it is possible that buried features such as wells that were not properly sealed or unused underground storage tanks not listed in any available database could be present within the DWSMA, available information does not suggest the presence of such features. Thus, there is no basis for a concerted search for such buried features within the DWSMA. If any such, currently unknown, features are to be located in the future it would most likely occur only if they are encountered during development or redevelopment of a property.

C1.3 Public Utilities

Per the September 25, 2018 Scoping Decision Notice, management of the City's DWSMA must consider and reflect available public utility services information. Pipelines, sanitary sewers, and storm sewers are addressed in this section.

Fridley Wells 2 through 12 all have open-borehole completions. The bedrock aquifers in which these wells are open are shown in Table C-1 . Well construction information for the Fridley municipal wells is summarized in Table C-1 . Copies of the MDH Well Records for these wells are presented in Appendix A.

C1.3.1 Pipelines

As shown on Figure C-16, one petroleum pipeline crosses the eastern portion of the DWSMA. There are no natural gas pipelines that cross the Fridley DWSMA. The City will rely on State/Federal oversight and the management program of the pipeline owner for proper operation and maintenance of the pipeline and response to any releases from the pipeline. The City will inform the pipeline owner that their pipeline crosses the City's DWSMA. To the extent possible, the City will support any response activities by these other entities in the event of a release from the pipeline within or near the DWSMA.

C.1.3.2 Sanitary Sewers

The trunk sanitary sewer system in Fridley is shown on Figure C-17.

An improperly designed or maintained sanitary sewer system may increase the chance for the release of untreated sewage into environmentally sensitive areas such as protected wetlands, lakes, or rivers or allow infiltration of contaminants that could potentially reach the uppermost source water aquifer. The City of Fridley has an ongoing maintenance program to insure the integrity and proper operation of their sanitary sewer system. Additional measures in this Plan to address the sanitary sewer system in Fridley is considered to be unnecessary.

C.1.3.3 Storm Sewers

Storm water management in Fridley is described in the City's Surface Water Management Plan). The City's storm sewer system is shown on Figure C-18. Chapter 208 of the City Code addresses stormwater management in Fridley.

A municipal storm sewer and surface water drainage system plays a significant role in the management of storm water and can be an important part of management strategies developed for a wellhead protection plan. An improperly designed or maintained storm sewer and surface water drainage system may increase the chance for the spread of a contaminant into environmentally sensitive areas such as protected wetlands, lakes, or rivers or allow infiltration of contaminants that could potentially reach the uppermost source water aquifer. A surface water management program is in place in Fridley. The City will rely on their existing surface water management program to address issues related to surface water. Therefore additional measures to address surface water in this Plan are considered to be unnecessary.

C1.4 Water Quantity Data Elements

Groundwater and surface water quantity are discussed in this section as required by the September 25, 2018 Scoping 2 Decision Notice from the MDH.

C1.4.1 Surface Water Quantity

As discussed above, surface water features within the DWSMA include lakes, ponds, stormwater basins, wetlands, and a portion of Rice Creek. Surface water management is discussed in the City's Surface Water Management Plan. There are no active surface water appropriation permits in the DWSMA. In addition, the City is not aware of any current water-use conflicts that impact surface water quantity in the vicinity of the DWSMA. Measures in this Plan to address surface water quantity issues are considered to be unnecessary.

C1.4.2 Groundwater Quantity

The Fridley municipal water supply system currently includes 11 primary water supply wells (Table C-1). Under MDNR Appropriation Permit No. 1975-6244, the City of Fridley currently has a permitted annual groundwater appropriation of 2.4 billion gallons per year (BGY).

The projected water use (i.e., pumpage) used to delineate the Fridley WHPAs and DWSMA was 1,694,652,000 gallons per year (Barr, 2018).

Fridley was incorporated in as a village in 1949 and became a city in 1957. In 1950 the population of Fridley was 3,796. By 1970 the population of Fridley had grown to 29,233. Between 1970 and 2000 the population of Fridley declined approximately 6 percent to 27,449. The 2010 census counted 27,208 people in Fridley. The Metropolitan Council estimated the 2017 population of Fridley to be 28,667 (Metropolitan Council, 2018a). The Metropolitan Council projects Fridley' population to reach 29,300 in 2020 and 31,600 in 2030 (Metropolitan Council, 2018b).

Water demand for the period 2005 through 2015 is presented in the City's draft Water Supply Plan (Fridley, 2016). Total annual volume pumped by the Fridley municipal wells during the period 2013 through 2017 is presented in the Part 1 Wellhead Protection Plan amendment (Barr, 2018). Between 2005 and 2015 Fridley's water demand varied from year to year. During this period the population served increased by approximately 7 percent. The total annual water demand in 2015 was approximately 16 percent lower than the total demand in 2005. During the period 2005 through 2015, the total per capita/day water demand met by the City's water supply system ranged from approximately 151 gallons per capita/day (gpc/d) to approximately 102 gpc/d.

Current daily water demand (based on the period 2013-2017) averages approximately 3.0 MGD. The City's draft Water Supply Plan (Fridley, 2016) projects the daily average water demand in 2030 will be approximately 3.8 MGD (approximately 2,600 gpm). Maximum day demand (the largest daily water use in a given year) ranged from approximately 5.9 MGD to 9.0 MGD in the period 2013-2017. The City's draft Water Supply Plan projects the City's 2030 maximum day demand will be approximately 7.6 MGD (approximately 5,300 gpm).

As discussed above, the PCSI identified 57 high capacity water wells, in addition to the City's water supply wells, within one mile of the DWSMA that are listed in the MDNR's MPARS database as having annual appropriations of more than 1 million gallons. Information on these wells is presented in Table C-12. The City is currently unaware of any adverse groundwater conflicts or interferences related to the existing Fridley municipal wells.

Construction of other high capacity wells in or near the DWSMA or increases in pumping of existing high capacity wells may influence groundwater flow in the source water aquifers and the groundwater quantity available to the municipal system. Such changes could potentially affect the boundaries of the DWSMA, which would require the City to update the Wellhead Protection Plan. In addition, pumping of such wells could potentially reduce the static levels in the source water aquifers. Issues regarding changes in appropriations resulting from additions or deletions to the current list of water appropriations in or near the DWSMA will be addressed in the management portion of this Plan.

Persistent drought conditions may also prove to be a threat to the quantity of groundwater available to the municipal system. The City's water conservation program includes a tiered water rate structure. Under Section 402.33 of the City Code, the City Council may establish water conservation regulations on an as needed basis.

Fridley' current water supply meets the demand of its consumers. The City is confident that the municipal water supply system will continue to have the capability of meeting future demand.

C1.5 Water Quality Data Elements

Surface water and groundwater quality are discussed in this section as required by the September 25, 2018 Scoping 2 Decision Notice from the MDH, submission of data related to water quality in this WHPP amendment is not required.

C1.5.1 Surface Water Quality

Rice Creek flows through the eastern and central portions of the DWSMA. The MPCA has identified this stream as an impaired water. No other impaired streams are present within the DWSMA. East Moore Lake and the northern portion of Long Lake are the impaired lakes in the DWSMA. Surface water management is addressed in the City's Surface Water Management Plan.

C1.5.2 Groundwater Quality

The MDH has an ongoing program to monitor the quality of municipal water supplies. City of Fridley municipal wells are sampled annually as part of this program. Parameters that are part of this program include metals, other inorganic compounds, organic compounds (including perfluorochemicals), and bacteria. Samples collected from the City's water supply wells by the MDH are not analyzed for all parameters every year. To date, reported concentrations of all monitoring parameters meet the regulatory levels specified by the U.S. EPA as part of the Safe Drinking Water Act or by the State of Minnesota. These results are presented in the City's annual Water Quality Report. Copies of the City's 2016 and 2017 Water Quality Reports are presented in Appendix D. Links to recent Water Quality Reports can be found on the City's website at http://www.ci.fridley.mn.us/620/Water-Quality-Reports.

In addition to the sampling performed by the MDH, the City performs supplemental monitoring of regulated and unregulated contaminants. The supplemental monitoring has identified low concentrations of trichloroethylene (TCE) in one well and 1,4-dioxane in several wells. Reported concentrations of these compounds are below the regulatory levels specified by the U.S. EPA as part of the Safe Drinking Water Act or by the State of Minnesota.

In recent years, the presence of perfluoroalkyl substances (PFAS) in drinking water has entered the public discussion. Wells 10 and 11 are located near where fire training using PFAS-containing foams had been done in the past. Wells 10 and 11 were sampled for PFAS compounds several times between 2009 and 2018. No PFAS compounds were reported in the samples collected from Well 11. Beginning with the 2016 sampling event, up to six different PFAS compounds including PFOA, PFBA, PFPeA, PFHxA, PFBS, and PFHxS have been reported at low concentrations in samples collected from Well 10. Not all the PFAS compounds were reported in all the samples from Well 10. Well 10 was taken out of service immediately after the 2016 sampling results became available. At the time this Plan was prepared the City was working in conjunction with the MDH to assess the options for addressing the presence of PFAS compounds in Well 10.

While trichloroethylene had been detected in some of the City's wells in the past, as noted in the City's 2017 Drinking Water Report (see Appendix D), this compound was reported in only one well in 2017 at a concentration below established drinking water standards and health risk guidelines but was not detected in the treated water distributed to customers. The 2017 Drinking Water Report also notes that 1,4-dioxane was reported several of the City's wells in 2017 at concentrations well below the applicable drinking water standards.

The City treats water pumped from its primary water supply wells in three water treatment plants to remove iron and manganese from the water before it is put in to the distribution system. In addition to iron and manganese removal, the Commons Park Water Treatment Plant also removes radionuclides from the raw water. Chlorination and fluoridation prior to distribution of treated water is done in all three treatment plants.

Water distributed from the City's water treatment plants was sampled for PFAS compounds in 2013 and 2014. No PFAS compounds were reported at concentrations above the applicable laboratory reporting limits.

The MDH has prepared a study for Anoka County which evaluates the relative susceptibility of the water table aquifer to contamination from nitrate (MDH, 2012). There are a few small areas of high susceptibility identified by the MDH within the Fridley DWSMA. The vast majority of the area in the DWSMA was given a moderate or low susceptibility rating. The vulnerability classification of the uppermost source water aquifer within the Fridley DWSMA ranges from Low to High (Barr, 2018). None of the small areas of high nitrate susceptibility rating are in areas where the source water aquifer vulnerability is classified as High. Available nitrate sampling results available for the City's wells indicate that no nitrate has been reported in the any of the City's wells for over 20 years. Typically, the most significant source of nitrate in groundwater is agricultural practices. As shown on Figure C-5, agricultural land use is not present in the Fridley DWSMA. Thus, it is unlikely that any significant concentrations of nitrate will be introduced into the water table aquifer in the DWSMA in the future and nitrate likely will not adversely impact the uppermost source water aquifer in the DWSMA.

It is important to consider groundwater quality when determining management strategies for the land uses within the DWSMA. Since the City currently enjoys good water quality, the City has developed management strategies in this WHPP amendment aimed at maintaining the groundwater quality in the source water aquifers.

C1.6 Assessment of Data Elements

C1.6.1 Use of the Municipal Wells

Fridley currently has 11 municipal water supply wells in the municipal water supply and distribution system for Public Water Supply 1020031. Locations of the wells are shown on Figure C-1 and construction details for the Fridley municipal wells are summarized in Table C-1. Copies of the MDH well records for these wells are presented in Appendix A.

In the 2010 census Fridley had a population of 27,208. The Metropolitan Council estimated the 2017 population of Fridley to be 28,667 (Metropolitan Council, 2018a). As of January 2018, the Metropolitan Council has projected Fridley's population to reach 29,300 in 2020 and 31,600 in 2030 (Metropolitan Council, 2018b).

The City's current daily water demand (based on the period 2013-2017) averages approximately 3.0 MGD (see Barr, 2018). Maximum day demand (the largest daily water use in a given year) ranged from

approximately 5.9 MGD to 9.0 MGD in the period 2013-2017. Fridley's permitted annual appropriation volume is 2.4 billion gallons per year (BGY). The City's draft Water Supply Plan (Fridley, 2016) projects the daily average water demand in 2030 will be approximately 3.8 MGD (approximately 2,600 gpm). The draft Water Supply Plan also projects the 2030 maximum day water demand will be approximately 7.6 MGD (approximately 5,300 gpm). The City has on ongoing well rehabilitation program but currently has no plans to construct any additional water supply wells to meet projected future water demand.

Fridley currently has four water storage facilities consisting of two elevated towers and two ground storage tanks. These facilities have a combined storage capacity of 6.5 million gallons. The City currently has no plans to construct any additional water storage facilities.

C1.6.2 Wellhead Protection Area Criteria

Delineation of the WHPAs for the Fridley wells involved the evaluation of both porous-media and fractured media flow. Information/criteria used to perform the groundwater flow modeling for the Fridley WHPA/DWSMA delineations are discussed in the WHPA delineation report (the Part 1 WHPP amendment prepared by Barr, 2018) and summarized below.

C1.6.2.1 Time of Travel

A 10-year groundwater time of travel was used for the WHPA delineation for each of the Fridley municipal wells. A map in the Part 1 amendment report shows the composite 10-year groundwater time of travel WHPA for the Fridley wells.

C1.6.2.2 Aquifer Transmissivity

A combination of pumping tests conducted at Well 10, Wells 6 and 8, Brooklyn Center Well 9, Blaine Well 7, and Wells 2 and 3 were used to estimate the transmissivities of the source water aquifers. Results from the tests were incorporated into the groundwater flow model as discussed in the WHPP Part 1 Amendment report (Barr, 2018).

C1.6.2.3 Daily Volume of Water Pumped

Daily volume of water pumped from each of Fridley's municipal wells used in the groundwater flow model was determined by using the highest recorded or projected pumping annual volume for each well. Determination of the daily volume of water pumped for each well used in the groundwater flow models is presented in Barr (2018).

C1.6.2.4 Flow Boundaries

The Mississippi River to the west of Fridley is a regional groundwater flow boundary. Local flow directions, especially in the Mt. Simon aquifer, are influenced by multiple high-capacity pumping wells in the area. Additional details on the groundwater flow boundaries used for groundwater flow modeling are presented in Metropolitan Council (2009; 2014). Major rivers and lakes within the model domain are simulated using the MODFLOW River (RIV) Package.

C1.6.2.5 Groundwater Flow Field

The groundwater flow field used for delineation of the WHPA was determined by the groundwater flow model. The groundwater flow directions in the Prairie du Chien, Jordan, Tunnel City-Wonewoc, and Mt. Simon aquifers calculated by the groundwater model are consistent with the flow directions for these aquifers shown in the Anoka County Geologic Atlas (Berg, 2016) and the ambient flow field simulation results presented by Metropolitan Council (2009; 2014).

C1.6.3 Quantity and Quality of Water Supplying the Public Water Supply Wells

The Fridley municipal wells are open to five different aquifers. Construction details for the Fridley municipal wells are summarized in Table C-1.

Based on the available information, there are no known groundwater quantity issues that will have any significant impact on the management of the DWSMA associated with the Fridley wells. While it is possible that high capacity wells completed in the source water aquifers in the vicinity of Fridley or within the DWSMA could affect the quantity of groundwater available, there are currently no known conflicts or interferences related to the municipal wells in the DWSMA.

The City currently is not planning to install any additional water supply wells to meet future demand, although replacement of existing wells may be considered. New high capacity wells constructed by others in the vicinity of the DWSMA within the 10-year life time of this Plan could, potentially, affect the DWSMA boundaries. If directed to do so by the MDH, the City will incorporate such new wells into the groundwater model and assess if projected pumping from the new wells would affect the boundaries of the DWSMA. Any required Plan amendments would be prepared with the help of the Wellhead Protection Consultant.

C1.6.4 Land and Groundwater Uses in the DWSMA

Aquifer vulnerability in approximately 5.4 percent of the area encompassed by the DWSMA is classified as High. Aquifer vulnerability in approximately 93 percent of the area in the DWSMA is classified as Moderate. The aquifer vulnerability in approximately 1.6 percent of the area in the DWSMA is classified as Low.

Land uses within the DWSMA could affect source water protection efforts or the management of the DWSMA. In addition, unmaintained, damaged, poorly-constructed, unused, or incorrectly abandoned wells could provide a direct route for contaminants to enter one or more of the source water aquifers.

As discussed by Barr (2018), the DWSMA was delineated to encompass the zones in which groundwater travel time to the Fridley municipal wells is ten years or less. The DWSMA encompasses the WHPA and is defined by geographically identifiable features. The DWSMA extends east of the Fridley city limits into New Brighton and Mounds View and north into Spring Lake Park.

Potential contaminant sources within the DWSMA identified through the PCSI include wells, properties where Class V wells potentially may be, or may have been, located, storage tank sites, chemical storage locations, wastewater locations, dump and spill locations, hazardous waste generators, and other

properties where contaminants may have been released not included in any of the other categories. These potential contaminant sources will be considered when developing the management strategies for the Fridley DWSMA.

C2.0 References

Barr Engineering Co. (Barr), 2018. City of Fridley Wellhead Protection Plan Amendment – Part 1: Delineation of the Wellhead Protection Area (WHPA), Drinking Water Supply Management Area (DWSMA) and Assessments of Well and DWSMA Vulnerability, prepared for the City of Fridley, July 2018.

Berg, J.A., 2016. Geologic atlas of Anoka County, Minnesota (Part B.: Minnesota Department of Natural Resources, County Atlas Series C-27, report and pls. 7–9, http://www.dnr.state.mn.us/waters/programs/gw_section/mapping/platesum/anokcga.html.

City of Fridley (Fridley), 2016. Draft Water Supply Plan, submitted to Minnesota Department of Natural Resources December 2016.

Metropolitan Council, 2009. Twin Cities Metropolitan Area Regional Groundwater Flow Model Version 2.00: Technical Report in Support of the Metropolitan Area Master Water Supply Plan

Metropolitan Council, 2012. Using the soil water balance model (SWB) to estimate recharge for the Twin Cities Metropolitan Area Groundwater Model Version 3. Prepared by Barr Engineering. Metropolitan Council: Saint Paul, MN.

Metropolitan Council, 2014. Twin Cities Metropolitan Area Regional Groundwater Flow Model, Version 3.0. Prepared by Barr Engineering. Metropolitan Council: Saint Paul, MN.

Metropolitan Council, 2018a. 2017 Preliminary Population Estimates by City and Township, downloaded from https://metrocouncil.org/Data-and-Maps/Publications-And-Resources/Files-and-reports/2017-Population-Estimates-(Final,-July-2018)-(1).aspx

Metropolitan Council, 2018b. Thrive MSP 2040 – Forecasts as of January 1, 2018, downloaded from https://metrocouncil.org/Data-and-Maps/Data/CouncilResearchProducts/Council-Forecasts.aspx?source=child.

Meyer, G.N., Tipping, R.G., and R.S. Lively, 2013. Sand Distribution Model. Plate 5 of 6, *in* Geologic Atlas of Anoka County, Minnesota: D.R. Setterholm (ed.). Minnesota Geological Survey County Atlas Series, Atlas C-27. University of Minnesota, St. Paul.

Minnesota Department of Health (MDH), 2018. Scoping 2 Decision Notice and Meeting Summary – City of Fridley – PWSID 1020031, letter from John Freitag of the MDH to James Kosluchar of the City of Fridley, September 25, 2018.

Minnesota Department of Health (MDH), 2012. Nitrate-Nitrogen Probability Ranking Map for the Water Table Aquifer – Anoka County, Minnesota, Environmental Health Division – Source Water Protection Unit, October 2012.

Mossler, J.H., 2012. Bedrock Geology. Plate 2 of 6, *in* Geologic Atlas of Anoka County, Minnesota: D.R. Setterholm (ed.). Minnesota Geological Survey County Atlas Series, Atlas C-27. University of Minnesota, St. Paul.

United States Dept. of Agriculture - Natural Resources Conservation Service (USDA-NRCS), 2012. Gridded Soil Survey Geographic (gSSURGO) Database for Minnesota. Available online at: http://datagateway.nrcs.usda.gov

Tables

Table C-1

Fridley Municipal Well Construction Summary
Fridley WHPP Amendment

Local Well ID	Unique Number	Use/ Status[1]	Casing Diameter (in.)	Casing Depth (ft.)	Well Depth (ft.)	Year Constructed	Aquifer	Well Vulnerability
2	206674	P	24 x 16	675	842	1960	CMTS	Not Vulnerable
3	206670	P	24 x 16 x 10	784	836	1961	CMTS	Not Vulnerable
4	201158	P	24 x 16	663	831	1961	CMTS	Not Vulnerable
5	206675	P	16	656	845	1961	CMTS	Not Vulnerable
6	206673	P	24	153	255	1972	OPCJ	Vulnerable
7	206678	P	24 x 16 x 12	138	262	1970	OPDC	Vulnerable
8	206669	P	16 x 12	138	265	1969	OPDC	Vulnerable
9	206672	P	30 x 24	153	255	1972	OPCJ	Vulnerable
10	206658	P	24 x 16	128	199	1969	QBAA	Vulnerable
11	206657	P	30 x 24	325	669	1970	CTMS	Vulnerable
12	209207	P	30 x 24	234	276	1970	CJDN	Vulnerable

[1] P = Primary

Aquifer Codes:
CJDN = Jordan Sandstone
CMTS = Mt. Simon Sandstone
CTMS = Tunnel City Group and Mt. Simon Sandstone
OPCJ = Prairie du Chien Group and Jordan Sandstone
OPDC = Prairie du Chien Group
QBAA = Quaternary buried artesian aquifer

Table C-2

Potential Contaminant Source Inventory Data Sources
Fridley WHPP Amendment

Potential Contaminant Source Type	Data Source(s)
Brownfield and State Superfund Sites	MPCA WIMN & Agency Interests databases
Chemical Storage Sites	MnDPS, MDA
Dump Sites	Anoka County
Hazardous Waste Generator Locations	MPCA WIMN & Agency Interests databases; Anoka County
LUST Site Locations	MPCA WIMN & Agency Interests databases
Potential Class V Well Locations	MPCA WIMN database; USEPA (database reviewed but no hits)
Spill Sites	MPCA WIMN & Agency Interests databases
Storage Tanks	MPCA WIMN & Agency Interests databases
Wastewater Disposal Locations	MPCA WIMN & Agency Interests databases
Wells	MN CWI database; MDNR MPARS database; MDH Sealed Wells database
Other Data Type	**Data Source(s)**
Current Land Use	Met Council 2010 Generalized Land Use
Historical Land Use	Met Council pre-1984 Land Use
Planned Land Use	Met Council 2030 Generalized Interpreted Land Use
Bedrock Geology	MGS 2013 Bedrock Geology of the Twin Cities Ten-County Metropolitan Area
Flood Zones	FEMA Digital Flood Insurance Rate Map Database (2018 – Effective)
Pipelines	MN Geospatial Information Office & MN Office of Pipeline Safety (1996)
Roads	MnDOT Office of Transportation database
Sewer Networks (storm and sanitary)	City of Fridley
Soil Cover	Natural Resources Conservation Service SSURGO Soils Database
Soil Permeability	Natural Resources Conservation Service SSURGO Soils Database
Zoning	City of Fridley

Table C-3

PCSI Results - Well Locations in the DWSMA
City of Fridley Part 2 WHPP Amendment

PCSI ID	PID No.	Unique No.	Status	Use	Well Name	Well Location	City	Total Depth (Feet)	Date Completed	Aquifer	PCS Code	Location Verified
1	123-193023230050	447900	A	Monitor Well	409U4	Not Available	New Brighton	340	22/07/1988	OPCJ	WEL	Uncertain
2	003-143024430019	206674	A	Community Supply (Municipal)	Fridley 2	6251 7th st Ne	Fridley	842	15/12/1960	CMTS	WEL	Yes
3	003-143024430032	206670	A	Community Supply (Municipal)	Fridley 3	611 61st Av Ne	Fridley	836	03/03/1961	CMTS	WEL	Yes
4	003-143024430041	201158	A	Community Supply (Municipal)	Fridley 4	631 63rd Av Ne	Fridley	831	20/02/1961	CMTS	WEL	Yes
5	003-143024440064	206675	A	Community Supply (Municipal)	Fridley 5	770 63rd Av Ne	Fridley	845	00/00/1961	CMTS	WEL	Yes
6	003-143024430041	206673	A	Community Supply (Municipal)	Fridley 6	600 63rd Av Ne	Fridley	255	00/08/1972	OPCJ	WEL	Yes
7	003-143024430041	206678	A	Community Supply (Municipal)	Fridley 7	680 63rd Av Ne	Fridley	262	14/01/1970	OPDC	WEL	Yes
8	003-143024430032	206669	A	Community Supply (Municipal)	Fridley 8	613 61st Av Ne	Fridley	265	17/12/1969	OPDC	WEL	Yes
9	003-143024430033	206672	A	Community Supply (Municipal)	Fridley 9	603 61st Av Ne	Fridley	255	22/12/1965	OPCJ	WEL	Yes
10	003-113024340013	206658	A	Community Supply (Municipal)	Fridley 10	6911 University Av Ne	Fridley	199	29/12/1969	QBAA	WEL	Yes
11	003-113024340013	206657	A	Community Supply (Municipal)	Fridley 11	6911 University Av	Fridley	669	20/04/1970	CTCM	WEL	Yes
12	003-123024240053	209207	A	Community Supply (Municipal)	Fridley 12	7345 65 Hy	Fridley	276	00/00/1970	CJDN	WEL	Yes
13	003-133024130009	796405	U	Irrigation	Addison, Betty Ann	6581 Central Av	Fridley	142	26/04/2013	Not Available	WEL	Yes
14	003-113024440001	258321	A	Public Supply/Non-Comm.-Transient	Anoka County Parks Dept.	Not Available	Fridley	Not Available	Not Available	Not Available	WEL	Uncertain
15	003-233024240131	465543	A	Recovery Well	Ashland Oil Company	5701 University Av	Fridley	40	08/06/1990	Not Available	WEL	Yes
16	123-183023430014	206761	A	Public Supply/Non-Community	Brightwood Golf Course	1975 Silver Lake Rd	New Brighton	295	04/11/1969	OPCJ	WEL	Yes
17	Not Available	224289	A	Domestic	City Of Fridley	Comstock & Davis	Fridley	145	01/01/1968	Not Available	WEL	Uncertain
18	003-143024430036	668832	A	Monitor Well	City Of Fridley	6100 Moose Lake Dr W	Fridley	88	07/06/2002	Not Available	WEL	Yes
19	003-143024320188	563365	A	Monitor Well	City Of Fridley	6490 University Av	Fridley	50	13/07/1995	Not Available	WEL	Approximate
20	003-133024130052	206662	A	Domestic	Corcoran, Lenny E.	6537 Central Av	Fridley	225	29/02/1946	OPDC	WEL	Yes
21	003-123024410004	804940	A	Monitor Well	Cummins Power Generation	1400 73rd Av Ne	Fridley	14	06/10/2014	Not Available	WEL	Yes
22	003-123024410004	804941	A	Monitor Well	Cummins Power Generation	1400 73rd Av Ne	Fridley	13	06/10/2014	Not Available	WEL	Yes
23	003-123024410004	804942	A	Monitor Well	Cummins Power Generation	1400 73rd Av Ne	Fridley	14	06/10/2014	Not Available	WEL	Yes
24	123-173023230009	473405	A	Monitor Well	D.L Beach	2251 Long Lake Rd	New Brighton	18.7	26/10/1990	Not Available	WEL	Yes
25	123-173023230009	473406	A	Monitor Well	D.L Beach	2251 Long Lake Rd	New Brighton	19.4	26/10/1990	Not Available	WEL	Yes
26	123-173023230009	473404	A	Monitor Well	D.L. Beach	2251 Long Lake Rd	New Brighton	20.8	25/10/1990	Not Available	WEL	Yes
27	003-143024310033	478149	A	Not Available	Dept. Of Trans.	6290 65 Hc	Fridley	16	09/04/1991	Not Available	WEL	Approximate
28	003-153024140085	206680	A	Industrial	Designware Industries	6536 Main st Ne	Fridley	303	09/11/1960	OPCJ	WEL	Yes
29	003-133024120005	206661	A	Domestic	Detterman, Robert	1380 H Cr	Fridley	124	13/07/1965	QBAA	WEL	Uncertain
30	123-173023230009	498006	A	Monitor Well	Dl Beach	2251 Long Lake Rd	New Brighton	15	17/03/1992	Not Available	WEL	Yes
31	003-143024410055	277736	U	Not Available	Dorff, Michael & Darlene	890 Mississippi st Ne	Fridley	Not Available	Not Available	Not Available	WEL	Yes
32	003-143024340091	273499	A	Unknown	Eggar, Fred	Not Available	Fridley	151	00/06/1949	Not Available	WEL	Uncertain
33	003-133024210026	206663	A	Domestic	Erickson, Ed	6825 Channel Rd	Fridley	82	12/08/1953	QBAA	WEL	Yes
34	003-133024210007	206664	A	Domestic	Erickson, Ed	6735 Channel Rd	Fridley	84	00/00/1953	QBAA	WEL	Yes
35	003-143024440060	206679	A	Irrigation	Fridley Junior High Scho	6100 Moore Dr	Fridley	263	18/04/1972	OPDC	WEL	Yes
36	003-143024420013	509089	A	Monitor Well	Fridley Mw-1	6431 University Av	Fridley	95	25/08/1990	QBAA	WEL	Yes
37	003-143024310093	509090	A	Monitor Well	Fridley Mw-2	6431 University Av	Fridley	107	14/09/1990	QBAA	WEL	Yes
38	003-143024420013	509091	A	Monitor Well	Fridley Mw-3	6431 University Av	Fridley	90	21/08/1990	QBAA	WEL	Yes
39	003-233024110003	206683	A	Irrigation	Fridley Senior High Scho	6000 Moore Dr W	Fridley	270	24/09/1968	OPDC	WEL	Yes
40	003-123024230002	206659	A	Community Supply (Municipal)	Fridley Terrace Mhp 1	7400 65 Hy Ne	Fridley	115	31/10/1957	QBAA	WEL	Yes
41	003-123024230002	206660	A	Community Supply (Municipal)	Fridley Terrace Mhp 2	65 Hy N	Fridley	588	30/11/1961	OPCW	WEL	Uncertain
42	Not Available	272810	U	Test Well	Fridley Test Hole 7	Comstock & Davis	Fridley	145	13/02/1969	Not Available	WEL	Uncertain
43	Not Available	272814	U	Test Well	Fridley Test Hole 71	N.E. Moore Lake	Fridley	145	13/02/1969	Not Available	WEL	Uncertain
44	003-143024340091	247265	U	Test Well	Fridley Tw-10	Not Available	Fridley	151	09/07/1969	Not Available	WEL	Uncertain
45	Not Available	247262	A	Test Well	Fridley Tw-3	69th Av N	Fridley	193	27/02/1969	Not Available	WEL	Uncertain
46	003-123024330001	221646	A	Test Well	Fridley Tw-5	Not Available	Fridley	128	04/02/1969	Not Available	WEL	Uncertain

Table C-3

PCSI Results - Well Locations in the DWSMA
City of Fridley Part 2 WHPP Amendment

PCSI ID	PID No.	Unique No.	Status	Use	Well Name	Well Location	City	Total Depth (Feet)	Date Completed	Aquifer	PCS Code	Location Verified
47	003-143024340091	247263	U	Test Well	Fridley Tw-8	Not Available	Fridley	Not Available	24/04/1969	Not Available	WEL	Uncertain
48	003-143024340091	247264	U	Test Well	Fridley Tw-9	Not Available	Fridley	183	07/05/1967	Not Available	WEL	Uncertain
49	003-113024140100	644557	A	Elevator	Grace Evangelical Church	755 73rd Av N	Fridley	26	05/06/2000	Not Available	WEL	Yes
50	123-063023310174	529477	A	Monitor Well	Gwv-1	2901 Hwy 10	Mounds View	34	10/09/1993	Not Available	WEL	Yes
51	003-123024310012	143684	A	Domestic	Harsted, D.W.	7101 65 Hy Ne	Fridley	195	27/07/1977	QBAA	WEL	Yes
52	123-073023220039	164658	A	Domestic	Hawkins, Peter	3008 J Cr	Mounds View	111	30/06/1980	QBAA	WEL	Yes
53	003-143024420038	223734	A	Domestic	Huss, Arelite	501 63rd Av	Fridley	124	19/08/1964	OSTP	WEL	Yes
54	003-143024120064	223736	A	Domestic	Jensen, Bill	589 Ricecreek Ne	Fridley	119	11/08/1971	QBAA	WEL	Yes
55	003-133024120020	184475	A	Domestic	Klohs, Ted W.	6851 Central Av Ne	Fridley	115	08/06/1982	QBAA	WEL	Yes
56	003-143024340091	272944	A	Unknown	Leier, S.	Not Available	Fridley	132	16/10/1934	Not Available	WEL	Uncertain
57	003-243024110133	206686	A	Domestic	Lillemoen, C.S.	1583 Gardenia Ne	Fridley	267	20/03/1947	OPDC	WEL	Approximate
58	003-013024340012	638983	A	Monitor Well	Mack, Charles	7701 65 Hy	Spring Lake Park	20	15/11/1999	Not Available	WEL	Yes
59	003-133024130036	171830	A	Irrigation	Mech, Betty	1315 66th Av Ne	Fridley	136	24/06/1983	QBUA	WEL	Yes
60	003-123024430001	235388	A	Piezometer	Medtronics B-1	Not Available	Fridley	25	03/06/1980	QWTA	WEL	Uncertain
61	003-123024430001	235397	A	Piezometer	Medtronics B-10	Not Available	Fridley	25	06/06/1980	QWTA	WEL	Uncertain
62	003-123024430001	235398	A	Piezometer	Medtronics B-11	Not Available	Fridley	22	11/06/1980	QWTA	WEL	Uncertain
63	003-123024430001	235399	U	Test Well	Medtronics B-12	Not Available	Fridley	15	10/06/1980	Not Available	WEL	Uncertain
64	003-123024430001	235400	U	Test Well	Medtronics B-13	Not Available	Fridley	17	05/06/1980	Not Available	WEL	Uncertain
65	003-123024430001	235401	U	Test Well	Medtronics B-14	Not Available	Fridley	17	05/06/1980	Not Available	WEL	Uncertain
66	003-123024430001	235402	A	Piezometer	Medtronics B-15	Not Available	Fridley	25	02/06/1980	QWTA	WEL	Uncertain
67	003-123024430001	235403	U	Test Well	Medtronics B-15A	Not Available	Fridley	52	03/06/1980	Not Available	WEL	Uncertain
68	003-123024410004	235404	U	Test Well	Medtronics B-16	Not Available	Fridley	56	12/06/1980	Not Available	WEL	Uncertain
69	003-123024410004	235405	A	Piezometer	Medtronics B-16A	Not Available	Fridley	20	13/06/1980	QWTA	WEL	Uncertain
70	003-123024340003	235406	U	Test Well	Medtronics B-17	Not Available	Fridley	37	16/06/1980	Not Available	WEL	Uncertain
71	003-123024340003	235407	A	Piezometer	Medtronics B-18	Not Available	Fridley	27	17/06/1980	QWTA	WEL	Uncertain
72	003-123024430004	235408	U	Test Well	Medtronics B-19	Not Available	Fridley	20	17/06/1980	Not Available	WEL	Uncertain
73	003-123024430001	235389	U	Test Well	Medtronics B-2	Not Available	Fridley	22	09/06/1980	Not Available	WEL	Uncertain
74	003-123024410004	235409	A	Piezometer	Medtronics B-20	Not Available	Fridley	21	18/06/1980	QWTA	WEL	Uncertain
75	003-123024410004	235410	U	Test Well	Medtronics B-21	Not Available	Fridley	17	18/06/1980	Not Available	WEL	Uncertain
76	003-123024410004	235411	A	Piezometer	Medtronics B-22	Not Available	Fridley	23	18/06/1980	QWTA	WEL	Uncertain
77	003-123024430001	235390	A	Piezometer	Medtronics B-3	Not Available	Fridley	20	06/06/1980	QWTA	WEL	Uncertain
78	003-123024430001	235391	U	Test Well	Medtronics B-4	Not Available	Fridley	15	10/06/1980	Not Available	WEL	Uncertain
79	003-123024430001	235392	A	Test Well	Medtronics B-5	Not Available	Fridley	25	04/06/1980	Not Available	WEL	Uncertain
80	003-123024430001	235393	U	Test Well	Medtronics B-6	Not Available	Fridley	20	05/06/1980	Not Available	WEL	Uncertain
81	003-123024430001	235394	U	Test Well	Medtronics B-7	Not Available	Fridley	17	05/06/1980	Not Available	WEL	Uncertain
82	003-123024430001	235395	U	Test Well	Medtronics B-8	Not Available	Fridley	25	10/06/1980	Not Available	WEL	Uncertain
83	003-123024430001	235396	A	Piezometer	Medtronics B-9	Not Available	Fridley	25	11/06/1980	QWTA	WEL	Uncertain
84	003-133024210058	191910	A	Test Well	Medtronics Fm-8A	Not Available	Fridley	30	21/05/1984	QWTA	WEL	Uncertain
85	003-123024340003	235499	A	Piezometer	Medtronics Fp-15	Not Available	Fridley	26	06/03/1982	QWTA	WEL	Uncertain
86	003-123024340003	235500	A	Piezometer	Medtronics Fp-16	Not Available	Fridley	25	06/03/1982	QWTA	WEL	Uncertain
87	003-123024310026	235501	A	Piezometer	Medtronics Fp-18	Not Available	Fridley	26	13/03/1982	QWTA	WEL	Uncertain
88	003-123024340003	235503	A	Piezometer	Medtronics Fp-19	Not Available	Fridley	26	21/08/1982	QWTA	WEL	Uncertain
89	003-123024340003	235504	A	Piezometer	Medtronics Fp-20	Not Available	Fridley	24	21/08/1982	QWTA	WEL	Uncertain
90	003-123024340003	235505	A	Piezometer	Medtronics Fp-21	Not Available	Fridley	26	21/08/1982	QWTA	WEL	Uncertain
91	003-123024340003	235506	A	Piezometer	Medtronics Fp-22	Not Available	Fridley	26	21/08/1982	QWTA	WEL	Uncertain
92	003-123024340003	191912	A	Test Well	Medtronics Opc-10	Not Available	Fridley	149	21/05/1984	OPDC	WEL	Uncertain

Table C-3

PCSI Results - Well Locations in the DWSMA
City of Fridley Part 2 WHPP Amendment

PCSI ID	PID No.	Unique No.	Status	Use	Well Name	Well Location	City	Total Depth (Feet)	Date Completed	Aquifer	PCS Code	Location Verified
93	003-123024340003	191911	A	Test Well	Medtronics Opc-8	Not Available	Fridley	138	21/05/1984	OPDC	WEL	Uncertain
94	123-083023330042	206722	A	Community Supply (Municipal)	Mounds View 5	5100 Long Lake Rd	Mounds View	350	10/04/1970	OPCJ	WEL	Yes
95	123-073023210015	206717	A	Community Supply (Municipal)	Mounds View 6	7545 Groveland Rd	Mounds View	679	15/05/1970	CJMS	WEL	Yes
96	123-083023420005	462247	A	Recovery Well	Mr. Thomas Manke	2280 I Cr W	Mounds View	30.5	02/05/1990	Not Available	WEL	Yes
97	003-123024430004	632297	U	Monitor Well	Murphy'S Warehouse	7033 Central Av Ne	Fridley	27	12/10/2000	Not Available	WEL	Approximate
98	003-123024430004	632298	U	Monitor Well	Murphy'S Warehouse Co.	7033 Central Av	Fridley	26	11/10/2000	Not Available	WEL	Approximate
99	003-123024430004	632299	U	Monitor Well	Murphy'S Warehouse Co.	7033 Central Av	Fridley	27	11/10/2000	Not Available	WEL	Approximate
100	003-123024340003	789938	A	Monitor Well	Mw	7000 Central Av Ne	Fridley	124	23/11/2012	Not Available	WEL	Yes
101	003-123024340003	795194	A	Monitor Well	Mw	7000 Central Av Ne	Fridley	22	29/05/2013	Not Available	WEL	Yes
102	003-123024210024	797963	A	Monitor Well	Mw 4	7593 65 Hy Ne	Fridley	15	23/09/2013	Not Available	WEL	Yes
103	003-123024340003	472961	A	Monitor Well	Mw#1 Pennzoil	7000 65 Hy Ne	Fridley	18	23/01/1991	Not Available	WEL	Yes
104	003-123024340003	472962	A	Monitor Well	Mw#2 Pennzoil	7000 65 Hy Ne	Fridley	17	23/01/1991	Not Available	WEL	Yes
105	003-123024220029	470162	A	Monitor Well	Mw- Lamperts Lumber	7600 65 Hy Ne	Fridley	16	19/11/1990	Not Available	WEL	Yes
106	003-123024240040	789187	A	Monitor Well	Mw-1	1240 73 1/2 Av Ne	Fridley	22	03/07/2012	Not Available	WEL	Yes
107	003-123024220029	507397	A	Monitor Well	Mw-1	7600 65 Hy	Fridley	16	28/12/1989	Not Available	WEL	Yes
108	003-123024430004	503601	A	Monitor Well	Mw-1	Not Available	Fridley	15	20/10/1988	Not Available	WEL	Uncertain
109	003-123024210024	787897	A	Monitor Well	Mw-1	7593 65 Hc Ne	Fridley	15	06/12/2011	Not Available	WEL	Yes
110	003-013024320001	458736	U	Monitor Well	Mw-1	8001 Able st	Spring Lake Park	25	20/04/1991	Not Available	WEL	Yes
111	003-143024130045	543528	A	Monitor Well	Mw-2	Not Available	Fridley	198	02/06/1994	OPDC	WEL	Uncertain
112	003-123024240040	789188	A	Monitor Well	Mw-2	1240 73 1/2 Av Ne	Fridley	22	03/07/2012	Not Available	WEL	Yes
113	003-123024220029	507398	A	Monitor Well	Mw-2	7600 65 Hy	Fridley	20	28/12/1989	Not Available	WEL	Yes
114	003-123024430004	503602	A	Monitor Well	Mw-2	Not Available	Fridley	15	21/10/1988	Not Available	WEL	Uncertain
115	003-013024320001	458737	U	Monitor Well	Mw-2	8001 Able st	Spring Lake Park	20.5	20/04/1991	Not Available	WEL	Yes
116	003-123024210024	787896	A	Monitor Well	Mw-2	7593 65 Hy Ne	Fridley	16	06/12/2011	Not Available	WEL	Yes
117	003-143024340091	543532	A	Monitor Well	Mw-3	61st Ave Ne & Jeffer	Fridley	357	12/07/1994	OPCJ	WEL	Uncertain
118	003-123024240040	789189	A	Monitor Well	Mw-3	1240 73 1/2 Av Ne	Fridley	24	03/07/2012	Not Available	WEL	Yes
119	003-123024220029	507399	A	Monitor Well	Mw-3	7600 65 Hy	Fridley	18	28/12/1989	Not Available	WEL	Yes
120	003-123024430004	503603	A	Monitor Well	Mw-3	Not Available	Fridley	14.3	24/10/1988	Not Available	WEL	Uncertain
121	003-013024320001	458738	U	Monitor Well	Mw-3	8001 Able st	Spring Lake Park	25	20/04/1991	Not Available	WEL	Yes
122	003-123024240040	789190	A	Monitor Well	Mw-4	1240 73 1/2 Av Ne	Fridley	23	03/07/2012	Not Available	WEL	Yes
123	003-123024330006	533624	A	Monitor Well	Mw-4	7000 65 Hy Ne	Fridley	17	16/08/1993	Not Available	WEL	Yes
124	003-123024330006	533625	A	Monitor Well	Mw-5	7000 Hwy 65 Ne	Fridley	14.5	16/08/1993	Not Available	WEL	Yes
125	003-123024330006	533626	A	Monitor Well	Mw-6	7000 65 Hy Ne	Fridley	15	17/08/1993	Not Available	WEL	Yes
126	003-123024330006	533627	A	Monitor Well	Mw-7	7000 65 Hy Ne	Fridley	15	17/08/1993	Not Available	WEL	Yes
127	123-083023420005	702835	A	Monitor Well	Mw-8	2280 I Cr W	Mounds View	17	17/12/2003	Not Available	WEL	Yes
128	003-233024120004	571544	A	Monitor Well	Mw-Fridley School Dist.	6085 7th st Ne	Fridley	40	22/02/1996	QBAA	WEL	Yes
129	123-183023130064	110485	A	Community Supply (Municipal)	New Brighton 12	Not Available	New Brighton	790	00/05/1984	CMTS	WEL	Uncertain
130	123-183023310060	532705	A	Elevator	New Brighton Assisted Li	2700 Rice Creek Rd	New Brighton	34	17/11/1993	Not Available	WEL	Yes
131	003-243024420070	596634	A	Monitor Well	New Brighton Mw-7	Not Available	Fridley	387	08/04/1998	Not Available	WEL	Uncertain
132	003-243024420070	596635	A	Monitor Well	New Brighton Mw-8	Not Available	Fridley	465	16/03/1998	Not Available	WEL	Uncertain
133	Not Available	760145	A	Elevator	North Star Commuter	61st Wa Ne	Fridley	21	22/10/2009	Not Available	WEL	Uncertain
134	Not Available	760144	A	Elevator	North Star Commuter Hub	Not Available	Fridley	20	19/10/2009	Not Available	WEL	Uncertain
135	003-143024340087	544077	A	Elevator	Norwood Square, Inc.	6200 5th st Ne	Fridley	21	20/06/1994	Not Available	WEL	Yes
136	003-133024320042	1000000015	U	Not Available	Not Available	Not Available	Fridley	Not Available	Not Available	Not Available	WEL	Uncertain
137	003-243024210033	1000000017	U	Not Available	Not Available	Not Available	Fridley	Not Available	Not Available	Not Available	WEL	Uncertain
138	003-243024120042	1000000010	U	Not Available	Not Available	Not Available	Fridley	Not Available	Not Available	Not Available	WEL	Uncertain

Table C-3

PCSI Results - Well Locations in the DWSMA
City of Fridley Part 2 WHPP Amendment

PCSI ID	PID No.	Unique No.	Status	Use	Well Name	Well Location	City	Total Depth (Feet)	Date Completed	Aquifer	PCS Code	Location Verified
139	003-133024420065	206666	A	Domestic	Not Available	1443 64th Av Ne	Fridley	90	10/08/1960	QBAA	WEL	Yes
140	003-133024420009	206667	A	Domestic	Not Available	1453 64th Av Ne	Fridley	95	10/08/1960	QBAA	WEL	Yes
141	003-243024110028	257511	U	Domestic	Not Available	1568 Ferndale Av	Fridley	Not Available	Not Available	Not Available	WEL	Yes
142	003-123024240004	251282	U	Domestic	Not Available	1130 Fireside	Fridley	Not Available	Not Available	QUUU	WEL	Yes
143	123-083023330048	419346	A	Other	Not Available	5084 Long Lake Rd	Mounds View	40	23/07/1986	Not Available	WEL	Yes
144	003-143024320188	563368	A	Monitor Well	Not Available	6490 University Av	Fridley	50	12/07/1995	Not Available	WEL	Approximate
145	003-143024320188	563367	A	Monitor Well	Not Available	6490 University Av	Fridley	50	13/07/1995	Not Available	WEL	Approximate
146	003-143024320188	563366	A	Monitor Well	Not Available	6490 University Av	Fridley	50	13/07/1995	Not Available	WEL	Approximate
147	003-143024310093	598223	A	Monitor Well	Not Available	6431 University Av Ne	Fridley	46	28/07/1997	Not Available	WEL	Yes
148	003-243024320001	564036	U	Monitor Well	Not Available	5695 Hackman Av	Fridley	15	09/10/1995	Not Available	WEL	Yes
149	003-243024320001	564035	U	Monitor Well	Not Available	5695 Hackman Av	Fridley	17	09/10/1995	Not Available	WEL	Yes
150	003-243024320001	564027	U	Monitor Well	Not Available	5695 Hackman Av	Fridley	101	30/08/1995	Not Available	WEL	Yes
151	003-243024320001	564021	U	Monitor Well	Not Available	5695 Hackman Av	Fridley	24	14/08/1995	Not Available	WEL	Yes
152	003-243024320001	544144	U	Monitor Well	Not Available	5695 Hackman Av	Fridley	70	16/05/1994	Not Available	WEL	Yes
153	003-233024120004	554304	U	Monitor Well	Not Available	6085 7th st Ne	Fridley	37	08/11/1995	Not Available	WEL	Yes
154	003-233024120004	554302	U	Monitor Well	Not Available	6085 7th st Ne	Fridley	37	08/11/1995	Not Available	WEL	Yes
155	003-233024210144	568215	U	Monitor Well	Not Available	6071 University Av	Fridley	30	25/07/1995	Not Available	WEL	Yes
156	003-233024120004	554303	U	Monitor Well	Not Available	6085 7th st Ne	Fridley	37	08/11/1995	Not Available	WEL	Yes
157	123-063023240061	472859	A	Irrigation	Olsen, Ronald & Debra	8148 Groveland Rd	Mounds View	23	25/09/1990	QWTA	WEL	Yes
158	003-123024410004	449083	A	Industrial	Onan Corp	1400 73rd Av Ne	Fridley	138	14/07/1988	Not Available	WEL	Yes
159	003-123024410004	161461	A	Test Well	Onan Corp	1400 73rd Av Ne	Fridley	90	19/03/1985	Not Available	WEL	Yes
160	003-123024440002	638965	A	Monitor Well	Onan Corp	1400 73rd Av	Fridley	20	10/11/1999	Not Available	WEL	Yes
161	003-123024410004	161462	A	Test Well	Onan Corp.	1400 73rd Av Ne	Fridley	93	19/03/1985	Not Available	WEL	Yes
162	003-123024430004	235412	A	Test Well	Onan Corp. B-1 Or 9-A	Not Available	Fridley	15	11/09/1979	Not Available	WEL	Uncertain
163	003-123024430004	235413	A	Test Well	Onan Corp. B-2 Or 8-A	Not Available	Fridley	16	11/09/1979	Not Available	WEL	Uncertain
164	003-123024430004	235414	A	Test Well	Onan Corp. B-3 Or 11-A	Not Available	Fridley	17	13/09/1979	Not Available	WEL	Uncertain
165	003-123024430004	235415	A	Test Well	Onan Corp. B-4 Or 10-A	Not Available	Fridley	20	13/09/1979	Not Available	WEL	Uncertain
166	003-123024430004	235416	U	Test Well	Onan Corp. B-5 Or 5-B	Not Available	Fridley	17	13/09/1979	Not Available	WEL	Uncertain
167	003-123024410004	661546	A	Monitor Well	Onan Corporation	Not Available	Fridley	27	25/10/2001	Not Available	WEL	Uncertain
168	003-123024410004	661545	A	Monitor Well	Onan Corporation	1400 73rd Av Ne	Fridley	27	25/10/2001	Not Available	WEL	Yes
169	003-123024410004	632296	U	Monitor Well	Onan Corporation	1400 73 Av Ne	Fridley	25	11/10/2000	Not Available	WEL	Yes
170	003-123024410004	571537	A	Monitor Well	Onan Corporation	1400 73rd Av Ne	Fridley	18	17/01/1996	Not Available	WEL	Yes
171	003-123024320009	571536	A	Monitor Well	Onan Corporation	2500 73rd Av Ne	Fridley	17	17/01/1996	Not Available	WEL	Approximate
172	003-123024410004	571538	A	Monitor Well	Onan Corporation	1400 73rd Av Ne	Fridley	18	17/01/1996	Not Available	WEL	Yes
173	003-123024410004	235494	A	Monitor Well	Onan Hillside Sand Well	Not Available	Fridley	Not Available	Not Available	QUUU	WEL	Uncertain
174	003-123024430004	235375	A	Industrial	Onan Inc.	Not Available	Fridley	Not Available	Not Available	MTPL	WEL	Uncertain
175	003-123024410004	235438	U	Test Well	Onan Inc. 1-C	Not Available	Fridley	16	26/06/1967	Not Available	WEL	Uncertain
176	003-123024430001	235428	U	Test Well	Onan Inc. 1-D	Not Available	Fridley	21	21/09/1977	Not Available	WEL	Uncertain
177	003-123024410004	235447	U	Test Well	Onan Inc. 10-C	Not Available	Fridley	16	26/06/1967	Not Available	WEL	Uncertain
178	003-123024430001	235437	U	Test Well	Onan Inc. 10-D	Not Available	Fridley	21	22/09/1977	Not Available	WEL	Uncertain
179	003-123024410004	235448	U	Test Well	Onan Inc. 11-C	Not Available	Fridley	16	26/06/1967	Not Available	WEL	Uncertain
180	003-123024410004	235449	U	Test Well	Onan Inc. 12-C	Not Available	Fridley	31	26/06/1967	Not Available	WEL	Uncertain
181	003-123024410004	235450	U	Test Well	Onan Inc. 13-C	Not Available	Fridley	16	26/06/1967	Not Available	WEL	Uncertain
182	003-123024410004	235451	U	Test Well	Onan Inc. 14-C	Not Available	Fridley	19	26/06/1967	Not Available	WEL	Uncertain
183	003-123024410004	235452	U	Test Well	Onan Inc. 15-C	Not Available	Fridley	16	26/06/1967	Not Available	WEL	Uncertain
184	003-123024410004	235453	U	Test Well	Onan Inc. 16-C	Not Available	Fridley	16	26/06/1967	Not Available	WEL	Uncertain

Table C-3

PCSI Results - Well Locations in the DWSMA
City of Fridley Part 2 WHPP Amendment

PCSI ID	PID No.	Unique No.	Status	Use	Well Name	Well Location	City	Total Depth (Feet)	Date Completed	Aquifer	PCS Code	Location Verified
185	003-123024410004	235454	U	Test Well	Onan Inc. 17-C	Not Available	Fridley	31	26/06/1967	Not Available	WEL	Uncertain
186	003-123024410004	235455	U	Test Well	Onan Inc. 18-C	Not Available	Fridley	16	26/06/1967	Not Available	WEL	Uncertain
187	003-123024410004	235456	U	Test Well	Onan Inc. 19-C	Not Available	Fridley	31	26/06/1967	Not Available	WEL	Uncertain
188	003-123024410004	235439	U	Test Well	Onan Inc. 2-C	Not Available	Fridley	16	26/06/1967	Not Available	WEL	Uncertain
189	003-123024430001	235429	U	Test Well	Onan Inc. 2-D	Not Available	Fridley	21	21/09/1977	Not Available	WEL	Uncertain
190	003-123024410004	235457	U	Test Well	Onan Inc. 20-C	Not Available	Fridley	36	26/06/1967	Not Available	WEL	Uncertain
191	003-123024410004	235458	U	Test Well	Onan Inc. 21-C	Not Available	Fridley	37	26/06/1967	Not Available	WEL	Uncertain
192	003-123024410004	235459	U	Test Well	Onan Inc. 22-C	Not Available	Fridley	35	26/06/1967	Not Available	WEL	Uncertain
193	003-123024410004	235460	U	Test Well	Onan Inc. 23-C	Not Available	Fridley	32	26/06/1967	Not Available	WEL	Uncertain
194	003-123024410004	235461	U	Test Well	Onan Inc. 24-C	Not Available	Fridley	35	26/06/1967	Not Available	WEL	Uncertain
195	Not Available	235462	U	Test Well	Onan Inc. 25-C	Not Available	Fridley	35	26/06/1967	Not Available	WEL	Uncertain
196	003-123024410004	235463	U	Test Well	Onan Inc. 26-C	Not Available	Fridley	32	26/06/1967	Not Available	WEL	Uncertain
197	123-Municipal RoW	235464	U	Test Well	Onan Inc. 27-C	Not Available	Fridley	32	26/06/1967	Not Available	WEL	Uncertain
198	003-123024410004	235465	U	Test Well	Onan Inc. 28-C	Not Available	Fridley	32	26/06/1967	Not Available	WEL	Uncertain
199	003-123024410004	235466	U	Test Well	Onan Inc. 29-C	Not Available	Fridley	32	26/06/1967	Not Available	WEL	Uncertain
200	003-123024410004	235440	U	Test Well	Onan Inc. 3-C	Not Available	Fridley	14	26/06/1967	Not Available	WEL	Uncertain
201	003-123024430001	235430	A	Test Well	Onan Inc. 3-D	Not Available	Fridley	21	21/09/1977	Not Available	WEL	Uncertain
202	003-123024430004	235467	U	Test Well	Onan Inc. 30-C	Not Available	Fridley	32	26/06/1967	Not Available	WEL	Uncertain
203	003-123024410004	235468	U	Test Well	Onan Inc. 31-C	Not Available	Fridley	32	26/06/1967	Not Available	WEL	Uncertain
204	003-123024430001	235470	U	Test Well	Onan Inc. 33-C	Not Available	Fridley	32	26/06/1967	Not Available	WEL	Uncertain
205	003-123024410004	235471	U	Test Well	Onan Inc. 34-C	Not Available	Fridley	52	26/06/1967	Not Available	WEL	Uncertain
206	003-123024430001	235472	U	Test Well	Onan Inc. 35-C	Not Available	Fridley	52	26/06/1967	Not Available	WEL	Uncertain
207	003-123024430001	235473	U	Test Well	Onan Inc. 36-C	Not Available	Fridley	32	26/06/1967	Not Available	WEL	Uncertain
208	Not Available	235474	U	Test Well	Onan Inc. 37-C	Not Available	Fridley	32	26/06/1967	Not Available	WEL	Uncertain
209	003-123024410004	235441	U	Test Well	Onan Inc. 4-C	Not Available	Fridley	16	26/06/1967	Not Available	WEL	Uncertain
210	003-123024430001	235431	U	Test Well	Onan Inc. 4-D	Not Available	Fridley	27	21/09/1977	Not Available	WEL	Uncertain
211	003-123024410004	235442	U	Test Well	Onan Inc. 5-C	Not Available	Fridley	32	26/06/1967	Not Available	WEL	Uncertain
212	003-123024430001	235432	U	Test Well	Onan Inc. 5-D	Not Available	Fridley	21	21/09/1977	Not Available	WEL	Uncertain
213	003-123024410004	235443	U	Test Well	Onan Inc. 6-C	Not Available	Fridley	17	26/06/1967	Not Available	WEL	Uncertain
214	003-123024430001	235433	U	Test Well	Onan Inc. 6-D	Not Available	Fridley	21	21/09/1977	Not Available	WEL	Uncertain
215	003-123024410004	235444	U	Test Well	Onan Inc. 7-C	Not Available	Fridley	15	26/06/1967	Not Available	WEL	Uncertain
216	003-123024430001	235434	U	Test Well	Onan Inc. 7-D	Not Available	Fridley	27	22/09/1977	Not Available	WEL	Uncertain
217	003-123024410004	235445	U	Test Well	Onan Inc. 8-C	Not Available	Fridley	32	26/06/1967	Not Available	WEL	Uncertain
218	003-123024430001	235435	U	Test Well	Onan Inc. 8-D	Not Available	Fridley	21	22/09/1977	Not Available	WEL	Uncertain
219	003-123024410004	235446	U	Test Well	Onan Inc. 9-C	Not Available	Fridley	16	26/06/1967	Not Available	WEL	Uncertain
220	003-123024430001	235436	U	Test Well	Onan Inc. 9-D	Not Available	Fridley	21	22/09/1977	Not Available	WEL	Uncertain
221	003-123024410004	235422	U	Test Well	Onan Inc. A-1 Or 6-E	Not Available	Fridley	10	02/05/1979	Not Available	WEL	Uncertain
222	003-123024410004	235423	A	Test Well	Onan Inc. A-2 Or 7-E	Not Available	Fridley	10	02/05/1979	Not Available	WEL	Uncertain
223	003-123024430004	235424	U	Test Well	Onan Inc. A-3 8-E	Not Available	Fridley	10	02/05/1979	Not Available	WEL	Uncertain
224	003-123024430004	235425	U	Test Well	Onan Inc. A-4 Or 9-E	Not Available	Fridley	10	02/05/1979	Not Available	WEL	Uncertain
225	003-123024410004	235426	U	Test Well	Onan Inc. A-5 Or 10-E	Not Available	Fridley	10	02/05/1979	Not Available	WEL	Uncertain
226	003-123024430004	235427	U	Test Well	Onan Inc. A-6 Or 11-E	Not Available	Fridley	10	02/05/1979	Not Available	WEL	Uncertain
227	003-123024430004	235417	U	Test Well	Onan Inc. B-1 Or 1-E	Not Available	Fridley	26	02/05/1979	Not Available	WEL	Uncertain
228	003-123024410004	176072	A	Piezometer	Onan Inc. B-1 Or P-4	Not Available	Fridley	17	29/01/1981	QWTA	WEL	Uncertain
229	003-123024340003	235512	A	Test Well	Onan Inc. B-10	Not Available	Fridley	36	08/08/1981	QWTA	WEL	Uncertain
230	003-123024430004	235475	U	Test Well	Onan Inc. B-101	Not Available	Fridley	36	15/06/1981	Not Available	WEL	Uncertain

Table C-3

PCSI Results - Well Locations in the DWSMA
City of Fridley Part 2 WHPP Amendment

PCSI ID	PID No.	Unique No.	Status	Use	Well Name	Well Location	City	Total Depth (Feet)	Date Completed	Aquifer	PCS Code	Location Verified
231	003-123024410004	235477	U	Test Well	Onan Inc. B-103	Not Available	Fridley	36	17/06/1981	Not Available	WEL	Uncertain
232	003-123024410004	235478	U	Test Well	Onan Inc. B-104	Not Available	Fridley	34	17/06/1981	Not Available	WEL	Uncertain
233	003-123024410004	235479	U	Test Well	Onan Inc. B-105	Not Available	Fridley	36	18/06/1981	Not Available	WEL	Uncertain
234	003-123024410004	235480	U	Test Well	Onan Inc. B-106	Not Available	Fridley	36	19/06/1981	Not Available	WEL	Uncertain
235	003-123024410004	235481	U	Test Well	Onan Inc. B-107	Not Available	Fridley	36	22/06/1981	Not Available	WEL	Uncertain
236	003-123024410004	235482	U	Test Well	Onan Inc. B-108	Not Available	Fridley	36	17/06/1981	Not Available	WEL	Uncertain
237	003-123024410004	235483	U	Test Well	Onan Inc. B-109	Not Available	Fridley	36	29/06/1981	Not Available	WEL	Uncertain
238	003-123024310027	235513	A	Test Well	Onan Inc. B-11	Not Available	Fridley	41	08/08/1981	Not Available	WEL	Uncertain
239	003-123024410004	235484	U	Test Well	Onan Inc. B-110	Not Available	Fridley	36	18/06/1981	Not Available	WEL	Uncertain
240	003-123024430004	235485	U	Test Well	Onan Inc. B-111	Not Available	Fridley	24	23/01/1981	Not Available	WEL	Uncertain
241	003-123024410004	235486	U	Test Well	Onan Inc. B-112	Not Available	Fridley	21	22/01/1981	Not Available	WEL	Uncertain
242	123-Municipal RoW	235487	U	Test Well	Onan Inc. B-113	Not Available	Fridley	15	22/01/1981	Not Available	WEL	Uncertain
243	003-123024430004	235488	U	Test Well	Onan Inc. B-114	Not Available	Fridley	20	26/06/1981	Not Available	WEL	Uncertain
244	003-123024440002	235489	U	Test Well	Onan Inc. B-115	Not Available	Fridley	23	26/06/1981	Not Available	WEL	Uncertain
245	003-123024410004	235490	U	Test Well	Onan Inc. B-116	Not Available	Fridley	10	23/06/1981	Not Available	WEL	Uncertain
246	003-123024410004	235491	U	Test Well	Onan Inc. B-117	Not Available	Fridley	18	23/06/1981	Not Available	WEL	Uncertain
247	Not Available	235492	U	Test Well	Onan Inc. B-118	Not Available	Fridley	36	29/06/1981	Not Available	WEL	Uncertain
248	003-123024340004	235514	A	Test Well	Onan Inc. B-12	Not Available	Fridley	41	08/08/1981	QWTA	WEL	Uncertain
249	Not Available	235515	A	Test Well	Onan Inc. B-13	Not Available	Fridley	26	22/05/1981	QWTA	WEL	Uncertain
250	003-123024430004	235418	U	Test Well	Onan Inc. B-2 Or 2-E	Not Available	Fridley	26	01/05/1979	Not Available	WEL	Uncertain
251	003-123024410004	176071	A	Piezometer	Onan Inc. B-2 Or P-3	Not Available	Fridley	17	29/01/1981	QWTA	WEL	Uncertain
252	003-123024430004	235419	U	Test Well	Onan Inc. B-3 Or 3-E	Not Available	Fridley	26	02/05/1979	Not Available	WEL	Uncertain
253	003-123024430004	235420	U	Test Well	Onan Inc. B-4 Or 4-E	Not Available	Fridley	26	02/05/1979	Not Available	WEL	Uncertain
254	003-123024430004	235421	U	Test Well	Onan Inc. B-5 Or 5-E	Not Available	Fridley	26	01/05/1979	Not Available	WEL	Uncertain
255	003-123024340003	235525	A	Test Well	Onan Inc. B-7	Not Available	Fridley	171	12/08/1981	QWTA	WEL	Uncertain
256	003-123024340003	235510	A	Test Well	Onan Inc. B-8	Not Available	Fridley	132	14/08/1981	QWTA	WEL	Uncertain
257	003-123024410004	235493	U	Test Well	Onan Inc. Bedrock 501	Not Available	Fridley	130	20/08/1981	Not Available	WEL	Uncertain
258	003-123024410004	235523	A	Test Well	Onan Inc. Db-1	Not Available	Fridley	22	23/04/1983	QWTA	WEL	Uncertain
259	003-123024410004	235524	A	Test Well	Onan Inc. Db-2	Not Available	Fridley	15	23/06/1983	QWTA	WEL	Uncertain
260	003-123024410004	235495	A	Test Well	Onan Inc. Pace 1	Not Available	Fridley	21	29/05/1981	QWTA	WEL	Uncertain
261	003-123024410004	235496	A	Test Well	Onan Inc. Pace 2	Not Available	Fridley	22	29/05/1981	QWTA	WEL	Uncertain
262	003-123024410004	235497	A	Test Well	Onan Inc. Pace 3	Not Available	Fridley	21	29/05/1981	QWTA	WEL	Uncertain
263	003-123024410004	235498	A	Test Well	Onan Inc. Pace 4	Not Available	Fridley	21	29/05/1981	Not Available	WEL	Uncertain
264	003-123024410004	169285	A	Piezometer	Onan Inc. S-1 Or P-1	1400 73rd Av Ne	Fridley	19	12/09/1980	QWTA	WEL	Yes
265	003-123024410004	169284	A	Piezometer	Onan Inc. S-2 Or P-2	1400 73rd Av Ne	Fridley	16	12/09/1980	QWTA	WEL	Yes
266	003-123024430004	235476	U	Test Well	Onan Inc.B-102	Not Available	Fridley	36	16/06/1981	Not Available	WEL	Uncertain
267	003-123024410004	161498	A	Monitor Well	Opc 512 Onan	1400 73rd Av Ne	Fridley	125	31/07/1986	OSTP	WEL	Yes
268	003-123024410004	161463	A	Monitor Well	Opc-520 Onan	1400 73rd Av Ne	Fridley	140	15/04/1985	OPDC	WEL	Yes
269	003-123024330006	539658	A	Monitor Well	Pennzoil Company	7000 Hwy 65 Ne	Fridley	14	07/12/1993	Not Available	WEL	Yes
270	003-123024340003	539657	A	Monitor Well	Pennzoil Company	7000 Hwy 65 Ne	Fridley	15	07/12/1993	Not Available	WEL	Yes
271	003-123024330006	539656	A	Monitor Well	Pennzoil Company	7000 Hwy 65	Fridley	14	08/12/1993	Not Available	WEL	Yes
272	003-123024330006	539654	A	Monitor Well	Pennzoil Company	7000 Hwy 65 Ne	Fridley	14	07/12/1993	Not Available	WEL	Yes
273	003-123024340003	472964	A	Monitor Well	Pennzoil Mw#3	7000 65 Hy Ne	Fridley	21	23/01/1991	Not Available	WEL	Yes
274	003-143024340010	457377	A	Monitor Well	Q Petroleum Corp. Mw-3	6101 University Av	Fridley	47	22/07/1988	Not Available	WEL	Yes
275	003-143024340010	444161	A	Monitor Well	Q-Petroleum Corp. Mw-1	6101 University Av	Fridley	41	02/03/1988	Not Available	WEL	Yes
276	003-143024340010	444162	A	Monitor Well	Q-Petroleum Corp. Mw-2	6101 University Av	Fridley	40	02/03/1988	Not Available	WEL	Yes

Table C-3

PCSI Results - Well Locations in the DWSMA
City of Fridley Part 2 WHPP Amendment

PCSI ID	PID No.	Unique No.	Status	Use	Well Name	Well Location	City	Total Depth (Feet)	Date Completed	Aquifer	PCS Code	Location Verified
277	003-143024340010	457376	A	Monitor Well	Q-Petroleum Corp. Mw-4	6101 University Av	Fridley	41	29/08/1988	Not Available	WEL	Yes
278	003-123024130035	640573	A	Elevator	Reschetar, Gary	1461 73rd Av Ne	Fridley	33	02/12/1999	Not Available	WEL	Yes
279	003-123024340003	471131	A	Recovery Well	Rw- Pennzoil Products	7000 65 Hy Ne	Fridley	31	04/02/1991	Not Available	WEL	Yes
280	123-183023430043	615123	A	Elevator	Salem Baptist Church	2351 Rice Creek Rd	New Brighton	24	10/07/1998	Not Available	WEL	Yes
281	003-223024140003	633477	A	Elevator	Sheet Metals Connectors	5850 Main st Ne	Fridley	16	20/08/1999	Not Available	WEL	Yes
282	003-13302433COND	265917	A	Public Supply/Non-Comm.-Transient	Sinclair Gas Station/Pre	Not Available	Fridley	Not Available	Not Available	Not Available	WEL	Uncertain
283	003-233024210144	568214	U	Monitor Well	Sinclair Marketing Co	6071 University Av	Fridley	38	25/07/1995	Not Available	WEL	Yes
284	003-233024210144	568206	U	Monitor Well	Sinclair Marketing Co	6071 University	Fridley	30	26/07/1995	Not Available	WEL	Yes
285	003-233024210144	568205	U	Monitor Well	Sinclair Marketing Co.	6071 University Av	Fridley	30	26/07/1995	Not Available	WEL	Yes
286	003-133024420020	206665	A	Domestic	Stiger, J.	1314 Mississippi st	Fridley	235	22/03/1946	CJDN	WEL	Yes
287	003-123024410004	161460	A	Monitor Well	Uh301A Onan	1400 73rd Av Ne	Fridley	86	26/03/1985	QWTA	WEL	Yes
288	123-083023330048	448780	A	Monitor Well	Williams Pipe Line	5084 Long Lake Rd	Mounds View	37	01/10/1986	Not Available	WEL	Yes
289	123-083023330048	527414	A	Other	Williams Pipeline	5084 Longlake Rd	Mounds View	35	28/07/1993	Not Available	WEL	Yes
290	003-143024420039	206668	A	Domestic	Williamson, Lloyd	6311 7th st Ne	Fridley	114	05/08/1964	QBAA	WEL	Yes
291	123-073023220029	166892	A	Domestic	Young, Charles	3032 I Cr	Mounds View	113	19/06/1980	QBAA	WEL	Yes

Approximate - Parcel not found but location is approximately where that address would exist
Uncertain - Not enough address information to verify location

A - Active
U - Unknown

Table C-4

PCSI Results - Potential Class V Well Locations in the DWSMA
City of Fridley Part 2 WHPP Amendment

PCSI ID	PID No.	Status*	Location Name	Street Address	City or Twp	PCS Code	Location Verified
292	003-123024220008	A	Auto Care Plus Inc. DBA Fridley Minnoco	7680 Highway 65	Fridley	CVMVW	Yes
293	123-173023230009	A	Beach's Long Lake Service	2251 Long Lake Rd	New Brighton	CVMVW	Yes
294	003-013024330003	I	Bert Auto	7890 Highway 65 NE	Spring Lake Park	CVMVW	Yes
295	003-013024340014	I	Boyer Ford Trucks Inc Body Shop	1115 Osborne Rd NE	Spring Lake Park	CVMVW	Yes
296	123-063023230045	A	C&G Automotive Inc	2975 Mounds View Blvd	Mounds View	CVMVW	Yes
297	003-233024210146	A	Carquest M & I Auto	6005 University Ave NE	Fridley	CVMVW	Yes
298	003-123024220013	A	Cena Transmission Inc	940 Osborne Rd NE	Fridley	CVMVW	Yes
299	003-123024240015	A	Central Auto Parts	1201 73 1/2 Ave NE	Fridley	CVMVW	Yes
300	123-183023240052	I	Checker Auto Parts 1831	2201 26th Ave NW	New Brighton	CVMVW	Yes
301	003-013024340037	A	Chob Auto Refinishing	7865 Highway 65 NE	Spring Lake Park	CVMVW	Yes
302	123-183023310089	A	Dennys Service Center	2190 Silver Lake Rd NW	New Brighton	CVMVW	Yes
303	003-143024310098	I	Dr Ryans Automotive Cln	6389 University Ave NE	Fridley	CVMVW	Approximate
304	003-123024220013	A	Fridley Auto Body	960 Osborne Rd NE	Fridley	CVMVW	Yes
305	003-123024240022	A	Fridley Auto Parts	7300 Central Ave NE	Fridley	CVMVW	Yes
306	003-133024330035	I	Fridley Sinclair Dba Johnson Automotive	6290 Highway 65 NE	Fridley	CVMVW	Yes
307	003-133024130022	A	Garys Automotive Service Of Fridley	6519 Central Ave NE	Fridley	CVMVW	Yes
308	003-143024230098	A	George's Automotive	6528 University Ave NE	Fridley	CVMVW	Yes
309	003-123024220006	I	Grand Central Auto - Fridley	7570 Highway 65 NE Ste 1	Fridley	CVMVW	Yes
310	123-063023230039	A	Haben Tire & Auto Center	1700 Highway 10 NE	Mounds View	CVMVW	Yes
311	123-183023310089	A	Honest 1 Auto Care	2172 Silver Lake Rd	New Brighton	CVMVW	Approximate
312	003-123024210007	A	JJC Auto Rebuilding	7570 Central Ave NE Ste 1	Fridley	CVMVW	Approximate
313	003-143024320188	I	Kiffes Automotive	6490 University Ave NE	Fridley	CVMVW	Approximate
314	003-123024130091	A	Pioneer Auto Trim	7401 Central Ave NE	Fridley	CVMVW	Yes
315	003-123024220006	A	Rio Grande Auto Body	7570 Highway 65 NE Rear Bay	Fridley	CVMVW	Yes
316	003-233024230157	I	Rtc Automotive Services Inc	5755 University Ave NE	Fridley	CVMVW	Yes
317	003-123024240040	A	Sams Auto Parts	1240 73 1/2 Ave NE	Fridley	CVMVW	Yes
318	003-123024220006	A	SAMS AUTO WORLD	7570 Highway 65 NE Ste 2	Fridley	CVMVW	Yes
319	003-013024340012	A	Uno Ven 76 Service Station	7701 Highway 65 NE	Spring Lake Park	CVMVW	Yes
320	003-123024240047	A	Valvoline Rapid Oil Change	7315 Highway 65	Fridley	CVMVW	Yes
321	003-233024240131	A	Valvoline Rapid Oil Change Fridley	5701 University Ave	Fridley	CVMVW	Yes

Table C-4

PCSI Results - Potential Class V Well Locations in the DWSMA
City of Fridley Part 2 WHPP Amendment

PCSI ID	PID No.	Status*	Location Name	Street Address	City or Twp	PCS Code	Location Verified
322	003-123024220003	A	Victory Auto Service - Fridley	1010 Osborne Rd NE	Fridley	CVMVW	Yes
323	003-123024210027	A	Voights Bus Service Inc	1240 Osborne Rd NE	Fridley	CVMVW	Yes

Potential Contaminant Source (PCS) Codes:
CVMVW - Motor Vehicle Waste Disposal Well (potential Class V)

Approximate - Parcel not found but location is approximately where that address would exist

A - Active
I - Inactive

* Indicates status of hazardous waste generator permit

Table C-5

PCSI Results - Storage Tank Locations in the DWSMA
City of Fridley Part 2 WHPP Amendment

PCSI ID	PID Number	MPCA Agency Interests ID	Site	Site Address	City	PCS Code-Material Code	Above or Underground	Tank Number	Tank Capacity	Install Date	Status	Tank Product/Product Released	Release Discovered Date	Release Report Date	Complete Site Closure Date	Location Verified
324	003-123024410004	2447	Cummins Power Generation	1400 73rd Ave Ne	Fridley	AST	Aboveground Storage Tank	TA023	10000	6/7/2010	Active	Other	Not Applicable	Not Applicable	Not Applicable	Yes
325	003-123024410004	2447	Cummins Power Generation	1400 73rd Ave Ne	Fridley	AST	Aboveground Storage Tank	19A	0	Not Available	Not Available	Not Available	Not Applicable	Not Applicable	Not Applicable	Yes
326	003-123024410004	2447	Cummins Power Generation	1400 73rd Ave Ne	Fridley	AST-C000	Aboveground Storage Tank	10C1	3500	1/1/1976	Closed	Chemical Other Or Unspecified	Not Applicable	Not Applicable	Not Applicable	Yes
326	003-123024410004	2447	Cummins Power Generation	1400 73rd Ave Ne	Fridley	AST-C000	Aboveground Storage Tank	10V1	4,000	1/1/1974	Closed	Chemical Other Or Unspecified	Not Applicable	Not Applicable	Not Applicable	Yes
327	003-123024410004	2447	Cummins Power Generation	1400 73rd Ave Ne	Fridley	AST-C000	Aboveground Storage Tank	1019	2600	1/1/1974	Removed	Chemical Other Or Unspecified	Not Applicable	Not Applicable	Not Applicable	Yes
328	003-123024410004	2447	Cummins Power Generation	1400 73rd Ave Ne	Fridley	AST-F000	Aboveground Storage Tank	032tegen	2,500	6/1/1992	Active	Diesel Fuel	Not Applicable	Not Applicable	Not Applicable	Yes
329	003-123024410004	2447	Cummins Power Generation	1400 73rd Ave Ne	Fridley	AST-F000	Aboveground Storage Tank	033sound	1000	6/1/1999	Removed	Diesel Fuel	Not Applicable	Not Applicable	Not Applicable	Yes
330	003-123024410004	2447	Cummins Power Generation	1400 73rd Ave Ne	Fridley	AST-W000	Aboveground Storage Tank	030ptest	1,000	6/1/1969	Closed	Used Oil	Not Applicable	Not Applicable	Not Applicable	Yes
330	003-123024410004	2447	Cummins Power Generation	1400 73rd Ave Ne	Fridley	AST-W000	Aboveground Storage Tank	031ptest	1000	6/1/1969	Closed	Used Oil	Not Applicable	Not Applicable	Not Applicable	Yes
331	003-123024410004	2447	Cummins Power Generation	1400 73rd Ave Ne	Fridley	UST	Underground Storage Tank System	18A	0	Not Available	Not Available	Not Available	Not Applicable	Not Applicable	Not Applicable	Yes
332	003-123024410004	2447	Cummins Power Generation	1400 73rd Ave Ne	Fridley	UST-C000	Underground Storage Tank System	021	10000	11/14/1994	Active	Antifreeze	Not Applicable	Not Applicable	Not Applicable	Yes
333	003-123024410004	2447	Cummins Power Generation	1400 73rd Ave Ne	Fridley	UST-C000	Underground Storage Tank System	011	2,000	7/20/1967	Removed	Chemical other or unspecified	Not Applicable	Not Applicable	Not Applicable	Yes
333	003-123024410004	2447	Cummins Power Generation	1400 73rd Ave Ne	Fridley	UST-C000	Underground Storage Tank System	012	2000	7/20/1967	Removed	Chemical other or unspecified	Not Applicable	Not Applicable	Not Applicable	Yes
334	003-123024410004	2447	Cummins Power Generation	1400 73rd Ave Ne	Fridley	UST-C000	Underground Storage Tank System	018	2,000	7/20/1967	Removed	Mineral spirits	Not Applicable	Not Applicable	Not Applicable	Yes
335	003-123024410004	2447	Cummins Power Generation	1400 73rd Ave Ne	Fridley	UST-F000	Underground Storage Tank System	03A	10000	1/5/1996	Active	Diesel	Not Applicable	Not Applicable	Not Applicable	Yes
336	003-123024410004	2447	Cummins Power Generation	1400 73rd Ave Ne	Fridley	UST-F000	Underground Storage Tank System	023	10,000	1/5/1996	Active	Diesel	Not Applicable	Not Applicable	Not Applicable	Yes
336	003-123024410004	2447	Cummins Power Generation	1400 73rd Ave Ne	Fridley	UST-F000	Underground Storage Tank System	04A	10000	1/5/1996	Active	Diesel	Not Applicable	Not Applicable	Not Applicable	Yes
336	003-123024410004	2447	Cummins Power Generation	1400 73rd Ave Ne	Fridley	UST-F000	Underground Storage Tank System	14A	10,000	12/22/1988	Active	Diesel	Not Applicable	Not Applicable	Not Applicable	Yes
336	003-123024410004	2447	Cummins Power Generation	1400 73rd Ave Ne	Fridley	UST-F000	Underground Storage Tank System	17A	10000	12/22/1988	Active	Diesel	Not Applicable	Not Applicable	Not Applicable	Yes
336	003-123024410004	2447	Cummins Power Generation	1400 73rd Ave Ne	Fridley	UST-F000	Underground Storage Tank System	22	20,000	10/29/2001	Active	Diesel	Not Applicable	Not Applicable	Not Applicable	Yes
336	003-123024410004	2447	Cummins Power Generation	1400 73rd Ave Ne	Fridley	UST-F000	Underground Storage Tank System	09A	10000	4/25/1990	Active	Fuel Oil	Not Applicable	Not Applicable	Not Applicable	Yes
336	003-123024410004	2447	Cummins Power Generation	1400 73rd Ave Ne	Fridley	UST-F000	Underground Storage Tank System	13A	10,000	12/22/1988	Active	Gasoline	Not Applicable	Not Applicable	Not Applicable	Yes
336	003-123024410004	2447	Cummins Power Generation	1400 73rd Ave Ne	Fridley	UST-F000	Underground Storage Tank System	05A	10000	1/5/1996	Active	Gasoline	Not Applicable	Not Applicable	Not Applicable	Yes
336	003-123024410004	2447	Cummins Power Generation	1400 73rd Ave Ne	Fridley	UST-F000	Underground Storage Tank System	10A	2,500	4/25/1990	Active	Gasoline	Not Applicable	Not Applicable	Not Applicable	Yes
336	003-123024410004	2447	Cummins Power Generation	1400 73rd Ave Ne	Fridley	UST-F000	Underground Storage Tank System	15A	10000	12/22/1988	Active	Gasoline	Not Applicable	Not Applicable	Not Applicable	Yes
336	003-123024410004	2447	Cummins Power Generation	1400 73rd Ave Ne	Fridley	UST-F000	Underground Storage Tank System	16A	10,000	12/22/1988	Active	Jet Fuel	Not Applicable	Not Applicable	Not Applicable	Yes
336	003-123024410004	2447	Cummins Power Generation	1400 73rd Ave Ne	Fridley	UST-F000	Underground Storage Tank System	02A	10000	1/5/1996	Active	Jet Fuel	Not Applicable	Not Applicable	Not Applicable	Yes
336	003-123024410004	2447	Cummins Power Generation	1400 73rd Ave Ne	Fridley	UST-F000	Underground Storage Tank System	020	10,000	11/14/1994	Active	Motor Oil	Not Applicable	Not Applicable	Not Applicable	Yes
337	003-123024410004	2447	Cummins Power Generation	1400 73rd Ave Ne	Fridley	UST-F000	Underground Storage Tank System	017	10000	7/2/1967	Removed	Diesel	Not Applicable	Not Applicable	Not Applicable	Yes
337	003-123024410004	2447	Cummins Power Generation	1400 73rd Ave Ne	Fridley	UST-F000	Underground Storage Tank System	001	12,000	9/9/1978	Removed	Diesel	Not Applicable	Not Applicable	Not Applicable	Yes
337	003-123024410004	2447	Cummins Power Generation	1400 73rd Ave Ne	Fridley	UST-F000	Underground Storage Tank System	007	5300	9/9/1978	Removed	Diesel	Not Applicable	Not Applicable	Not Applicable	Yes
337	003-123024410004	2447	Cummins Power Generation	1400 73rd Ave Ne	Fridley	UST-F000	Underground Storage Tank System	002	12,000	9/9/1978	Removed	Diesel	Not Applicable	Not Applicable	Not Applicable	Yes
337	003-123024410004	2447	Cummins Power Generation	1400 73rd Ave Ne	Fridley	UST-F000	Underground Storage Tank System	004	5300	9/9/1978	Removed	Diesel	Not Applicable	Not Applicable	Not Applicable	Yes
337	003-123024410004	2447	Cummins Power Generation	1400 73rd Ave Ne	Fridley	UST-F000	Underground Storage Tank System	009	10,000	9/9/1978	Removed	Diesel	Not Applicable	Not Applicable	Not Applicable	Yes
337	003-123024410004	2447	Cummins Power Generation	1400 73rd Ave Ne	Fridley	UST-F000	Underground Storage Tank System	003	12000	9/9/1978	Removed	Diesel	Not Applicable	Not Applicable	Not Applicable	Yes
337	003-123024410004	2447	Cummins Power Generation	1400 73rd Ave Ne	Fridley	UST-F000	Underground Storage Tank System	005	5,300	9/9/1978	Removed	Diesel	Not Applicable	Not Applicable	Not Applicable	Yes
337	003-123024410004	2447	Cummins Power Generation	1400 73rd Ave Ne	Fridley	UST-F000	Underground Storage Tank System	015	10000	7/20/1967	Removed	Diesel	Not Applicable	Not Applicable	Not Applicable	Yes
337	003-123024410004	2447	Cummins Power Generation	1400 73rd Ave Ne	Fridley	UST-F000	Underground Storage Tank System	028	10,000	1/1/1900	Removed	Fuel Oil	Not Applicable	Not Applicable	Not Applicable	Yes
337	003-123024410004	2447	Cummins Power Generation	1400 73rd Ave Ne	Fridley	UST-F000	Underground Storage Tank System	016	1000	7/20/1967	Removed	Gasoline	Not Applicable	Not Applicable	Not Applicable	Yes
337	003-123024410004	2447	Cummins Power Generation	1400 73rd Ave Ne	Fridley	UST-F000	Underground Storage Tank System	006	5,300	9/9/1978	Removed	Gasoline	Not Applicable	Not Applicable	Not Applicable	Yes
337	003-123024410004	2447	Cummins Power Generation	1400 73rd Ave Ne	Fridley	UST-F000	Underground Storage Tank System	013	10000	7/20/1967	Removed	Gasoline	Not Applicable	Not Applicable	Not Applicable	Yes
337	003-123024410004	2447	Cummins Power Generation	1400 73rd Ave Ne	Fridley	UST-F000	Underground Storage Tank System	014	1,000	7/20/1967	Removed	Gasoline	Not Applicable	Not Applicable	Not Applicable	Yes
337	003-123024410004	2447	Cummins Power Generation	1400 73rd Ave Ne	Fridley	UST-F000	Underground Storage Tank System	008	4000	6/15/1973	Removed	Motor Oil	Not Applicable	Not Applicable	Not Applicable	Yes
337	003-123024410004	2447	Cummins Power Generation	1400 73rd Ave Ne	Fridley	UST-F000	Underground Storage Tank System	010	2,000	9/9/1978	Removed	Motor Oil	Not Applicable	Not Applicable	Not Applicable	Yes
338	003-123024410004	2447	Cummins Power Generation	1400 73rd Ave Ne	Fridley	UST-W000	Underground Storage Tank System	022	500	1/1/1996	Removed	Used or waste oil	Not Applicable	Not Applicable	Not Applicable	Yes
339	003-013024340025	104639	Dale Movers Inc	7816 Central Ave Ne	Spring Lake Park	AST	Aboveground Storage Tank	1001	265	1/6/1988	Active	Other	Not Applicable	Not Applicable	Not Applicable	Approximate
340	123-173023130011	131102	Dell Com	4860 Mustang Cir	Mounds View	AST-F000	Aboveground Storage Tank	1001	1000	4/19/2010	Active	Diesel Fuel	Not Applicable	Not Applicable	Not Applicable	Yes
340	123-173023130011	131102	Dell Com	4860 Mustang Cir	Mounds View	AST-F000	Aboveground Storage Tank	1002	1,000	4/19/2010	Active	Diesel Fuel	Not Applicable	Not Applicable	Not Applicable	Yes
341	003-123024240047	130443	Former Fridley Valvoline Oil	7315 Central Ave Ne	Fridley	AST-F000	Aboveground Storage Tank	1001	500	2/1/1988	Removed	Motor Oil	Not Applicable	Not Applicable	Not Applicable	Yes
341	003-123024240047	130443	Former Fridley Valvoline Oil	7315 Central Ave Ne	Fridley	AST-F000	Aboveground Storage Tank	2	500	2/1/1988	Removed	Motor Oil	Not Applicable	Not Applicable	Not Applicable	Yes
342	003-123024240047	130443	Former Fridley Valvoline Oil	7315 Central Ave Ne	Fridley	AST-W000	Aboveground Storage Tank	3	1000	2/1/1988	Removed	Used Oil	Not Applicable	Not Applicable	Not Applicable	Yes
343	003-123024240054	117125	Friendly Chevrolet	7501 Ne Highway 65	Fridley	AST	Aboveground Storage Tank	1001	0	Not Available	Not Available	Not Available	Not Applicable	Not Applicable	Not Applicable	Yes
344	003-123024240054	117125	Friendly Chevrolet	7501 Ne Highway 65	Fridley	AST-W000	Aboveground Storage Tank	1	265	10/1/1991	Active	Used Oil	Not Applicable	Not Applicable	Not Applicable	Yes
345	003-123024240054	117125	Friendly Chevrolet	7501 Ne Highway 65	Fridley	UST-W000	Underground Storage Tank System	001	1,000	1/1/1901	Removed	Used or waste oil	Not Applicable	Not Applicable	Not Applicable	Yes
346	003-133024130022	26551	Garys Automotive Service Of Fridley	6519 Central Ave Ne	Fridley	AST	Aboveground Storage Tank	1001	0	Not Available	Not Available	Not Available	Not Applicable	Not Applicable	Not Applicable	Yes
347	003-133024130022	26551	Garys Automotive Service Of Fridley	6519 Central Ave Ne	Fridley	AST-W000	Aboveground Storage Tank	1002	250	7/1/1997	Active	Used Oil	Not Applicable	Not Applicable	Not Applicable	Yes
348	003-133024130022	26551	Garys Automotive Service Of Fridley	6519 Central Ave Ne	Fridley	UST-W000	Underground Storage Tank System	111	1000	1/1/1900	Removed	Used or waste oil	Not Applicable	Not Applicable	Not Applicable	Yes
349	003-113024310020	109450	International Paper	350 Northco Dr Ne	Fridley	AST	Aboveground Storage Tank	1004	400	1/1/1991	Closed	Other	Not Applicable	Not Applicable	Not Applicable	Yes
349	003-113024310020	109450	International Paper	350 Northco Dr Ne	Fridley	AST	Aboveground Storage Tank	1003	2160	1/1/1991	Closed	Other	Not Applicable	Not Applicable	Not Applicable	Yes
349	003-113024310020	109450	International Paper	350 Northco Dr Ne	Fridley	AST	Aboveground Storage Tank	1002	2,160	1/1/1991	Closed	Other	Not Applicable	Not Applicable	Not Applicable	Yes
350	003-113024310020	109450	International Paper	350 Northco Dr Ne	Fridley	AST-C000	Aboveground Storage Tank	1005	2160	1/1/1991	Closed	Chemical Caustic	Not Applicable	Not Applicable	Not Applicable	Yes
351	003-113024310020	109450	International Paper	350 Northco Dr Ne	Fridley	AST-F000	Aboveground Storage Tank	1001	6,000	1/1/1991	Active	Fuel Oil #1	Not Applicable	Not Applicable	Not Applicable	Yes
352	003-113024310020	109450	International Paper	350 Northco Dr Ne	Fridley	AST-W000	Aboveground Storage Tank	1006	300	1/1/1997	Closed	Used Oil	Not Applicable	Not Applicable	Not Applicable	Yes
353	003-133024240078	140925	Kurt Manufacturing Co	6585 Highway 65 Ne	Fridley	AST	Aboveground Storage Tank	1001	900	6/1/2000	Closed	Other	Not Applicable	Not Applicable	Not Applicable	Approximate
354	003-123024210008	147162	Kurt Mfg / Die Cast	7585 Highway 65 Ne	Fridley	AST-C000	Aboveground Storage Tank	1	400	6/1/1993	Closed	Chemical Caustic	Not Applicable	Not Applicable	Not Applicable	Yes
355	123-083023430038	94656	Medtronic - Mounds View	2240 Woodale Dr	Mounds View	AST-F000	Aboveground Storage Tank	1002	850	10/10/2007	Active	Diesel Fuel	Not Applicable	Not Applicable	Not Applicable	Yes
356	123-083023430038	94656	Medtronic - Mounds View	2240 Woodale Dr	Mounds View	AST-F000	Aboveground Storage Tank	1001	1000	5/15/2004	Removed	Diesel Fuel	Not Applicable	Not Applicable	Not Applicable	Yes
357	003-123024340003	102539	Medtronic Inc	7000 Central Ave Ne	Fridley	AST-F000	Aboveground Storage Tank	1001	560	7/28/1999	Active	Diesel Fuel	Not Applicable	Not Applicable	Not Applicable	Yes
358	003-123024340003	102539	Medtronic Inc	7000 Central Ave Ne	Fridley	UST-F000	Underground Storage Tank System	009	10000	8/22/1992	Active	Diesel	Not Applicable	Not Applicable	Not Applicable	Yes
359	003-123024340003	102539	Medtronic Inc	7000 Central Ave Ne	Fridley	UST-F000	Underground Storage Tank System	006	20,000	5/10/1999	Active	Diesel	Not Applicable	Not Applicable	Not Applicable	Yes
359	003-123024340003	102539	Medtronic Inc	7000 Central Ave Ne	Fridley	UST-F000	Underground Storage Tank System	008	560	1/1/1982	Removed	Diesel	Not Applicable	Not Applicable	Not Applicable	Yes
359	003-123024340003	102539	Medtronic Inc	7000 Central Ave Ne	Fridley	UST-F000	Underground Storage Tank System	006	20,000	1/1/1982	Removed	Fuel Oil	Not Applicable	Not Applicable	Not Applicable	Yes
359	003-123024340003	102539	Medtronic Inc	7000 Central Ave Ne	Fridley	UST-F000	Underground Storage Tank System	007	20000	1/1/1982	Removed	Fuel Oil	Not Applicable	Not Applicable	Not Applicable	Yes
359	003-123024340003	102539	Medtronic Inc	7000 Central Ave Ne	Fridley	UST-F000	Underground Storage Tank System	001	20,000	1/1/1969	Removed	Fuel Oil	Not Applicable	Not Applicable	Not Applicable	Yes
359	003-123024340003	102539	Medtronic Inc	7000 Central Ave Ne	Fridley	UST-F000	Underground Storage Tank System	005	30000	1/1/1974	Removed	Fuel Oil	Not Applicable	Not Applicable	Not Applicable	Yes
359	003-123024340003	102539	Medtronic Inc	7000 Central Ave Ne	Fridley	UST-F000	Underground Storage Tank System	002	30,000	1/1/1974	Removed	Fuel Oil	Not Applicable	Not Applicable	Not Applicable	Yes
359	003-123024340003	102539	Medtronic Inc	7000 Central Ave Ne	Fridley	UST-F000	Underground Storage Tank System	003	30000	1/1/1974	Removed	Fuel Oil	Not Applicable	Not Applicable	Not Applicable	Yes
359	003-123024340003	102539	Medtronic Inc	7000 Central Ave Ne	Fridley	UST-F000	Underground Storage Tank System	004	30,000	1/1/1974	Removed	Fuel Oil	Not Applicable	Not Applicable	Not Applicable	Yes
360	123-083023430038	121498	Medtronic Inc Distribution Center	2292 Woodale Dr	Mounds View	AST-F000	Aboveground Storage Tank	1001	1000	11/1/2006	Active	Diesel Fuel	Not Applicable	Not Applicable	Not Applicable	Yes
360	003-233024410030	111788	Medtronic, Inc.-Headquarters	710 Medtronic Pkwy Highways 65 And 694	Fridley	AST-F000	Aboveground Storage Tank	1015	200	9/15/2000	Active	Diesel Fuel	Not Applicable	Not Applicable	Not Applicable	Yes
360	003-233024410030	111788	Medtronic, Inc.-Headquarters	710 Medtronic Pkwy Highways 65 And 694	Fridley	AST-F000	Aboveground Storage Tank	1016	120	9/15/2000	Active	Diesel Fuel	Not Applicable	Not Applicable	Not Applicable	Yes
361	003-233024410030	111788	Medtronic, Inc.-Headquarters	710 Medtronic Pkwy Highways 65 And 694	Fridley	UST-F000	Underground Storage Tank System	014	20,000	11/9/1999	Active	Fuel Oil	Not Applicable	Not Applicable	Not Applicable	Yes

Table C-5

PCSI Results - Storage Tank Locations in the DWSMA
City of Fridley Part 2 WHPP Amendment

PCSI ID	PID Number	MPCA Agency Interests ID	Site	Site Address	City	PCS Code-Material Code	Above or Underground	Tank Number	Tank Capacity	Install Date	Status	Tank Product/Product Released	Release Discovered Date	Release Report Date	Complete Site Closure Date	Location Verified
362	123-063023310043	32406	Pat's Muffler & Welding Service	2848 Mounds View Blvd	Mounds View	AST-C000	Aboveground Storage Tank	1003	150	8/4/1985	Active	Transmission Fluid	Not Applicable	Not Applicable	Not Applicable	Yes
363	123-063023310043	32406	Pat's Muffler & Welding Service	2848 Mounds View Blvd	Mounds View	AST-F000	Aboveground Storage Tank	1001	300	8/4/1985	Active	Motor Oil	Not Applicable	Not Applicable	Not Applicable	Yes
363	123-063023310043	32406	Pat's Muffler & Welding Service	2848 Mounds View Blvd	Mounds View	AST-F000	Aboveground Storage Tank	1002	300	8/4/1985	Active	Motor Oil	Not Applicable	Not Applicable	Not Applicable	Yes
364	123-063023310043	32406	Pat's Muffler & Welding Service	2848 Mounds View Blvd	Mounds View	UST-F000	Underground Storage Tank System	001	6,000	4/14/1998	Removed	Gasoline	Not Applicable	Not Applicable	Not Applicable	Yes
364	123-063023310043	32406	Pat's Muffler & Welding Service	2848 Mounds View Blvd	Mounds View	UST-F000	Underground Storage Tank System	002	6000	4/14/1998	Removed	Gasoline	Not Applicable	Not Applicable	Not Applicable	Yes
364	123-063023310043	32406	Pat's Muffler & Welding Service	2848 Mounds View Blvd	Mounds View	UST-F000	Underground Storage Tank System	004	3,000	4/14/1998	Removed	Gasoline	Not Applicable	Not Applicable	Not Applicable	Yes
364	123-063023310043	32406	Pat's Muffler & Welding Service	2848 Mounds View Blvd	Mounds View	UST-F000	Underground Storage Tank System	003	6000	4/14/1998	Removed	Gasoline	Not Applicable	Not Applicable	Not Applicable	Yes
365	123-063023310043	32406	Pat's Muffler & Welding Service	2848 Mounds View Blvd	Mounds View	UST-W000	Underground Storage Tank System	001	560	4/13/1998	Removed	Used or waste oil	Not Applicable	Not Applicable	Not Applicable	Yes
366	003-123024330006	29638	Pennzoil Products Co	7000 Highway 65 Ne	Fridley	AST-C000	Aboveground Storage Tank	1029	25000	1/1/1980	Removed	Antifreeze	Not Applicable	Not Applicable	Not Applicable	Yes
366	003-123024330006	29638	Pennzoil Products Co	7000 Highway 65 Ne	Fridley	AST-C000	Aboveground Storage Tank	1015	20,000	1/1/1980	Removed	Antifreeze	Not Applicable	Not Applicable	Not Applicable	Yes
366	003-123024330006	29638	Pennzoil Products Co	7000 Highway 65 Ne	Fridley	AST-C000	Aboveground Storage Tank	1019	10000	1/1/1972	Removed	Chemical Other Or Unspecified	Not Applicable	Not Applicable	Not Applicable	Yes
366	003-123024330006	29638	Pennzoil Products Co	7000 Highway 65 Ne	Fridley	AST-C000	Aboveground Storage Tank	1020	15,000	1/1/1972	Removed	Chemical Other Or Unspecified	Not Applicable	Not Applicable	Not Applicable	Yes
366	003-123024330006	29638	Pennzoil Products Co	7000 Highway 65 Ne	Fridley	AST-C000	Aboveground Storage Tank	1030	4000	1/1/1988	Removed	Chemical Other Or Unspecified	Not Applicable	Not Applicable	Not Applicable	Yes
366	003-123024330006	29638	Pennzoil Products Co	7000 Highway 65 Ne	Fridley	AST-C000	Aboveground Storage Tank	1021	17,000	1/1/1972	Removed	Lubricating Oils	Not Applicable	Not Applicable	Not Applicable	Yes
366	003-123024330006	29638	Pennzoil Products Co	7000 Highway 65 Ne	Fridley	AST-C000	Aboveground Storage Tank	1018	25400	1/1/1972	Removed	Lubricating Oils	Not Applicable	Not Applicable	Not Applicable	Yes
366	003-123024330006	29638	Pennzoil Products Co	7000 Highway 65 Ne	Fridley	AST-C000	Aboveground Storage Tank	1001	20,000	1/1/1970	Removed	Lubricating Oils	Not Applicable	Not Applicable	Not Applicable	Yes
366	003-123024330006	29638	Pennzoil Products Co	7000 Highway 65 Ne	Fridley	AST-C000	Aboveground Storage Tank	1010	15240	1/1/1970	Removed	Lubricating Oils	Not Applicable	Not Applicable	Not Applicable	Yes
366	003-123024330006	29638	Pennzoil Products Co	7000 Highway 65 Ne	Fridley	AST-C000	Aboveground Storage Tank	1011	12,000	1/1/1970	Removed	Lubricating Oils	Not Applicable	Not Applicable	Not Applicable	Yes
366	003-123024330006	29638	Pennzoil Products Co	7000 Highway 65 Ne	Fridley	AST-C000	Aboveground Storage Tank	1012	12000	1/1/1970	Removed	Lubricating Oils	Not Applicable	Not Applicable	Not Applicable	Yes
366	003-123024330006	29638	Pennzoil Products Co	7000 Highway 65 Ne	Fridley	AST-C000	Aboveground Storage Tank	1013	12,000	1/1/1970	Removed	Lubricating Oils	Not Applicable	Not Applicable	Not Applicable	Yes
366	003-123024330006	29638	Pennzoil Products Co	7000 Highway 65 Ne	Fridley	AST-C000	Aboveground Storage Tank	1014	12000	1/1/1970	Removed	Lubricating Oils	Not Applicable	Not Applicable	Not Applicable	Yes
366	003-123024330006	29638	Pennzoil Products Co	7000 Highway 65 Ne	Fridley	AST-C000	Aboveground Storage Tank	1016	30,500	1/1/1972	Removed	Lubricating Oils	Not Applicable	Not Applicable	Not Applicable	Yes
366	003-123024330006	29638	Pennzoil Products Co	7000 Highway 65 Ne	Fridley	AST-C000	Aboveground Storage Tank	1017	25400	1/1/1972	Removed	Lubricating Oils	Not Applicable	Not Applicable	Not Applicable	Yes
366	003-123024330006	29638	Pennzoil Products Co	7000 Highway 65 Ne	Fridley	AST-C000	Aboveground Storage Tank	1002	20,000	1/1/1970	Removed	Lubricating Oils	Not Applicable	Not Applicable	Not Applicable	Yes
366	003-123024330006	29638	Pennzoil Products Co	7000 Highway 65 Ne	Fridley	AST-C000	Aboveground Storage Tank	1022	17600	1/1/1972	Removed	Lubricating Oils	Not Applicable	Not Applicable	Not Applicable	Yes
366	003-123024330006	29638	Pennzoil Products Co	7000 Highway 65 Ne	Fridley	AST-C000	Aboveground Storage Tank	1023	21,300	1/1/1972	Removed	Lubricating Oils	Not Applicable	Not Applicable	Not Applicable	Yes
366	003-123024330006	29638	Pennzoil Products Co	7000 Highway 65 Ne	Fridley	AST-C000	Aboveground Storage Tank	1024	21300	1/1/1972	Removed	Lubricating Oils	Not Applicable	Not Applicable	Not Applicable	Yes
366	003-123024330006	29638	Pennzoil Products Co	7000 Highway 65 Ne	Fridley	AST-C000	Aboveground Storage Tank	1025	21,300	1/1/1972	Removed	Lubricating Oils	Not Applicable	Not Applicable	Not Applicable	Yes
366	003-123024330006	29638	Pennzoil Products Co	7000 Highway 65 Ne	Fridley	AST-C000	Aboveground Storage Tank	1026	25000	1/1/1980	Removed	Lubricating Oils	Not Applicable	Not Applicable	Not Applicable	Yes
366	003-123024330006	29638	Pennzoil Products Co	7000 Highway 65 Ne	Fridley	AST-C000	Aboveground Storage Tank	1003	20,000	1/1/1970	Removed	Lubricating Oils	Not Applicable	Not Applicable	Not Applicable	Yes
366	003-123024330006	29638	Pennzoil Products Co	7000 Highway 65 Ne	Fridley	AST-C000	Aboveground Storage Tank	1004	20000	1/1/1970	Removed	Lubricating Oils	Not Applicable	Not Applicable	Not Applicable	Yes
366	003-123024330006	29638	Pennzoil Products Co	7000 Highway 65 Ne	Fridley	AST-C000	Aboveground Storage Tank	1005	20,000	1/1/1970	Removed	Lubricating Oils	Not Applicable	Not Applicable	Not Applicable	Yes
366	003-123024330006	29638	Pennzoil Products Co	7000 Highway 65 Ne	Fridley	AST-C000	Aboveground Storage Tank	1006	14300	1/1/1970	Removed	Lubricating Oils	Not Applicable	Not Applicable	Not Applicable	Yes
366	003-123024330006	29638	Pennzoil Products Co	7000 Highway 65 Ne	Fridley	AST-C000	Aboveground Storage Tank	1007	15,240	1/1/1970	Removed	Lubricating Oils	Not Applicable	Not Applicable	Not Applicable	Yes
366	003-123024330006	29638	Pennzoil Products Co	7000 Highway 65 Ne	Fridley	AST-C000	Aboveground Storage Tank	1008	15240	1/1/1970	Removed	Lubricating Oils	Not Applicable	Not Applicable	Not Applicable	Yes
366	003-123024330006	29638	Pennzoil Products Co	7000 Highway 65 Ne	Fridley	AST-C000	Aboveground Storage Tank	1009	15,240	1/1/1970	Removed	Lubricating Oils	Not Applicable	Not Applicable	Not Applicable	Yes
366	003-123024330006	29638	Pennzoil Products Co	7000 Highway 65 Ne	Fridley	AST-C000	Aboveground Storage Tank	1027	25000	1/1/1980	Removed	Transmission Fluid	Not Applicable	Not Applicable	Not Applicable	Yes
366	003-123024330006	29638	Pennzoil Products Co	7000 Highway 65 Ne	Fridley	AST-C000	Aboveground Storage Tank	1028	25,000	1/1/1980	Removed	Transmission Fluid	Not Applicable	Not Applicable	Not Applicable	Yes
367	003-123024330006	29638	Pennzoil Products Co	7000 Highway 65 Ne	Fridley	UST-C000	Underground Storage Tank System	003	565	6/20/1982	Removed	Lube Oil	Not Applicable	Not Applicable	Not Applicable	Yes
368	003-123024330006	29638	Pennzoil Products Co	7000 Highway 65 Ne	Fridley	UST-F000	Underground Storage Tank System	001	10,000	6/30/1979	Removed	Diesel	Not Applicable	Not Applicable	Not Applicable	Yes
368	003-123024330006	29638	Pennzoil Products Co	7000 Highway 65 Ne	Fridley	UST-F000	Underground Storage Tank System	002	10000	6/30/1979	Removed	Gasoline	Not Applicable	Not Applicable	Not Applicable	Yes
369	003-013024340025	21109	Quickway Rigging Transfer Inc	7800 Central Ave Ne	Spring Lake Park	AST-F000	Aboveground Storage Tank	1001	3,000	7/23/1993	Active	Diesel Fuel	Not Applicable	Not Applicable	Not Applicable	Yes
370	003-013024340025	21109	Quickway Rigging Transfer Inc	7800 Central Ave Ne	Spring Lake Park	UST	Underground Storage Tank System	001	0	Not Available	Not Available	Not Available	Not Applicable	Not Applicable	Not Applicable	Yes
370	003-013024340025	21109	Quickway Rigging Transfer Inc	7800 Central Ave Ne	Spring Lake Park	UST	Underground Storage Tank System	002	0	Not Available	Not Available	Not Available	Not Applicable	Not Applicable	Not Applicable	Yes
371	003-153024410045	114773	Rao Manufacturing	200 Mississippi st Ne	Fridley	AST	Aboveground Storage Tank	1002	260	1/1/1996	Active	Other	Not Applicable	Not Applicable	Not Applicable	Yes
371	003-153024410045	114773	Rao Manufacturing	200 Mississippi st Ne	Fridley	AST	Aboveground Storage Tank	1001	260	1/1/1995	Active	Other	Not Applicable	Not Applicable	Not Applicable	Yes
372	003-153024410045	114773	Rao Manufacturing	200 Mississippi st Ne	Fridley	AST-C000	Aboveground Storage Tank	1009	300	5/25/2004	Closed	Chemical Other Or Unspecified	Not Applicable	Not Applicable	Not Applicable	Yes
373	003-153024410045	114773	Rao Manufacturing	200 Mississippi st Ne	Fridley	AST-F000	Aboveground Storage Tank	1005	345	5/25/2004	Closed	Petroleum Other	Not Applicable	Not Applicable	Not Applicable	Yes
373	003-153024410045	114773	Rao Manufacturing	200 Mississippi st Ne	Fridley	AST-F000	Aboveground Storage Tank	1006	345	5/25/2004	Closed	Petroleum Other	Not Applicable	Not Applicable	Not Applicable	Yes
373	003-153024410045	114773	Rao Manufacturing	200 Mississippi st Ne	Fridley	AST-F000	Aboveground Storage Tank	1007	345	5/25/2004	Closed	Petroleum Other	Not Applicable	Not Applicable	Not Applicable	Yes
373	003-153024410045	114773	Rao Manufacturing	200 Mississippi st Ne	Fridley	AST-F000	Aboveground Storage Tank	1008	345	5/25/2004	Closed	Petroleum Other	Not Applicable	Not Applicable	Not Applicable	Yes
374	003-153024410045	114773	Rao Manufacturing	200 Mississippi st Ne	Fridley	AST-W000	Aboveground Storage Tank	1004	250	1/1/1992	Active	Used Oil	Not Applicable	Not Applicable	Not Applicable	Yes
374	003-153024410045	114773	Rao Manufacturing	200 Mississippi st Ne	Fridley	AST-W000	Aboveground Storage Tank	1003	250	1/1/1992	Active	Used Oil	Not Applicable	Not Applicable	Not Applicable	Yes
375	003-123024240040	27746	Sams Auto Parts	1240 73 1/2 Ave Ne	Fridley	AST-F000	Aboveground Storage Tank	1007	1,000	6/1/1995	Active	Diesel Fuel	Not Applicable	Not Applicable	Not Applicable	Yes
375	003-123024240040	27746	Sams Auto Parts	1240 73 1/2 Ave Ne	Fridley	AST-F000	Aboveground Storage Tank	1006	1000	6/1/1995	Active	Gasoline Blends (E1-E49)	Not Applicable	Not Applicable	Not Applicable	Yes
376	003-153024140085	1559	Stylmark Inc	6536 Main st Ne	Fridley	AST-C000	Aboveground Storage Tank	3	1,100	1/1/1985	Closed	Chemical Acidic	Not Applicable	Not Applicable	Not Applicable	Yes
376	003-153024140085	1559	Stylmark Inc	6536 Main st Ne	Fridley	AST-C000	Aboveground Storage Tank	11	1500	1/1/1995	Closed	Chemical Acidic	Not Applicable	Not Applicable	Not Applicable	Yes
376	003-153024140085	1559	Stylmark Inc	6536 Main st Ne	Fridley	AST-C000	Aboveground Storage Tank	1	4,000	1/1/1960	Closed	Chemical Acidic	Not Applicable	Not Applicable	Not Applicable	Yes
376	003-153024140085	1559	Stylmark Inc	6536 Main st Ne	Fridley	AST-C000	Aboveground Storage Tank	5	10000	1/1/1973	Closed	Chemical Acidic	Not Applicable	Not Applicable	Not Applicable	Yes
376	003-153024140085	1559	Stylmark Inc	6536 Main st Ne	Fridley	AST-C000	Aboveground Storage Tank	12	4,000	1/1/1995	Closed	Chemical Caustic	Not Applicable	Not Applicable	Not Applicable	Yes
377	003-153024140085	1559	Stylmark Inc	6536 Main st Ne	Fridley	AST-C000	Aboveground Storage Tank	2	1000	1/1/1985	Removed	Chemical Acidic	Not Applicable	Not Applicable	Not Applicable	Yes
377	003-153024140085	1559	Stylmark Inc	6536 Main st Ne	Fridley	AST-C000	Aboveground Storage Tank	4	1,000	1/1/1960	Removed	Chemical Caustic	Not Applicable	Not Applicable	Not Applicable	Yes
377	003-153024140085	1559	Stylmark Inc	6536 Main st Ne	Fridley	AST-C000	Aboveground Storage Tank	6	1500	1/1/1989	Removed	Chemical Other Or Unspecified	Not Applicable	Not Applicable	Not Applicable	Yes
378	003-153024140085	1559	Stylmark Inc	6536 Main st Ne	Fridley	AST-F000	Aboveground Storage Tank	10	490	1/1/1988	Closed	Fuel Oil #1	Not Applicable	Not Applicable	Not Applicable	Yes
378	003-153024140085	1559	Stylmark Inc	6536 Main st Ne	Fridley	AST-F000	Aboveground Storage Tank	7	490	1/1/1988	Closed	Fuel Oil #1	Not Applicable	Not Applicable	Not Applicable	Yes
378	003-153024140085	1559	Stylmark Inc	6536 Main st Ne	Fridley	AST-F000	Aboveground Storage Tank	8	490	1/1/1988	Closed	Fuel Oil #1	Not Applicable	Not Applicable	Not Applicable	Yes
378	003-153024140085	1559	Stylmark Inc	6536 Main st Ne	Fridley	AST-F000	Aboveground Storage Tank	9	490	1/1/1988	Closed	Fuel Oil #1	Not Applicable	Not Applicable	Not Applicable	Yes
379	003-153024140085	1559	Stylmark Inc	6536 Main st Ne	Fridley	UST-F000	Underground Storage Tank System	010	10,000	9/20/1973	Closed In-Place	Fuel Oil	Not Applicable	Not Applicable	Not Applicable	Yes
379	003-153024140085	1559	Stylmark Inc	6536 Main st Ne	Fridley	UST-F000	Underground Storage Tank System	004	4000	7/28/1959	Closed In-Place	Fuel Oil	Not Applicable	Not Applicable	Not Applicable	Yes
380	003-243024130013	10143	Target Fridley Distribution Center T0551	1090 73rd Ave Ne	Fridley	AST-F000	Aboveground Storage Tank	1001	10,000	10/11/1991	Active	Diesel Fuel	Not Applicable	Not Applicable	Not Applicable	Yes
380	003-233024240131	13237	Valvoline Rapid Oil Change Fridley	5701 University Ave	Fridley	AST-F000	Aboveground Storage Tank	1	500	9/1/1977	Active	Motor Oil	Not Applicable	Not Applicable	Not Applicable	Yes
380	003-233024240131	13237	Valvoline Rapid Oil Change Fridley	5701 University Ave	Fridley	AST-F000	Aboveground Storage Tank	2	500	9/1/1977	Active	Motor Oil	Not Applicable	Not Applicable	Not Applicable	Yes
381	003-233024240131	13237	Valvoline Rapid Oil Change Fridley	5701 University Ave	Fridley	AST-W000	Aboveground Storage Tank	3	1000	9/1/1977	Active	Used Oil	Not Applicable	Not Applicable	Not Applicable	Yes
382	003-233024240131	13237	Valvoline Rapid Oil Change Fridley	5701 University Ave	Fridley	UST-F000	Underground Storage Tank System	002	500	1/1/1900	Removed	Fuel Oil	Not Applicable	Not Applicable	Not Applicable	Yes
383	003-233024240131	13237	Valvoline Rapid Oil Change Fridley	5701 University Ave	Fridley	UST-W000	Underground Storage Tank System	001	500	1/1/1900	Removed	Used or waste oil	Not Applicable	Not Applicable	Not Applicable	Yes
384	003-123024220003	25774	Victory Auto Service - Fridley	1010 Osborne Rd Ne	Fridley	AST-W000	Aboveground Storage Tank	1001	650	12/1/1997	Active	Used Oil	Not Applicable	Not Applicable	Not Applicable	Yes
385	003-123024220003	25774	Victory Auto Service - Fridley	1010 Osborne Rd Ne	Fridley	UST-W000	Underground Storage Tank System	001	500	7/18/1983	Removed	Used or waste oil	Not Applicable	Not Applicable	Not Applicable	Yes
386	003-123024310115	1543	Wcec Industrial Services	1241 72nd Ave Ne	Fridley	AST	Aboveground Storage Tank	017	0	Not Available	Not Available	Not Available	Not Applicable	Not Applicable	Not Applicable	Yes
386	003-123024310115	1543	Wcec Industrial Services	1241 72nd Ave Ne	Fridley	AST	Aboveground Storage Tank	018	0	Not Available	Not Available	Not Available	Not Applicable	Not Applicable	Not Applicable	Yes
386	003-123024310115	1543	Wcec Industrial Services	1241 72nd Ave Ne	Fridley	AST	Aboveground Storage Tank	021	0	Not Available	Not Available	Not Available	Not Applicable	Not Applicable	Not Applicable	Yes
386	003-123024310115	1543	Wcec Industrial Services	1241 72nd Ave Ne	Fridley	AST	Aboveground Storage Tank	022	0	Not Available	Not Available	Not Available	Not Applicable	Not Applicable	Not Applicable	Yes
386	003-123024310115	1543	Wcec Industrial Services	1241 72nd Ave Ne	Fridley	AST	Aboveground Storage Tank	023	0	Not Available	Not Available	Not Available	Not Applicable	Not Applicable	Not Applicable	Yes

Table C-5

PCSI Results - Storage Tank Locations in the DWSMA
City of Fridley Part 2 WHPP Amendment

PCSI ID	PID Number	MPCA Agency Interests ID	Site	Site Address	City	PCS Code-Material Code	Above or Underground	Tank Number	Tank Capacity	Install Date	Status	Tank Product/Product Released	Release Discovered Date	Release Report Date	Complete Site Closure Date	Location Verified
386	003-123024310115	1543	Wcec Industrial Services	1241 72nd Ave Ne	Fridley	AST	Aboveground Storage Tank	024	0	Not Available	Not Available	Not Available	Not Applicable	Not Applicable	Not Applicable	Yes
386	003-123024310115	1543	Wcec Industrial Services	1241 72nd Ave Ne	Fridley	AST	Aboveground Storage Tank	025	0	Not Available	Not Available	Not Available	Not Applicable	Not Applicable	Not Applicable	Yes
387	003-123024310115	1543	Wcec Industrial Services	1241 72nd Ave Ne	Fridley	AST-F000	Aboveground Storage Tank	026	10700	6/18/2010	Active	Fuel Oil #1	Not Applicable	Not Applicable	Not Applicable	Yes
387	003-123024310115	1543	Wcec Industrial Services	1241 72nd Ave Ne	Fridley	AST-F000	Aboveground Storage Tank	027	17,000	9/15/2010	Active	Fuel Oil #1	Not Applicable	Not Applicable	Not Applicable	Yes
387	003-123024310115	1543	Wcec Industrial Services	1241 72nd Ave Ne	Fridley	AST-F000	Aboveground Storage Tank	029	15000	9/15/2010	Active	Fuel Oil #1	Not Applicable	Not Applicable	Not Applicable	Yes
387	003-123024310115	1543	Wcec Industrial Services	1241 72nd Ave Ne	Fridley	AST-F000	Aboveground Storage Tank	028	17,000	9/15/2010	Active	Fuel Oil #1	Not Applicable	Not Applicable	Not Applicable	Yes
387	003-123024310115	1543	Wcec Industrial Services	1241 72nd Ave Ne	Fridley	AST-F000	Aboveground Storage Tank	019	2500	8/10/2007	Removed	Diesel Fuel	Not Applicable	Not Applicable	Not Applicable	Yes
387	003-123024310115	1543	Wcec Industrial Services	1241 72nd Ave Ne	Fridley	AST-F000	Aboveground Storage Tank	020	3,000	8/10/2007	Removed	Petroleum Other	Not Applicable	Not Applicable	Not Applicable	Yes
388	003-123024310115	1543	Wcec Industrial Services	1241 72nd Ave Ne	Fridley	UST-F000	Underground Storage Tank System	F14	12000	10/22/1993	Active	Fuel Oil	Not Applicable	Not Applicable	Not Applicable	Yes
388	003-123024310115	1543	Wcec Industrial Services	1241 72nd Ave Ne	Fridley	UST-F000	Underground Storage Tank System	F15	12,000	10/26/1993	Active	Fuel Oil	Not Applicable	Not Applicable	Not Applicable	Yes
388	003-123024310115	1543	Wcec Industrial Services	1241 72nd Ave Ne	Fridley	UST-F000	Underground Storage Tank System	G12	12000	10/21/1993	Active	Gasoline	Not Applicable	Not Applicable	Not Applicable	Yes
388	003-123024310115	1543	Wcec Industrial Services	1241 72nd Ave Ne	Fridley	UST-F000	Underground Storage Tank System	G13	12,000	10/21/1993	Active	Gasoline	Not Applicable	Not Applicable	Not Applicable	Yes
388	003-123024310115	1543	Wcec Industrial Services	1241 72nd Ave Ne	Fridley	UST-F000	Underground Storage Tank System	W16	12000	10/27/1993	Active	Non-oxygenated gasoline	Not Applicable	Not Applicable	Not Applicable	Yes
389	003-123024310115	1543	Wcec Industrial Services	1241 72nd Ave Ne	Fridley	UST-F000	Underground Storage Tank System	015	10,000	12/14/1998	Removed	Diesel	Not Applicable	Not Applicable	Not Applicable	Yes
389	003-123024310115	1543	Wcec Industrial Services	1241 72nd Ave Ne	Fridley	UST-F000	Underground Storage Tank System	002	6000	10/1/1976	Removed	Diesel	Not Applicable	Not Applicable	Not Applicable	Yes
389	003-123024310115	1543	Wcec Industrial Services	1241 72nd Ave Ne	Fridley	UST-F000	Underground Storage Tank System	008	17,000	10/1/1984	Removed	Fuel Oil	Not Applicable	Not Applicable	Not Applicable	Yes
389	003-123024310115	1543	Wcec Industrial Services	1241 72nd Ave Ne	Fridley	UST-F000	Underground Storage Tank System	006	6000	8/1/1982	Removed	Fuel Oil	Not Applicable	Not Applicable	Not Applicable	Yes
389	003-123024310115	1543	Wcec Industrial Services	1241 72nd Ave Ne	Fridley	UST-F000	Underground Storage Tank System	011	15,000	4/1/1983	Removed	Fuel Oil	Not Applicable	Not Applicable	Not Applicable	Yes
389	003-123024310115	1543	Wcec Industrial Services	1241 72nd Ave Ne	Fridley	UST-F000	Underground Storage Tank System	005	14000	10/1/1976	Removed	Fuel Oil	Not Applicable	Not Applicable	Not Applicable	Yes
389	003-123024310115	1543	Wcec Industrial Services	1241 72nd Ave Ne	Fridley	UST-F000	Underground Storage Tank System	013	10,000	12/14/1998	Removed	Gasoline	Not Applicable	Not Applicable	Not Applicable	Yes
389	003-123024310115	1543	Wcec Industrial Services	1241 72nd Ave Ne	Fridley	UST-F000	Underground Storage Tank System	009	11000	10/1/1984	Removed	Gasoline	Not Applicable	Not Applicable	Not Applicable	Yes
389	003-123024310115	1543	Wcec Industrial Services	1241 72nd Ave Ne	Fridley	UST-F000	Underground Storage Tank System	001	10,000	10/1/1976	Removed	Gasoline	Not Applicable	Not Applicable	Not Applicable	Yes
389	003-123024310115	1543	Wcec Industrial Services	1241 72nd Ave Ne	Fridley	UST-F000	Underground Storage Tank System	004	3000	10/1/1976	Removed	Gasoline	Not Applicable	Not Applicable	Not Applicable	Yes
389	003-123024310115	1543	Wcec Industrial Services	1241 72nd Ave Ne	Fridley	UST-F000	Underground Storage Tank System	003	3,000	10/1/1976	Removed	Gasoline	Not Applicable	Not Applicable	Not Applicable	Yes
390	003-123024310115	1543	Wcec Industrial Services	1241 72nd Ave Ne	Fridley	UST-W000	Underground Storage Tank System	012	2000	1/1/1900	Removed	Used or waste oil	Not Applicable	Not Applicable	Not Applicable	Yes
391	123-083023330047	109041	Williams Pipe Line Co	5092 Long Lake Rd	Mounds View	AST-F000	Aboveground Storage Tank	1001	500	7/1/1987	Removed	Petroleum Other	Not Applicable	Not Applicable	Not Applicable	Yes
392	003-113024140100	111561	Amoco Ss #7507	755 73rd Ave Ne	Fridley	UST-F000	Underground Storage Tank System	001	12000	1/1/1900	Removed	Gasoline	Not Applicable	Not Applicable	Not Applicable	Yes
392	003-113024140100	111561	Amoco Ss #7507	755 73rd Ave Ne	Fridley	UST-F000	Underground Storage Tank System	002	12,000	1/1/1900	Removed	Gasoline	Not Applicable	Not Applicable	Not Applicable	Yes
393	003-123024210029	107232	Anderson Trucking Service Inc	7600 Central Ave	Fridley	UST-F000	Underground Storage Tank System	002	10000	9/1/1970	Removed	Diesel	Not Applicable	Not Applicable	Not Applicable	Yes
393	003-123024210029	107232	Anderson Trucking Service Inc	7600 Central Ave	Fridley	UST-F000	Underground Storage Tank System	003	10,000	3/7/1979	Removed	Diesel	Not Applicable	Not Applicable	Not Applicable	Yes
393	003-123024210029	107232	Anderson Trucking Service Inc	7600 Central Ave	Fridley	UST-F000	Underground Storage Tank System	001	1900	1/1/1901	Removed	Gasoline	Not Applicable	Not Applicable	Not Applicable	Yes
393	003-123024210029	107232	Anderson Trucking Service Inc	7600 Central Ave	Fridley	UST-F000	Underground Storage Tank System	001	4,000	9/1/1970	Removed	Gasoline	Not Applicable	Not Applicable	Not Applicable	Yes
394	003-243024320012	117619	Apartment Building	5650 Polk st Ne	Fridley	UST-F000	Underground Storage Tank System	001	0	1/1/1901	Removed	Fuel Oil	Not Applicable	Not Applicable	Not Applicable	Yes
395	123-173023230009	28375	Beach's Long Lake Service	2251 Long Lake Rd	New Brighton	UST-F000	Underground Storage Tank System	002	6,000	10/10/1965	Removed	Diesel	Not Applicable	Not Applicable	Not Applicable	Yes
395	123-173023230009	28375	Beach's Long Lake Service	2251 Long Lake Rd	New Brighton	UST-F000	Underground Storage Tank System	003	6000	10/10/1965	Removed	E-10 - 10% ethanol & 90% gas	Not Applicable	Not Applicable	Not Applicable	Yes
395	123-173023230009	28375	Beach's Long Lake Service	2251 Long Lake Rd	New Brighton	UST-F000	Underground Storage Tank System	001	6,000	10/10/1965	Removed	E-10 - 10% ethanol & 90% gas	Not Applicable	Not Applicable	Not Applicable	Yes
395	123-173023230009	28375	Beach's Long Lake Service	2251 Long Lake Rd	New Brighton	UST-F000	Underground Storage Tank System	004	6000	10/10/1965	Removed	E-10 - 10% ethanol & 90% gas	Not Applicable	Not Applicable	Not Applicable	Yes
395	123-173023230009	28375	Beach's Long Lake Service	2251 Long Lake Rd	New Brighton	UST-F000	Underground Storage Tank System	005	1,000	10/10/1965	Removed	Gasoline	Not Applicable	Not Applicable	Not Applicable	Yes
396	123-173023230009	28375	Beach's Long Lake Service	2251 Long Lake Rd	New Brighton	UST-W000	Underground Storage Tank System	006	560	10/10/1965	Removed	Used or waste oil	Not Applicable	Not Applicable	Not Applicable	Yes
397	003-233024230145	25778	Big O Tires 23021	251 57th Ave Ne	Fridley	UST-F000	Underground Storage Tank System	004	1,000	12/29/1994	Removed	Diesel	Not Applicable	Not Applicable	Not Applicable	Yes
398	003-233024230145	25778	Big O Tires 23021	251 57th Ave Ne	Fridley	UST-W000	Underground Storage Tank System	003	560	12/19/1994	Removed	Used or waste oil	Not Applicable	Not Applicable	Not Applicable	Yes
398	003-233024230145	25778	Big O Tires 23021	251 57th Ave Ne	Fridley	UST-W000	Underground Storage Tank System	002	560	12/19/1994	Removed	Used or waste oil	Not Applicable	Not Applicable	Not Applicable	Yes
398	003-233024230145	25778	Big O Tires 23021	251 57th Ave Ne	Fridley	UST-W000	Underground Storage Tank System	001	560	12/19/1994	Removed	Used or waste oil	Not Applicable	Not Applicable	Not Applicable	Yes
399	003-123024240056	111811	Brenk Brothers Inc	7490 Old Central Ave	Fridley	UST-W000	Underground Storage Tank System	001	350	1/1/1900	Removed	Used or waste oil	Not Applicable	Not Applicable	Not Applicable	Yes
400	123-063023230045	37397	C&G Automotive Inc	2975 Mounds View Blvd	Mounds View	UST-F000	Underground Storage Tank System	002	8000	1/1/1958	Removed	Gasoline	Not Applicable	Not Applicable	Not Applicable	Yes
400	123-063023230045	37397	C&G Automotive Inc	2975 Mounds View Blvd	Mounds View	UST-F000	Underground Storage Tank System	001	8,000	1/1/1958	Removed	Gasoline	Not Applicable	Not Applicable	Not Applicable	Yes
400	123-063023230045	37397	C&G Automotive Inc	2975 Mounds View Blvd	Mounds View	UST-F000	Underground Storage Tank System	003	8000	1/1/1971	Removed	Gasoline	Not Applicable	Not Applicable	Not Applicable	Yes
401	123-063023230045	37397	C&G Automotive Inc	2975 Mounds View Blvd	Mounds View	UST-W000	Underground Storage Tank System	004	500	1/1/1900	Removed	Used or waste oil	Not Applicable	Not Applicable	Not Applicable	Yes
401	123-063023230045	37397	C&G Automotive Inc	2975 Mounds View Blvd	Mounds View	UST-W000	Underground Storage Tank System	005	560	1/1/1900	Removed	Used or waste oil	Not Applicable	Not Applicable	Not Applicable	Yes
402	123-083023430012	26591	Central Sandblasting Co	2299 County Road H	Mounds View	UST-F000	Underground Storage Tank System	EQ2	4,000	1/1/1972	Removed	Diesel	Not Applicable	Not Applicable	Not Applicable	Yes
402	123-083023430012	26591	Central Sandblasting Co	2299 County Road H	Mounds View	UST-F000	Underground Storage Tank System	TR1	6000	1/1/1972	Removed	Diesel	Not Applicable	Not Applicable	Not Applicable	Yes
402	123-083023430012	26591	Central Sandblasting Co	2299 County Road H	Mounds View	UST-F000	Underground Storage Tank System	GA3	4,000	1/1/1972	Removed	Gasoline	Not Applicable	Not Applicable	Not Applicable	Yes
403	003-233024210144	150364	Demo Site	6051 University Ave	Fridley	UST	Underground Storage Tank System	001	0	Not Available	Not Available	Not Available	Not Applicable	Not Applicable	Not Applicable	Yes
404	003-013024310001	117135	Fireside Apartments	8030 Central Ave Ne	Spring Lake Park	UST-F000	Underground Storage Tank System	001	8,000	1/1/1900	Removed	Fuel Oil	Not Applicable	Not Applicable	Not Applicable	Yes
405	003-123024310031	132171	Former Gas Station	7250 Central Ave Ne	Fridley	UST	Underground Storage Tank System	1001	0	Not Available	Not Available	Not Available	Not Applicable	Not Applicable	Not Applicable	Approximate
405	003-123024310031	132171	Former Gas Station	7250 Central Ave Ne	Fridley	UST	Underground Storage Tank System	1002	0	Not Available	Not Available	Not Available	Not Applicable	Not Applicable	Not Applicable	Approximate
405	003-123024310031	132171	Former Gas Station	7250 Central Ave Ne	Fridley	UST	Underground Storage Tank System	1003	0	Not Available	Not Available	Not Available	Not Applicable	Not Applicable	Not Applicable	Approximate
405	003-123024310031	132171	Former Gas Station	7250 Central Ave Ne	Fridley	UST	Underground Storage Tank System	1004	0	Not Available	Not Available	Not Available	Not Applicable	Not Applicable	Not Applicable	Approximate
406	003-123024310031	132171	Former Gas Station	7250 Central Ave Ne	Fridley	UST-W000	Underground Storage Tank System	1005	1000	6/3/1981	Removed	Used or waste oil	Not Applicable	Not Applicable	Not Applicable	Approximate
407	003-143024340010	107238	Former Q Petroleum	6101 University Ave Ne	Fridley	UST-F000	Underground Storage Tank System	107	1,000	7/27/1999	Removed	Fuel Oil	Not Applicable	Not Applicable	Not Applicable	Yes
407	003-143024340010	107238	Former Q Petroleum	6101 University Ave Ne	Fridley	UST-F000	Underground Storage Tank System	104	10000	6/13/1988	Removed	Gasoline	Not Applicable	Not Applicable	Not Applicable	Yes
407	003-143024340010	107238	Former Q Petroleum	6101 University Ave Ne	Fridley	UST-F000	Underground Storage Tank System	102	10,000	1/1/1986	Removed	Gasoline	Not Applicable	Not Applicable	Not Applicable	Yes
407	003-143024340010	107238	Former Q Petroleum	6101 University Ave Ne	Fridley	UST-F000	Underground Storage Tank System	105	10000	6/13/1988	Removed	Gasoline	Not Applicable	Not Applicable	Not Applicable	Yes
407	003-143024340010	107238	Former Q Petroleum	6101 University Ave Ne	Fridley	UST-F000	Underground Storage Tank System	101	8,000	1/1/1986	Removed	Gasoline	Not Applicable	Not Applicable	Not Applicable	Yes
407	003-143024340010	107238	Former Q Petroleum	6101 University Ave Ne	Fridley	UST-F000	Underground Storage Tank System	103	10000	1/1/1986	Removed	Petroleum other	Not Applicable	Not Applicable	Not Applicable	Yes
408	003-143024340010	107238	Former Q Petroleum	6101 University Ave Ne	Fridley	UST-W000	Underground Storage Tank System	106	560	7/27/1999	Removed	Used or waste oil	Not Applicable	Not Applicable	Not Applicable	Yes
409	003-133024130045	104937	Four Corners Gas & Conven Store	1301 Ne Mississippi	Fridley	UST-C000	Underground Storage Tank System	001	10000	1/1/1900	Active	Alcohol Blend	Not Applicable	Not Applicable	Not Applicable	Yes
409	003-133024130045	104937	Four Corners Gas & Conven Store	1301 Ne Mississippi	Fridley	UST-C000	Underground Storage Tank System	002	10,000	1/1/1900	Active	Alcohol Blend	Not Applicable	Not Applicable	Not Applicable	Yes
410	003-233024230158	111621	Franks Used Cars	5740 University Ave Ne	Fridley	UST-F000	Underground Storage Tank System	001	6000	1/1/1962	Removed	Gasoline	Not Applicable	Not Applicable	Not Applicable	Approximate
411	003-113024340008	216902	Fridley City Of - Civic Complex	7011 University Avenue Ne 400 71st Avenue Ne	Fridley	UST-F000	Underground Storage Tank System	001C	8,000	4/16/2018	Pending	Diesel	Not Applicable	Not Applicable	Not Applicable	Yes
411	003-113024340008	216902	Fridley City Of - Civic Complex	7011 University Avenue Ne 400 71st Avenue Ne	Fridley	UST-F000	Underground Storage Tank System	002C	8000	4/16/2018	Pending	Diesel	Not Applicable	Not Applicable	Not Applicable	Yes
411	003-113024340008	216902	Fridley City Of - Civic Complex	7011 University Avenue Ne 400 71st Avenue Ne	Fridley	UST-F000	Underground Storage Tank System	001C	4,000	4/16/2018	Pending	E10 gasoline	Not Applicable	Not Applicable	Not Applicable	Yes
411	003-113024340008	216902	Fridley City Of - Civic Complex	7011 University Avenue Ne 400 71st Avenue Ne	Fridley	UST-F000	Underground Storage Tank System	002C	4000	4/16/2018	Pending	E10 gasoline	Not Applicable	Not Applicable	Not Applicable	Yes
412	003-233024120004	113494	Fridley Community Ed Center	6085 7th st Ne	Fridley	UST-F000	Underground Storage Tank System	002	3,000	1/1/1968	Removed	Fuel Oil	Not Applicable	Not Applicable	Not Applicable	Yes
413	003-123024220008	110809	Fridley Minnoco	7680 Highway 65	Fridley	UST-F000	Underground Storage Tank System	009	8000	8/1/1990	Active	Gasoline	Not Applicable	Not Applicable	Not Applicable	Yes
413	003-123024220008	110809	Fridley Minnoco	7680 Highway 65	Fridley	UST-F000	Underground Storage Tank System	008	6,000	8/1/1990	Active	Gasoline	Not Applicable	Not Applicable	Not Applicable	Yes
413	003-123024220008	110809	Fridley Minnoco	7680 Highway 65	Fridley	UST-F000	Underground Storage Tank System	007	6000	8/1/1990	Active	Gasoline	Not Applicable	Not Applicable	Not Applicable	Yes
414	003-123024220008	110809	Fridley Minnoco	7680 Highway 65	Fridley	UST-F000	Underground Storage Tank System	001	1,000	1/1/1961	Removed	Fuel Oil	Not Applicable	Not Applicable	Not Applicable	Yes
414	003-123024220008	110809	Fridley Minnoco	7680 Highway 65	Fridley	UST-F000	Underground Storage Tank System	004	8000	1/1/1970	Removed	Gasoline	Not Applicable	Not Applicable	Not Applicable	Yes
414	003-123024220008	110809	Fridley Minnoco	7680 Highway 65	Fridley	UST-F000	Underground Storage Tank System	003	6,000	1/1/1961	Removed	Gasoline	Not Applicable	Not Applicable	Not Applicable	Yes
414	003-123024220008	110809	Fridley Minnoco	7680 Highway 65	Fridley	UST-F000	Underground Storage Tank System	002	6000	1/1/1961	Removed	Gasoline	Not Applicable	Not Applicable	Not Applicable	Yes
415	003-123024220008	110809	Fridley Minnoco	7680 Highway 65	Fridley	UST-W000	Underground Storage Tank System	006	560	8/1/1990	Removed	Used or waste oil	Not Applicable	Not Applicable	Not Applicable	Yes

Table C-5

PCSI Results - Storage Tank Locations in the DWSMA
City of Fridley Part 2 WHPP Amendment

PCSI ID	PID Number	MPCA Agency Interests ID	Site	Site Address	City	PCS Code-Material Code	Above or Underground	Tank Number	Tank Capacity	Install Date	Status	Tank Product/Product Released	Release Discovered Date	Release Report Date	Complete Site Closure Date	Location Verified
415	003-123024220008	110809	Fridley Minnoco	7680 Highway 65	Fridley	UST-W000	Underground Storage Tank System	005	500	1/1/1961	Removed	Used or waste oil	Not Applicable	Not Applicable	Not Applicable	Yes
416	003-113024340009	105696	Fridley Municipal Garage	400 71st Ave Ne	Fridley	UST-F000	Underground Storage Tank System	011	6,000	5/12/1998	Pending	Diesel	Not Applicable	Not Applicable	Not Applicable	Yes
416	003-113024340009	105696	Fridley Municipal Garage	400 71st Ave Ne	Fridley	UST-F000	Underground Storage Tank System	012	6000	5/12/1998	Pending	Gasoline	Not Applicable	Not Applicable	Not Applicable	Yes
417	003-113024340009	105696	Fridley Municipal Garage	400 71st Ave Ne	Fridley	UST-F000	Underground Storage Tank System	005	2,000	6/1/1968	Removed	Diesel	Not Applicable	Not Applicable	Not Applicable	Yes
417	003-113024340009	105696	Fridley Municipal Garage	400 71st Ave Ne	Fridley	UST-F000	Underground Storage Tank System	004	6000	6/1/1968	Removed	Diesel	Not Applicable	Not Applicable	Not Applicable	Yes
417	003-113024340009	105696	Fridley Municipal Garage	400 71st Ave Ne	Fridley	UST-F000	Underground Storage Tank System	003	6,000	6/1/1968	Removed	Gasoline	Not Applicable	Not Applicable	Not Applicable	Yes
417	003-113024340009	105696	Fridley Municipal Garage	400 71st Ave Ne	Fridley	UST-F000	Underground Storage Tank System	007	560	6/1/1974	Removed	Motor Oil	Not Applicable	Not Applicable	Not Applicable	Yes
417	003-113024340009	105696	Fridley Municipal Garage	400 71st Ave Ne	Fridley	UST-F000	Underground Storage Tank System	006	560	6/1/1974	Removed	Motor Oil	Not Applicable	Not Applicable	Not Applicable	Yes
417	003-113024340009	105696	Fridley Municipal Garage	400 71st Ave Ne	Fridley	UST-F000	Underground Storage Tank System	010	560	6/1/1974	Removed	Non-oxygenated gasoline	Not Applicable	Not Applicable	Not Applicable	Yes
418	003-113024340009	105696	Fridley Municipal Garage	400 71st Ave Ne	Fridley	UST-W000	Underground Storage Tank System	008	265	5/1/1975	Removed	Used or waste oil	Not Applicable	Not Applicable	Not Applicable	Yes
418	003-113024340009	105696	Fridley Municipal Garage	400 71st Ave Ne	Fridley	UST-W000	Underground Storage Tank System	009	1000	4/15/1982	Removed	Used or waste oil	Not Applicable	Not Applicable	Not Applicable	Yes
419	003-233024120004	113493	Fridley Schools/Community Ed Center	6085 7th st Ne	Fridley	UST-F000	Underground Storage Tank System	003	4,000	7/11/1995	Active	Fuel Oil	Not Applicable	Not Applicable	Not Applicable	Yes
420	003-233024120004	113493	Fridley Schools/Community Ed Center	6085 7th st Ne	Fridley	UST-F000	Underground Storage Tank System	002	4000	1/1/1958	Removed	Fuel Oil	Not Applicable	Not Applicable	Not Applicable	Yes
420	003-233024120004	113493	Fridley Schools/Community Ed Center	6085 7th st Ne	Fridley	UST-F000	Underground Storage Tank System	001	10,000	1/1/1975	Removed	Fuel Oil	Not Applicable	Not Applicable	Not Applicable	Yes
421	003-013024340012	107254	Go Gas N Wash	7701 Highway 65 Ne	Spring Lake Park	UST-F000	Underground Storage Tank System	006	9827	7/25/1991	Active	Gasoline	Not Applicable	Not Applicable	Not Applicable	Yes
421	003-013024340012	107254	Go Gas N Wash	7701 Highway 65 Ne	Spring Lake Park	UST-F000	Underground Storage Tank System	008	9,827	7/25/1991	Active	Gasoline	Not Applicable	Not Applicable	Not Applicable	Yes
421	003-013024340012	107254	Go Gas N Wash	7701 Highway 65 Ne	Spring Lake Park	UST-F000	Underground Storage Tank System	007	9827	7/25/1991	Active	Gasoline	Not Applicable	Not Applicable	Not Applicable	Yes
422	003-013024340012	107254	Go Gas N Wash	7701 Highway 65 Ne	Spring Lake Park	UST-F000	Underground Storage Tank System	001	550	1/1/1971	Removed	Fuel Oil	Not Applicable	Not Applicable	Not Applicable	Yes
422	003-013024340012	107254	Go Gas N Wash	7701 Highway 65 Ne	Spring Lake Park	UST-F000	Underground Storage Tank System	004	10000	1/1/1971	Removed	Gasoline	Not Applicable	Not Applicable	Not Applicable	Yes
422	003-013024340012	107254	Go Gas N Wash	7701 Highway 65 Ne	Spring Lake Park	UST-F000	Underground Storage Tank System	005	8,000	1/1/1971	Removed	Gasoline	Not Applicable	Not Applicable	Not Applicable	Yes
422	003-013024340012	107254	Go Gas N Wash	7701 Highway 65 Ne	Spring Lake Park	UST-F000	Underground Storage Tank System	003	6000	1/1/1971	Removed	Gasoline	Not Applicable	Not Applicable	Not Applicable	Yes
423	003-013024340012	107254	Go Gas N Wash	7701 Highway 65 Ne	Spring Lake Park	UST-W000	Underground Storage Tank System	002	550	1/1/1971	Removed	Used or waste oil	Not Applicable	Not Applicable	Not Applicable	Yes
424	003-123024240042	117683	Gustavson Grindgin Inc	7410 Old Central Ave Ne	Fridley	UST-F000	Underground Storage Tank System	002	2000	1/1/1980	Removed	Gasoline	Not Applicable	Not Applicable	Not Applicable	Yes
424	003-123024240042	117683	Gustavson Grindgin Inc	7410 Old Central Ave Ne	Fridley	UST-F000	Underground Storage Tank System	001	1,000	1/1/1975	Removed	Gasoline	Not Applicable	Not Applicable	Not Applicable	Yes
425	123-063023230039	147860	Haben Tire & Auto Center	1700 Highway 10 Ne	Spring Lake Park	UST-F000	Underground Storage Tank System	004	550	1/1/1900	Removed	Fuel Oil	Not Applicable	Not Applicable	Not Applicable	Yes
425	123-063023230039	147860	Haben Tire & Auto Center	1700 Highway 10 Ne	Spring Lake Park	UST-F000	Underground Storage Tank System	R02	5,000	1/1/1900	Removed	Gasoline	Not Applicable	Not Applicable	Not Applicable	Yes
425	123-063023230039	147860	Haben Tire & Auto Center	1700 Highway 10 Ne	Spring Lake Park	UST-F000	Underground Storage Tank System	UL1	8000	1/1/1900	Removed	Gasoline	Not Applicable	Not Applicable	Not Applicable	Yes
425	123-063023230039	147860	Haben Tire & Auto Center	1700 Highway 10 Ne	Spring Lake Park	UST-F000	Underground Storage Tank System	R01	4,000	1/1/1900	Removed	Gasoline	Not Applicable	Not Applicable	Not Applicable	Yes
426	123-063023230039	147860	Haben Tire & Auto Center	1700 Highway 10 Ne	Spring Lake Park	UST-W000	Underground Storage Tank System	005	550	1/1/1900	Removed	Used or waste oil	Not Applicable	Not Applicable	Not Applicable	Yes
427	003-123024310012	107249	Harstad Company	7101 Highway 65 Ne	Fridley	UST-F000	Underground Storage Tank System	002	1,000	1/1/1961	Removed	Diesel	Not Applicable	Not Applicable	Not Applicable	Yes
427	003-123024310012	107249	Harstad Company	7101 Highway 65 Ne	Fridley	UST-F000	Underground Storage Tank System	001	1000	1/1/1961	Removed	Gasoline	Not Applicable	Not Applicable	Not Applicable	Yes
428	003-143024130008	118180	Hayes Elementary School	615 Mississippi st Ne	Fridley	UST-F000	Underground Storage Tank System	001	4,000	6/27/1991	Active	Fuel Oil	Not Applicable	Not Applicable	Not Applicable	Yes
429	003-143024130008	118180	Hayes Elementary School	615 Mississippi st Ne	Fridley	UST-F000	Underground Storage Tank System	265	6000	1/1/1965	Removed	Fuel Oil	Not Applicable	Not Applicable	Not Applicable	Yes
430	003-243024320001	23615	Holiday Stationstore #188	5695 Hackmann Ave Ne	Fridley	UST-F000	Underground Storage Tank System	007	8,000	10/26/1999	Active	Diesel	Not Applicable	Not Applicable	Not Applicable	Yes
430	003-243024320001	23615	Holiday Stationstore #188	5695 Hackmann Ave Ne	Fridley	UST-F000	Underground Storage Tank System	003	8000	10/26/1999	Active	Gasoline	Not Applicable	Not Applicable	Not Applicable	Yes
430	003-243024320001	23615	Holiday Stationstore #188	5695 Hackmann Ave Ne	Fridley	UST-F000	Underground Storage Tank System	004	8,000	10/26/1999	Active	Gasoline	Not Applicable	Not Applicable	Not Applicable	Yes
430	003-243024320001	23615	Holiday Stationstore #188	5695 Hackmann Ave Ne	Fridley	UST-F000	Underground Storage Tank System	005	8000	10/26/1999	Active	Gasoline	Not Applicable	Not Applicable	Not Applicable	Yes
430	003-243024320001	23615	Holiday Stationstore #188	5695 Hackmann Ave Ne	Fridley	UST-F000	Underground Storage Tank System	006	8,000	10/26/1999	Active	Gasoline	Not Applicable	Not Applicable	Not Applicable	Yes
431	003-243024320001	23615	Holiday Stationstore #188	5695 Hackmann Ave Ne	Fridley	UST-F000	Underground Storage Tank System	001	10000	4/1/1978	Removed	Gasoline	Not Applicable	Not Applicable	Not Applicable	Yes
431	003-243024320001	23615	Holiday Stationstore #188	5695 Hackmann Ave Ne	Fridley	UST-F000	Underground Storage Tank System	002	10,000	4/1/1978	Removed	Gasoline	Not Applicable	Not Applicable	Not Applicable	Yes
432	003-143024440060	1509	Isd 14 - Fridley Middle School	6100 W Moore Lake Dr	Fridley	UST-F000	Underground Storage Tank System	003	20000	6/4/1999	Active	Fuel Oil	Not Applicable	Not Applicable	Not Applicable	Yes
433	003-143024440060	1509	Isd 14 - Fridley Middle School	6100 W Moore Lake Dr	Fridley	UST-F000	Underground Storage Tank System	002	20,000	1/1/1975	Removed	Fuel Oil	Not Applicable	Not Applicable	Not Applicable	Yes
433	003-143024440060	1509	Isd 14 - Fridley Middle School	6100 W Moore Lake Dr	Fridley	UST-F000	Underground Storage Tank System	001	10000	1/1/1970	Removed	Fuel Oil	Not Applicable	Not Applicable	Not Applicable	Yes
434	003-233024110003	25779	Isd 14 Fridley High School	6000 W Moore Lake Dr	Fridley	UST-F000	Underground Storage Tank System	003	20,000	7/14/1989	Active	Fuel Oil	Not Applicable	Not Applicable	Not Applicable	Yes
435	003-233024110003	25779	Isd 14 Fridley High School	6000 W Moore Lake Dr	Fridley	UST-F000	Underground Storage Tank System	001	10000	1/1/1976	Removed	Fuel Oil	Not Applicable	Not Applicable	Not Applicable	Yes
435	003-233024110003	25779	Isd 14 Fridley High School	6000 W Moore Lake Dr	Fridley	UST-F000	Underground Storage Tank System	002	20,000	1/1/1962	Removed	Fuel Oil	Not Applicable	Not Applicable	Not Applicable	Yes
436	123-183023120001	95636	Isd 621 Sunnyside Elementary	2070 County Road H	New Brighton	UST-F000	Underground Storage Tank System	003	10000	7/26/2001	Active	Fuel Oil	Not Applicable	Not Applicable	Not Applicable	Yes
437	123-183023120001	95636	Isd 621 Sunnyside Elementary	2070 County Road H	New Brighton	UST-F000	Underground Storage Tank System	002	2,500	1/1/1950	Removed	Fuel Oil	Not Applicable	Not Applicable	Not Applicable	Yes
437	123-183023120001	95636	Isd 621 Sunnyside Elementary	2070 County Road H	New Brighton	UST-F000	Underground Storage Tank System	001	15000	1/1/1950	Removed	Fuel Oil	Not Applicable	Not Applicable	Not Applicable	Yes
438	003-143024320188	20200	Kiffes Automotive	6490 University Ave Ne	Fridley	UST-W000	Underground Storage Tank System	001	500	8/1/1983	Removed	Used or waste oil	Not Applicable	Not Applicable	Not Applicable	Approximate
439	003-123024320004	106534	Kittys Corner	7298 Highway 65 Ne	Fridley	UST-F000	Underground Storage Tank System	002	8000	12/1/1971	Removed	Gasoline	Not Applicable	Not Applicable	Not Applicable	Yes
439	003-123024320004	106534	Kittys Corner	7298 Highway 65 Ne	Fridley	UST-F000	Underground Storage Tank System	001	8,000	12/1/1971	Removed	Gasoline	Not Applicable	Not Applicable	Not Applicable	Yes
439	003-123024320004	106534	Kittys Corner	7298 Highway 65 Ne	Fridley	UST-F000	Underground Storage Tank System	003	8000	12/1/1971	Removed	Gasoline	Not Applicable	Not Applicable	Not Applicable	Yes
440	003-123024320004	106534	Kittys Corner	7298 Highway 65 Ne	Fridley	UST-F000	Underground Storage Tank System	004	8,000	9/1/1981	Tank Site Deleted	Diesel	Not Applicable	Not Applicable	Not Applicable	Yes
440	003-123024320004	106534	Kittys Corner	7298 Highway 65 Ne	Fridley	UST-F000	Underground Storage Tank System	008	10000	6/7/1991	Tank Site Deleted	Gasoline	Not Applicable	Not Applicable	Not Applicable	Yes
440	003-123024320004	106534	Kittys Corner	7298 Highway 65 Ne	Fridley	UST-F000	Underground Storage Tank System	007	10,000	6/7/1991	Tank Site Deleted	Gasoline	Not Applicable	Not Applicable	Not Applicable	Yes
440	003-123024320004	106534	Kittys Corner	7298 Highway 65 Ne	Fridley	UST-F000	Underground Storage Tank System	006	10000	6/7/1991	Tank Site Deleted	Gasoline	Not Applicable	Not Applicable	Not Applicable	Yes
441	003-123024330005	106690	Kuether Dist Co	6982 Highway 65 Ne	Fridley	UST-F000	Underground Storage Tank System	002	10,000	3/10/1983	Removed	Diesel	Not Applicable	Not Applicable	Not Applicable	Yes
441	003-123024330005	106690	Kuether Dist Co	6982 Highway 65 Ne	Fridley	UST-F000	Underground Storage Tank System	001	10000	3/10/1983	Removed	Gasoline	Not Applicable	Not Applicable	Not Applicable	Yes
442	123-063023310031	107241	Kunz Oil Compnay	2901 Highway 10	Mounds View	UST-F000	Underground Storage Tank System	517	12,000	1/1/1901	Removed	Gasoline	Not Applicable	Not Applicable	Not Applicable	Yes
442	123-063023310031	107241	Kunz Oil Compnay	2901 Highway 10	Mounds View	UST-F000	Underground Storage Tank System	518	12000	1/1/1901	Removed	Gasoline	Not Applicable	Not Applicable	Not Applicable	Yes
442	123-063023310031	107241	Kunz Oil Compnay	2901 Highway 10	Mounds View	UST-F000	Underground Storage Tank System	516	12,000	1/1/1901	Removed	Gasoline	Not Applicable	Not Applicable	Not Applicable	Yes
443	003-123024310008	106924	Kurt Manufacturing Co	7191 Highway 65	Fridley	UST-F000	Underground Storage Tank System	001	4000	1/1/1900	Removed	Fuel Oil	Not Applicable	Not Applicable	Not Applicable	Yes
444	123-063023320022	103127	Laddie Lake Truck Station/Bldg 90982	Highway 10 & 65	Spring Lake Park	UST-F000	Underground Storage Tank System	822	1,500	9/1/1969	Removed	Diesel	Not Applicable	Not Applicable	Not Applicable	Approximate
444	123-063023320022	103127	Laddie Lake Truck Station/Bldg 90982	Highway 10 & 65	Spring Lake Park	UST-F000	Underground Storage Tank System	821	1000	9/1/1969	Removed	Gasoline	Not Applicable	Not Applicable	Not Applicable	Approximate
445	003-123024220026	40854	Lai International Midwest	7645 Baker Street Ne	Fridley	UST-F000	Underground Storage Tank System	001	8,000	5/1/1979	Removed	Gasoline	Not Applicable	Not Applicable	Not Applicable	Yes
445	003-123024220026	40854	Lai International Midwest	7645 Baker Street Ne	Fridley	UST-F000	Underground Storage Tank System	002	8000	5/1/1979	Removed	Gasoline	Not Applicable	Not Applicable	Not Applicable	Yes
446	123-083023430004	137585	Lambert Machinery	2297 County Road H	Mounds View	UST-F000	Underground Storage Tank System	002	1,900	1/1/1900	Removed	Gasoline	Not Applicable	Not Applicable	Not Applicable	Yes
447	123-083023430004	137585	Lambert Machinery	2297 County Road H	Mounds View	UST-W000	Underground Storage Tank System	001	250	1/1/1900	Removed	Used or waste oil	Not Applicable	Not Applicable	Not Applicable	Yes
448	123-083023440007	30032	Lucky's Station #8	2155 Highway 10	Mounds View	UST-F000	Underground Storage Tank System	003	10,000	1/1/1982	Active	Diesel	Not Applicable	Not Applicable	Not Applicable	Yes
448	123-083023440007	30032	Lucky's Station #8	2155 Highway 10	Mounds View	UST-F000	Underground Storage Tank System	001	10000	1/1/1982	Active	Gasoline	Not Applicable	Not Applicable	Not Applicable	Yes
448	123-083023440007	30032	Lucky's Station #8	2155 Highway 10	Mounds View	UST-F000	Underground Storage Tank System	002	10,000	1/1/1982	Active	Gasoline	Not Applicable	Not Applicable	Not Applicable	Yes
448	123-083023440007	30032	Lucky's Station #8	2155 Highway 10	Mounds View	UST-F000	Underground Storage Tank System	004	10000	1/1/1982	Active	Gasoline	Not Applicable	Not Applicable	Not Applicable	Yes
449	003-123024310007	147383	Rustic Oaks Apartments	1200 72nd Ave Ne	Fridley	UST	Underground Storage Tank System	001	0	Not Available	Not Available	Not Available	Not Applicable	Not Applicable	Not Applicable	Yes
450	003-133024330064	112930	Saint Philips Lutheran Church	6180 Highway 65 Ne	Fridley	UST-F000	Underground Storage Tank System	002	8000	9/1/1973	Removed	Fuel Oil	Not Applicable	Not Applicable	Not Applicable	Yes
450	003-133024330064	112930	Saint Philips Lutheran Church	6180 Highway 65 Ne	Fridley	UST-F000	Underground Storage Tank System	001	3,008	6/1/1966	Removed	Fuel Oil	Not Applicable	Not Applicable	Not Applicable	Yes
451	003-143024340091	118234	Saint Williams Catholic Church	6120 5th St	Fridley	UST-F000	Underground Storage Tank System	001	8000	1/1/1900	Removed	Fuel Oil	Not Applicable	Not Applicable	Not Applicable	Yes
452	003-013024340050	109665	Shorty's Towing	1257 Osborne Rd Ne	Spring Lake Park	UST-W000	Underground Storage Tank System	001	1,500	1/1/1900	Closed In-Place	Used or waste oil	Not Applicable	Not Applicable	Not Applicable	Approximate
453	003-013024340050	20907	Shortys Heavy Duty Wrecker Service Inc	1229 Osborne Rd Ne	Spring Lake Park	UST-F000	Underground Storage Tank System	001	4000	1/1/1901	Removed	Fuel Oil	Not Applicable	Not Applicable	Not Applicable	Yes
453	003-013024340050	20907	Shortys Heavy Duty Wrecker Service Inc	1229 Osborne Rd Ne	Spring Lake Park	UST-F000	Underground Storage Tank System	002	3,000	1/1/1901	Removed	Fuel Oil	Not Applicable	Not Applicable	Not Applicable	Yes
454	003-133024330035	106530	Sinclair Retail	6290 Highway 65	Fridley	UST-F000	Underground Storage Tank System	002	3000	1/1/1957	Removed	Diesel	Not Applicable	Not Applicable	Not Applicable	Yes
454	003-133024330035	106530	Sinclair Retail	6290 Highway 65	Fridley	UST-F000	Underground Storage Tank System	005	1,000	1/1/1957	Removed	Fuel Oil	Not Applicable	Not Applicable	Not Applicable	Yes

Table C-5

PCSI Results - Storage Tank Locations in the DWSMA
City of Fridley Part 2 WHPP Amendment

PCSI ID	PID Number	MPCA Agency Interests ID	Site	Site Address	City	PCS Code-Material Code	Above or Underground	Tank Number	Tank Capacity	Install Date	Status	Tank Product/Product Released	Release Discovered Date	Release Report Date	Complete Site Closure Date	Location Verified
454	003-133024330035	106530	Sinclair Retail	6290 Highway 65	Fridley	UST-F000	Underground Storage Tank System	001	8000	1/1/1977	Removed	Gasoline	Not Applicable	Not Applicable	Not Applicable	Yes
454	003-133024330035	106530	Sinclair Retail	6290 Highway 65	Fridley	UST-F000	Underground Storage Tank System	003	3,000	1/1/1957	Removed	Gasoline	Not Applicable	Not Applicable	Not Applicable	Yes
454	003-133024330035	106530	Sinclair Retail	6290 Highway 65	Fridley	UST-F000	Underground Storage Tank System	004	3000	1/1/1957	Removed	Gasoline	Not Applicable	Not Applicable	Not Applicable	Yes
455	003-133024330035	106530	Sinclair Retail	6290 Highway 65	Fridley	UST-W000	Underground Storage Tank System	006	560	1/1/1957	Removed	Used or waste oil	Not Applicable	Not Applicable	Not Applicable	Yes
456	003-233024210144	23614	Sinclair Retail	6071 University Ave Ne	Fridley	UST-F000	Underground Storage Tank System	008	10000	4/1/1991	Removed	E-10 - 10% ethanol & 90% gas	Not Applicable	Not Applicable	Not Applicable	Yes
456	003-233024210144	23614	Sinclair Retail	6071 University Ave Ne	Fridley	UST-F000	Underground Storage Tank System	007	10,000	4/1/1991	Removed	E-10 - 10% ethanol & 90% gas	Not Applicable	Not Applicable	Not Applicable	Yes
456	003-233024210144	23614	Sinclair Retail	6071 University Ave Ne	Fridley	UST-F000	Underground Storage Tank System	005	1000	1/1/1957	Removed	Fuel Oil	Not Applicable	Not Applicable	Not Applicable	Yes
456	003-233024210144	23614	Sinclair Retail	6071 University Ave Ne	Fridley	UST-F000	Underground Storage Tank System	001	4,000	1/1/1957	Removed	Gasoline	Not Applicable	Not Applicable	Not Applicable	Yes
456	003-233024210144	23614	Sinclair Retail	6071 University Ave Ne	Fridley	UST-F000	Underground Storage Tank System	003	3000	1/1/1957	Removed	Gasoline	Not Applicable	Not Applicable	Not Applicable	Yes
456	003-233024210144	23614	Sinclair Retail	6071 University Ave Ne	Fridley	UST-F000	Underground Storage Tank System	002	3,000	1/1/1957	Removed	Gasoline	Not Applicable	Not Applicable	Not Applicable	Yes
456	003-233024210144	23614	Sinclair Retail	6071 University Ave Ne	Fridley	UST-F000	Underground Storage Tank System	004	3000	1/1/1957	Removed	Gasoline	Not Applicable	Not Applicable	Not Applicable	Yes
457	003-233024210144	23614	Sinclair Retail	6071 University Ave Ne	Fridley	UST-W000	Underground Storage Tank System	006	560	1/1/1957	Removed	Used or waste oil	Not Applicable	Not Applicable	Not Applicable	Yes
458	003-013024320001	102442	Spring Lake Park Isd #16 Service Bldg	8000 Highway 65 Ne	Spring Lake Park	UST-F000	Underground Storage Tank System	001	10000	5/20/1972	Active	Fuel Oil	Not Applicable	Not Applicable	Not Applicable	Yes
458	003-013024320001	102442	Spring Lake Park Isd #16 Service Bldg	8000 Highway 65 Ne	Spring Lake Park	UST-F000	Underground Storage Tank System	001	15,000	4/15/1975	Active	Fuel Oil	Not Applicable	Not Applicable	Not Applicable	Yes
458	003-013024320001	102442	Spring Lake Park Isd #16 Service Bldg	8000 Highway 65 Ne	Spring Lake Park	UST-F000	Underground Storage Tank System	001	10000	3/10/1955	Active	Fuel Oil	Not Applicable	Not Applicable	Not Applicable	Yes
458	003-013024320001	102442	Spring Lake Park Isd #16 Service Bldg	8000 Highway 65 Ne	Spring Lake Park	UST-F000	Underground Storage Tank System	002	12,000	1/1/1900	Active	Fuel Oil	Not Applicable	Not Applicable	Not Applicable	Yes
459	003-013024320001	102442	Spring Lake Park Isd #16 Service Bldg	8000 Highway 65 Ne	Spring Lake Park	UST-F000	Underground Storage Tank System	005	12000	1/1/1977	Removed	Fuel Oil	Not Applicable	Not Applicable	Not Applicable	Yes
459	003-013024320001	102442	Spring Lake Park Isd #16 Service Bldg	8000 Highway 65 Ne	Spring Lake Park	UST-F000	Underground Storage Tank System	004	10,000	1/1/1972	Removed	Fuel Oil	Not Applicable	Not Applicable	Not Applicable	Yes
459	003-013024320001	102442	Spring Lake Park Isd #16 Service Bldg	8000 Highway 65 Ne	Spring Lake Park	UST-F000	Underground Storage Tank System	007	12000	1/1/1970	Removed	Fuel Oil	Not Applicable	Not Applicable	Not Applicable	Yes
459	003-013024320001	102442	Spring Lake Park Isd #16 Service Bldg	8000 Highway 65 Ne	Spring Lake Park	UST-F000	Underground Storage Tank System	006	10,000	1/1/1970	Removed	Fuel Oil	Not Applicable	Not Applicable	Not Applicable	Yes
459	003-013024320001	102442	Spring Lake Park Isd #16 Service Bldg	8000 Highway 65 Ne	Spring Lake Park	UST-F000	Underground Storage Tank System	003	4000	1/1/1901	Removed	Gasoline	Not Applicable	Not Applicable	Not Applicable	Yes
459	003-013024320001	102442	Spring Lake Park Isd #16 Service Bldg	8000 Highway 65 Ne	Spring Lake Park	UST-F000	Underground Storage Tank System	001	4,000	2/29/1980	Removed	Gasoline	Not Applicable	Not Applicable	Not Applicable	Yes
459	003-013024320001	102442	Spring Lake Park Isd #16 Service Bldg	8000 Highway 65 Ne	Spring Lake Park	UST-F000	Underground Storage Tank System	008	1000	8/10/1998	Removed	Gasoline	Not Applicable	Not Applicable	Not Applicable	Yes
459	003-113024340008	38689	State Special Waste Facility	7011 University Ave Ne	Fridley	UST-F000	Underground Storage Tank System	CA1	8,000	1/1/1974	Removed	Fuel Oil	Not Applicable	Not Applicable	Not Applicable	Yes
459	003-113024340008	38689	State Special Waste Facility	7011 University Ave Ne	Fridley	UST-F000	Underground Storage Tank System	CA2	10000	1/1/1974	Removed	Fuel Oil	Not Applicable	Not Applicable	Not Applicable	Yes
460	123-083023310077	107677	Suds & Shine Self Service Car Wash	2340 Highway 10	Mounds View	UST-C000	Underground Storage Tank System	056	1,250	10/1/1986	Active	Unregulated	Not Applicable	Not Applicable	Not Applicable	Yes
460	123-083023310077	107677	Suds & Shine Self Service Car Wash	2340 Highway 10	Mounds View	UST-C000	Underground Storage Tank System	012	1250	10/1/1986	Active	Unregulated	Not Applicable	Not Applicable	Not Applicable	Yes
460	123-083023310077	107677	Suds & Shine Self Service Car Wash	2340 Highway 10	Mounds View	UST-C000	Underground Storage Tank System	034	1,250	10/1/1986	Active	Unregulated	Not Applicable	Not Applicable	Not Applicable	Yes
460	123-083023310077	107677	Suds & Shine Self Service Car Wash	2340 Highway 10	Mounds View	UST-C000	Underground Storage Tank System	078	1250	10/1/1986	Active	Unregulated	Not Applicable	Not Applicable	Not Applicable	Yes
461	123-183023120041	147743	Superamerica	2507 Silver Lake Rd	New Brighton	UST	Underground Storage Tank System	001	0	Not Available	Not Available	Not Available	Not Applicable	Not Applicable	Not Applicable	Approximate
462	123-183023420101	96905	Superamerica #1354	2051 Silver Lake Rd	New Brighton	UST-F000	Underground Storage Tank System	001	15000	1/1/1900	Removed	Gasoline	Not Applicable	Not Applicable	Not Applicable	Yes
462	123-183023420101	96905	Superamerica #1354	2051 Silver Lake Rd	New Brighton	UST-F000	Underground Storage Tank System	002	15,000	1/1/1900	Removed	Gasoline	Not Applicable	Not Applicable	Not Applicable	Yes
463	123-183023310087	25740	Superamerica 4116	2010 Silver Lake Rd Nw	New Brighton	UST-C000	Underground Storage Tank System	001	4000	7/18/1970	Removed	Alcohol Blend	Not Applicable	Not Applicable	Not Applicable	Yes
463	123-183023310087	25740	Superamerica 4116	2010 Silver Lake Rd Nw	New Brighton	UST-C000	Underground Storage Tank System	004	10,000	3/15/1984	Removed	Alcohol Blend	Not Applicable	Not Applicable	Not Applicable	Yes
463	123-183023310087	25740	Superamerica 4116	2010 Silver Lake Rd Nw	New Brighton	UST-C000	Underground Storage Tank System	003	6000	7/18/1970	Removed	Alcohol Blend	Not Applicable	Not Applicable	Not Applicable	Yes
463	123-183023310087	25740	Superamerica 4116	2010 Silver Lake Rd Nw	New Brighton	UST-C000	Underground Storage Tank System	002	5,000	7/18/1970	Removed	Alcohol Blend	Not Applicable	Not Applicable	Not Applicable	Yes
463	123-183023310087	25740	Superamerica 4116	2010 Silver Lake Rd Nw	New Brighton	UST-C000	Underground Storage Tank System	005	10000	7/18/1970	Removed	Alcohol Blend	Not Applicable	Not Applicable	Not Applicable	Yes
464	123-183023310087	25740	Superamerica 4116	2010 Silver Lake Rd Nw	New Brighton	UST-F000	Underground Storage Tank System	008	6,000	5/22/1998	Active	Diesel	Not Applicable	Not Applicable	Not Applicable	Yes
464	123-183023310087	25740	Superamerica 4116	2010 Silver Lake Rd Nw	New Brighton	UST-F000	Underground Storage Tank System	007	1000	5/22/1998	Active	E-10 - 10% ethanol & 90% gas	Not Applicable	Not Applicable	Not Applicable	Yes
464	123-183023310087	25740	Superamerica 4116	2010 Silver Lake Rd Nw	New Brighton	UST-F000	Underground Storage Tank System	006	15,000	6/9/1998	Active	E-10 - 10% ethanol & 90% gas	Not Applicable	Not Applicable	Not Applicable	Yes
465	003-233024310108	118596	Superamerica 4175	5667 University Ave N	Fridley	UST-F000	Underground Storage Tank System	004	10000	8/27/1986	Active	Diesel	Not Applicable	Not Applicable	Not Applicable	Yes
465	003-233024310108	118596	Superamerica 4175	5667 University Ave N	Fridley	UST-F000	Underground Storage Tank System	003	10,000	8/27/1986	Active	E-10 - 10% ethanol & 90% gas	Not Applicable	Not Applicable	Not Applicable	Yes
465	003-233024310108	118596	Superamerica 4175	5667 University Ave N	Fridley	UST-F000	Underground Storage Tank System	002	10000	8/27/1986	Active	E-10 - 10% ethanol & 90% gas	Not Applicable	Not Applicable	Not Applicable	Yes
465	003-233024310108	118596	Superamerica 4175	5667 University Ave N	Fridley	UST-F000	Underground Storage Tank System	001	12,000	8/27/1986	Active	E-10 - 10% ethanol & 90% gas	Not Applicable	Not Applicable	Not Applicable	Yes
466	003-123024310051	30761	Superamerica 4199	7299 Highway 65 Ne	Fridley	UST-F000	Underground Storage Tank System	004	8000	12/20/1983	Active	Diesel	Not Applicable	Not Applicable	Not Applicable	Yes
466	003-123024310051	30761	Superamerica 4199	7299 Highway 65 Ne	Fridley	UST-F000	Underground Storage Tank System	002	12,000	12/20/1983	Active	E-10 - 10% ethanol & 90% gas	Not Applicable	Not Applicable	Not Applicable	Yes
466	003-123024310051	30761	Superamerica 4199	7299 Highway 65 Ne	Fridley	UST-F000	Underground Storage Tank System	001	12000	12/20/1983	Active	E-10 - 10% ethanol & 90% gas	Not Applicable	Not Applicable	Not Applicable	Yes
466	003-123024310051	30761	Superamerica 4199	7299 Highway 65 Ne	Fridley	UST-F000	Underground Storage Tank System	003	8,000	12/20/1983	Active	E-10 - 10% ethanol & 90% gas	Not Applicable	Not Applicable	Not Applicable	Yes
467	123-173023220043	104070	Synthetic Turf Field/Track - Irondale Hs	2425 Long Lake Rd	New Brighton	UST-F000	Underground Storage Tank System	003	15000	7/17/2001	Active	Fuel Oil	Not Applicable	Not Applicable	Not Applicable	Yes
468	123-173023220043	104070	Synthetic Turf Field/Track - Irondale Hs	2425 Long Lake Rd	New Brighton	UST-F000	Underground Storage Tank System	002	20,000	1/1/1970	Removed	Fuel Oil	Not Applicable	Not Applicable	Not Applicable	Yes
468	123-173023220043	104070	Synthetic Turf Field/Track - Irondale Hs	2425 Long Lake Rd	New Brighton	UST-F000	Underground Storage Tank System	001	12000	1/1/1966	Removed	Fuel Oil	Not Applicable	Not Applicable	Not Applicable	Yes
469	003-243024130013	140074	Totino Grace High School	1350 Gardena Ave Ne	Fridley	UST-F000	Underground Storage Tank System	001	500	1/1/1900	Removed	Gasoline	Not Applicable	Not Applicable	Not Applicable	Yes
470	003-243024130013	140074	Totino Grace High School	1350 Gardena Ave Ne	Fridley	UST-W000	Underground Storage Tank System	002	300	1/1/1978	Removed	Used or waste oil	Not Applicable	Not Applicable	Not Applicable	Yes
471	123-173023130006	115175	Tyson Companies	4825 Mustang Cir	Mounds View	UST-F000	Underground Storage Tank System	001	10,000	8/15/1982	Removed	Diesel	Not Applicable	Not Applicable	Not Applicable	Yes
471	123-173023130006	115175	Tyson Companies	4825 Mustang Cir	Mounds View	UST-F000	Underground Storage Tank System	002	20000	8/15/1982	Removed	Diesel	Not Applicable	Not Applicable	Not Applicable	Yes
472	123-173023130006	115175	Tyson Companies	4825 Mustang Cir	Mounds View	UST-W000	Underground Storage Tank System	003	1,000	8/15/1982	Removed	Used or waste oil	Not Applicable	Not Applicable	Not Applicable	Yes
473	003-143024310067	113855	Village Green Apartments	460 Mississippi st Ne	Fridley	UST-F000	Underground Storage Tank System	001	20000	1/1/1978	Active	Fuel Oil	Not Applicable	Not Applicable	Not Applicable	Yes
474	003-123024210027	111820	Voigt's Fridley Bus Co	1250 Osborne Rd Ne	Fridley	UST-F000	Underground Storage Tank System	001	12,000	11/4/1994	Active	Diesel	Not Applicable	Not Applicable	Not Applicable	Approximate
475	003-123024210027	111820	Voigt's Fridley Bus Co	1250 Osborne Rd Ne	Fridley	UST-F000	Underground Storage Tank System	002	6000	5/1/1998	Removed	Diesel	Not Applicable	Not Applicable	Not Applicable	Approximate
476	003-123024210029	147506	Williams Electric	7616 Central Ave	Fridley	UST-F000	Underground Storage Tank System	002	500	5/19/1997	Removed	Diesel	Not Applicable	Not Applicable	Not Applicable	Approximate
476	003-123024210029	147506	Williams Electric	7616 Central Ave	Fridley	UST-F000	Underground Storage Tank System	001	500	5/19/1997	Removed	Gasoline	Not Applicable	Not Applicable	Not Applicable	Approximate
477	003-113024110086	105697	Woodcrest Elementary School	880 Osborne Rd	Fridley	UST-F000	Underground Storage Tank System	001	8,000	1/16/1961	Removed	Fuel Oil	Not Applicable	Not Applicable	Not Applicable	Yes
478	003-123024230012	134463	Able Property Management	7479 Able st Ne	Fridley	LUST	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Closed	Unknown	7/12/2002	7/12/2002	5/5/2015	Yes
479	123-063023320022	112384	Amazon Environmental Inc	7180 W Commerce Cir Ne	Fridley	LUST	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Closed	Diesel	10/3/1995	10/3/1995	5/15/1996	Yes
480	003-123024210029	107232	Anderson Trucking Service Inc	7600 Central Ave	Fridley	LUST	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Closed	Diesel; Gasoline, Leaded	10/30/1991	10/30/1991	9/24/1993	Yes
481	003-243024120042	191310	Bacon Residence	1336 Hillcrest	Fridley	LUST	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Closed	Fuel Oil #1 & #2	5/30/1997	5/30/1997	7/29/1997	Yes
482	123-173023230009	28375	Beach'S Long Lake Service	2251 Long Lake Rd	New Brighton	LUST	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Closed	Diesel; Gasoline, Unleaded	7/15/1997	7/15/1997	1/17/2001	Yes
482	123-173023230009	28375	Beach'S Long Lake Service	2251 Long Lake Rd	New Brighton	LUST	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Closed	Diesel; Gasoline, Unleaded	4/19/2010	4/19/2010	10/28/2010	Yes
482	123-173023230009	28375	Beach'S Long Lake Service	2251 Long Lake Rd	New Brighton	LUST	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Closed	Diesel; Gasoline, Unleaded	5/2/1990	5/16/1990	8/14/1995	Yes
483	003-123024240056	111811	Brenk Brothers Inc	7490 Old Central Ave	Fridley	LUST	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Closed	Used Oil	12/7/1994	12/7/1994	3/19/1996	Yes
484	123-063023230045	37397	C&G Automotive Inc	2975 Mounds View Blvd	Mounds View	LUST	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Closed	Hydraulic Fluid	9/12/2013	9/13/2013	2/3/2014	Yes
485	003-133024310014	188521	Chismar Residence	6428 Delwood Dr	Fridley	LUST	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Closed	Fuel Oil #1 & #2	6/20/1996	6/20/1996	8/27/1996	Yes
486	003-113024340008	189572	Columbia Arenas	7011 University Ave Ne	Fridley	LUST	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Closed	Gasoline, Unleaded	11/8/2006	11/9/2006	2/6/2007	Yes
486	003-113024340008	189572	Columbia Arenas	7011 University Ave Ne	Fridley	LUST	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Closed	Gasoline, Unleaded	10/6/2015	10/7/2015	9/19/2016	Yes
487	003-123024410004	2447	Cummins Power Generation	1400 73rd Ave Ne	Fridley	LUST	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Closed	Diesel	Not Available	4/5/1989	7/7/1995	Yes
487	003-123024410004	2447	Cummins Power Generation	1400 73rd Ave Ne	Fridley	LUST	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Closed	Diesel	10/17/2001	10/17/2001	4/5/2002	Yes
487	003-123024410004	2447	Cummins Power Generation	1400 73rd Ave Ne	Fridley	LUST	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Closed	Diesel	4/9/2005	4/25/2005	1/30/2007	Yes
487	003-123024410004	2447	Cummins Power Generation	1400 73rd Ave Ne	Fridley	LUST	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Closed	Diesel	5/20/2010	5/20/2010	9/3/2010	Yes
487	003-123024410004	2447	Cummins Power Generation	1400 73rd Ave Ne	Fridley	LUST	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Closed	Diesel	8/8/1989	12/6/1989	11/4/1993	Yes
487	003-123024410004	2447	Cummins Power Generation	1400 73rd Ave Ne	Fridley	LUST	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Closed	Diesel	Not Available	8/12/1988	4/9/1990	Yes
488	003-233024240131	195638	Dicks Tire	57th 1 2nd Ave & University Ave Nw Corner	Fridley	LUST	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Closed	Used Oil	12/19/1994	12/20/1994	4/18/1995	Approximate
489	003-013024310001	117135	Fireside Apartments	8030 Central Ave Ne	Spring Lake Park	LUST	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Closed	Fuel Oil #1 & #2	Not Available	6/25/1990	12/7/1990	Yes

Table C-5

PCSI Results - Storage Tank Locations in the DWSMA
City of Fridley Part 2 WHPP Amendment

PCSI ID	PID Number	MPCA Agency Interests ID	Site	Site Address	City	PCS Code-Material Code	Above or Underground	Tank Number	Tank Capacity	Install Date	Status	Tank Product/Product Released	Release Discovered Date	Release Report Date	Complete Site Closure Date	Location Verified
490	003-123024240047	130443	Former Fridley Valvoline Oil	7315 Central Ave Ne	Fridley	LUST	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Closed	Diesel; Gasoline, Type Unknown	12/20/2010	12/22/2010	9/19/2011	Yes
491	003-143024340010	107238	Former Q Petroleum	6101 University Ave Ne	Fridley	LUST	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Closed	Fuel Oil #1 & #2; Used Oil	8/4/1999	8/4/1999	1/20/2000	Yes
492	123-083023430036	189444	Former Rent All Minnesota	2190 County Road 10	Mounds View	LUST	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Closed	Diesel; Gasoline, Type Unknown	11/24/1999	12/1/1999	4/3/2002	Approximate
493	003-233024230158	111621	Franks Used Cars	5740 University Ave Ne	Fridley	LUST	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Closed	Fuel Oil #1 & #2	6/13/1995	6/14/1995	11/20/1995	Approximate
494	003-233024120004	113494	Fridley Community Ed Center	6085 7th st Ne	Fridley	LUST	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Closed	Fuel Oil #1 & #2	Not Available	7/6/1988	12/22/1989	Yes
495	003-143024320188	185812	Fridley Fast Lube	6490 University Ne	Fridley	LUST	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Closed	Fuel Oil #1 & #2; Gasoline, Type Unknown	1/6/1995	1/6/1995	4/6/2001	Approximate
496	003-123024220008	110809	Fridley Minnoco	7680 Highway 65	Fridley	LUST	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Closed	Fuel Oil #1 & #2; Gasoline, Type Unknown	Not Available	11/1/1988	8/27/2002	Yes
497	003-113024340009	105696	Fridley Municipal Garage	400 71st Ave Ne	Fridley	LUST	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Closed	Hydraulic Fluid	6/2/1998	6/2/1998	1/21/2010	Yes
497	003-113024340009	105696	Fridley Municipal Garage	400 71st Ave Ne	Fridley	LUST	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Closed	Hydraulic Fluid	1/14/2011	3/9/2011	12/11/2012	Yes
498	003-123024240054	117125	Friendly Chevrolet	7501 Ne Highway 65	Fridley	LUST	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Closed	Waste Oil	1/8/1992	1/8/1992	6/12/1992	Yes
499	003-013024340012	107254	Go Gas N Wash	7701 Highway 65 Ne	Spring Lake Park	LUST	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Closed	Gasoline	7/28/2016	7/28/2016	5/18/2018	Yes
500	123-063023230039	42400	Haben Tire & Auto Center	1700 Highway 10 Ne	Mounds View	LUST	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Closed	Fuel Oil #1 & #2; Gasoline, Type Unknown; Waste Oil	11/6/1990	11/6/1990	1/8/2003	Yes
501	003-123024310012	107249	Harstad Company	7101 Highway 65 Ne	Fridley	LUST	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Closed	Diesel; Gasoline, Type Unknown	6/5/2012	6/6/2012	9/21/2012	Yes
502	003-143024130008	187358	Hayes Elementary School	615 Mississippi st Ne	Fridley	LUST	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Closed	Fuel Oil #1 & #2	6/1/1988	7/6/1988	10/22/1992	Yes
503	003-133024310075	194245	Highway 65 Apartments	6341 & 6342 Highway 65 Ne	Fridley	LUST	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Closed	Fuel Oil #1 & #2	5/24/2013	5/24/2013	1/30/2014	Yes
504	003-233024240205	192875	Holiday Stationstore #118	5807 University Ave Ne	Fridley	LUST	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Closed	Gasoline, Unleaded	11/15/1989	1/31/1990	10/4/1990	Approximate
504	003-233024240205	192875	Holiday Stationstore #118	5807 University Ave Ne	Fridley	LUST	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Closed	Gasoline, Unleaded	Not Available	Not Available	2/10/2000	Approximate
505	003-243024320001	23615	Holiday Stationstore #188	5695 Hackmann Ave Ne	Fridley	LUST	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Closed	Gasoline, Unleaded	3/9/1993	3/9/1993	6/9/2006	Yes
506	003-233024120004	1070	Isd 14 - Fridley Community Education Ctr	6085 7th st Ne	Fridley	LUST	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Closed	Fuel Oil #1 & #2	7/10/1995	7/10/1995	4/11/1997	Yes
507	003-143024440060	1509	Isd 14 - Fridley Middle School	6100 W Moore Lake Dr	Fridley	LUST	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Closed	Fuel Oil #1 & #2	Not Available	7/17/1989	10/11/1990	Yes
508	003-233024110003	25779	Isd 14 Fridley High School	6000 W Moore Lake Dr	Fridley	LUST	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Closed	Fuel Oil #1 & #2	Not Available	7/13/1989	12/22/1989	Yes
509	123-183023210030	188182	Kathleen Fisher	2553 Eastman Dr	New Brighton	LUST	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Closed	Fuel Oil #1 & #2	Not Available	3/14/1989	9/5/1996	Yes
510	003-123024320004	106534	Kittys Corner	7298 Highway 65 Ne	Fridley	LUST	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Closed	Gasoline, Type Unknown	10/25/1990	11/16/1990	10/30/1995	Yes
511	003-123024330005	106690	Kuether Dist Co	6982 Highway 65 Ne	Fridley	LUST	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Closed	Diesel; Gasoline, Type Unknown	10/23/1998	10/24/1998	10/27/1999	Yes
511	003-123024330005	106690	Kuether Dist Co	6982 Highway 65 Ne	Fridley	LUST	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Closed	Diesel; Gasoline, Type Unknown	2/9/1996	2/9/1996	4/18/1996	Yes
512	123-063023310031	107241	Kunz Oil Compnay	2901 Highway 10	Mounds View	LUST	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Closed	Gasoline, Leaded	Not Available	11/8/1989	1/5/1998	Yes
513	123-063023320022	103127	Laddie Lake Truck Station/Bldg 90982	Highway 10 & 65	Spring Lake Park	LUST	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Closed	Diesel; Gasoline, Type Unknown	9/30/1992	9/30/1992	7/31/1997	Approximate
514	003-233024410030	192684	Lake Point Development	I694 & Central Ave Ne Nw Corner	Fridley	LUST	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Closed	Unknown	2/28/1995	2/28/1995	5/4/1995	Approximate
515	123-083023430004	137585	Lambert Machinery	2297 County Road H	Mounds View	LUST	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Closed	Gasoline, Type Unknown	6/4/1990	7/23/1990	6/28/1991	Yes
516	003-123024220029	193593	Lampert Building Center	7600 Highway 65 Ne	Fridley	LUST	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Closed	Gasoline, Type Unknown	9/8/1989	9/8/1989	5/26/1992	Yes
517	123-083023440007	30032	Lucky'S Station #8	2155 Highway 10	Mounds View	LUST	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Active	Gasoline, Unleaded	4/16/2014	4/16/2014	Not Available	Yes
517	123-083023440007	30032	Lucky'S Station #8	2155 Highway 10	Mounds View	LUST	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Closed	Gasoline, Unleaded	1/31/1995	1/31/1995	11/7/1995	Yes
518	003-123024340003	102539	Medtronic Inc	7000 Central Ave Ne	Fridley	LUST	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Closed	Fuel Oil #1 & #2	5/3/1999	5/17/1999	11/17/1999	Yes
518	003-123024340003	102539	Medtronic Inc	7000 Central Ave Ne	Fridley	LUST	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Closed	Fuel Oil #1 & #2	9/18/1991	9/18/1991	4/13/1995	Yes
519	003-133024130022	194851	Northeast Towing Service	6519 Central Ave Ne	Fridley	LUST	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Closed	Gasoline, Type Unknown	3/25/2002	3/26/2002	5/12/2004	Yes
520	003-123024410004	194890	Onan Technical Center	1500 73rd Ave Ne	Fridley	LUST	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Closed	Gasoline, Unleaded	10/27/1992	10/27/1992	10/14/1996	Approximate
521	123-063023310043	32406	Pat'S Muffler & Welding Service	2848 Mounds View Blvd	Mounds View	LUST	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Closed	Gasoline, Unleaded; Motor Oil; Transmission Fluid; Used Oil	2/14/2014	2/14/2014	8/4/2014	Yes
522	003-123024330006	29638	Pennzoil Products Co	7000 Highway 65 Ne	Fridley	LUST	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Closed	Diesel; Gasoline, Unleaded	10/25/1993	10/25/1993	5/21/1996	Yes
523	003-133024310072	194500	Peterson Property	6301 Highway 65 Ne	Fridley	LUST	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Closed	Fuel Oil #1 & #2; Unknown	4/15/1999	4/16/1999	7/3/2000	Yes
523	003-133024310072	194500	Peterson Property	6301 Highway 65 Ne	Fridley	LUST	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Closed	Fuel Oil #1 & #2; Unknown	4/22/1999	4/23/1999	7/3/2000	Yes
524	003-143024340010	186633	Q Superette	6101 University Ave Ne	Fridley	LUST	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Closed	Gasoline, Type Unknown	Not Available	3/8/1988	5/7/1991	Yes
524	003-143024340010	186633	Q Superette	6101 University Ave Ne	Fridley	LUST	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Closed	Gasoline, Type Unknown	Not Available	Not Available	8/24/1995	Yes
524	003-143024340010	186633	Q Superette	6101 University Ave Ne	Fridley	LUST	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Closed	Gasoline, Type Unknown	10/27/1992	10/28/1992	8/24/1995	Yes
525	003-013024340025	21109	Quickway Rigging Transfer Inc	7800 Central Ave Ne	Spring Lake Park	LUST	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Closed	Diesel	3/14/2003	3/16/2003	10/30/2003	Yes
526	003-233024240131	195654	Rapid Oil	5701 University Ave Ne	Fridley	LUST	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Closed	Fuel Oil #1 & #2; Gasoline, Type Unknown	2/23/1988	6/22/1988	2/16/1995	Yes
527	003-243024420005	188258	Renz Residence	5615 N Danube Rd	Fridley	LUST	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Closed	Fuel Oil #1 & #2	5/5/1997	5/6/1997	10/9/1997	Yes
528	003-243024210005	190607	Rush Residence	6028 Old Central Ave	Fridley	LUST	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Closed	Fuel Oil #1 & #2	12/13/1996	12/15/1996	2/4/1998	Yes
529	003-123024240040	188971	Sams Auto Parts	7350 Central Ave Ne	Fridley	LUST	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Closed	Diesel; Gasoline, Type Unknown	9/3/2008	9/3/2008	7/29/2013	Yes
530	003-133024440002	196500	Sf Home	1635 Rice Creek Rd	Fridley	LUST	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Closed	Diesel; Gasoline, Type Unknown; Kerosene	4/7/1999	4/9/1999	4/12/2001	Approximate
531	003-013024340050	20907	Shortys Heavy Duty Wrecker Service Inc	1229 Osborne Rd Ne	Spring Lake Park	LUST	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Closed	Diesel	8/26/2011	8/30/2011	5/1/2014	Yes
532	003-133024330035	106530	Sinclair Retail	6290 Highway 65	Fridley	LUST	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Closed	Fuel Oil #1 & #2; Gasoline, Unleaded	1/8/1990	1/31/1990	11/25/1997	Yes
532	003-133024330035	106530	Sinclair Retail	6290 Highway 65	Fridley	LUST	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Closed	Fuel Oil #1 & #2; Gasoline, Unleaded	Not Available	Not Available	10/1/2002	Yes
532	003-133024330035	106530	Sinclair Retail	6290 Highway 65	Fridley	LUST	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Closed	Fuel Oil #1 & #2; Gasoline, Unleaded	Not Available	Not Available	10/1/2002	Yes
533	003-233024210144	23614	Sinclair Retail	6071 University Ave Ne	Fridley	LUST	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Closed	Hydraulic Fluid	5/8/2008	5/9/2008	12/18/2008	Yes
533	003-233024210144	23614	Sinclair Retail	6071 University Ave Ne	Fridley	LUST	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Closed	Hydraulic Fluid	1/25/2010	1/28/2010	2/28/2011	Yes
533	003-233024210144	23614	Sinclair Retail	6071 University Ave Ne	Fridley	LUST	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Closed	Hydraulic Fluid	4/26/1991	4/26/1991	9/14/1993	Yes
533	003-233024210144	23614	Sinclair Retail	6071 University Ave Ne	Fridley	LUST	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Closed	Hydraulic Fluid	Not Available	Not Available	5/12/1999	Yes
533	003-233024210144	23614	Sinclair Retail	6071 University Ave Ne	Fridley	LUST	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Closed	Hydraulic Fluid	Not Available	Not Available	5/12/1999	Yes
534	003-013024320001	102442	Spring Lake Park Isd #16 Service Bldg	8000 Highway 65 Ne	Spring Lake Park	LUST	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Closed	Gasoline, Type Unknown	11/28/1988	4/11/1989	9/9/1992	Yes
534	003-013024320001	102442	Spring Lake Park Isd #16 Service Bldg	8000 Highway 65 Ne	Spring Lake Park	LUST	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Closed	Gasoline, Type Unknown	8/10/1998	8/10/1998	2/12/1999	Yes
535	003-013024320001	29756	Spring Lake Park Senior Hs	8001 Able st Ne	Spring Lake Park	LUST	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Closed	Fuel Oil #1 & #2	8/28/2008	8/28/2008	12/19/2008	Yes
536	123-183023420101	96905	Superamerica #1354	2051 Silver Lake Rd	New Brighton	LUST	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Closed	Gasoline, Unleaded	Not Available	8/18/1986	8/23/1993	Yes
537	123-183023310087	25740	Superamerica 4116	2010 Silver Lake Rd Nw	New Brighton	LUST	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Closed	Gasoline, Unleaded	6/3/1998	6/4/1998	11/22/2000	Yes
537	123-183023310087	25740	Superamerica 4116	2010 Silver Lake Rd Nw	New Brighton	LUST	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Closed	Gasoline, Unleaded	1/28/1994	1/28/1994	10/6/1995	Yes
538	003-233024310108	30756	Superamerica 4175	5667 University Ave Ne	Fridley	LUST	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Closed	Diesel; Gasoline, Unleaded	8/31/1998	9/1/1998	4/4/2001	Yes
539	003-123024310051	30761	Superamerica 4199	7299 Highway 65 Ne	Fridley	LUST	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Closed	Gasoline, Unleaded	7/13/2004	7/14/2004	4/13/2009	Yes
540	123-173023220043	104070	Synthetic Turf Field/Track - Irondale Hs	2425 Long Lake Rd	New Brighton	LUST	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Closed	Fuel Oil #1 & #2	8/16/1995	8/16/1995	10/30/1997	Yes
541	003-133024330034	187484	Taho Sports	6304 Highway 65 Ne	Fridley	LUST	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Closed	Fuel Oil #1 & #2	10/6/2000	10/6/2000	10/7/2002	Yes
542	123-173023130006	115175	Tyson Companies	4825 Mustang Cir	Mounds View	LUST	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Closed	Diesel	9/19/2016	9/20/2016	9/21/2017	Yes
543	003-233024220144	187430	U S West	5920 Ne 3rd Ave	Fridley	LUST	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Closed	Fuel Oil #4 & #6	1/4/2000	1/4/2000	1/25/2001	Yes
544	003-123024220003	25774	Victory Auto Service - Fridley	1010 Osborne Rd Ne	Fridley	LUST	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Closed	Waste Oil	12/18/1997	12/18/1997	2/10/1998	Yes
545	003-123024310115	1543	Wcec Industrial Services	1241 72nd Ave Ne	Fridley	LUST	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Closed	Fuel Oil #1 & #2	7/28/1998	7/28/1998	8/5/2008	Yes
545	003-123024310115	1543	Wcec Industrial Services	1241 72nd Ave Ne	Fridley	LUST	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Closed	Fuel Oil #1 & #2	5/8/2013	5/8/2013	3/25/2014	Yes
545	003-123024310115	1543	Wcec Industrial Services	1241 72nd Ave Ne	Fridley	LUST	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Closed	Fuel Oil #1 & #2	10/20/1993	10/20/1993	3/24/2003	Yes
546	003-113024110086	186593	Woodcrest Elementary School	880 Ne Osborne Rd	Fridley	LUST	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Closed	Fuel Oil #1 & #2	Not Available	4/11/1989	10/2/1990	Yes

LUST - Leaking Underground Storage Tank
AST - Aboveground Storage Tank
UST - Underground Storage Tank

Approximate - Parcel not found but location is approximately where that address would exist
Uncertain - Not enough address information to verify location

Table C-6

PCSI Results - Chemical Storage Sites in the DWSMA
City of Fridley Part 2 WHPP Amendment

Non-Agricultural Chemicals							
PCSI ID	**PID Number**	**CAS Number**	**Facility Name**	**Site Address**	**Chemicals**	**PCS Code - Material Code**	**Location Verified**
547	003-223024140002	20550114	Arden Hills Annex	5736 Main St	Lead, Sulfuric Acid	STOR-C000	Yes
548	003-113024310025	270100018	Camso - Brooklyn Center, Mn	452 Northco Drive	Naptha	STOR-C000	Yes
549	003-113024420010	20550075	Carter Day International Inc.	494 Northco Drive Ne	Lead Acid Batteries	STOR-C000	Approximate
550	003-233024220144	20550042	Centurylink - Fridley Co	5920 3rd st Ne	DIESEL FUEL #2, SULFURIC ACID, LEAD	STOR-C000	Yes
551	003-143024430032	20550083	City Of Fridley - Commons Filtration Plant	601 61st Avenue Ne	CHLORINE, AMMONIA, ANHYDROUS	STOR-C000	Yes
552	003-113024340013	20550081	City Of Fridley - Locke Park Filter Plant	6911 University Avenue Ne	CHLORINE	STOR-C000	Yes
553	003-123024240053	20550084	City Of Fridley - Water Filtration Plant #3	7345 Highway #65 Ne	CHLORINE	STOR-C000	Yes
554	003-113024340009	20550082	City Of Fridley Public Works Garage	400 71st Avenue Ne	GASOLINE, REGULAR UNLEADED WIth ETHANOL, FUEL OIL #2	STOR-C000	Yes
555	123-083023330042	620400014	City Of Mounds View - Well #5	5100 Long Lake Rd	CHLORINE, SULFUR DIOXIDE	STOR-C000	Yes
556	123-073023210015	620400015	City Of Mounds View - Well #6	7545 Groveland Rd	CHLORINE, SULFUR DIOXIDE	STOR-C000	Yes
557	003-123024410004	20550009	Cummins Power System	1400 73rd Ave Ne	ANTIFREEZE (ETHYLENE GLYCOL), DIESEL FUEL #2, JP 8 FUEL, LUBRICANT MIXTURE, DIESEL FUEL #2, GASOLINE, UNLEADED, LEAD, LIQUID NITROGEN, LUBRICANT MIXTURE, PROPANE (LIQUIFIED PETROLEUM GAS), etc...	STOR-C000	Yes
558	003-233024120004	20550037	Fridley Community Center	6085 7th st Ne	FUEL OIL #2	STOR-C000	Yes
559	003-233024110003	20550036	Fridley High School	6000 W Moore Lake Drv	FUEL OIL #2	STOR-C000	Yes
560	003-143024440060	20550035	Fridley Middle School	6100 W Moore Lake Drv	FUEL OIL #2	STOR-C000	Yes
561	003-123024240054	20550090	Friendly Chevrolet	7501 N.E. Highway 65	Gasoline, Motor Oil	STOR-C000	Yes
562	003-143024130008	20550039	Hayes Elementary School	615 Mississippi st Ne	FUEL OIL #2	STOR-C000	Yes
563	003-113024420010	20550066	Incertec	490 Northco Drive	Sulfuric acid, Alprep 230, Chemeon TCP-HF, Enova Lumen 765MU, Houghto-Seal A-620, Isoprep 161, Isoprep 35, Macuplex J-61, Nitric acid, Sodium cyanide, Sodium Dichromate Dihydrate, etc...	STOR-C000	Yes
564	003-113024310020	20550057	International Paper Company	350 Northco Drv Ne	DIESEL FUEL, SODIUM HYDROXIDE 50%, SULFURIC ACID, STARCH(CORN)	STOR-C000	Yes
565	123-173023220043	620450029	Irondale High School	2425 Long Lake Road	FUEL OIL, CHLORINE	STOR-C000	Yes
566	003-223024140002	20550087	Kurt Manufacturing / 5800 Main	5800 Main Street Northeast	Hydrofluoric acid (conc. 50% or greater), NITRIC ACID	STOR-C000	Yes
567	003-123024210008	20550014	Kurt Manufacturing / Die Cast	7585 Hwy 65 Ne	OIL, PROPANE (LIQUIFIED PETROLEUM GAS), SULFURIC ACID	STOR-C000	Yes
568	003-233024410030	20550077	Medtronic Inc.	710 Medtronic Parkway	FUEL OIL #2 (LOW SULFUR), Sodium Chloride, NITROGEN, CRYOGENIC LIQUID	STOR-C000	Yes
569	003-123024340003	20550011	Medtronic Plc.	7000 Central Ave Ne	ETHYLENE OXIDE; LEAD; NITROGEN, REFRIGERATED LIQUID; SULFURIC ACID; ETHYLENE OXIDE; FUEL OIL #2; NITRIC ACID (HONO2);	STOR-C000	Yes
570	003-243024310114	20550040	North Park Elementary School	5575 Fillmore st Ne	FUEL OIL	STOR-C000	Yes
571	003-013024330063	21100012	Quickway Rigging & Transfer, Inc.	7800 Central Ave Ne	FUEL OIL, [DIESEL]	STOR-C000	Yes
572	003-153024410045	20550086	Rao Manufacturing Company	200 Mississippi st N E	HYDRAULIC AND LUBRICATING OIL, LEAD, SULFURIC ACID	STOR-C000	Yes
573	003-153024140085	20550016	Stylmark, Inc.	6536 Main st Ne	FUEL OIL #2, LIQUI BRITE, NITRIC ACID, PHOSPHORIC ACID, SODIUM HYDROXIDE, PHOSPHORIC CO PRODUCT, NOVA BRIGHT DIP CONDITIONER, SULFURIC ACID	STOR-C000	Yes
574	003-243024130013	20550065	Target Distribution Center #551	1090 73rd Ave Ne	Lead, Propane, Diesel Fuel, Sulfuric Acid	STOR-C000	Yes
575	003-123024220013	20550110	Verizon Wireless Panther (Id:24835248)	940 Osborne Rd	Sulfuric Acid	STOR-C000	Yes
576	003-123024210027	20550108	Voigts Bus Service	1240 Osborne Rd	DIESEL FUEL	STOR-C000	Yes
577	003-123024310115	20550095	Wcec Industrial Services	1241 72nd Avenue Ne	FUEL OIL, UNLEADED GASOLINE	STOR-C000	Yes
578	003-113024110086	20550099	Woodcrest Elementary School	880 Osborne Road	FUEL OIL	STOR-C000	Yes

Agricultural Chemicals							
PCSI ID	**PID Number**	**Program ID**	**Facility Name**	**Site Address**	**License Type**	**PCS Code - Material Code**	**Location Verified**
579	003-143024330047	20194132	Earlygreen Landscape Inc	6160 Rainbow Dr Ne	Fertilizer License	STOR-C010	Yes
580	003-143024410013	20128182	Teffs Lawn & Snow Services Inc	6370 Quincy st Ne	Fertilizer License	STOR-C010	Yes

Approximate - Parcel not found but location is approximately where that address would exist.

Table C-7

PCSI Results - Wastewater Locations in the DWSMA
City of Fridley Part 2 WHPP Amendment

PCSI ID	PID No.	MPCA Agency Interests ID	Status	Location Name	Street Address	City or Twp	PCS Code	Location Verified
581	003-223024140002	25436	A	Kurt Manufacturing Co - 5800 Bldg	5800 Main st Ne	Fridley	WWDS	Yes

A - Active

Table C-8

PCSI Results - Potential Contaminant Site Locations in the DWSMA
City of Fridley Part 2 WHPP Amendment

PCSI ID	PID No.	MPCA Agency Interests ID	Status	Location Name	Street Address	City or Twp	PCS Code	Location Verified
582	003-143024340010	191796	A	City Of Fridley Redevelopment	6101 University Ave Ne	Fridley	BMS	Yes
583	003-113024340008	189572	A	Columbia Arenas	7011 University Ave Ne	Fridley	BMS	Yes
584	003-123024410004	2447	A	Cummins Power Generation	1400 73rd Ave Ne	Fridley	BMS	Yes
600	003-123024410004	2447	A	Cummins Power Generation	1400 73rd Ave Ne	Fridley	PLP	Yes
585	003-233024320006	117214	A	Cvs Pharmacy 8435	5696 University Ave Ne	Fridley	BMS	Yes
586	003-123024320004	194804	A	Fina #9550	7298 Highway 65 N	Fridley	BMS	Yes
601	003-143024440060	192077	A	Fridley Commons Park Well Field	Not Available	Fridley	PLP	Yes
587	003-223024110023	190541	A	Fridley Northstar Rail Station	Not Available	Fridley	BMS	Uncertain
588	003-123024130050	188902	A	Fridley Salvage Yards	73rd Ave N	Fridley	BMS	Uncertain
589	003-123024310012	107249	I	Harstad Company	7101 Highway 65 Ne	Fridley	BMS	Yes
590	123-083023430012	1770	A	Herbst & Sons Demolition Landfill	2291 W County Road H	Mounds View	BMS	Yes
591	123-063023310031	107241	I	Kunz Oil Compnay	2901 Highway 10	Mounds View	BMS	Yes
592	003-123024220026	40854	A	Lai International Midwest	7645 Baker Street Ne	Fridley	BMS	Yes
593	003-123024340003	102539	A	Medtronic Inc	7000 Central Ave Ne	Fridley	BMS	Yes
594	003-123024230005	221321	A	Rensfeldt'S Automotive	7363 Baker Street Northeast	Fridley	BMS	Yes
595	003-013024340050	20907	A	Shortys Heavy Duty Wrecker Service Inc	1229 Osborne Rd Ne	Spring Lake Park	BMS	Yes
596	003-233024210144	23614	A	Sinclair Retail	6071 University Ave Ne	Fridley	BMS	Yes
597	003-123024210024	190258	A	Stericycle Facility	7593 Highway 65 Ne	Fridley	BMS	Yes
598	003-153024140085	1559	A	Stylmark Inc	6536 Main st Ne	Fridley	BMS	Yes
599	123-173023130006	115175	A	Tyson Companies	4825 Mustang Cir	Mounds View	BMS	Yes

Uncertain - Not enough address information to verify location
PCS Codes
BMS - Brownfields
PLP - State Superfund Site

Uncertain - Not enough address information to verify location

A - Active
I - Inactive

Table C-9

PCSI Results - Hazardous Waste Generator Locations in the DWSMA
City of Fridley Part 2 WHPP Amendment

PCSI ID	PID No.	MPCA Agency Interests ID	Status	Location Name	Street Address	City or Twp	PCS Code	Location Verified
602	003-233024230143	131072	A	Almikes Computer Recycling Llc	290 58th Ave Ne	Fridley	HWG	Yes
603	003-133024340038	121776	I	Alza Corp	1250 Moore Lake Dr E Ste 200	Fridley	HWG	Yes
604	003-233024240106	125020	A	Anoka County Community Action Program	380 57th Pl	Fridley	HWG	Yes
605	003-233024230145	25778	A	Big O Tires 23021	251 57th Ave Ne	Fridley	HWG	Yes
606	003-233024210146	31285	A	Carquest M & I Auto	6005 University Ave Ne	Fridley	HWG	Yes
607	003-233024320012	134290	A	Cub Foods 1630	246 57th Ave Ne	Fridley	HWG	Yes
608	003-223024140002	90277	A	Decopac Inc	5736 Main st	Fridley	HWG	Yes
609	003-223024140002	25436	A	Kurt Manufacturing Co - 5800 Bldg	5800 Main st Ne	Fridley	HWG	Yes
610	003-233024230157	21247	I	Rtc Automotive Services Inc	5755 University Ave Ne	Fridley	HWG	Yes
611	003-223024140003	19721	A	Sheet Metal Connectors Inc	5850 Main st Ne	Fridley	HWG	Yes
612	003-233024210144	23614	A	Sinclair Retail	6071 University Ave Ne	Fridley	HWG	Yes
613	003-233024240131	13237	A	Valvoline Rapid Oil Change Fridley	5701 University Ave	Fridley	HWG	Yes
614	003-223024140002	13265	A	Viking Engineering Ave Dev Inc	5750 Main st Ne	Fridley	HWG	Yes
615	003-133024310034	16085	A	Ziebart Of Minnesota Inc Fridley	6300 Central Ave Ne	Fridley	HWG	Yes
292	003-123024220008	25772	A	Auto Care Plus Inc. DBA Fridley Minnoco	7680 Highway 65	Fridley	CVMVW	Yes
293	123-173023230009	28375	A	Beach's Long Lake Service	2251 Long Lake Rd	New Brighton	CVMVW	Yes
294	003-013024330003	30620	I	Bert Auto	7890 Highway 65 NE	Spring Lake Park	CVMVW	Yes
295	003-013024340014	39979	I	Boyer Ford Trucks Inc Body Shop	1115 Osborne Rd NE	Spring Lake Park	CVMVW	Yes
296	123-063023230045	37397	A	C&G Automotive Inc	2975 Mounds View Blvd	Mounds View	CVMVW	Yes
297	003-233024210146	31285	A	Carquest M & I Auto	6005 University Ave NE	Fridley	CVMVW	Yes
298	003-123024220013	22014	A	Cena Transmission Inc	940 Osborne Rd NE	Fridley	CVMVW	Yes
299	003-123024240015	3388	A	Central Auto Parts	1201 73 1/2 Ave NE	Fridley	CVMVW	Yes
300	123-183023240052	49757	I	Checker Auto Parts 1831	2201 26th Ave NW	New Brighton	CVMVW	Yes
301	003-013024340037	22207	A	Chob Auto Refinishing	7865 Highway 65 NE	Spring Lake Park	CVMVW	Yes
302	123-183023310089	23798	A	Dennys Service Center	2190 Silver Lake Rd NW	New Brighton	CVMVW	Yes
303	003-143024310098	24271	I	Dr Ryans Automotive Cln	6389 University Ave NE	Fridley	CVMVW	Approximate
304	003-123024220013	25773	A	Fridley Auto Body	960 Osborne Rd NE	Fridley	CVMVW	Yes
305	003-123024240022	6975	A	Fridley Auto Parts	7300 Central Ave NE	Fridley	CVMVW	Yes
306	003-133024330035	25781	I	Fridley Sinclair Dba Johnson Automotive	6290 Highway 65 NE	Fridley	CVMVW	Yes
307	003-133024130022	26551	A	Garys Automotive Service Of Fridley	6519 Central Ave NE	Fridley	CVMVW	Yes
308	003-143024230098	25775	A	George's Automotive	6528 University Ave NE	Fridley	CVMVW	Yes
309	003-123024220006	27745	I	Grand Central Auto - Fridley	7570 Highway 65 NE Ste 1	Fridley	CVMVW	Yes
310	123-063023230039	42400	A	Haben Tire & Auto Center	1700 Highway 10 NE	Mounds View	CVMVW	Yes
311	123-183023310089	91175	A	Honest 1 Auto Care	2172 Silver Lake Rd	New Brighton	CVMVW	Approximate
312	003-123024210007	51710	A	JJC Auto Rebuilding	7570 Central Ave NE Ste 1	Fridley	CVMVW	Approximate
313	003-143024320188	20200	I	Kiffes Automotive	6490 University Ave NE	Fridley	CVMVW	Approximate
314	003-123024130091	24438	A	Pioneer Auto Trim	7401 Central Ave NE	Fridley	CVMVW	Yes
315	003-123024220006	134571	A	Rio Grande Auto Body	7570 Highway 65 NE Rear Bay	Fridley	CVMVW	Yes
316	003-233024230157	21247	I	Rtc Automotive Services Inc	5755 University Ave NE	Fridley	CVMVW	Yes
317	003-123024240040	27746	A	Sams Auto Parts	1240 73 1/2 Ave NE	Fridley	CVMVW	Yes

Table C-9

PCSI Results - Hazardous Waste Generator Locations in the DWSMA
City of Fridley Part 2 WHPP Amendment

PCSI ID	PID No.	MPCA Agency Interests ID	Status	Location Name	Street Address	City or Twp	PCS Code	Location Verified
318	003-123024220006	127483	A	SAMS AUTO WORLD	7570 Highway 65 NE Ste 2	Fridley	CVMVW	Yes
319	003-013024340012	23616	A	Uno Ven 76 Service Station	7701 Highway 65 NE	Spring Lake Park	CVMVW	Yes
320	003-123024240047	16081	A	Valvoline Rapid Oil Change	7315 Highway 65	Fridley	CVMVW	Yes
321	003-233024240131	13237	A	Valvoline Rapid Oil Change Fridley	5701 University Ave	Fridley	CVMVW	Yes
322	003-123024220003	25774	A	Victory Auto Service - Fridley	1010 Osborne Rd NE	Fridley	CVMVW	Yes
323	003-123024210027	29325	A	Voights Bus Service Inc	1240 Osborne Rd NE	Fridley	CVMVW	Yes

Approximate - Parcel not found but location is approximately where that address would exist

A - Active
I - Inactive

Table C-10

PCSI Results - Dump Locations in the DWSMA
City of Fridley Part 2 WHPP Amendment

PCSI ID	PID No.	Program ID	Status	Location Name	Street Address	City or Twp	PCS Code	Location Verified
616	003-133024130052	195666	A	Central Avenue Dump, Former	6537 Central Ave Ne	Fridley	SWMS	Yes
617	003-143024210005	185706	A	Columbia/City Of Fridley Demo Fill	Not Available	Fridley	SWMS	Uncertain
618	003-243024120078	195994	A	Gardena Avenue Dump	Not Available	Fridley	SWMS	Uncertain
619	123-083023430012	1770	A	Herbst & Sons Demolition Landfill	2291 W County Road H	Mounds View	SWMS	Yes
620	003-233024110001	188735	A	Moore Lake Dump	Not Available	Fridley	SWMS	Uncertain

Uncertain - Not enough address information to verify location

A - Active

Table C-11

PCSI Results - Spill Locations in the DWSMA
City of Fridley Part 2 WHPP Amendment

PCSI ID	PID No.	Program ID	Status	Location Name	Street Address	Spill Substance	City or Twp	PCS Code	Location Verified
621	003-123024240041	59372	C	Abc Auto Recycling	7300 Central Ave Ne	Not Available	Fridley	SPL	Approximate
622	003-123024240041	56760	C	Abc Auto Recycling	7300 Central Ave Ne	Other	Fridley	SPL	Approximate
623	003-233024210144	64540	C	Aggregate Industries - Eagan	61st And University Ne	Hydraulic Fluid	Fridley	SPL	Approximate
624	003-123024240015	76478	C	Central Auto Parts	1201 73rd 1/2 Avenue	Motor Oil	Fridley	SPL	Yes
625	003-243024240062	90757	C	Central Mn Tree Service	5945 Hackman Avenue	Hydraulic Fluid	Fridley	SPL	Yes
626	003-113024340009	92393	C	City Of Fridley	400 71st Avenue Ne	Hydraulic Fluid	Fridley	SPL	Yes
627	003-123024340003	59691	C	Cullivan (Sub Contractor)	7000 Central Ave Ne	Hydraulic Fluid	Fridley	SPL	Yes
628	003-123024410004	74043	C	Cummins	1400 73rd Ave	Diesel Fuel	Fridley	SPL	Yes
629	003-123024410004	94134	C	Cummins Power Generation - Formerly Onan	1400 73rd Ave Ne	Diesel Fuel	Fridley	SPL	Yes
630	003-123024410004	88362	C	Cummins Power Generation - Formerly Onan	1400 73rd Ave Ne	Antifreeze	Fridley	SPL	Yes
631	003-123024410004	87588	C	Cummins Power Generation - Formerly Onan	1400 73rd Ave Ne	Petroleum Other	Fridley	SPL	Yes
632	003-123024410004	78562	C	Cummins Power Generation - Formerly Onan	1400 73rd Ave Ne	Antifreeze	Fridley	SPL	Yes
633	003-123024410004	76027	C	Cummins Power Generation - Formerly Onan	1400 73rd Ave Ne	Diesel Fuel	Fridley	SPL	Yes
634	003-123024410004	75633	C	Cummins Power Generation - Formerly Onan	1400 73rd Ave Ne	Antifreeze	Fridley	SPL	Yes
635	003-123024410004	73316	C	Cummins Power Generation - Formerly Onan	1400 73rd Ave Ne	Diesel Fuel	Fridley	SPL	Yes
636	003-123024310115	29989	C	Determan Brownie Inc.	1241 72nd Ave Ne	Aviation Gas	Fridley	SPL	Yes
637	003-123024310115	27285	C	Determan Welding	1241 72nd Ave Ne	Aviation Gas	Fridley	SPL	Yes
638	003-123024310115	18633	C	Determan Welding	1241 72nd Ave	Gasoline, Leaded	Fridley	SPL	Yes
639	003-123024310115	27737	C	Determan Welding & Tank	1241 72nd Ave Ne	Aviation Gas	Fridley	SPL	Yes
640	003-143024210062	53442	C	Determine Welding	567 Rice Creek Terrace	Petroleum Other	Fridley	SPL	Yes
641	003-233024110002	5588	C	Fridley Middle School	6100 W Moore Lake Dr	Petroleum Other	Fridley	SPL	Approximate
642	003-233024110002	74620	C	Fridley Middle School	6100 Moore Lake Dr W	Antifreeze	Fridley	SPL	Approximate
643	003-123024310031	25586	C	Fridley/Dick's Auto Parts	73rd And Old Central	Hydraulic Fluid	Fridley	SPL	Approximate
644	003-123024310051	5056	C	Goodman Tim	7299 Highway 65 Ne	Petroleum Other	Fridley	SPL	Yes
645	003-243024230037	186157	C	Holiday Companies	5695 Hackman Ave Ne	Gasoline, Type Unknown	Fridley	SPL	Approximate
646	003-243024230037	54489	C	Holiday Companies	5695 Hackman Ave Ne	Gasoline, Leaded	Fridley	SPL	Approximate
647	003-243024230037	185912	C	Holiday Stationstore #188	5695 Hackman Ave Ne	Gasoline, Unleaded	Fridley	SPL	Approximate
648	003-233024110003	5549	C	Independent School Dist #14	6000 W Moore Lake Dr	Petroleum Other	Fridley	SPL	Yes
649	003-233024310108	19761	C	Indianhead Trucking	5667 University Ave N E	Gasoline, Leaded	Fridley	SPL	Yes
650	003-123024210008	18450	C	Kurt Manufacturing	7585 N E Viron Road	Other	Fridley	SPL	Yes
651	003-143024340092	70978	C	Mdw Equity Llc	6161 University Ave Ne	Gasoline, Unleaded	Fridley	SPL	Approximate
652	003-233024410030	82191	C	Medtronic - Fridley	710 Medtronic Pkwy	Antifreeze	Fridley	SPL	Yes
653	003-123024340003	94441	C	Medtronic - Fridley, Central Ave	7000 Central Ave Ne	Hydraulic Fluid	Fridley	SPL	Yes
654	003-123024340003	82699	C	Medtronic - Fridley, Central Ave	7000 Central Ave Ne	Other	Fridley	SPL	Yes
655	003-123024340003	65131	C	Medtronic - Fridley, Central Ave	7000 Central Ave Ne	Other	Fridley	SPL	Yes
656	003-233024410030	65240	C	Medtronic - Fridley, Medtronic Parkway	710 Medtronic Parkway	Other	Fridley	SPL	Yes
657	003-123024340003	17914	C	Medtronic Incorporated	7000 Central Ave Ne	Unknown	Fridley	SPL	Yes
658	123-183023310061	25398	C	New Market Foods	2600 Rice Creek Rd	Other	New Brighton	SPL	Yes
659	003-113024420006	18268	C	Northern Stater Power	500 E 73rd St	Mineral Oil	Fridley	SPL	Yes
660	003-143024310095	20399	C	Northern States Power	6469 5th st N E	Mineral Oil	Fridley	SPL	Approximate
661	003-153024440088	78759	C	Not Available	6230 Starlite Blvd	Unknown	Fridley	SPL	Yes
662	003-123024240041	75335	C	Not Available	7300 Old Central Avenue Ne	Unknown	Fridley	SPL	Approximate
663	003-233024240031	69030	C	Not Available	57 1/2 Ave And 5th Street	Other	Fridley	SPL	Approximate
664	003-123024340003	64477	C	Not Available	7000 Central Ave Ne	Not Available	Fridley	SPL	Yes
665	003-123024310031	25973	C	Not Available	73rd & Central Ne	Used Oil	Fridley	SPL	Approximate
666	003-123024240048	19598	C	Not Available	1220 & 1224 73 1/2 Avenue N.E.	Petroleum Other	Fridley	SPL	Approximate

Table C-11

PCSI Results - Spill Locations in the DWSMA
City of Fridley Part 2 WHPP Amendment

PCSI ID	PID No.	Program ID	Status	Location Name	Street Address	Spill Substance	City or Twp	PCS Code	Location Verified
667	003-123024240047	17724	C	Not Available	73rd & Highway 65	Used Oil	Fridley	SPL	Approximate
668	003-123024410004	53946	C	Onan Corporation	1400 73rd Ave Ne	Diesel Fuel	Fridley	SPL	Yes
669	003-123024410004	14217	C	Onan Corporation	1400 73rd Ave Ne	Chemical Other Or Unspecified	Fridley	SPL	Yes
670	003-123024410004	12868	C	Onan Corporation	1400 73rd Ave Ne	Petroleum Other	Fridley	SPL	Yes
671	003-123024410004	4805	C	Onan Corporation	1400 73rd Ave Ne	Petroleum Other	Fridley	SPL	Yes
672	003-153024140085	94428	C	Pearson Brothers Inc	6536 Main Street Ne	Hydraulic Fluid	Fridley	SPL	Yes
673	003-123024330006	18290	C	Pennzoil	7000 Highway 65 Ne	Mineral Spirits	Fridley	SPL	Yes
674	003-243024230038	103050	C	Personally Owned Vehicle	5750 Hackman Ave	Gasoline, Unleaded	Fridley	SPL	Yes
675	123-183023210015	74784	C	Resident	2654 Eastman Drive	Other	New Brighton	SPL	Yes
676	003-123024230002	90640	C	Ruan	1090 73rd Ave	Diesel Fuel	Fridley	SPL	Yes
677	003-123024410004	61334	C	S L Transport / Usdot 796970	1400 73rd Ave Ne	Antifreeze	Fridley	SPL	Yes
678	003-143024230098	14253	C	Safety Clean	6544 University Ave Ne	Chemical Other Or Unspecified	Fridley	SPL	Approximate
679	003-133024310088	55949	C	Sandy's Restaurant	6490 Central Ave Ne	Other	Fridley	SPL	Yes
680	003-133024210050	91339	C	Sealtech Inc	6831 Hwy 65 Service Road	Asphalt	Fridley	SPL	Yes
681	003-133024330035	56570	C	Sinclair	6290 Hwy65	Motor Oil	Fridley	SPL	Yes
682	003-123024310051	61714	C	Speedway Superamerica Llc	7299 Highway 65 Ne	Not Available	Fridley	SPL	Yes
683	003-123024310051	57146	C	Speedway Superamerica Llc	7299 Highway 65 Ne	Gasoline, Leaded	Fridley	SPL	Yes
684	003-123024310031	14459	C	Steve Ehlert	7298 Central Ave	Gasoline, Unleaded	Fridley	SPL	Approximate
685	003-153024140085	20271	C	Stylemark	6536 Main st N E	Sewage	Fridley	SPL	Yes
686	003-153024140085	72581	C	Stylmark	6536 Main St Ne	Unknown	Fridley	SPL	Yes
687	003-153024140085	27085	C	Stylmark	6536 Main St Ne	Other	Fridley	SPL	Yes
688	003-123024310051	66224	C	Super America	73rd And Hwy 65	Diesel Fuel	Fridley	SPL	Approximate
689	003-123024230002	91988	C	Target Stores - Distribution Center	1090 73rd Ave Ne	Hydraulic Fluid	Fridley	SPL	Approximate
690	003-123024230002	27882	C	Target Stores	1090 73rd Ave Ne	Diesel Fuel	Fridley	SPL	Approximate
691	003-123024220012	185958	C	Tires For Less	980 Osborne Rd. Ne	Motor Oil	Fridley	SPL	Yes
692	003-233024420042	4450	C	Totinos Pizza	523 Central Ave Ne	Unknown	Fridley	SPL	Approximate
693	003-223024140002	105704	C	Unknown	5750 Main st Ne	Unknown	Fridley	SPL	Approximate
694	123-073023340042	70154	C	Wayne Mecl	6969 Knollwood Drive	Unknown	Mounds View	SPL	Yes
695	003-123024310115	90614	C	West Central Environmental Consultants - Fridley	1241 72nd Avenue Ne	Sewage	Fridley	SPL	Yes
696	003-133024420040	17500	C	Woodlake Sanitary	1384 64th Ave	Hydraulic Fluid	Fridley	SPL	Yes

Approximate - Parcel not found but location is approximately where that address would exist

C - Closed (Refers to Status of Spill)

Table C-12

High Capacity Wells within One Mile of the DWSMA
City of Fridley Part 2 WHPP Amendment

PCSI ID	Permit Number	Unique ID	Status	Permittee	Use	Aquifer	Permitted Volume MGY
2	1975-6244	206674	Active	Fridley, City Of	Municipal/Public Water Supply	Mt. Simon	2400
3	1975-6244	206670	Active	Fridley, City Of	Municipal/Public Water Supply	Mt. Simon	2400
4	1975-6244	201158	Active	Fridley, City Of	Municipal/Public Water Supply	Mt. Simon	2400
5	1975-6244	206675	Active	Fridley, City Of	Municipal/Public Water Supply	Mt. Simon	2400
6	1975-6244	206673	Active	Fridley, City Of	Municipal/Public Water Supply	Prairie du Chien-Jordan	2400
7	1975-6244	206678	Active	Fridley, City Of	Municipal/Public Water Supply	Prairie du Chien	2400
8	1975-6244	206669	Active	Fridley, City Of	Municipal/Public Water Supply	Prairie du Chien	2400
9	1975-6244	206672	Active	Fridley, City Of	Municipal/Public Water Supply	Prairie du Chien-Jordan	2400
10	1975-6244	206658	Active	Fridley, City Of	Municipal/Public Water Supply	Quaternary Buried Artesian	2400
11	1975-6244	206657	Active	Fridley, City Of	Municipal/Public Water Supply	St. Lawrence-Mt. Simon	2400
12	1975-6244	209207	Active	Fridley, City Of	Municipal/Public Water Supply	Jordan	2400
16	1969-1220	206761	Active	New Brighton, City Of	Golf Course Irrigation	Prairie du Chien-Jordan	16.5
28	1960-0717	206680	Active	Stylmark INC	Other Industrial Processing	Prairie du Chien-Jordan	20
35	1991-6160	206679	Active	Ind School District 14	Landscaping/Athletic Field Irrigation	Prairie du Chien	8
39	1968-1184	206683	Active	Ind School District 14	Landscaping/Athletic Field Irrigation	Prairie du Chien	36
40	1963-1021	206659	Active	Brand-Broadway Assoc	Private Water Supply	Quaternary Buried Artesian	50
41	1963-1021	206660	Active	Brand-Broadway Assoc	Private Water Supply	Prairie du Chien-Eau Claire	50
94	1976-6253	206722	Active	Mounds View, City Of	Municipal/Public Water Supply	Prairie du Chien-Jordan	594
95	1976-6253	206717	Active	Mounds View, City Of	Municipal/Public Water Supply	Jordan-Mt. Simon	594
129	1970-0157	110485	Active	New Brighton, City Of	Municipal/Public Water Supply	Mt. Simon	1925
110493	1976-6396	110493	Active	Brooklyn Center, City of	Municipal/Public Water Supply	Jordan	1800
127269	1976-6396	127269	Active	Brooklyn Center, City of	Municipal/Public Water Supply	Prairie du Chien-Jordan	1800
180920	1972-0123	180920	Active	Spring Lake Park, City Of	Municipal/Public Water Supply	Eau Claire-Mt. Simon	399
203257	1976-6396	203257	Active	Brooklyn Center, City of	Municipal/Public Water Supply	Jordan	1800
203258	1976-6396	203258	Active	Brooklyn Center, City of	Municipal/Public Water Supply	Jordan	1800
206637	1972-0123	206637	Active	Spring Lake Park, City Of	Municipal/Public Water Supply	St. Lawrence-Mt. Simon	398.6
206638	1972-0123	206638	Active	Spring Lake Park, City Of	Municipal/Public Water Supply	Tunnel City-Mt. Simon	399
206685	1975-6244	206685	Active	Fridley, City Of	Municipal/Public Water Supply	Tunnel City-Mt. Simon	2400
206694	1996-6184	206694	Active	Kurt Manufacturing	Pollution Containment	Jordan	20
206696	1975-6244	206696	Active	Fridley, City Of	Municipal/Public Water Supply	Prairie du Chien-Jordan	2400
206716	1976-6253	206716	Active	Mounds View, City Of	Municipal/Public Water Supply	Mt. Simon	594
206719	1976-6253	206719	Active	Mounds View, City Of	Municipal/Public Water Supply	Tunnel City-Mt. Simon	594
206720	1976-6253	206720	Active	Mounds View, City Of	Municipal/Public Water Supply	Jordan	594
206721	1976-6253	206721	Active	Mounds View, City Of	Municipal/Public Water Supply	Tunnel City-Mt. Simon	594

Table C-12

High Capacity Wells within One Mile of the DWSMA
City of Fridley Part 2 WHPP Amendment

PCSI ID	Permit Number	Unique ID	Status	Permittee	Use	Aquifer	Permitted Volume MGY
206792	1970-0157	206792	Active	New Brighton, City Of	Municipal/Public Water Supply	Prairie du Chien-St Lawrence	1925
206793	1970-0157	206793	Active	New Brighton, City Of	Municipal/Public Water Supply	Prairie du Chien-St Lawrence	1925
206794	1970-0157	206794	Active	New Brighton, City Of	Municipal/Public Water Supply	Mt. Simon	1925
206795	1970-0157	206795	Active	New Brighton, City Of	Municipal/Public Water Supply	Prairie du Chien-St Lawrence	1925
206797	1970-0157	206797	Active	New Brighton, City Of	Municipal/Public Water Supply	Jordan	1925
223294	1972-0123	223294	Active	Spring Lake Park, City Of	Municipal/Public Water Supply	Tunnel City-Mt. Simon	398.6
256194	1987-6048	256194	Active	US Army Corps of Engineers	Pollution Containment	Water Table	1600
426842	1987-6048	426842	Active	US Army Corps of Engineers	Pollution Containment	Water Table	1600
426843	1987-6048	426843	Active	US Army Corps of Engineers	Pollution Containment	Water Table	1600
426844	1987-6048	426844	Active	US Army Corps of Engineers	Pollution Containment	Water Table	1600
426845	1987-6048	426845	Active	US Army Corps of Engineers	Pollution Containment	Water Table	1600
426846	1987-6048	426846	Active	US Army Corps of Engineers	Pollution Containment	Water Table	1600
426847	1987-6048	426847	Active	US Army Corps of Engineers	Pollution Containment	Water Table	1600
453821	1987-6048	453821	Active	US Army Corps of Engineers	Pollution Containment	Water Table	1600
453822	1987-6048	453822	Active	US Army Corps of Engineers	Pollution Containment	Water Table	1600
453823	1987-6048	453823	Active	US Army Corps of Engineers	Pollution Containment	Quaternary Buried Artesian	1600
453825	1987-6048	453825	Active	US Army Corps of Engineers	Pollution Containment	Jordan	1600
453826	1987-6048	453826	Active	US Army Corps of Engineers	Pollution Containment	Prairie du Chien-Jordan	1600
453827	1987-6048	453827	Active	US Army Corps of Engineers	Pollution Containment	Prairie du Chien-Jordan	1600
453828	1987-6048	453828	Active	US Army Corps of Engineers	Pollution Containment	Prairie du Chien-Jordan	1600
509083	1970-0157	509083	Active	New Brighton, City Of	Municipal/Public Water Supply	Mt. Simon	1925
538076	1996-6184	538076	Active	Kurt Manufacturing	Pollution Containment	Quaternary Buried Artesian	20
554216	1970-0157	554216	Active	New Brighton, City Of	Municipal/Public Water Supply	Prairie du Chien-Jordan	1925
563006	1972-0123	563006	Active	Spring Lake Park, City Of	Municipal/Public Water Supply	Mt. Simon	399
575168	2015-2569	575168	Active	Perfect 10 Car Wash	Commercial/Institutional Water Supply	Jordan	10
582628	1970-0157	582628	Active	New Brighton, City Of	Municipal/Public Water Supply	Prairie du Chien-Jordan	1925
609817	2015-2452	609817	Active	Bachman's Inc	Landscaping/Athletic Field Irrigation	Tunnel City-Wonewoc	3.5
609817	2015-2452	609817	Active	Bachman's Inc	Nursery Irrigation	Tunnel City-Wonewoc	4
687112	1987-6048	687112	Active	US Army Corps of Engineers	Pollution Containment	Water Table	1600
NA1	2017-2558	Not Available	Active	City of Fridley	Construction Dewatering	Not Available	4
NA2	2017-2570	Not Available	Active	Spring Lake Park Leased Housing Associates I, LLLP	Construction Dewatering	Not Available	47.5
NA3	1986-6220	Not Available	Active	US Army Corps of Engineers	Pollution Containment	Not Available	11
NA4	1992-6127	Not Available	Active	US Navy	Pollution Containment	Quaternary Buried Artesian	526
NA5	1992-6127	Not Available	Active	US Navy	Pollution Containment	Water Table	526

Figures

2 - Municipal Well Location PCSI ID
(PCSI ID refers to Table C-3)

0 1,000 2,000
Feet

Image Source: FSA (2017)

Blaine SW DWSMA
Spring Lake Park
Spring Lake Park East DWSMA
Blaine
Shoreview
Spring Lake Park West DWSMA
Riverview Apartment Partnership DWSMA
Fridley
Mounds View
Mounds View DWSMA
Brooklyn Park
Brooklyn Park DWSMA
Arden Hills
Brooklyn Center DWSMA
Brooklyn Center
New Brighton DWSMA
New Brighton

A - Areas with a 1% annual chance of flooding and a 26% chance of flooding over the life of a 30-year mortgage. Because detailed analyses are not performed for such areas; no depths or base flood elevations are shown within these zones.

AE - The base floodplain where base flood elevations are provided. AE Zones are now used on new format FIRMs instead of A1-A30 Zones.

AH - areas with a 1% annual chance of shallow flooding, usually in the form of a pond, with an average depth ranging from 1 to 3 feet. flood elevations derived from detailed analyses are shown at selected intervals within these zones.

AO - River or stream flood hazard areas, and areas with a 1% or greater chance of shallow flooding each year, usually in the form of sheet flow, with an average depth ranging from 1 to 3 feet. Average flood depths derived from detailed analyses are shown within these zones.

X - Area of minimal flood hazard, usually depicted on FIRMs as above the 500-year flood level. Zone C may have ponding and local drainage problems that don't warrant a detailed study or designation as base floodplain. Zone X is the area determined to be outside the 500-year flood and protected by levee from 100-year flood.

Municipal Well
Railroad
Fridley DWSMA
Municipal Boundary

FEMA Flood Zone

A
AE
AH
AO
X

Nearby DWSMAs

Blaine SW
Brooklyn Center
Brooklyn Park
Mounds View
New Brighton
Riverview Apartment Partnership
Saint Anthony Village
Spring Lake Park East
Spring Lake Park West

Aquifer Vulnerability

High
Moderate
Low

MUNICIPAL WELLS AND AQUIFER VULNERABILITY
Part 2 WHPP Amendment
City of Fridley
Anoka County, MN

FIGURE C-1

BARR

Barr Footer: ArcGIS 10.6, 2018-10-31 11:54 File: I:\Projects\23\02\1062\Maps\Reports\Fridley_Part_II_WHPP_Amendment\Fig C-01 Municipal Wells DWSMA and Vulnerability.mxd User: jil2

Municipal Well

Fridley DWSMA

Municipal Boundary

Bedrock Subcrop*

Jordan Sandstone

Prairie du Chien Group

St. Lawrence Formation

St. Peter Sandstone

Tunnel City Group

* Minnesota Geological Survey

2 - Municipal Well Location PCSI ID (PCSI ID refers to Table C-3)

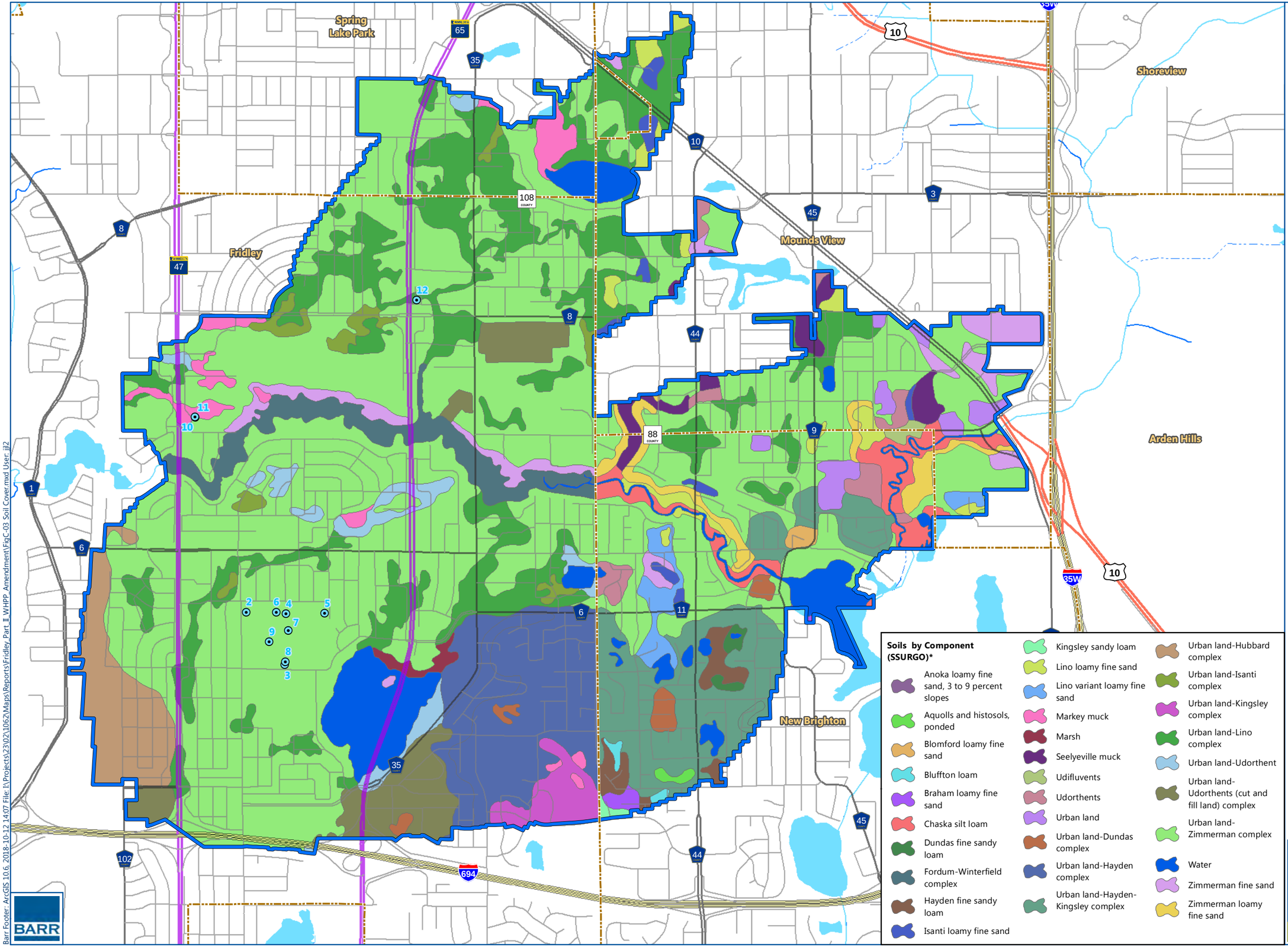
0 1,000 2,000

Feet

BEDROCK SUBCROP
Part 2 WHPP Amendment
City of Fridley
Anoka County, MN

FIGURE C-2

Barr Footer: ArcGIS 10.6, 2018-10-12 14:06 File: I:\Projects\23\02\1062\Maps\Reports\Fridley_Part_II_WHPP_Amendment\FigC-02 Bedrock Subcrop.mxd User: jil2



* SSURGO Data (U.S. Dept. of Agriculture, Natural Resources Conservation Service)

2 - Municipal Well Location PCSI ID (PCSI ID refers to Table C-3)

N

0 1,000 2,000

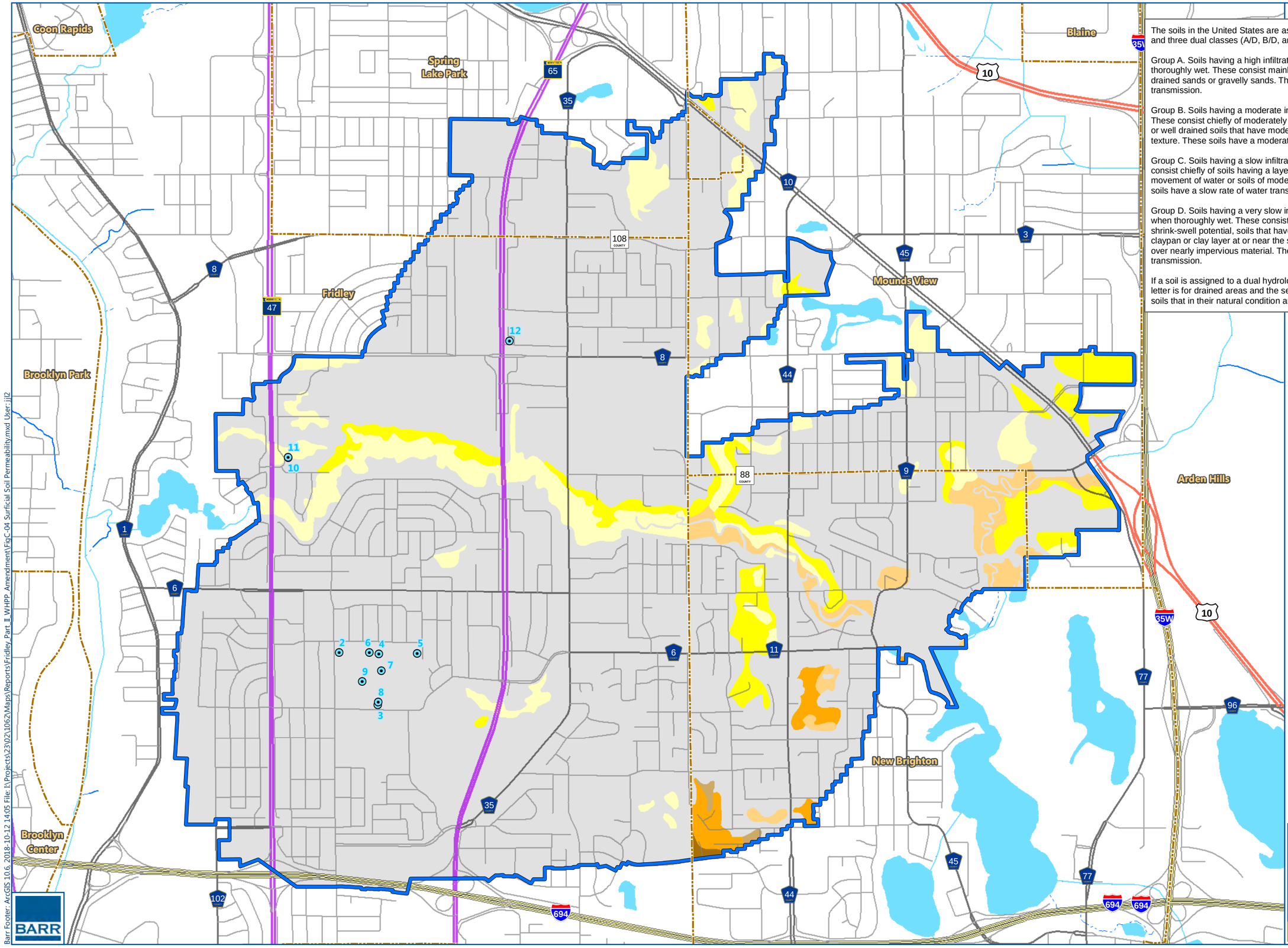
Feet

SOIL COVER
Part 2 WHPP Amendment
City of Fridley
Anoka County, MN

FIGURE C-3

BARR

Barr Footer: ArcGIS 10.6, 2018-10-12 14:07 File: I:\Projects\23\02\1062\Maps\Reports\Fridley_Part_II_WHPP_Amendment\FigC-03 Soil Cover.mxd User: jil2



The soils in the United States are assigned to four groups (A, B, C, and D) and three dual classes (A/D, B/D, and C/D). The groups are defined as follows:

Group A. Soils having a high infiltration rate (low runoff potential) when thoroughly wet. These consist mainly of deep, well drained to excessively drained sands or gravelly sands. These soils have a high rate of water transmission.

Group B. Soils having a moderate infiltration rate when thoroughly wet. These consist chiefly of moderately deep or deep, moderately well drained or well drained soils that have moderately fine texture to moderately coarse texture. These soils have a moderate rate of water transmission.

Group C. Soils having a slow infiltration rate when thoroughly wet. These consist chiefly of soils having a layer that impedes the downward movement of water or soils of moderately fine texture or fine texture. These soils have a slow rate of water transmission.

Group D. Soils having a very slow infiltration rate (high runoff potential) when thoroughly wet. These consist chiefly of clays that have a high shrink-swell potential, soils that have a high water table, soils that have a claypan or clay layer at or near the surface, and soils that are shallow over nearly impervious material. These soils have a very slow rate of water transmission.

If a soil is assigned to a dual hydrologic group (A/D, B/D, or C/D), the first letter is for drained areas and the second is for undrained areas. Only the soils that in their natural condition are in group D are assigned to dual classes.

Municipal Well

Fridley DWSMA

Municipal Boundary

Soil Permeability Classification*

Not rated or not available

A

A/D

B

B/D

C

C/D

* SSURGO Data (U.S. Dept. of Agriculture, Natural Resources Conservation Service)

2 - Municipal Well Location PCSI ID (PCSI ID refers to Table C-3)

N

0 1,000 2,000

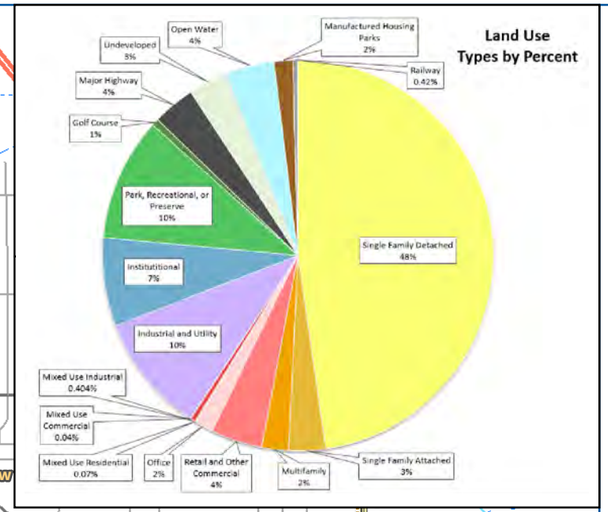
Feet

SURFICIAL SOIL PERMEABILITY
Part 2 WHPP Amendment
City of Fridley
Anoka County, MN

FIGURE C-4

BARR

Barr Footer: ArcGIS 10.6, 2018-10-12 14:05 File: I:\Projects\23\02\1062\Maps\Reports\Fridley_Part_II_WHPP_Amendment\FigC-04 Surficial Soil Permeability.mxd User: jil2



Municipal Well

Fridley DWSMA

Municipal Boundary

Single Family Detached

Manufactured Housing Park

Single Family Attached

Multifamily

Retail and Other Commercial

Office

Mixed Use Residential

Mixed Use Industrial

Mixed Use Commercial and Other

Industrial and Utility

Institutional

Park, Recreational or Preserve

Golf Course

Major Highway

Railway

Undeveloped

Water

N

0 1,000 2,000

Feet

* Land Use Data (Met Council 2010 Generalized Land Use)

2 - Municipal Well Location PCSI ID (PCSI ID refers to Table C-3)

CURRENT LAND USE
Part 2 WHPP Amendment
City of Fridley
Anoka County, MN

FIGURE C-5

BARR

Barr Footer: ArcGIS 10.6, 2018-10-15 12:27 File: I:\Projects\23\02\1062\Maps\Reports\Fridley_Part_II_WHPP_Amendment\FigC-05_Current Land Use.mxd User: jjl2

Municipal Well

Fridley DWSMA

Municipal Boundary

City of Fridley Zoning

- C-1 - Local Business
- C-2 - General Business
- C-3 - General Shopping
- C-R1 - General Shopping
- M-1 - Light Industrial
- M-2 - Heavy Industrail
- M-3 - Outdoor Intensive Heavy Industrial
- M-4 - Manufacturing Only
- P - Public Facilities
- PUD - Planned Unit Development
- R-1 - One Family Units
- R-2 - Two Family Units
- R-3 - General Multiple Units
- R-4 - Mobile Home Parks
- RR - Railroads
- ROW
- S-1 - Hyde Park Neighborhoods
- S-2 - Redevelopment District
- S-3 - Heavy Ind. Onaway Addition

* City of Fridley

2 - Municipal Well Location PCSI ID (PCSI ID refers to Table C-3)

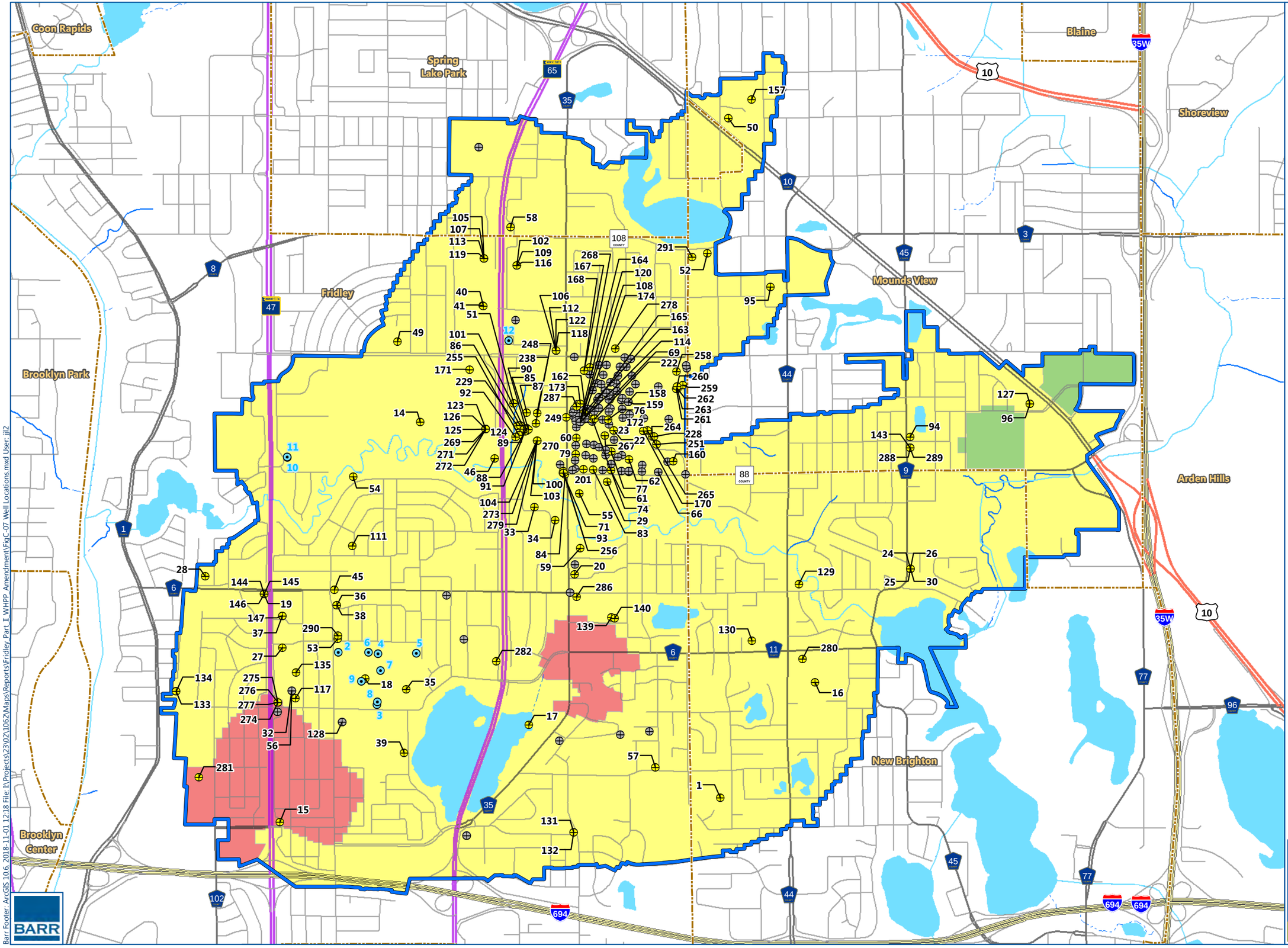
0 1,000 2,000

Feet

CURRENT ZONING - FRIDLEY
Part 2 WHPP Amendment
City of Fridley
Anoka County, MN

FIGURE C-6

BARR



WELL LOCATIONS
Part 2 WHPP Amendment
City of Fridley
Anoka County, MN

FIGURE C-7

Municipal Well

Potential Class V Well Location

Fridley DWSMA

Municipal Boundary

Aquifer Vulnerability

High

Moderate

Low

303 - Potential Class V Well Location PCSI ID (PCSI ID refers to Table C-4)

2 - Municipal Well Location PCSI ID (PCSI ID refers to Table C-3)

N

0 1,000 2,000

Feet

POTENTIAL CLASS V WELL LOCATIONS
Part 2 WHPP Amendment
City of Fridley
Anoka County, MN

FIGURE C-8

BARR

Barr Footer: ArcGIS 10.6, 2018-11-01 12:18 File: I:\Projects\23\02\1062\Maps\Reports\Fridley_Part_II_WHPP_Amendment\FigC-08 Potential Class V Well Locations.mxd User: jil2

Municipal Well
MPCA LUST Site

Tank Location

Active
Closed
Inactive
Removed
Unknown

Fridley DWSMA
Municipal Boundary

Aquifer Vulnerability

High
Moderate
Low

397 - Tank/LUST Location PCSI ID (PCSI ID refers to Table C-5)

2 - Municipal Well Location PCSI ID (PCSI ID refers to Table C-3)

N

0 1,000 2,000
Feet

STORAGE TANK LOCATIONS
Part 2 WHPP Amendment
City of Fridley
Anoka County, MN

FIGURE C-9

BARR

Barr Footer: ArcGIS 10.6, 2018-11-01 12:11 File: I:\Projects\23\02\1062\Maps\Reports\Fridley_Part_II_WHPP_Amendment\FigC-09 Storage Tank Locations.mxd User: jjl2

Municipal Well

Agricultural Chemical Storage Location

Non-agricultural Chemical Storage Location

Fridley DWSMA

Municipal Boundary

Aquifer Vulnerability

High

Moderate

Low

574 - Chemical Storage Location PCSI ID (PCSI ID refers to Table C-6)

2 - Municipal Well Location PCSI ID (PCSI ID refers to Table C-3)

0 1,000 2,000

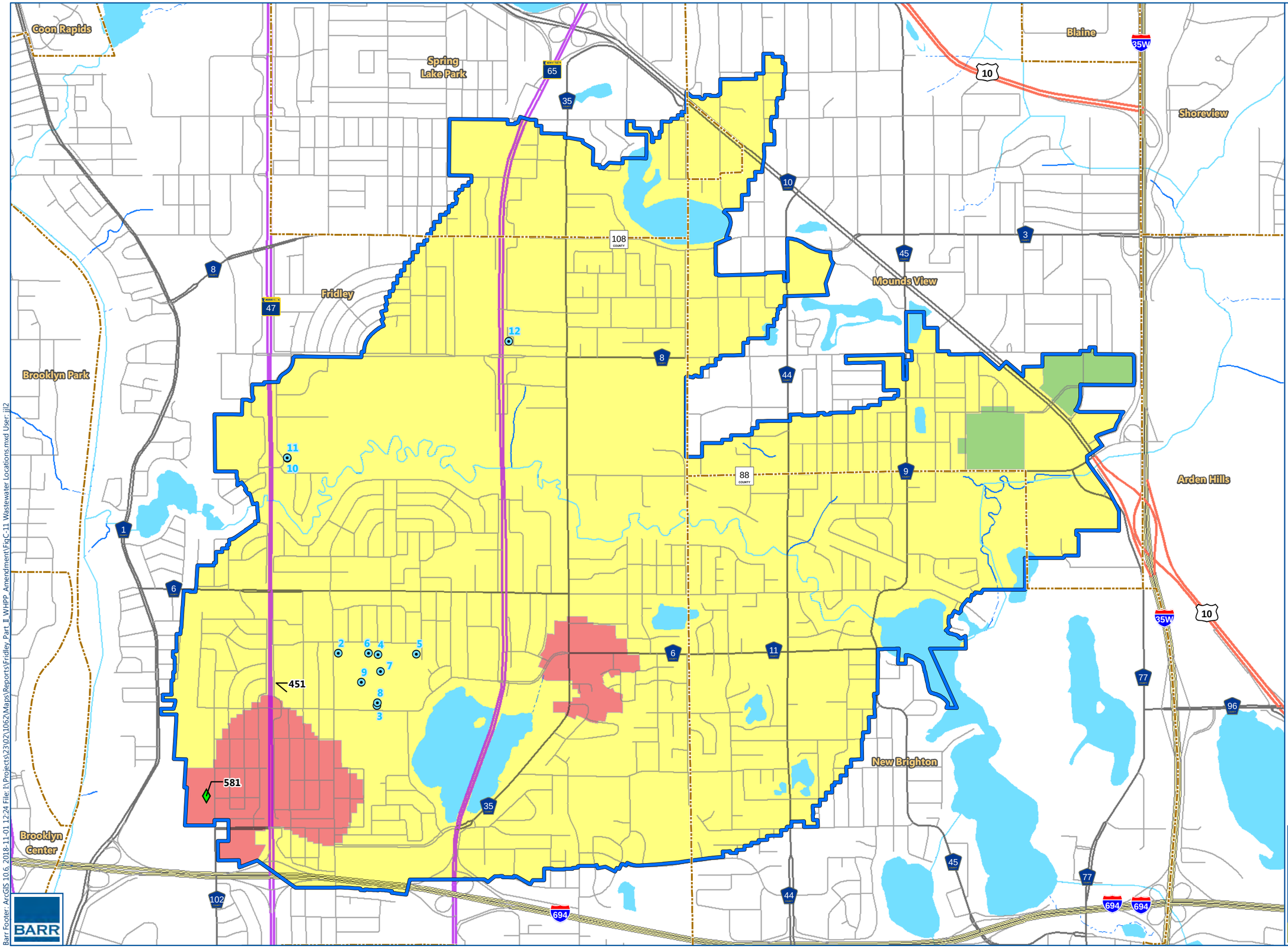
Feet

CHEMICAL STORAGE TANK LOCATIONS
Part 2 WHPP Amendment
City of Fridley
Anoka County, MN

FIGURE C-10

BARR

Barr Footer: ArcGIS 10.6, 2018-11-01 12:20 File: I:\Projects\23\02\1062\Maps\Reports\Fridley_Part_II_WHPP_Amendment\FigC-10 Chemical Storage Tank Locations.mxd User: jjl2


Coon Rapids
Spring Lake Park
Blaine
Shoreview
Fridley
Mounds View
Brooklyn Park
Arden Hills
New Brighton
Brooklyn Center
65
35
10
35W
108
88
47
8
12
11
10
451
581
2
6
4
5
9
7
8
3
Municipal Well
Wastewater Disposal Site
Fridley DWSMA
Municipal Boundary
Aquifer Vulnerability
High
Moderate
Low
581 - Wastewater Location Map ID (Map ID refers to Table C-7)
2 - Municipal Well Location PCSI ID (PCSI ID refers to Table C-3)
0 1,000 2,000
Feet
WASTEWATER LOCATIONS
Part 2 WHPP Amendment
City of Fridley
Anoka County, MN
FIGURE C-11
BARR
Barr Footer: ArcGIS 10.6, 2018-11-01 12:24 File: I:\Projects\23\02\1062\Maps\Reports\Fridley_Part_II_WHPP_Amendment\Fig C-11 Wastewater Locations.mxd User: jjl2

Municipal Well

Potential Contaminant Site Location

Fridley DWSMA

Municipal Boundary

Aquifer Vulnerability

High

Moderate

Low

590 - Potential Contaminant Site Location PCSI ID
(PCSI ID refers to Table C-8)

2 - Municipal Well Location PCSI ID
(PCSI ID refers to Table C-3)

N

0 1,000 2,000

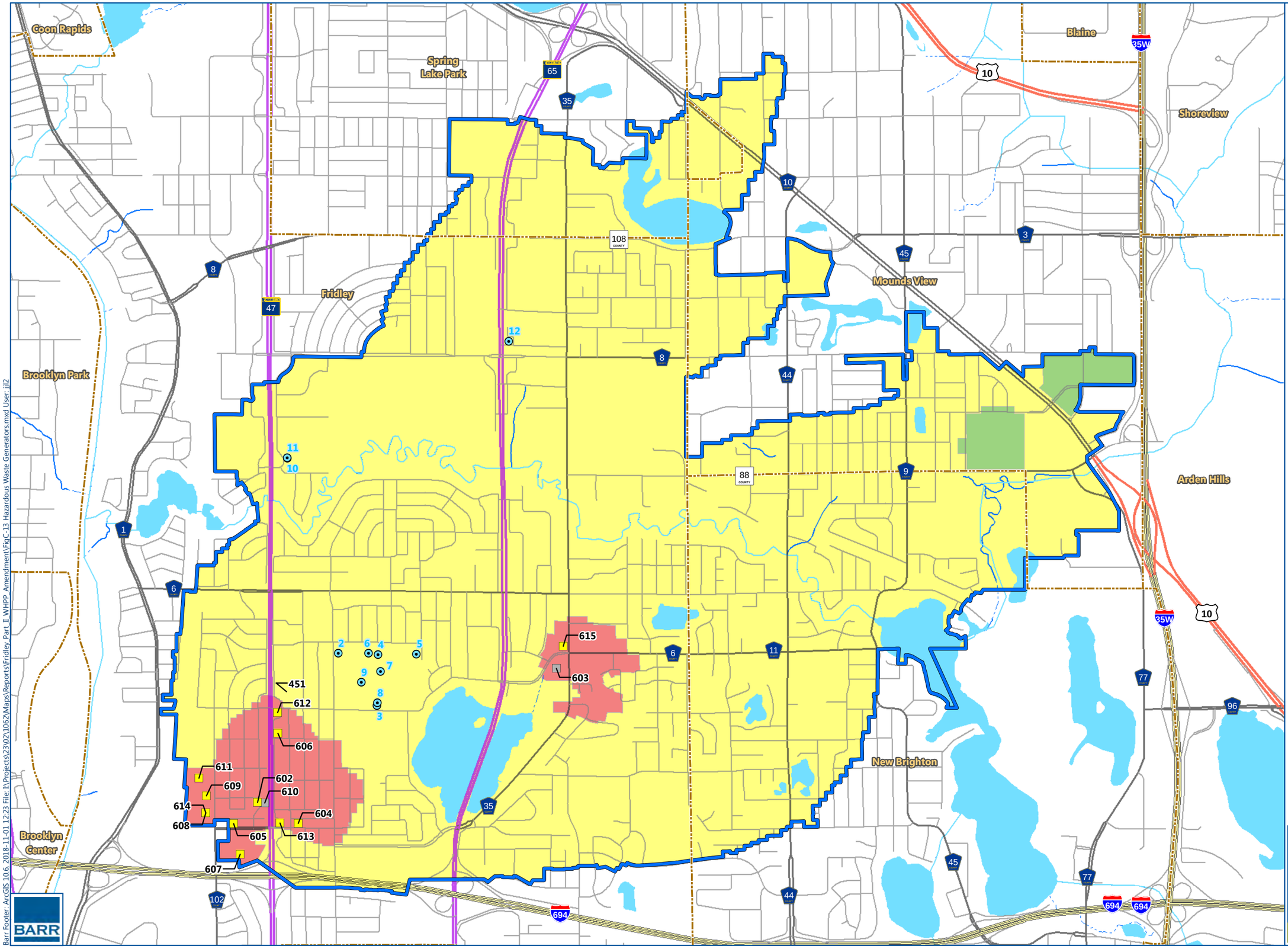
Feet

POTENTIAL CONTAMINANT SITE LOCATIONS
Part 2 WHPP Amendment
City of Fridley
Anoka County, MN

FIGURE C-12

BARR

Barr Footer: ArcGIS 10.6, 2018-11-01 12:23 File: I:\Projects\23\02\1062\Maps\Reports\Fridley_Part_II_WHPP_Amendment\Fig C-12 Potential Contaminant Source Locations.mxd User: jil2


Municipal Well
Hazardous Waste Generators by Status
Active
Inactive
Fridley DWSMA
Municipal Boundary
Aquifer Vulnerability
High
Moderate
Low
615 - Hazardous Waste Location Map ID (Map ID refers to Table C-9)
2 - Municipal Well Location PCSI ID (PCSI ID refers to Table C-3)
0 1,000 2,000
Feet
HAZARDOUS WASTE GENERATORS
Part 2 WHPP Amendment
City of Fridley
Anoka County, MN
FIGURE C-13
Coon Rapids
Spring Lake Park
Blaine
Shoreview
Fridley
Mounds View
Brooklyn Park
Brooklyn Center
Arden Hills
New Brighton
615
603
451
612
606
611
609
602
610
614
608
604
605
613
607
2
6
4
5
9
7
8
3
11
10
12
BARR
Barr Footer: ArcGIS 10.6, 2018-11-01 12:23 File: I:\Projects\23\02\1062\Maps\Reports\Fridley_Part_II_WHPP_Amendment\FigC-13 Hazardous Waste Generators.mxd User: jil2

Municipal Well
Dump Location
Spill Location
Fridley DWSMA
Municipal Boundary

Aquifer Vulnerability

High
Moderate
Low

618 - Dump Location Map ID
(Map ID refers to Table C-10)

627 - Spill Location Map ID
(Map ID refers to Table C-11)

2 - Municipal Well Location PCSI ID
(PCSI ID refers to Table C-3)

0 1,000 2,000
Feet

DUMP AND SPILL LOCATIONS
Part 2 WHPP Amendment
City of Fridley
Anoka County, MN

FIGURE C-14

Coon Rapids
Spring Lake Park
Blaine
Shoreview
Fridley
Mounds View
Brooklyn Park
Arden Hills
New Brighton
Brooklyn Center

Municipal Well

Fridley DWSMA

Municipal Boundary

Historical (1984) Land Use*

- Single Family Residential
- Multi-Family Residential
- Commercial
- Industrial
- Public/Semi-Public
- Parks & Recreation
- Vacant/Agricultural
- Major Four Lane Highways
- Open Water Bodies
- Industrial Parks not Developed

* Historical Land Use Data (Metropolitan Council)

2 - Municipal Well Location PCSI ID (PCSI ID refers to Table C-3)

N

0 1,000 2,000

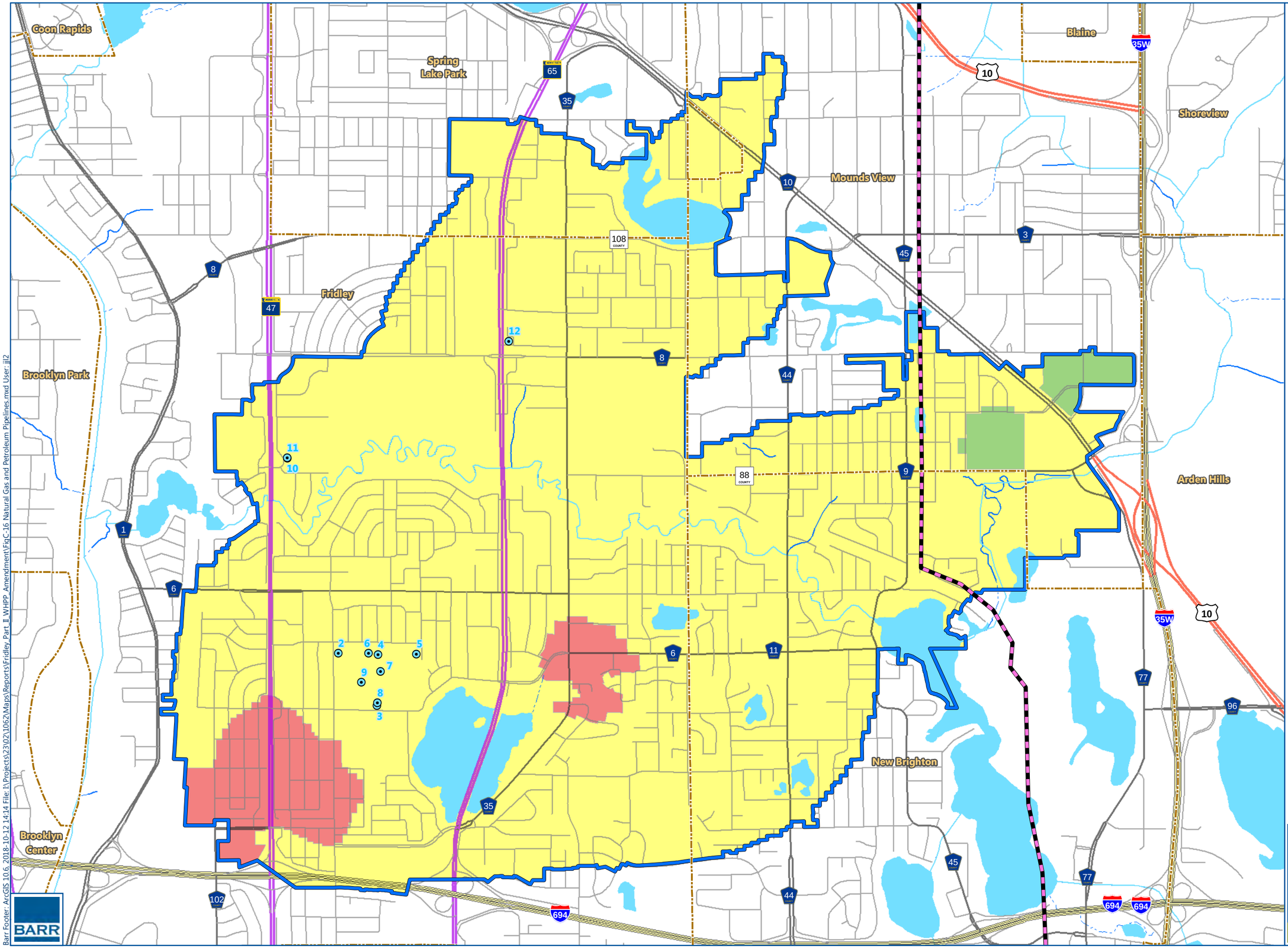
Feet

HISTORICAL LAND USE
Part 2 WHPP Amendment
City of Fridley
Anoka County, MN

FIGURE C-15

BARR

Barr Footer: ArcGIS 10.6, 2018-10-12 14:14 File: I:\Projects\23\02\1062\Maps\Reports\Fridley_Part_II_WHPP_Amendment\Fig C-15 Historical Land Use.mxd User: jjl2



NATURAL GAS AND PETROLEUM PIPELINES
Part 2 WHPP Amendment
City of Fridley
Anoka County, MN

FIGURE C-16

BARR

Barr Footer: ArcGIS 10.6, 2018-10-12 14:14 File: I:\Projects\23\02\1062\Maps\Reports\Fridley_Part_II_WHPP_Amendment\FigC-16 Natural Gas and Petroleum Pipelines.mxd User: jil2

Municipal Well

Sanitary Manhole*

Sanitary Line*

Fridley DWSMA

Municipal Boundary

Aquifer Vulnerability

High

Moderate

Low

* City of Fridley

2 - Municipal Well Location PCSI ID (PCSI ID refers to Table C-3)

0 1,000 2,000

Feet

FRIDLEY SANITARY SEWER NETWORK
Part 2 WHPP Amendment
City of Fridley
Anoka County, MN

FIGURE C-17

BARR

Barr Footer: ArcGIS 10.6, 2018-10-16 19:02 File: I:\Projects\23\02\1062\Maps\Reports\Fridley_Part_II_WHPP_Amendment\FigC-17 Fridley Sanitary Sewer Network.mxd User: jjl2

Coon Rapids
Spring Lake Park
Blaine
Shoreview
Mounds View
Fridley
Brooklyn Park
Arden Hills
New Brighton
Brooklyn Center

Municipal Well
Stormwater Inlet
Stormwater Outfall
Stormwater Pipe
Fridley DWSMA
Municipal Boundary

Aquifer Vulnerability

High
Moderate
Low

* City of Fridley

2 - Municipal Well Location PCSI ID (PCSI ID refers to Table C-3)

0 1,000 2,000
Feet

FRIDLEY STORM SEWER NETWORK
Part 2 WHPP Amendment
City of Fridley
Anoka County, MN

FIGURE C-18

BARR

Barr Footer: ArcGIS 10.6, 2018-10-16 19:12 File: I:\Projects\23\02\1062\Maps\Reports\Fridley_Part_II_WHPP_Amendment\FigC-18 Fridley Storm Sewer Network.mxd User: jil2

Attachment C-1

Precipitation Data

Minnesota Climatology Working Group

Annual Reports of Monthly Precipitation Totals

This application creates annual summaries of precipitation data gathered by volunteer-based observation networks throughout Minnesota. The data presented are monthly totals and the data are grouped by county. Observer locations are described using township, range, and section numbers.

Choose a county and year, then click on **"Annual report"**.

ANOKA 2013 Annual report

2013 ANOKA Monthly Precipitation, Totals

cc	ttt	rr	ss	oooooooo	nnnn	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	AGR	HYD	ANN	GRO
2	30N	24W	3	RUSCHY D	DNR	.66	1.05	2.18	4.28	4.31	7.66	3.68	.80	1.34	4.41	.75	1.41	29.01	29.84	32.53	17.79
2	30N	24W	14		SWCD	.69	1.20	2.03	4.40	4.67	7.46	3.55	1.00	1.20	3.91	.53	1.63	30.06	30.73	32.27	17.88
2	30N	24W	14		BYRG	.69	1.12	2.03	3.78	5.00	7.43	3.61	1.05	1.33	4.06	.44	1.60	29.78	30.49	32.14	18.42
2	30N	24W	25	RANTA SC	MOSQ				2.44	5.85	7.50	2.83	1.05	1.34	4.05						18.57
2	31N	22W	29	LINO LAK	MOSQ				1.65	4.60	6.46	2.47	.62	1.63	4.42						15.78
2	31N	23W	21	BLAINE	MOSQ				3.54	5.08	4.90	3.24	.98	1.46	4.35						15.66
2	31N	23W	22		BYRG	1.18	1.50	2.30	4.13	4.70	5.30										
2	31N	24W	7	LUBERDA	MOSQ				2.94	4.00	5.65	4.12	.77	1.70	4.24						16.24
2	31N	24W	24	MADETZKE	MOSQ				3.11	4.41	5.97	3.49	.91	1.45	4.77						16.23
2	32N	22W	14		BYRG	.51	1.16	2.11	4.37	3.36	5.87	3.86	.51	1.39	3.57	.59	1.63	26.08	26.89	28.93	14.99
2	32N	23W	16	JOHNSONB	MOSQ				3.16	4.95	5.51	3.27	.67	1.66	3.62						16.06
2	32N	23W	18		SWCD			1.11	3.04	4.92	4.98	2.89	1.03	1.48	4.40						15.30
2	32N	23W	20		SWCD				5.70	4.95	5.06	3.63	1.16	1.94	4.41	.63					16.74
2	32N	23W	21	KIRKMANM	MOSQ					4.51	5.46	3.15	1.02	1.59	3.45						15.73
2	32N	24W	4	SPEISER	MOSQ				1.60	4.18	3.75	3.11	.37	2.04	4.70						13.45
2	32N	24W	23	ANDOVER	NWS	.93	1.28	1.75	3.20	3.54	4.27	2.29	.55	2.75	1.96	.38	1.96			24.86	13.40
2	32N	24W	26		SWCD	.70	1.14	2.17	3.16	4.29	5.11	2.77	1.04	1.53	3.82	.66	1.77	25.78	26.78	28.16	14.74
2	32N	24W	35	ANOKA	MOSQ				2.94	4.62	2.99	2.72	.72	1.54	3.63						12.59
2	32N	25W	6		SWCD				2.58	4.30	5.95	4.89	.65	2.62	4.25	.94					18.41
2	33N	22W	7		SWCD				2.46	4.93	4.66	1.96	.97	1.79	2.51						14.31
2	33N	23W	4	EAST BET	MOSQ				3.42	4.05	5.24	3.48	.51	2.52	3.52						15.80
2	33N	23W	18		SWCD				3.31	4.51	5.11	2.92	1.00	2.43	3.79						15.97
2	33N	23W	25		SWCD	.69	.72	1.93	2.39	4.10	4.57	3.50	.57	1.74	3.12	.70	1.31	23.39	24.73	25.34	14.48
2	33N	23W	35		SWCD				3.01	4.02	4.47	2.94	.89	1.64	3.40						13.96
2	33N	24W	16		SWCD				1.90	4.69	5.35	3.77	.56	2.35	3.43						16.72
2	33N	24W	32		SWCD	.62	1.29	2.55	4.32	3.40	6.18	3.65	.61	1.65	3.48	.75	2.40	27.88	29.16	30.90	15.49
2	33N	24W	32		SWCD		1.37	3.50	2.24	3.13	6.12	2.31	.35	1.12	1.70	.61	2.06				13.03
2	33N	25W	36		SWCD				2.71	4.59	5.42	4.19	1.06	1.86	3.73	.92					17.12
2	34N	23W	36		BYRG	.29	1.25	2.56	4.28	4.60	4.87	3.73	.54	2.78	3.59	1.06	2.17	27.15	29.56	31.72	16.52
2	34N	24W	32	ST FRANC	NWS	.79	1.38	3.09	4.19		7.71			2.80	4.54						
2	34N	24W	32	STFRANHS	MOSQ				2.80	5.42	5.44	3.31	.53	1.99	4.01						16.69
county averages						.70	1.21	2.25	3.24	4.46	5.56	3.29	.78	1.82	3.76	.69	1.79	27.39	28.52	29.65	15.80

# of obs	11	12	13	30	30	31	29	29	30	30	13	10	8	8	9	29

- Data as received and digitized on or before 5/18/2017. **All values are in inches**.
- 'cc ttt rr ss' is county-township-range-section number, 'oooooooo' is community name (where applicable), 'nnnn' is network type.
- 'AGR', 'HYD', and 'ANN' are 12 month precipitation totals starting in Sep 2012, Oct 2012, and Jan 2013, respectively. 'GRO' is growing season (May 2013 thru Sep 2013) precipitation total.
- '*' denotes a partial monthly record, 'e' denotes that value is wholly or partially estimated.
- Prepared by: State Climatology Office - DNR Waters, phone: 651-296-4214, web: http://climate.umn.edu

For some purposes, **daily** precipitation data are required. The precipitation data archive allows a user to interactively retrieve daily precipitation data from the site nearest to a target.

Obtaining Data for Legal Purposes

Last modified: April 10, 2008

Minnesota Climatology Working Group

Annual Reports of Monthly Precipitation Totals

This application creates annual summaries of precipitation data gathered by volunteer-based observation networks throughout Minnesota. The data presented are monthly totals and the data are grouped by county. Observer locations are described using township, range, and section numbers.

Choose a county and year, then click on **"Annual report"**.

ANOKA 2014 Annual report

2014 ANOKA Monthly Precipitation, Totals

cc	ttt	rr	ss	oooooooo	nnnn	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	AGR	HYD	ANN	GRO
2	30N	24W	3	RUSCHY D	DNR	1.19	1.26	.91	7.82	3.78	9.57	3.17	4.12	2.36	1.08	1.33	.98	39.73	40.75	37.57	23.00
2	30N	24W	14		SWCD	1.37	1.51	.79	7.43	5.08	8.16	2.52	4.23	1.55	1.16	1.15	1.11	38.36	38.71	36.06	21.54
2	30N	24W	14		BYRG					5.02	8.02	2.76	4.39	1.60	*		.95				21.79
2	30N	24W	25	RANTA SC	MOSQ				5.27	4.52	9.50										
2	31N	22W	29	LINO LAK	MOSQ				5.32	3.84	11.39										
2	31N	23W	21	BLAINE	MOSQ				6.48	5.01	9.57										
2	31N	23W	22		BYRG					6.22	8.39		6.73	1.93	.97	1.43	1.13				
2	31N	24W	7	LUBERDA	MOSQ				6.55	4.80	9.91										
2	31N	24W	24	MADETZKE	MOSQ				6.42	5.01	11.29										
2	32N	22W	14		BYRG	1.08	1.62	.88	5.93	4.38	10.80	2.32	5.79	2.85	1.14	1.51	1.01	39.98	41.44	39.31	26.14
2	32N	23W	16	JOHNSONB	MOSQ				5.69	4.11	12.16										
2	32N	23W	18		SWCD			.46	8.70	8.22	8.26	1.98	5.23	1.78	1.21						25.47
2	32N	23W	20		SWCD				6.30	4.54	14.31	2.25	3.68	4.63	1.43						29.41
2	32N	23W	21	KIRKMANM	MOSQ				7.90	4.69	11.45										
2	32N	24W	4	SPEISER	MOSQ				4.83	4.17	10.47										
2	32N	24W	23	ANDOVER	NWS	.55	.92	.75	7.48	3.73	9.16	1.33	3.66	1.74	.59	1.65	.84	34.63	33.62	32.40	19.62
2	32N	24W	26		SWCD	1.23	1.13	.92	6.96	4.48	11.69	1.72	5.45	1.86	.95	1.58	1.03	41.36	41.69	39.00	25.20
2	32N	24W	35	ANOKA	MOSQ				6.70	4.75	14.56										
2	32N	25W	6		SWCD				6.29	7.29	8.39	1.63	4.35	1.03	.79						22.69
2	33N	22W	7		SWCD				5.50	3.47	9.10	1.02	4.99	1.15	1.01						19.73
2	33N	23W	4	EAST BET	MOSQ				5.64	3.89	10.34										
2	33N	23W	18		SWCD				6.12	4.90	11.32	2.20	4.70	1.44	1.02						24.56
2	33N	23W	25		SWCD	1.14	1.28	.69	4.78	6.91	5.82	1.59	7.20	1.25	1.15	.95	1.09	36.28	35.79	33.85	22.77
2	33N	23W	35		SWCD				7.42	5.06	9.13	1.75									
2	33N	24W	16		SWCD					3.94	10.24	2.15	5.52	2.97							24.82
2	33N	24W	32		SWCD	1.45	1.91	.53	7.70	7.81	10.70	1.95	6.36	1.15	.61			46.69	46.19		27.97
2	33N	25W	36		SWCD				7.11	4.62	9.40	1.58	5.40	1.71	.94						22.71
2	34N	23W	36		BYRG	1.23	1.29	.75	8.38	5.18	9.51	1.28	4.85	2.42	.94	2.15	1.24	42.07	41.71	39.22	23.24
2	34N	24W	32	STFRANHS	MOSQ				4.89	4.15	9.99										
county averages						1.16	1.37	.74	6.52	4.95	10.09	1.95	5.10	1.97	1.00	1.47	1.04	39.89	39.99	36.77	23.79
# of obs						8	8	9	26	29	29	17	17	17	15	8	9	8	8	7	16

- Data as received and digitized on or before 5/18/2017. **All values are in inches**.
- 'cc ttt rr ss' is county-township-range-section number, 'oooooooo' is community name (where applicable), 'nnnn' is network type.
- 'AGR', 'HYD', and 'ANN' are 12 month precipitation totals starting in Sep 2013, Oct 2013, and Jan 2014, respectively. 'GRO' is growing season (May 2014 thru Sep 2014) precipitation total.
- '*' denotes a partial monthly record, 'e' denotes that value is wholly or partially estimated.
- Prepared by: State Climatology Office - DNR Waters, phone: 651-296-4214, web: http://climate.umn.edu

For some purposes, **daily** precipitation data are required. The precipitation data archive allows a user to interactively retrieve daily precipitation data from the site nearest to a target.

Obtaining Data for Legal Purposes

Last modified: April 10, 2008

Minnesota Climatology Working Group

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

Annual Reports of Monthly Precipitation Totals

This application creates annual summaries of precipitation data gathered by volunteer-based observation networks throughout Minnesota. The data presented are monthly totals and the data are grouped by county. Observer locations are described using township, range, and section numbers.

Choose a county and year, then click on **"Annual report"**.

ANOKA 2015 Annual report

2015 ANOKA Monthly Precipitation, Totals

cc ttt rr ss	oooooooo	nnnn	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	AGR	HYD	ANN	GRO
2 30N 24W 3	RUSCHY D	DNR	.25	.27	.58	1.68	5.59	4.08	7.40	3.84	4.43	2.77	3.76	1.91	29.44	31.51	36.56	25.34
2 30N 24W 14		SWCD	.30	.36	.73	1.88	5.23	3.99	7.13	3.97	4.79	2.75	3.98	1.97	28.56	31.80	37.08	25.11
2 30N 24W 14		BYRG	.23	.32	.72	1.90	5.49	3.82	7.14	4.20	4.56	2.32	3.95	1.55			36.20	25.21
2 31N 23W 22		BYRG	.32	.38	.52	2.10	6.24	4.35	6.35	3.96	3.64	3.46	3.99	1.47	29.68	31.39	36.78	24.54
2 32N 22W 14		BYRG	.24	.23	.59	2.16	5.69	4.40	7.62	5.26	3.43	3.12	3.72	1.56	32.70	33.28	38.02	26.40
2 32N 23W 18		SWCD			.78	2.17	5.88	3.71	7.11	4.34	3.05	3.29	3.87					24.09
2 32N 23W 20		SWCD				1.93	5.27	3.86	6.10	5.00	3.23	3.50	4.60					23.46
2 32N 24W 23	ANDOVER	NWS	.13	.30	.51	1.34	4.14	2.80	7.49	4.49	1.61	3.25	3.52	1.16	26.02	25.89	30.74	20.53
2 32N 24W 26		SWCD	.31	.30	.64	1.96	4.59	3.30	6.94	4.14	2.39	3.25	4.23	1.82	27.60	28.13	33.87	21.36
2 32N 25W 6		SWCD				1.91	5.44	*	6.64	3.61	3.82	4.15	3.74					
2 33N 22W 7		SWCD				1.79	4.77	3.07	6.02	4.04	2.91	2.75						20.81
2 33N 23W 18		SWCD				2.85	5.12	3.94	6.48	3.65	3.14	3.52						22.33
2 33N 23W 25		SWCD	.24	.31	.50	1.96	5.03	3.07	5.96	2.81	2.45	3.58	3.62	1.02	24.32	25.52	30.55	19.32
2 33N 24W 16		SWCD					3.90	3.10	5.48	2.12	3.68							18.28
2 33N 24W 32		SWCD				.52	5.01											
2 33N 25W 36		SWCD				2.72	4.90	4.12	6.39	3.69	3.26	3.70	3.15					22.36
2 34N 23W 36		BYRG	.20	.41	.79	3.04	5.07	4.38	5.36	4.55	3.30	3.71	3.11	1.89	30.55	31.43	35.81	22.66
2 34N 24W 32	ST FRANC	NWS							*									
county averages			.25	.32	.64	1.99	5.14	3.73	6.60	3.98	3.36	3.27	3.79	1.59	28.61	29.87	35.07	22.79
# of obs			9	9	10	16	17	15	16	16	16	15	13	9	8	8	9	15

- Data as received and digitized on or before 5/18/2017. **All values are in inches**.
- 'cc ttt rr ss' is county-township-range-section number, 'oooooooo' is community name (where applicable), 'nnnn' is network type.
- 'AGR', 'HYD', and 'ANN' are 12 month precipitation totals starting in Sep 2014, Oct 2014, and Jan 2015, respectively. 'GRO' is growing season (May 2015 thru Sep 2015) precipitation total.
- '*' denotes a partial monthly record, 'e' denotes that value is wholly or partially estimated.
- Prepared by: State Climatology Office - DNR Waters, phone: 651-296-4214, web: http://climate.umn.edu

For some purposes, **daily** precipitation data are required. The precipitation data archive allows a user to interactively retrieve daily precipitation data from the site nearest to a target.

Obtaining Data for Legal Purposes

Last modified: April 10, 2008

Minnesota Climatology Working Group

Annual Reports of Monthly Precipitation Totals

This application creates annual summaries of precipitation data gathered by volunteer-based observation networks throughout Minnesota. The data presented are monthly totals and the data are grouped by county. Observer locations are described using township, range, and section numbers.

Choose a county and year, then click on **"Annual report"**.

ANOKA 2016 Annual report

2016 ANOKA Monthly Precipitation, Totals

cc ttt rr ss	oooooooo	nnnn	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	AGR	HYD	ANN	GRO
2 30N 24W 3	RUSCHY D	DNR	.29	.58	1.62	3.26	3.00	3.71	4.42	7.77	10.73	3.23	3.08	2.28	37.52	43.82	43.97	29.63
2 30N 24W 14		SWCD	.31	.92	1.96	3.73	2.69	2.84	5.02	9.75	8.45	3.08	3.50	1.98	40.71	44.37	44.23	28.75
2 30N 24W 14		BYRG	.28	.50	1.54	4.28	3.14	3.29	4.88	9.66	9.58	3.28	3.39	1.88	39.95	44.97	45.70	30.55
2 30N 24W 15	BENNEK D	MOSQ			3.32		4.74			7.79	7.67							
2 31N 23W 22		BYRG	.41	1.17					4.68	6.81	6.34	2.89	2.83	2.32				
2 32N 22W 14		BYRG	.31	.91	2.11	2.43	2.42	3.50	4.60	7.89	5.01	2.69	2.32	1.43	36.00	37.58	35.62	23.42
2 32N 23W 18		SWCD			2.18	3.11	3.02	4.53	5.39	7.71	5.80	3.37	*					26.45
2 32N 23W 20		SWCD				2.96	3.53	4.73	7.13	8.85	5.75	3.66	2.94					29.99
2 32N 24W 23	ANDOVER	NWS	.20	1.00	1.54	2.29	3.39	3.88	6.59	5.13	3.48	2.26	3.40	1.73	33.56	35.43	34.89	22.47
2 32N 24W 26		SWCD	.29	.68	1.89	2.70	3.87	3.78	6.63	5.97	4.74	3.75	3.24	1.77	37.50	39.85	39.31	24.99
2 32N 25W 6		SWCD				2.85	5.56	2.76	6.77	6.23	4.88	2.87	*					26.20
2 33N 22W 7		SWCD				1.41	3.74	3.29	4.67	5.34	5.15	2.92						22.19
2 33N 23W 18		SWCD				2.21	2.57	3.74	6.05	5.53	6.08	3.77						23.97
2 33N 23W 25		SWCD	.40	.89	1.87	2.07	3.21	4.02	5.57	5.61	5.21	3.50	3.04	1.54	34.31	37.07	36.93	23.62
2 33N 24W 16		SWCD						2.79										
2 33N 24W 16		SWCD					8.05		5.05	2.41	5.50	3.15						
2 33N 24W 32		SWCD				3.89												
2 33N 25W 14		SWCD									6.54	2.89						
2 33N 25W 36		SWCD				3.05	3.81	2.75	*	6.25	5.56	2.55	1.05					
2 34N 23W 36		BYRG	.56		2.97	2.10	2.95	3.79	5.20	5.16	5.15	3.74	3.80	1.84				22.25
county averages			.34	.83	2.10	2.82	3.73	3.56	5.51	6.70	6.20	3.15	2.96	1.86	37.08	40.44	40.09	25.73
# of obs			9	8	10	15	16	15	15	17	18	17	11	9	7	7	7	13

- Data as received and digitized on or before 5/18/2017. **All values are in inches**.
- 'cc ttt rr ss' is county-township-range-section number, 'oooooooo' is community name (where applicable), 'nnnn' is network type.
- 'AGR', 'HYD', and 'ANN' are 12 month precipitation totals starting in Sep 2015, Oct 2015, and Jan 2016, respectively. 'GRO' is growing season (May 2016 thru Sep 2016) precipitation total.
- '*' denotes a partial monthly record, 'e' denotes that value is wholly or partially estimated.
- Prepared by: State Climatology Office - DNR Waters, phone: 651-296-4214, web: http://climate.umn.edu

For some purposes, **daily** precipitation data are required. The precipitation data archive allows a user to interactively retrieve daily precipitation data from the site nearest to a target.

Obtaining Data for Legal Purposes

Last modified: April 10, 2008

Minnesota State Climatology Office

Annual Reports of Monthly Precipitation Totals

This application creates annual summaries of precipitation data gathered by volunteer-based observation networks throughout Minnesota. The data presented are monthly totals and the data are grouped by county. Observer locations are described using township, range, and section numbers.

Choose a county and year, then click on **"Annual report"**.

ANOKA 2017 Annual report

2017 ANOKA Monthly Precipitation, Totals

cc	ttt	rr	ss	oooooooo	nnnn	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	AGR	HYD	ANN	GRO
2	30N	24W	3	RUSCHY D	DNR	.84	.73	.77	3.04	6.89	3.64	2.52	6.38	1.75	5.45	.45	.84	44.13	35.15	33.30	21.18
2	30N	24W	14		SWCD	.80	.70	.65	3.96	6.16	3.26	2.40	5.83	1.30	5.66	.52	.87	40.77	33.62	32.11	18.95
2	30N	24W	14		BYRG	.75	.68	.62	2.52	7.11	3.51	2.45	6.01	1.43	6.07	.51	.70	41.78	33.63	32.36	20.51
2	31N	23W	22		BYRG	.79	.63	.68	3.98	6.46											
2	32N	22W	14		BYRG	.83	.74	.51	3.09	6.28	5.10	2.24	5.47	1.87	5.40	.55	.67	35.71	32.57	32.75	20.96
2	32N	23W	18		SWCD			.99	4.39	7.46	4.44	2.17	6.36	2.08	4.32						22.51
2	32N	23W	20		SWCD		.94	.50	4.49	6.77	4.46	3.14	5.72	1.61							21.70
2	32N	24W	23	ANDOVER	NWS	.56	.47	.50	3.49	3.89	3.29	2.58	5.43	1.68	4.24	.74	.54	31.08	29.28	27.41	16.87
2	32N	24W	26		SWCD	.84	.75	.65	3.39	5.99	3.57	2.65	5.96	1.85	4.12	.56	.76	37.30	34.41	31.09	20.02
2	32N	25W	6		SWCD				3.96	4.78	3.75	3.47	3.42	1.33	7.18						16.75
2	32N	25W	26		SWCD						*	2.81	4.68	1.76							
2	33N	22W	7		SWCD				2.24	3.84	2.90	1.50	4.33	1.59	3.45						14.16
2	33N	23W	18		SWCD				3.52	5.90	3.70		5.01	1.88	5.25						
2	33N	23W	25		SWCD	.61	.69	.31	2.75	4.96	3.78	1.54	4.59	1.89	3.45	.67	.53	32.52	29.20	25.77	16.76
2	33N	24W	16		SWCD						*										
2	33N	25W	14		SWCD							2.45	5.00	1.59	6.44						
2	33N	25W	36		SWCD				3.38	3.55	4.84	3.06	5.64	1.38	4.54						18.47
2	34N	23W	36		BYRG	.96	.79	.71	3.74	6.37	3.29	2.64	5.37	2.03	5.24	.64	.74	38.40	35.28	32.52	19.70
2	34N	23W	36		SWCD							2.17	4.36	1.67	4.81	.63	.66				
county averages						.78	.71	.63	3.46	5.76	3.82	2.49	5.27	1.69	5.04	.59	.70	37.71	32.89	30.91	19.12
# of obs						9	10	11	15	15	14	16	17	17	15	9	9	8	8	8	13

- Data as received and digitized on or before 9/26/2018. **All values are in inches**.
- 'cc ttt rr ss' is county-township-range-section number, 'oooooooo' is community name (where applicable), 'nnnn' is network type.
- 'AGR', 'HYD', and 'ANN' are 12 month precipitation totals starting in Sep 2016, Oct 2016, and Jan 2017, respectively. 'GRO' is growing season (May 2017 thru Sep 2017) precipitation total.
- '*' denotes a partial monthly record, 'e' denotes that value is wholly or partially estimated.
- Prepared by: State Climatology Office - DNR Waters, phone: 651-296-4214, web: http://climate.umn.edu

For some purposes, **daily** precipitation data are required. The precipitation data archive allows a user to interactively retrieve daily precipitation data from the site nearest to a target.

Obtaining Data for Legal Purposes

Last modified: April 10, 2008

Minnesota State Climatology Office

Annual Reports of Monthly Precipitation Totals

This application creates annual summaries of precipitation data gathered by volunteer-based observation networks throughout Minnesota. The data presented are monthly totals and the data are grouped by county. Observer locations are described using township, range, and section numbers.

Choose a county and year, then click on **"Annual report"**.

RAMSEY 2013 Annual report

2013 RAMSEY Monthly Precipitation, Totals

cc	ttt	rr	ss	oooooooo	nnnn	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	AGR	HYD	ANN	GRO
62	28N	22W	1		SWCD	.65	1.13	2.06	4.32	6.56	6.58	1.83	1.12	1.77	2.87	.42	2.19	28.56	29.89	31.50	17.86
62	28N	22W	9	STPAULAP	NWS				3.33	5.75	5.28	1.99	1.56	1.50	2.82	*					16.08
62	28N	23W	2		SWCD	.88	1.43	1.85	5.67	6.53	6.49	2.68	2.35	1.49	3.42	.60	1.53	32.12	33.16	34.92	19.54
62	28N	23W	3		SWCD	.40	1.56	2.33	3.63	7.10		1.70	1.30	.95	3.45	.40	1.46				
62	28N	23W	4		SWCD	.39			2.59	7.03	6.78	3.10	2.18	1.42	3.93	.57	1.57				20.51
62	28N	23W	9		SWCD	1.07	1.52	2.13	5.51	7.56	7.02		2.38	1.49	3.86	.62	1.47				
62	28N	23W	10		SWCD	.90	1.53	2.14	6.02	7.13	5.84	2.25	2.02	1.23	3.33	.54	1.45	31.84	32.66	34.38	18.47
62	28N	23W	10	ST PAUL3	NWS	.90	1.53	2.14	5.30	6.45	5.84	2.25	2.02	1.23	3.33	.54	1.45	30.44	31.26	32.98	17.79
62	28N	23W	16		SWCD	1.01	1.75	2.36	5.60	6.41	6.09	2.45	2.32	1.62	3.35	.70					18.89
62	29N	22W	1		SWCD				4.27	4.78	8.96	2.21	.78	1.12	4.06						17.85
62	29N	22W	1		SWCD	.97	1.68	2.49	5.65	5.99	8.33	2.40	.73	1.41	3.91	.68	1.93	33.15	33.98	36.17	18.86
62	29N	22W	2		SWCD	.93	1.43	2.26	5.57	6.03	8.93	2.54	.82	1.39	3.90	.65	1.62	33.42	34.21	36.07	19.71
62	29N	22W	2		BYRG	.94	1.40	2.40	4.97	6.37	8.84	2.79	.88	1.42	4.09	.65	1.67	33.38	34.16	36.42	20.30
62	29N	22W	3		BYRG					6.33	8.59	2.70	.79	1.43							19.84
62	29N	22W	6		SWCD	.36	1.25	1.85	4.79	6.60	8.51	1.60	1.50	1.38	2.87	.52	1.29	30.63	31.51	32.52	19.59
62	29N	22W	9		BYRG	.78	1.22	2.28	5.28	5.96	9.49	2.72	.92	1.35	4.15	.55	1.55	33.14	33.98	36.25	20.44
62	29N	22W	10		SWCD	.92	1.16	1.89	5.34	6.17	8.48	2.70	1.09	1.27	3.49	.66	1.65			34.82	19.71
62	29N	22W	12		SWCD					5.51	7.84										
62	29N	22W	17		SWCD	.88	1.28	2.15	5.20	6.00	8.67	2.73	1.35	1.20	3.79	.43	1.49	32.91	33.55	35.17	19.95
62	29N	22W	22		SWCD	.85	1.53	2.32	5.45	6.35	9.41	2.72	1.49	1.56	4.26	.72	1.76	34.87	35.90	38.42	21.53
62	29N	22W	22		SWCD	.76	1.48	2.25	4.72	6.34	9.85	2.76	1.68	1.51	4.11	.72	1.58	34.54	35.51	37.76	22.14
62	29N	22W	25		SWCD	.70	1.40	2.00	4.54	5.08	2.24	2.89	.68	.97	3.56	*	1.59	23.33	23.85		11.86
62	29N	22W	26		SWCD					6.30	8.27	2.40	1.63	1.72	3.63	.68					20.32
62	29N	22W	34		SWCD	.93	1.48	2.43	5.29	6.84	8.19	2.51	1.62	1.71	3.65	.52	1.60	33.80	34.97	36.77	20.87
62	29N	22W	35		SWCD	.87	.93	1.53	5.03	6.24	6.60	1.73	1.48	1.33	3.03	.61	1.49	29.47	30.24	30.87	17.38
62	29N	23W	1		SWCD					5.98	7.07	2.60	.84	1.39	4.09	.28	.71				17.88
62	29N	23W	1		SWCD								.70	1.35							
62	29N	23W	1		SWCD	.35	1.56	2.45	4.77	6.60	7.32	2.44	.99	1.36	3.99	.48	1.15	30.90	31.77	33.46	18.71
62	29N	23W	4	MANWEILE	MOSQ				3.84	6.48	8.39	2.65	1.00	1.35	4.28		1.54				19.87
62	29N	23W	4		SWCD	.83	1.37	1.79	4.79	6.80		2.47	1.01	1.39	4.14	.55	1.69				
62	29N	23W	5		BYRG		1.12	1.91	4.96	5.32	6.17	2.69	1.02	1.10	4.17	.50	1.32				16.30
62	29N	23W	10		SWCD	.82	1.39	2.21	5.08	7.25	8.15	2.64	1.32	1.40	4.44	.59	1.46	33.53	34.29	36.75	20.76
62	29N	23W	15		SWCD	.81	1.35	1.95	4.86	6.68	7.88	2.85	1.48	1.34	4.03	.55	1.45	32.11	32.97	35.23	20.23

62	29N	23W	17		SWCD	1.06	1.30	1.66		6.83	6.40	2.31	1.68	1.08	3.76	.49	1.09				18.30
62	29N	23W	21	UOFM ST	NWS	.76	1.31	2.01	5.10	7.21	7.31	3.18	1.48	1.30	4.35	.48	1.39	32.92	33.78	35.88	20.48
62	29N	23W	22		SWCD	.78	1.39	3.03	4.51	7.34	6.42	3.82	1.78	1.31	3.56	.54	1.62	33.34	34.17	36.10	20.67
62	30N	22W	3		SWCD	.37	.98	1.92													
62	30N	22W	3		BYRG				4.11	5.31	7.58	2.49	.73	1.32	3.89						17.43
62	30N	22W	6		SWCD	.85	1.39	2.49	5.05	4.74	7.04	3.35	.84	1.22	3.54	.89	1.02		30.71	32.42	17.19
62	30N	22W	12		SWCD	.37	1.61	1.32	4.93	5.71	7.97	2.41	.65	1.37	3.75	.66	1.75	29.81	30.70	32.50	18.11
62	30N	22W	13		SWCD	.80	1.41	2.53	4.84	5.23	7.90	2.11	*	1.07	3.80	.58	1.70				
62	30N	22W	17		SWCD				4.93	6.27	7.42	2.86	.81	1.11	3.84						18.47
62	30N	22W	21		SWCD						2.26		.57	1.36							
62	30N	22W	23		SWCD	.82	1.28	2.27	4.87	6.01	7.89	2.41	.83	1.32	3.96			30.79	31.62		18.46
62	30N	22W	23		SWCD	.89	1.24	2.20	4.72	6.80	8.10	2.47	.66	1.53	4.23			31.81	32.77		19.56
62	30N	22W	24		SWCD	1.02	1.40	2.63	3.90	5.51	7.84	2.52	1.20	1.60	4.07	.45	1.97	30.22	31.35	34.11	18.67
62	30N	22W	24		SWCD	.85	1.43	2.86	3.91	5.20	8.33	2.35	.74	1.59	3.96	.63	1.64	31.65	32.83	33.49	18.21
62	30N	22W	24		BYRG	.95	1.49	2.65	5.06	6.07	8.26	2.41	.74	1.55	4.22	.60	1.72	32.59	33.59	35.72	19.03
62	30N	22W	25		SWCD				5.03	5.74	5.82	4.82	.66	1.61	4.21	.66					18.65
62	30N	22W	25		SWCD	.80	1.46	2.08	4.71	5.90	8.65	2.46	.74	1.63	4.30	.72	1.52	31.26	32.32	34.97	19.38
62	30N	22W	30		SWCD						7.99		.58	1.44							
62	30N	22W	31		SWCD					7.04	8.46		.70	1.36	3.99						
62	30N	22W	31	VADNAISL	NWS	.79	.97	1.49	3.60	6.06	7.86	2.99	.88	1.34	3.74	.45	1.44	28.29	29.24	31.61	19.13
62	30N	22W	33		SWCD	.88		2.38	4.61	6.05	8.71	2.80	.70	1.43	3.91	.58	1.62				19.69
62	30N	22W	34		SWCD						*		.60	1.38							
62	30N	22W	35		SWCD	1.21	1.38		4.81	5.92	8.89	1.95	.68	1.25	4.00	.47					18.69
62	30N	22W	36		BYRG					5.75	8.38	2.12									
62	30N	23W	2		SWCD			*	*	5.36	7.35	2.65	.68	1.33	4.04	*					17.37
62	30N	23W	6		BYRG			*	4.81	4.82	5.91	3.15	.73	1.32							15.93
62	30N	23W	7		SWCD	.72	1.78	2.14	4.84	4.69	7.20	3.23	.79	1.55	4.05	.57	1.60	30.40	31.40	33.16	17.46
62	30N	23W	7		SWCD	.57		2.42	5.05	4.51	7.78		1.66	1.33	3.86	.60	1.78				
62	30N	23W	7		SWCD		1.34	2.46	4.33	4.33	8.32		.86	1.33	3.46	.59	1.77				
62	30N	23W	7		SWCD	.70	1.70	2.43	5.56	5.95	4.88	4.62	1.27	1.25	2.82	.60	1.34	30.88	31.71	33.12	17.97
62	30N	23W	7		SWCD	.67	1.07	1.07	4.06	4.40	7.38										
62	30N	23W	14		SWCD	.84	1.73	2.82	4.95	5.41	8.92	3.12	.68	1.27	4.69	.49	1.87	32.66	33.42	36.79	19.40
62	30N	23W	15		SWCD	.88	1.45	2.01	5.76	5.92	7.14	4.08	.63	1.28	4.16	.64	1.90	32.37	33.14	35.85	19.05
62	30N	23W	17		SWCD	.39	1.56	2.38	5.08	5.40	8.06	3.43	.80	1.24	4.21	.69	1.56	31.75	32.47	34.80	18.93
62	30N	23W	19		BYRG	.71	1.20	1.61	4.39	4.30	7.74	2.40	.73	1.32	2.48	.59	1.45	27.30	28.23	28.92	16.49
62	30N	23W	30		SWCD	.77	1.41	1.64	4.86	4.78	7.02	2.06	.62	1.02	3.71	.54	1.78	27.37	28.10	30.21	15.50
62	30N	23W	31		SWCD	.83	1.36	2.22	4.52	6.25	8.42	2.66	.93	1.34		.56	1.59	31.63	32.45		19.60
62	30N	23W	31		SWCD	.91	1.51	2.29	6.02	6.24	8.82	2.80	1.24	1.40	4.18	.72	1.71	35.07	35.99	37.84	20.50
62	30N	23W	32		SWCD	.61	1.25	1.84	4.76	6.13	8.82	2.95	1.17	1.24	3.78	.44	1.49	32.02	32.83	34.48	20.31
62	30N	23W	36		SWCD				4.64												
county averages						.78	1.39	2.15	4.81	6.00	7.54	2.67	1.11	1.36	3.81	.58	1.56	31.48	32.33	34.51	18.80
# of obs						52	51	52	60	67	67	61	67	68	61	52	50	38	39	36	57

- Data as received and digitized on or before 9/26/2018. **All values are in inches**.
- 'cc ttt rr ss' is county-township-range-section number, 'oooooooo' is community name (where applicable), 'nnnn' is network type.
- 'AGR', 'HYD', and 'ANN' are 12 month precipitation totals starting in Sep 2012, Oct 2012, and Jan 2013, respectively. 'GRO' is growing season (May 2013 thru Sep 2013) precipitation total.
- '*' denotes a partial monthly record, 'e' denotes that value is wholly or partially estimated.
- Prepared by: State Climatology Office - DNR Waters, phone: 651-296-4214, web: http://climate.umn.edu

For some purposes, **daily** precipitation data are required. The precipitation data archive allows a user to interactively retrieve daily precipitation data from the site nearest to a target.

Obtaining Data for Legal Purposes

Last modified: April 10, 2008

Minnesota State Climatology Office

Annual Reports of Monthly Precipitation Totals

This application creates annual summaries of precipitation data gathered by volunteer-based observation networks throughout Minnesota. The data presented are monthly totals and the data are grouped by county. Observer locations are described using township, range, and section numbers.

Choose a county and year, then click on **"Annual report"**.

RAMSEY 2014 Annual report

2014 RAMSEY Monthly Precipitation, Totals

cc	ttt	rr	ss	oooooooo	nnnn	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	AGR	HYD	ANN	GRO
62	28N	22W	1		SWCD	1.40	2.18	.74	7.25	5.46	11.07	3.88	3.77	1.95	2.16			43.00	43.18		26.13
62	28N	22W	9	STPAULAP	NWS												*				
62	28N	23W	2		SWCD		1.31	1.03	7.51	7.53	8.72	3.21	3.14		2.05	1.01	1.06				
62	28N	23W	3		SWCD	1.83	1.51	.53	6.05	4.55	12.95	3.25	3.20	2.05	1.90	1.02	.80	40.13	41.23	39.64	26.00
62	28N	23W	4		SWCD				6.09	3.90	11.73	2.85	4.30	2.13	2.07	1.18	1.07				24.91
62	28N	23W	9		SWCD		1.96	1.01	7.07	4.38	12.68	3.32	3.85	2.23	1.94	.98	1.11				26.46
62	28N	23W	10		SWCD	1.47	1.30	1.03	7.52	7.45	9.23	2.98	3.39	1.18	1.85	1.14	1.07	40.92	40.87	39.61	24.23
62	28N	23W	10	ST PAUL3	NWS	1.47	1.30	1.03	7.52	7.45	9.23	2.98	3.39	1.18	1.85	1.14	1.07	40.92	40.87	39.61	24.23
62	28N	23W	16		SWCD	1.54	1.49	1.09	8.22	4.58	12.86	2.91	3.44	1.65	2.43	1.30	1.16			42.67	25.44
62	29N	22W	1		SWCD				7.39	3.90	12.16	3.12	2.08	3.33	1.23						24.59
62	29N	22W	1		SWCD	1.10	2.15	.88	8.30	4.73	10.70	1.91	2.80	2.36	1.83	1.60	1.43	40.50	41.45	39.79	22.50
62	29N	22W	2		SWCD	1.49	1.35	.82	8.23	4.99	9.82	2.29	2.93	2.13	1.74	1.30	1.28	39.48	40.22	38.37	22.16
62	29N	22W	2		BYRG	1.35	1.22	.82	8.46	6.16	10.25	2.41	3.20	2.01	1.78	1.38	1.19	41.70	42.29	40.23	24.03
62	29N	22W	3		BYRG				8.19	4.90	10.14	2.42	3.35	2.46	1.71						23.27
62	29N	22W	6		SWCD	1.97	1.03	.56	7.15	4.32	9.61	2.38	3.54	2.79	1.46	.93	.67	36.62	38.03	36.41	22.64
62	29N	22W	9		BYRG	1.37	1.08	.78	7.93	4.44	10.22	2.63	3.65	2.39	1.75	1.29	1.07	39.70	40.74	38.60	23.33
62	29N	22W	10		SWCD	1.42	1.26	.68	8.57	4.61	10.35	2.72	3.58	2.36	1.80	1.36	1.25	40.26	41.35	39.96	23.62
62	29N	22W	12		SWCD							1.87	3.47	3.00	1.59						
62	29N	22W	17		SWCD	1.17	1.29	.52	5.32	3.59	11.75	2.51	4.03	2.32	1.96	1.37	.83	37.09	38.21	36.66	24.20
62	29N	22W	22		SWCD	1.55	1.41	1.08	8.60	5.51	11.79	2.21	4.29	1.81	2.20	1.56	1.29	44.74	44.99	43.30	25.61
62	29N	22W	22		SWCD	1.55	1.21	.86	8.15	7.45	9.68	2.63	4.02	1.72	2.12	1.40	1.19	43.47	43.68	41.98	25.50
62	29N	22W	25		SWCD	1.00			3.42	3.17	8.97	2.48	1.88	2.54			1.14				19.04
62	29N	22W	26		SWCD					4.68	11.10	2.00	3.82	2.16	2.22						23.76
62	29N	22W	34		SWCD	1.29	1.21	.86	7.92	4.67	11.54	2.57	3.81	2.19	2.20	1.02	1.56	41.35	41.83	40.84	24.78
62	29N	22W	35		SWCD	1.84	1.77	.88	8.20	5.64	8.01	2.51	3.12	1.26	1.97	.83	.76	38.43	38.36	36.79	20.54
62	29N	23W	1		SWCD					5.20	8.98	2.27	4.00	2.30	1.49		.85				22.75
62	29N	23W	1		SWCD		2.01	.90		4.99	10.72	2.36	5.53								
62	29N	23W	1		SWCD	1.57	1.31	.44	7.48	4.01	10.07	2.14	3.64	2.17	1.47	.92	1.31	37.64	38.45	36.53	22.03
62	29N	23W	4	MANWEILE	MOSQ	1.44	1.19		6.20	3.54	9.52					1.31	.98				
62	29N	23W	5		BYRG	1.31	1.43	.85	6.26	3.49	5.92	2.73	3.92	1.57				33.00	33.47		17.63
62	29N	23W	10		SWCD	1.33	1.45	.78	7.61												
62	29N	23W	15		SWCD	1.22	1.45	.79	6.70	3.76	10.50	2.77	3.14	2.60	1.48	1.17	1.31	37.70	38.96	36.89	22.77
62	29N	23W	17		SWCD	1.87	1.10	.53	5.95	2.61	6.33	1.78	4.56	1.48	1.21	.84	.33	31.15	31.55	28.59	16.76

62	29N	23W	21	UOFM ST	NWS	1.51	1.19	.78	6.94	3.54	9.20	2.73	3.12	2.19	1.44	.95	.99	36.53	37.42	34.58	20.78
62	29N	23W	22		SWCD	1.11	1.28	.65	7.05	3.96	10.59	2.87	3.51	2.49	1.14	1.00	1.11	38.05	39.23	36.76	23.42
62	30N	22W	3		BYRG				6.34	4.66	10.07	2.06	4.89	2.78	1.28						24.46
62	30N	22W	6		SWCD	1.46	1.28	.72	7.27	4.30	8.64	2.41	5.32	3.16	1.24	1.48	1.22	38.07	40.01	38.50	23.83
62	30N	22W	12		SWCD	1.55	1.51	.83	7.12	5.44	10.32	2.33	3.72	2.38	1.70	1.43	1.15	40.35	41.36	39.48	24.19
62	30N	22W	13		SWCD	1.51	1.30	.78	7.47	5.14	8.19	1.94	4.21	2.71	1.39	1.45	.80	37.69	39.33	36.89	22.19
62	30N	22W	17		SWCD				5.16	4.86	8.52	2.25	5.16		1.36						
62	30N	22W	21		SWCD				6.20			2.03	3.09	4.36	1.47						
62	30N	22W	23		SWCD				7.21	5.74	9.69	1.99	5.08	2.35	1.55	2.02	1.35				24.85
62	30N	22W	24		SWCD	1.32	1.23	.63	7.30	5.26	10.45	1.87	3.34	3.00	1.59	1.23	1.04	39.49	40.89	38.26	23.92
62	30N	22W	24		SWCD		1.57	1.32	7.02	5.54	12.02	2.40	4.25	3.79			1.05				28.00
62	30N	22W	24		BYRG	1.40	1.44	.79	7.41	5.97	9.19	2.21	4.67	2.21	1.68	1.62	1.37	41.17	41.83	39.96	24.25
62	30N	22W	25		SWCD				7.10	5.17	9.13	2.27	3.78	2.50	1.77						22.85
62	30N	22W	25		SWCD	1.48	1.58	.65	6.19	4.85	10.30	2.43	3.90	2.65	1.83	1.30	1.23	39.55	40.57	38.39	24.13
62	30N	22W	30		SWCD				6.64			2.32	2.93	3.43	1.43						
62	30N	22W	31		SWCD							2.26	4.78	1.96	1.47						
62	30N	22W	31	VADNAISL	NWS	1.13	.97	.22	5.85	4.62	9.48	1.53	3.45	2.59	1.38	.43	.99	34.22	35.47	32.64	21.67
62	30N	22W	33		SWCD	1.24	1.18			6.21	9.40	2.38	3.59	2.66	1.80	1.29	1.15				24.24
62	30N	22W	34		SWCD				5.90			2.22	2.52	4.17	1.60						
62	30N	22W	35		SWCD				5.80	8.12	8.13	2.80	4.92	2.10	1.80						26.07
62	30N	23W	2		SWCD				*	3.47	9.27	1.93	4.12	2.95	1.20	*					21.74
62	30N	23W	6		BYRG				6.87	3.78	9.57	2.18	4.67	2.52							22.72
62	30N	23W	7		SWCD	*	2.17	.78	7.80	4.00	7.04	2.66	3.90	2.11	1.09	1.31	1.16				19.71
62	30N	23W	7		SWCD	1.82	1.23	.88	8.15	4.26	8.56		4.62	1.66	1.21		1.48				
62	30N	23W	7		SWCD	1.44	1.24	.80	*		9.04										
62	30N	23W	7		SWCD	1.57	1.09	.76	6.21	6.70	9.62	2.14	3.92	1.70	1.65	.95	.78	38.02	38.47	37.09	24.08
62	30N	23W	14		SWCD	1.60	1.26	1.02	7.83	3.80	10.09	1.99	4.99	3.88	1.34	1.15	1.52	40.90	43.51	40.47	24.75
62	30N	23W	15		SWCD	2.05	1.63	.88	8.35	4.13	9.78	1.93	4.26	3.88	1.29	.41	1.26	40.99	43.59	39.85	23.98
62	30N	23W	17		SWCD	2.09	1.75	.88	7.88	4.86	8.72	2.37	4.33	1.87	1.25	1.30	1.26	40.58	41.21	38.56	22.15
62	30N	23W	19		BYRG	1.37	.89	.73	6.59	3.78	7.28	3.40	2.92	3.30				32.80	34.78		20.68
62	30N	23W	30		SWCD	1.44	1.22	.88	7.57	4.11	6.25	1.18	3.15	1.54	.80	1.75	1.00	32.85	33.37	30.89	16.23
62	30N	23W	31		SWCD	1.37	1.34	.85	7.46	4.48	9.27	2.30	4.45	2.66	1.49	1.28	1.12			38.07	23.16
62	30N	23W	31		SWCD	1.76	1.99	.97	7.73	3.83	8.36	2.90	3.66	2.40	1.23	1.55	1.34	39.21	40.21	37.72	21.15
62	30N	23W	32		SWCD	.57	1.84	.74	5.35	3.30	8.03	2.77	2.40	3.92	1.22	1.06	1.28	31.95	34.63	32.48	20.42
62	30N	23W	36		SWCD				7.47	4.87	9.51	1.72	4.82	2.62	*	1.23	.86				23.54
county averages						1.46	1.42	.81	7.09	4.81	9.68	2.43	3.80	2.46	1.62	1.21	1.11	38.62	39.60	37.92	23.13
# of obs						44	48	46	59	60	61	63	64	61	57	43	47	36	36	35	55

- Data as received and digitized on or before 9/26/2018. **All values are in inches**.
- 'cc ttt rr ss' is county-township-range-section number, 'oooooooo' is community name (where applicable), 'nnnn' is network type.
- 'AGR', 'HYD', and 'ANN' are 12 month precipitation totals starting in Sep 2013, Oct 2013, and Jan 2014, respectively. 'GRO' is growing season (May 2014 thru Sep 2014) precipitation total.
- '*' denotes a partial monthly record, 'e' denotes that value is wholly or partially estimated.
- Prepared by: State Climatology Office - DNR Waters, phone: 651-296-4214, web: http://climate.umn.edu

For some purposes, **daily** precipitation data are required. The precipitation data archive allows a user to interactively retrieve daily precipitation data from the site nearest to a target.

Obtaining Data for Legal Purposes

Last modified: April 10, 2008

Minnesota State Climatology Office

Annual Reports of Monthly Precipitation Totals

This application creates annual summaries of precipitation data gathered by volunteer-based observation networks throughout Minnesota. The data presented are monthly totals and the data are grouped by county. Observer locations are described using township, range, and section numbers.

Choose a county and year, then click on **"Annual report"**.

RAMSEY 2015 Annual report

2015 RAMSEY Monthly Precipitation, Totals

cc	ttt	rr	ss	oooooooo	nnnn	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	AGR	HYD	ANN	GRO
62	28N	22W	9	STPAULAP	NWS	*			1.84	4.07	4.69	4.54	4.73	5.77	2.47	4.65	2.41				23.80
62	28N	23W	2		SWCD				2.34	4.64	4.54	5.94	4.03	4.88	3.06	5.40	2.58				24.03
62	28N	23W	3		SWCD	.31	.31	.55	2.40	3.90	4.50	6.80	3.30	4.60	2.53	5.10	2.59	27.84	30.39	36.89	23.10
62	28N	23W	4		SWCD	.24			2.73	5.16	4.96	7.31	2.92	4.58	2.50	5.29	2.97				24.93
62	28N	23W	9		SWCD				2.57	4.11	5.03	7.05	3.37	4.82	2.92	5.43	2.85				24.38
62	28N	23W	10		SWCD	.27	.28	.51	2.14	4.53	4.55	6.09	3.52	5.58	2.70	5.45	2.27	27.13	31.53	37.89	24.27
62	28N	23W	10	ST PAUL3	NWS	.27	.28	.66	2.20	4.53	4.55	6.09	3.52	5.58	2.62	5.45	*	27.34	31.74		24.27
62	28N	23W	16		SWCD	.31	.36	.75	2.33	4.63	6.25	6.16	4.38	5.99	2.84	4.75	3.17	31.71	36.05	41.92	27.41
62	29N	22W	1		SWCD				1.99	5.16	6.49	4.56	3.65	6.47	2.86						26.33
62	29N	22W	1		SWCD	.36	.30	.69	1.51	5.24	5.40	7.34	3.27	5.90	2.44	4.73	2.74	31.33	34.87	39.92	27.15
62	29N	22W	2		SWCD	.32	.28	.67	2.00	5.00	4.75	7.29	2.93	5.55	2.83	4.59	2.84	29.69	33.11	39.05	25.52
62	29N	22W	2		BYRG	.32	.31	.71	2.07	5.65	5.33	7.46	3.26	6.00	3.16	5.18	2.31	31.47	35.46	41.76	27.70
62	29N	22W	3		BYRG				1.97	4.87	4.46	7.17	2.89	6.01	2.69						25.40
62	29N	22W	6		SWCD	.37	.35	1.18	2.03	6.78	5.73	6.74	4.20	4.40	3.87	5.04	1.94	33.23	34.84	42.63	27.85
62	29N	22W	9		BYRG	.27	.23	.68	2.03	4.74	4.36	6.58	2.49	5.10	3.00	4.48	2.56	27.88	30.59	36.52	23.27
62	29N	22W	10		SWCD	.29	.14	.79	2.01	4.63	5.03	6.76	3.23	3.16	3.02	4.39	2.91	29.65	30.45	36.36	22.81
62	29N	22W	15		SWCD												2.02				
62	29N	22W	17		SWCD	.39	.36	.39	1.97	4.69	4.32	6.83	2.46	4.27	3.00	4.68	2.11	27.89	29.84	35.47	22.57
62	29N	22W	22		SWCD	.59	.34	1.10	2.12	5.09	5.27	6.77	3.97	6.47	3.92	5.87	2.64	32.11	36.77	44.15	27.57
62	29N	22W	22		SWCD	.40	.33	.54	1.84	4.47	5.92	6.66	3.77	6.37	2.90	6.12	2.39	30.36	35.01	41.71	27.19
62	29N	22W	25		SWCD						3.96	5.50	3.13	5.20	2.57		2.42				
62	29N	22W	26		SWCD				2.09	5.17	4.28	5.72	4.22	6.55	3.27	*					25.94
62	29N	22W	34		SWCD	.38	.32	.88	2.07	4.77	5.03	5.47	4.03	6.44	2.94	4.14	2.55	29.92	34.17	39.02	25.74
62	29N	22W	35		SWCD	.27	.65	.54	1.87	3.69	4.26	5.32	4.04	5.78	2.40	5.57	2.11	25.46	29.98	36.50	23.09
62	29N	23W	1		SWCD				1.81	4.84	4.22	5.51	2.42	4.23	3.10	4.11	1.34				21.22
62	29N	23W	1		SWCD	.43	.04	.42	2.05	6.27	4.63	5.67	2.50	3.49				27.88	29.20		22.56
62	29N	23W	4	MANWEILE	MOSQ	.34	.42	.74	2.31	5.52	4.12	6.83	2.86	4.63	1.64	4.80	2.31			36.52	23.96
62	29N	23W	5		BYRG	*	*	*	*	*	*	6.54	2.67	4.02	2.77	4.43	1.84				
62	29N	23W	15		SWCD	.26	.22	.76	2.06	5.16	4.16	4.91	2.90	3.63	2.86	4.74	2.29	26.99	28.02	33.95	20.76
62	29N	23W	17		SWCD	.34	.06	.85	1.88	4.15	3.36	6.35	4.56	3.04	2.56	4.13	1.75	25.41	26.97	33.03	21.46
62	29N	23W	21	UOFM ST	NWS	.26	.22	.71	2.07	4.94	3.31	6.19	2.79	3.82	2.87	4.58	2.13	26.06	27.69	33.89	21.05
62	29N	23W	22		SWCD	.27	.19	.66	2.14	5.66	3.90	6.00	2.77	4.69	2.90	5.08	2.49	27.33	29.53	36.75	23.02
62	30N	22W	3		BYRG				2.07	7.17	4.28	6.76	3.09	4.43	3.18						25.73

62	30N	22W	6		SWCD	.39	.32	.30	2.39	6.91	4.83	5.60	3.66	4.28	3.45	3.51	1.53	31.50	32.62	37.17	25.28
62	30N	22W	12		SWCD					6.47	5.37	6.70	2.34	5.70	3.22	4.25	2.36				26.58
62	30N	22W	13		SWCD	.64	.32	.55	1.94	5.52	4.26	6.63	2.33	4.39	2.46	4.28	1.97	28.54	30.22	35.29	23.13
62	30N	22W	17		SWCD				1.84		4.65	7.90	3.00	4.50	3.12						
62	30N	22W	21		SWCD					6.82	5.09	6.54	2.94	5.17	2.83	4.83					26.56
62	30N	22W	23		SWCD	.51	.38	.77	2.28	5.70	4.92	6.90	2.90	5.84	3.26	4.35	2.38	31.63	35.12	40.19	26.26
62	30N	22W	24		SWCD	.38	.34	.72	1.73	6.09	6.10	6.64	2.83	5.53	3.45	4.12	1.88	31.69	34.22	39.81	27.19
62	30N	22W	24		SWCD				2.26	6.31	6.27	7.64									
62	30N	22W	24		BYRG	.93	.29	.77	2.14	6.18	5.66	7.23	2.89	5.45	3.53	4.87	1.90	32.97	36.21	41.84	27.41
62	30N	22W	25		SWCD				1.84	5.65	5.31	7.01	2.74	5.18	3.25	4.57					25.89
62	30N	22W	25		SWCD	.40	.29	.62	1.85	5.30	5.38	7.48	2.47	3.87	3.14	4.35	2.25	30.80	32.02	37.40	24.50
62	30N	22W	30		SWCD					5.98	3.96	6.82	2.83	5.27	3.08	4.45					24.86
62	30N	22W	31		SWCD				2.06	6.16	5.26	6.73	3.05	4.83	3.30	3.46					26.03
62	30N	22W	31	VADNAISL	NWS	.22	.27	.62	1.37	6.11	5.06	6.53	2.86	4.76	3.23	4.29	1.67	28.43	30.60	36.99	25.32
62	30N	22W	33		SWCD	.37	.34	.64	2.14	5.74	5.11	6.46	2.57	4.54	2.82	4.50	2.44	30.27	32.15	37.67	24.42
62	30N	22W	34		SWCD					5.03	4.07	6.31	2.58	4.49	2.70	4.25					22.48
62	30N	22W	35		SWCD					4.25	5.26		2.58	5.04	2.60						
62	30N	23W	2		SWCD			.36	2.41	5.66	4.50	8.93	3.32	4.27	2.76	4.62					26.68
62	30N	23W	6		BYRG			.50	2.10	4.92	4.25	8.50	4.22	5.10	3.08						26.99
62	30N	23W	7		SWCD	.14	.14	.42	1.99	5.21	4.72	8.05	3.84	4.00	2.90	3.64	2.07	30.18	32.07	37.12	25.82
62	30N	23W	7		SWCD	.31	.39	.74	1.88	5.61	4.86	8.50	4.10	3.65	2.78	4.85	2.11			39.78	26.72
62	30N	23W	7		SWCD					5.08	3.91	7.81	3.98	2.76	2.51	4.65	1.83				23.54
62	30N	23W	7		SWCD	.22	.32	.67	2.59		5.60	7.79	3.54	4.69	2.67	4.26	2.82				
62	30N	23W	14		SWCD	.32	.51	.74	2.21	6.72	6.33	7.15	2.92	4.75	3.26	4.58	2.61	34.79	35.66	42.10	27.87
62	30N	23W	15		SWCD	.40	.42	.72	2.25	5.30	6.20	7.26	3.44	4.28	2.70	5.67	2.71	32.83	33.23	41.35	26.48
62	30N	23W	17		SWCD	.28	.35	.61	2.20	4.70	5.28	8.09	3.66	3.84	2.71	4.80	2.34	30.85	32.82	38.86	25.57
62	30N	23W	30		SWCD	.24	.28	.54	1.82	4.01	3.45	6.01	2.24	2.17	2.08	3.93	2.25	23.68	24.31	29.02	17.88
62	30N	23W	31		SWCD	.29	.32	.53	2.14	3.88	5.11	6.10	2.70	4.63	3.17	4.86	2.73	27.62	29.59	36.46	22.42
62	30N	23W	31		SWCD	.29	.33	.77	2.20	4.65	4.91	7.24	3.31	4.23	2.91	4.73	2.56	30.22	32.05	38.13	24.34
62	30N	23W	32		SWCD	.32	.28	.69	2.18	4.47	4.62	7.07	3.20	4.20	3.35	4.04	2.10	30.31	30.59	36.52	23.56
62	30N	23W	36		SWCD				2.33	6.08	5.25	7.03	2.59	5.24	3.30	5.35					26.19
county averages						.35	.30	.66	2.08	5.25	4.86	6.70	3.22	4.81	2.92	4.68	2.32	29.53	31.94	38.05	24.81
# of obs						40	39	41	55	59	62	62	62	62	61	53	47	36	36	36	57

- Data as received and digitized on or before 9/26/2018. **All values are in inches**.
- 'cc ttt rr ss' is county-township-range-section number, 'oooooooo' is community name (where applicable), 'nnnn' is network type.
- 'AGR', 'HYD', and 'ANN' are 12 month precipitation totals starting in Sep 2014, Oct 2014, and Jan 2015, respectively. 'GRO' is growing season (May 2015 thru Sep 2015) precipitation total.
- '*' denotes a partial monthly record, 'e' denotes that value is wholly or partially estimated.
- Prepared by: State Climatology Office - DNR Waters, phone: 651-296-4214, web: http://climate.umn.edu

For some purposes, **daily** precipitation data are required. The precipitation data archive allows a user to interactively retrieve daily precipitation data from the site nearest to a target.

Obtaining Data for Legal Purposes

Last modified: April 10, 2008

Minnesota State Climatology Office

Annual Reports of Monthly Precipitation Totals

This application creates annual summaries of precipitation data gathered by volunteer-based observation networks throughout Minnesota. The data presented are monthly totals and the data are grouped by county. Observer locations are described using township, range, and section numbers.

Choose a county and year, then click on **"Annual report"**.

RAMSEY 2016 Annual report

2016 RAMSEY Monthly Precipitation, Totals

cc	ttt	rr	ss	oooooooo	nnnn	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	AGR	HYD	ANN	GRO
62	28N	22W	6	STPAULWB	NWS				2.88	2.15	4.78	5.51	8.74	4.85			1.39				26.03
62	28N	23W	2		SWCD	.36	.65	2.59	3.26	2.52	5.12	4.38		5.17	3.50	2.81	2.17				
62	28N	23W	3		SWCD	.41	1.51	2.77	3.70	2.35	6.40	5.10	6.80	5.93	4.30	1.90	2.44	43.86	45.19	43.61	26.58
62	28N	23W	4		SWCD	.23			3.57	2.14	4.73	4.24	7.55	4.72	3.84	2.72	3.03				23.38
62	28N	23W	9		SWCD	.38	.86	2.56	3.61	2.05	4.19	3.68	8.92	5.32	3.84	2.84	2.65	42.27	42.77	40.90	24.16
62	28N	23W	10		SWCD	.40	.88	2.61	3.52	2.56	4.81	4.64	9.03	5.10	3.71	2.93	2.37	44.45	43.97	42.56	26.14
62	28N	23W	10	ST PAUL3	NWS	.40	.88	2.49	3.63	2.51	4.77	4.73	8.03	5.10	2.99	2.88	2.42			40.83	25.14
62	28N	23W	16		SWCD	.32	.87	2.48	3.21	2.57	4.20	6.52	8.28	5.59	3.45	2.66	2.46	45.20	44.80	42.61	27.16
62	29N	22W	1		SWCD				3.24	1.73	7.92	5.47	9.70	5.36	2.88						30.18
62	29N	22W	1		SWCD	.59	.93	2.17	2.74	1.96	5.31	6.61	8.63	5.65	3.17	2.00	2.34	44.75	44.50	42.10	28.16
62	29N	22W	2		SWCD	.38	.77	2.31	3.44	2.27	5.76	6.96	8.27	5.23	3.12	2.06	2.09	45.97	45.65	42.66	28.49
62	29N	22W	2		BYRG	.38	.69	2.46	3.13	2.85	5.91	7.05	8.91	5.93	3.21	2.04	2.11	48.03	47.96	44.67	30.65
62	29N	22W	3		BYRG				3.70	2.32	5.44	7.01	8.15	5.32	3.22						28.24
62	29N	22W	6		SWCD	.52	1.21	3.21	3.36	2.07	4.81	8.27	9.24	5.58	3.46	2.69	2.22	47.94	49.12	46.64	29.97
62	29N	22W	9		BYRG	.31	.70	2.42	3.66	2.32	4.84	7.00	7.90	4.82	3.49	2.28	1.88	44.29	44.01	41.62	26.88
62	29N	22W	10		SWCD	.37	.60	2.72	3.58	2.62	4.00	6.42	8.71	4.92	3.28	2.38	2.13	42.50	44.26	41.73	26.67
62	29N	22W	15		SWCD	.34	.47	2.47	2.63	1.88	6.42	5.43	7.12	3.67	2.11	1.21	1.76			35.51	24.52
62	29N	22W	17		SWCD	.43	.72	2.90	3.46	2.36	4.11	6.50	8.73	4.95	3.59	2.21	2.52	43.27	43.95	42.48	26.65
62	29N	22W	22		SWCD	.36	.92	2.72	3.21	2.33	4.89	6.94	10.34	5.76	3.68	1.69	2.18	50.61	49.90	45.02	30.26
62	29N	22W	22		SWCD	.41	.74	2.67	2.97	2.34	4.37	6.59	10.29	5.48	*	2.41	1.94	48.16	47.27		29.07
62	29N	22W	26		SWCD				3.42	2.42	3.90	7.09	8.88	5.60	3.64	*					27.89
62	29N	22W	34		SWCD	.43	1.03	2.38	3.38	2.18	3.96	6.73	9.69	5.53	3.59	2.06	1.61	45.85	44.94	42.57	28.09
62	29N	22W	35		SWCD	.17	.71	2.38	3.53	2.00	3.90	6.51	9.01	5.27	3.60	1.40	2.26	44.07	43.56	40.74	26.69
62	29N	23W	1		SWCD			2.62	2.89	2.29	4.59	7.44	9.58	6.03	2.92	2.73	2.09				29.93
62	29N	23W	4	MANWEILE	MOSQ		1.06	1.86	4.24	2.34		7.28	8.83	6.20	3.14	2.80	2.15				
62	29N	23W	5		BYRG	*						*	8.58	5.77	3.55	2.41	*				
62	29N	23W	14		SWCD									5.14	3.15						
62	29N	23W	15		SWCD	.30	.41	2.17	3.54	2.50	3.74	5.86	8.88	5.34	3.59	2.89	1.95	40.92	42.63	41.17	26.32
62	29N	23W	17		SWCD	.50	.80	1.97	2.53	1.88	3.24	6.30	8.77	6.27	1.95	3.41	2.58	37.47	40.70	40.20	26.46
62	29N	23W	20		BYRG									5.09	3.43	2.02	2.99				
62	29N	23W	21	UOFM ST	NWS	.28	.79	2.15	3.66	2.05	3.65	5.97	9.90	5.19	3.32	2.70	2.01	41.85	43.22	41.67	26.76
62	29N	23W	22		SWCD	.31	.71	2.33	3.46	2.46	5.25	4.38	9.49	5.22	3.48	3.06	2.08	43.55	44.08	42.23	26.80
62	29N	23W	29		SWCD					2.38		5.49									

62	29N	23W	33	MET MOSQ	MOSQ					2.08		4.48	8.79	5.32	3.43								
62	30N	22W	3		BYRG				3.18	2.12	4.64	5.41	7.77	7.30	2.46								27.24
62	30N	22W	5		SWCD					1.26	4.36	3.07	9.21	2.74	3.70	2.93	2.00						20.64
62	30N	22W	6		SWCD	.26	.56	2.15	3.52	2.30	4.75	4.16	8.92	8.55	3.04	1.88	2.12	39.39	43.66	42.21	28.68
62	30N	22W	12		SWCD	.40	.82	2.12	3.10	2.01	5.18	4.87	7.94	6.99	3.02	2.11	2.14	41.97	43.26	40.70	26.99
62	30N	22W	13		SWCD	.33	*	*	2.94	1.45	4.96	4.85	8.21	6.68	2.71	2.37	2.27						26.15
62	30N	22W	21		SWCD					*	4.99	5.65	8.81	6.82	3.05								
62	30N	22W	23		SWCD		.76	2.19	3.32	2.28	5.26	5.61	8.34	6.83	2.82	2.20	*						28.32
62	30N	22W	24		SWCD	.42	.52	2.07	2.96	2.19	6.29	4.97	8.05	6.58	2.59	2.10	2.28	42.45	43.50	41.02	28.08
62	30N	22W	24		BYRG	.37	.80	2.25	3.16	2.36	6.00	5.59	8.67	6.28	3.07	2.24	2.15	44.95	45.78	42.94	28.90
62	30N	22W	25		SWCD	.44	.64	2.16	3.11	2.14	5.84	6.23	8.52	6.59	3.31	1.82	1.64	42.69	45.41	42.44	29.32
62	30N	22W	30		SWCD					*	6.19	7.02	9.85	6.57	2.37								
62	30N	22W	31		SWCD				3.14	2.32	5.92	7.18	9.31	5.80	3.05								30.53
62	30N	22W	31	VADNAISL	NWS	.26	.44	2.66	3.12	2.44	5.22	7.78	9.22	5.99	3.06	2.39	2.00	45.09	46.32	44.58	30.65
62	30N	22W	33		SWCD	.38	.69	2.34	3.03	2.36	6.28	7.66	9.06	5.70	3.38	2.36	2.13	46.10	47.26	45.37	31.06
62	30N	22W	34		SWCD					*	6.32	5.30	8.24	5.29	3.03								
62	30N	22W	35		SWCD				3.55	1.50	4.50	7.04	4.35	8.19	3.97								25.58
62	30N	23W	2		SWCD			1.68	3.71	2.47	5.30	4.75	9.48	8.52	2.96	.93							30.52
62	30N	23W	6		BYRG			2.15	4.23	2.87	4.80	6.18	8.93	9.94	2.98								32.72
62	30N	23W	7		SWCD	.18	.59	1.67	3.66	2.57	4.29	5.14	9.18	8.84	1.63	3.55	2.52	39.89	44.73	43.82	30.02
62	30N	23W	7		SWCD	.40	.79	1.95	4.20	3.38	4.77	5.99	10.01	9.43	2.11	3.21	2.34	44.88	50.66	48.58	33.58
62	30N	23W	7		SWCD	.29	.58	1.48	4.57	2.56	4.72	5.21	9.19	8.00	2.87	2.75	2.32	40.35	45.59	44.54	29.68
62	30N	23W	7		SWCD	.57	1.06	1.98	4.21	2.30	4.25	5.24	8.32	5.23	3.83	2.91	2.16	42.37	42.91	42.06	25.34
62	30N	23W	14		SWCD	.47	.43	2.23	3.64	2.33	6.37	6.33	8.85	7.62	3.19	2.13	2.13	45.85	48.72	45.72	31.50
62	30N	23W	15		SWCD	.36	.91	2.06	3.98	2.29	4.39	6.68	8.82	6.95	3.07	3.14	2.31	44.85	47.52	44.96	29.13
62	30N	23W	17		SWCD	.31	.50	1.67	3.67	2.18	5.02	5.98	8.39	7.43	3.02	2.87	2.06	41.41	45.00	43.10	29.00
62	30N	23W	30		SWCD	.28	.78	1.28	4.52	2.13	4.60	6.58	9.81	6.49	3.53	3.02	2.53	40.41	44.73	45.55	29.61
62	30N	23W	31		SWCD	.32	.56	2.03	3.60	2.36	5.02	7.61	9.19	6.25	3.11	3.16	3.13	46.08	47.70	46.34	30.43
62	30N	23W	31		SWCD	.32	1.01	1.94	4.24	2.72	4.09	6.95	8.73	6.10	3.06	2.97	2.79	44.43	46.30	44.92	28.59
62	30N	23W	32		SWCD	.37	.66	1.44	3.52	2.60	4.30	6.60	8.60	5.78	3.03	2.52	1.55	41.78	43.36	40.97	27.88
62	30N	23W	36		SWCD				3.64	2.54	6.03	8.04	10.60	6.87	3.41	2.89							34.08
county averages						.36	.76	2.24	3.47	2.28	4.99	6.00	8.77	6.08	3.18	2.47	2.22	43.78	45.27	42.93	28.18
# of obs						42	42	45	55	58	58	61	60	63	61	50	47	37	37	38	54

- Data as received and digitized on or before 9/26/2018. **All values are in inches**.
- 'cc ttt rr ss' is county-township-range-section number, 'oooooooo' is community name (where applicable), 'nnnn' is network type.
- 'AGR', 'HYD', and 'ANN' are 12 month precipitation totals starting in Sep 2015, Oct 2015, and Jan 2016, respectively. 'GRO' is growing season (May 2016 thru Sep 2016) precipitation total.
- '*' denotes a partial monthly record, 'e' denotes that value is wholly or partially estimated.
- Prepared by: State Climatology Office - DNR Waters, phone: 651-296-4214, web: http://climate.umn.edu

For some purposes, **daily** precipitation data are required. The precipitation data archive allows a user to interactively retrieve daily precipitation data from the site nearest to a target.

Obtaining Data for Legal Purposes

Last modified: April 10, 2008

Minnesota State Climatology Office

Annual Reports of Monthly Precipitation Totals

This application creates annual summaries of precipitation data gathered by volunteer-based observation networks throughout Minnesota. The data presented are monthly totals and the data are grouped by county. Observer locations are described using township, range, and section numbers.

Choose a county and year, then click on **"Annual report"**.

RAMSEY 2017 Annual report

2017 RAMSEY Monthly Precipitation, Totals

cc	ttt	rr	ss	oooooooo	nnnn	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	AGR	HYD	ANN	GRO
62	28N	22W	6	STPAULWB	NWS	*	.60	.54	3.85	3.93	3.59	2.45	6.97	1.59	3.60						18.53
62	28N	23W	2		SWCD	1.12	.65	1.08		6.07	3.50		6.67	1.64	5.06	.52	.83				
62	28N	23W	3		SWCD	*	.50	.77	3.50	5.80	2.00	2.00		*	4.20		.53				
62	28N	23W	4		SWCD	.76		0	3.97	6.84	3.73	1.56	7.64	1.32	4.89	.31	1.01				21.09
62	28N	23W	9		SWCD							*	7.05	1.43	4.61	.38	.53				
62	28N	23W	9		SWCD	1.14	.65	.91	4.16	6.58	3.73	3.73	7.35	1.34	4.99	.52		42.90	38.92		22.73
62	28N	23W	10		SWCD	.93	.70	.93	4.73	5.79											
62	28N	23W	10	ST PAUL3	NWS	.93	.64	.99	4.16	6.80	*	*									
62	28N	23W	16		SWCD	1.14															
62	29N	22W	1		SWCD				3.38	7.69		2.38	6.62	1.96	5.54						
62	29N	22W	1		SWCD	1.14	.70	.89	3.41	6.92	2.54	2.26	6.45	1.78	4.84	.69	.79	37.47	33.60	32.41	19.95
62	29N	22W	2		SWCD	1.14	.67	.88	3.29	6.41	3.12	2.50	6.06	1.80	4.82	.45	.83	36.57	33.14	31.97	19.89
62	29N	22W	2		BYRG	1.10	.72	.90	4.11	5.98	3.09	2.45	6.80	1.93	5.02	.54	.86	38.44	34.44	33.50	20.25
62	29N	22W	3		BYRG				3.26	6.49	3.18	2.56	6.73	1.68	4.84						20.64
62	29N	22W	4		SWCD					7.69	3.39										
62	29N	22W	6		SWCD			.20	4.12	6.59	3.87	3.15	8.32		4.92	.36					
62	29N	22W	9		BYRG	.79	.47	.64	3.29	6.11	3.42	2.51	6.42	1.62	4.45	.38	.79	36.12	32.92	30.89	20.08
62	29N	22W	10		SWCD	.95	.65	.61	3.28	6.24	3.14	2.72	6.91	1.69	4.95	.54	.80	37.21	33.98	32.48	20.70
62	29N	22W	12		BYRG							*	6.37	1.91	5.05	*					
62	29N	22W	15		SWCD	.95	.68	.58	2.62	4.40	2.72	1.97	5.00	1.24	3.42	.41	.78	27.67	25.24	24.77	15.33
62	29N	22W	17		SWCD	1.17	.75	.83	3.38	6.32	3.09	3.81	6.71	1.61	4.85	.58	1.19	39.33	35.99	34.29	21.54
62	29N	22W	22		SWCD	1.30	.68	1.05	3.49	6.12	3.41	2.43	8.67	1.95	4.71	.41	.84	40.46	36.65	35.06	22.58
62	29N	22W	22		SWCD	.90	.73	.85	3.79	6.88	3.78	3.08	8.63	1.99	4.81	.65	1.00			37.09	24.36
62	29N	22W	26		SWCD			1.04	3.80	5.85	3.57	2.62	8.26	1.74	4.56						22.04
62	29N	22W	34		SWCD	1.12	.64	1.18	3.81	5.27	3.51	2.67	7.65	1.62	4.41	.56	.92	38.64	34.73	33.36	20.72
62	29N	22W	35		SWCD	.81	.76	.90	3.55	5.20	3.63	2.57	8.03	1.61	4.37	.36	.58	37.98	34.32	32.37	21.04
62	29N	23W	1		SWCD				2.83	5.44	2.64	2.64	6.67	*	3.77						
62	29N	23W	4	MANWEILE	MOSQ	.73	.87	.67	3.56	6.80	3.03	2.48	8.00	1.23	5.85			40.43	35.46		21.54
62	29N	23W	5		BYRG						*	*	8.37	1.37	5.49						
62	29N	23W	10		SWCD							*	7.65	1.15	4.73	.51	.69				
62	29N	23W	11		SWCD							2.70	5.84	*	4.39	.24	.72				
62	29N	23W	15		SWCD				3.52	6.54	3.14	2.75	7.63	1.30	5.06	.39	.82				21.36
62	29N	23W	17		SWCD	1.20		.68		5.89	2.44		8.83	1.18	6.15	.44	.80				

62	29N	23W	20		BYRG	.56	.71	1.03	4.61									
62	29N	23W	21	UOFM ST	NWS	.93	.70	.58	3.68	6.54	3.16	2.45	8.89	1.25	4.84	.42	.62	40.15	36.21	34.06	22.29
62	29N	23W	22		SWCD	.93	.55	.60	3.84	6.42	2.93	2.80	7.87	1.51	4.57	.51	.81	39.78	36.07	33.34	21.53
62	29N	23W	33	MET MOSQ	MOSQ				3.84	6.34	2.82	3.07	7.76	1.43	4.85						21.42
62	30N	22W	3		BYRG				3.17	4.50	3.08	2.81	5.15	1.18	4.50						16.72
62	30N	22W	5		SWCD	.75						4.00		1.32	4.89	.79					
62	30N	22W	6		SWCD	.88	.69	.48	3.10	6.25	2.16	3.19	6.02	1.67	5.60	.52	.76	38.36	31.48	31.32	19.29
62	30N	22W	12		SWCD	1.06	.70	.76		6.80		2.64	4.75		4.40	.53	1.06				
62	30N	22W	13		SWCD	.92	.63		2.88	7.57	3.05	2.36	4.85	1.64	4.10	*	*				19.47
62	30N	22W	21		SWCD					5.02	2.84	2.72	6.08	1.64							18.30
62	30N	22W	23		SWCD			.33	3.47	6.49	2.67	2.45	5.21		4.20						
62	30N	22W	24		SWCD	1.03	.69	.70	2.67	5.59	3.11	1.59	5.11	1.69	4.74	.67	.88	34.04	29.15	28.47	17.09
62	30N	22W	24		BYRG	1.13	.64	.84	3.75	6.00	3.02	1.95	5.06	1.79	4.71	.51	.91	36.13	31.64	30.31	17.82
62	30N	22W	25		SWCD	1.04	.56	.62	2.97	6.93	3.25	2.57	5.55	1.98	5.40	.44	1.10	36.85	32.24	32.41	20.28
62	30N	22W	30		SWCD					5.51	3.40	2.71	6.37	2.10							20.09
62	30N	22W	31		SWCD				3.30	7.04	3.74	2.30	5.54	1.72	4.33						20.34
62	30N	22W	31	VADNAISL	NWS	.72	.56	.57	3.14	5.96	3.06	2.44	6.51	1.37	4.66	*	.47	36.40	31.78		19.34
62	30N	22W	33		SWCD	.98	.61	1.25	2.41	6.04	2.93	2.34	5.01	1.53	4.16	.53	.84	35.14	30.97	28.63	17.85
62	30N	22W	34		SWCD					5.33	3.01	2.73	5.07	2.38							18.52
62	30N	23W	2		SWCD			.39	3.00	6.60	3.10	3.00	6.02	1.51	5.15						20.23
62	30N	23W	6		BYRG			*	2.75	6.54	3.17	1.79	5.92	1.50	5.32						18.92
62	30N	23W	7		SWCD	.63															
62	30N	23W	7		SWCD		1.01	.61	3.32	6.59	3.37	1.45		1.33		.35	.81				
62	30N	23W	7		SWCD	.69	.68	.67		6.15	2.84	1.68	5.98	1.32	5.20	.50	.60				17.97
62	30N	23W	7		SWCD	.91	.62	.73	4.33	4.55	3.24	3.14	6.52	1.46	4.67		.81	38.17	34.40		18.91
62	30N	23W	14		SWCD	.99	.74	.58	3.55	5.99	2.91	2.62	6.21	1.31	5.29	.74	.94	38.66	32.35	31.87	19.04
62	30N	23W	15		SWCD	.97	.68	.70	3.01	8.58	3.13	2.33	6.38	1.45	5.92	.37	.91	41.25	35.75	34.43	21.87
62	30N	23W	17		SWCD	.90	.70	.60	3.38	5.21	3.32	2.11	6.04	1.31	5.59	.59	.83	37.64	31.52	30.58	17.99
62	30N	23W	30		SWCD	.80	.74	.60	3.36	7.47	3.74	2.30	6.93	.95	6.42	.39	.43	41.51	35.97	34.13	21.39
62	30N	23W	31		SWCD	.97	.69	.68	3.78	6.57	2.70	2.15	6.83	1.33	5.15	.47	.69	40.02	35.10	32.01	19.58
62	30N	23W	31		SWCD	1.15	.75	.81	3.90	6.33	2.85	2.05	7.51	1.36	6.11	.57	.98	40.27	35.53	34.37	20.10
62	30N	23W	32		SWCD	.82	.66	.47	3.53	5.98	3.54	2.07	7.34	1.27	5.56	.35	1.06	37.29	32.78	32.65	20.20
62	30N	23W	33		SWCD							*	7.35	1.08	5.29	.30	.85				
62	30N	23W	36		SWCD				3.73	6.24		2.54	7.10	*	5.00	.24					
62	30N	23W	36		SWCD							*	6.53	1.11	4.74	.48	.67				
county averages						.95	.68	.72	3.51	6.21	3.14	2.52	6.71	1.53	4.89	.48	.81	38.03	33.65	32.27	20.02
# of obs						41	39	44	50	57	52	54	59	55	58	41	40	28	28	25	44

- Data as received and digitized on or before 9/26/2018. **All values are in inches**.
- 'cc ttt rr ss' is county-township-range-section number, 'oooooooo' is community name (where applicable), 'nnnn' is network type.
- 'AGR', 'HYD', and 'ANN' are 12 month precipitation totals starting in Sep 2016, Oct 2016, and Jan 2017, respectively. 'GRO' is growing season (May 2017 thru Sep 2017) precipitation total.
- '*' denotes a partial monthly record, 'e' denotes that value is wholly or partially estimated.
- Prepared by: State Climatology Office - DNR Waters, phone: 651-296-4214, web: http://climate.umn.edu

For some purposes, **daily** precipitation data are required. The precipitation data archive allows a user to interactively retrieve daily precipitation data from the site nearest to a target.

Obtaining Data for Legal Purposes

Last modified: April 10, 2008

Attachment C-2

IWMZ Inventories

MDH
Minnesota
Department
of Health

PROTECTING, MAINTAINING & IMPROVING THE HEALTH OF ALL MINNESOTANS

September 11, 2017

Fridley City Council
c/o Ms. Deb Skogen, City Clerk
Commons W.T.P.
6431 University Avenue NE
Fridley, MN 55432

Dear Council Members:

SUBJECT: Fridley Municipal Water Supply, Anoka County, PWSID 1020031

I met with Jason Wiehle from your Community Public Water Supply on 8/14/2017 to complete Inner Wellhead Management Zone (IWMZ) Work. As we discussed, the purpose of IWMZ Work is to conduct a Potential Contaminant Source Inventory (PCSI) and identify wellhead protection measures (steps or activities) you can take to help prevent any adverse impacts to the water supply from the identified contaminant sources. The measures contained in your IWMZ PCSI Report (see attached) will be incorporated into your Wellhead Protection Plan when it is initiated or amended. MDH District Engineers will update the IWMZ PCSI Report every 6 years as part of the Sanitary Survey. Implementation of recommended wellhead protection measures protects public health by managing potential contaminant sources to reduce risk. Only one measure is recommended at this time (see Well #3).

If you have any questions concerning the information contained in this report, please contact me at 651/201-5180.

Sincerely,

Simon McCormack
Metro-West District Engineer
Section of Drinking Water Protection
P.O. Box 64975
St. Paul, MN 55164-0975

RECEIVED
SEP 19 2017
CITY OF FRIDLEY
ENGINEERING

Enclosures

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

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

PUBLIC WATER SYSTEM INFORMATION

PWS ID	1020031 **COMMUNITY**
NAME	Fridley
ADDRESS	Fridley Water Superintendent, Commons Water Treatment Plant, 6431 University Avenue NE, Fridley, MN 55432

FACILITY (WELL) INFORMATION

NAME	Well #1
FACILITY ID	S01
UNIQUE WELL NO.	206685
COUNTY	Anoka

IS THERE A WELL LOG OR ADDITIONAL CONSTRUCTION INFORMATION AVAILABLE?

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

PWS ID / FACILITY ID	1020031 S01	UNIQUE WELL NO.	206685

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

PWS ID / FACILITY ID	1020031 S01	UNIQUE WELL NO.	206685

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				
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	94	Y
SB2	Sewer, buried, collector, municipal, serving a facility handling infectious or pathological wastes, open-jointed or unapproved materials	50	50		Y	120	Y
*WB1	Water treatment backwash holding basin, reclaim basin, or surge tank with a direct sewer connection	50	50		N		
*WB2	Water treatment backwash holding basin, reclaim basin, or surge tank with a backflow protected sewer connection	20	20		N		
Land Application							
SPT	Land spreading area for sewage, septage, or sludge	50	50	100	N		
Solid Waste Related							
COS	Commercial compost site	50	50		N		
CD1	Construction or demolition debris disposal area	50	50	100	N		
*HW1	Household solid waste disposal area, single residence	50	50	100	N		
LF1	Landfill, permitted demolition debris, dump, or mixed municipal solid waste from multiple persons	300	300	600	N		
SVY	Scrap yard	50	50		N		
SWT	Solid waste transfer station	50	50		N		
Storm Water Related							
SD1	Storm water drain pipe, 8 inches or greater in diameter	50	20		Y	64	Y
SD1	Storm water drain pipe, 8 inches or greater in diameter	50	20		Y	118	Y
SWI	Storm water drainage well[2] (Class V well - illegal[3])	50	50		N		
SM1	Storm water pond greater than 5000 gal.	50	35		N		
Wells and Borings							
*EB1	Elevator boring, not conforming to rule	50	50		N		
*EB2	Elevator boring, conforming to rule	20	20		N		
MON	Monitoring well	record dist.	record dist.		Y	60	
WEL	Operating well	record dist.	record dist.		N		
UUW	Unused, unsealed well or boring	50	50		N		
General							
*CR1	Cistern or reservoir, buried, nonpressurized water supply	20	20		N		
PLM	Contaminant plume	50	50		N		
*CW1	Cooling water pond, industrial	50	50	100	N		
DC1	Deicing chemicals, bulk road	50	50	100	N		
*ET1	Electrical transformer storage area, oil-filled	50	50		N		
GRV	Grave or mausoleum	50	50		N		
GP1	Gravel pocket or French drain for clear water drainage only	20	20		N		
*HS1	Hazardous substance buried piping	50	50		N		
HS2	Hazardous substance tank or container, above ground or underground, 56 gal. or more, or 100 lbs. or more dry weight, without safeguards	150	150		N		
HS3	Hazardous substance tank or container, above ground or underground, 56 gal. or more, or 100 lbs. or more dry weight with safeguards	100	100		N		
HS4	Hazardous substance multiple storage tanks or containers for residential retail sale or use, no single tank or container exceeding 56 gal. or 100 lbs., but aggregate volume exceeding	50	50		N		
HWF	Highest water or flood level	50	N/A		N		
*HG1	Horizontal ground source closed loop heat exchanger buried piping	50	50		N		
*HG2	Horizontal ground source closed loop heat exchanger buried piping and horizontal piping, approved materials and heat transfer fluid	50	10		N		
IWD	Industrial waste disposal well (Class V well)[2]	illegal[3]	illegal[3]		N		
IWS	Interceptor, including a flammable waste or sediment	50	50		N		

PWS ID / FACILITY ID	1020031 S01	UNIQUE WELL NO.	206685

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

* New potential contaminant source.

[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	1020031 S01	UNIQUE WELL NO.	206685

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?			X

Reminder Question: Were the wellhead protection measure(s) implemented?			
INSPECTOR	McCormack, Simon	DATE	8 - 14 - 2017

PWS ID / FACILITY ID	1020031 S01	UNIQUE WELL NO.	206685

RECOMMENDED WELLHEAD PROTECTION (WHP) MEASURES	WHP MEASURE IMPLEMENTED? Y or N	DATE VERIFIED

COMMENTS

Abandoned sanitary sewer line next to current sanitary sewer line.

SB2 across the road is a sanitary force main.

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	1020031 **COMMUNITY**
NAME	Fridley
ADDRESS	Fridley Water Superintendent, Commons Water Treatment Plant, 6431 University Avenue NE, Fridley, MN 55432

FACILITY (WELL) INFORMATION

NAME	Well #2
FACILITY ID	S02
UNIQUE WELL NO.	206674
COUNTY	Anoka

IS THERE A WELL LOG OR ADDITIONAL CONSTRUCTION INFORMATION AVAILABLE?

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

PWS ID / FACILITY ID	1020031 S02	**UNIQUE WELL NO.**	206674

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

PWS ID / FACILITY ID	1020031 S02	UNIQUE WELL NO.	206674

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				
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	110	Y
*WB1	Water treatment backwash holding basin, reclaim basin, or surge tank with a direct sewer connection	50	50		N		
*WB2	Water treatment backwash holding basin, reclaim basin, or surge tank with a backflow protected sewer connection	20	20		N		
Land Application							
SPT	Land spreading area for sewage, septage, or sludge	50	50	100	N		
Solid Waste Related							
COS	Commercial compost site	50	50		N		
CD1	Construction or demolition debris disposal area	50	50	100	N		
*HW1	Household solid waste disposal area, single residence	50	50	100	N		
LF1	Landfill, permitted demolition debris, dump, or mixed municipal solid waste from multiple persons	300	300	600	N		
SVY	Scrap yard	50	50		N		
SWT	Solid waste transfer station	50	50		N		
Storm Water Related							
SD1	Storm water drain pipe, 8 inches or greater in diameter	50	20		Y	104	Y
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.		Y	158	
UUW	Unused, unsealed well or boring	50	50		N		
General							
*CR1	Cistern or reservoir, buried, nonpressurized water supply	20	20		N		
PLM	Contaminant plume	50	50		N		
*CW1	Cooling water pond, industrial	50	50	100	N		
DC1	Deicing chemicals, bulk road	50	50	100	N		
*ET1	Electrical transformer storage area, oil-filled	50	50		N		
GRV	Grave or mausoleum	50	50		N		
GP1	Gravel pocket or French drain for clear water drainage only	20	20		N		
*HS1	Hazardous substance buried piping	50	50		N		
HS2	Hazardous substance tank or container, above ground or underground, 56 gal. or more, or 100 lbs. or more dry weight, without safeguards	150	150		N		
HS3	Hazardous substance tank or container, above ground or underground, 56 gal. or more, or 100 lbs. or more dry weight with safeguards	100	100		N		
HS4	Hazardous substance multiple storage tanks or containers for residential retail sale or use, no single tank or container exceeding 56 gal. or 100 lbs., but aggregate volume exceeding	50	50		N		
HWF	Highest water or flood level	50	N/A		N		
*HG1	Horizontal ground source closed loop heat exchanger buried piping	50	50		N		
*HG2	Horizontal ground source closed loop heat exchanger buried piping and horizontal piping, approved materials and heat transfer fluid	50	10		N		
IWD	Industrial waste disposal well (Class V well)[2]	illegal[3]	illegal[3]		N		
IWS	Interceptor, including a flammable waste or sediment	50	50		N		
OH1	Ordinary high water level of a stream, river, pond, lake, reservoir, or drainage ditch (holds water six months or more)	50	35		N		
*PP1	Petroleum buried piping	50	50		N		
*PP2	Petroleum or crude oil pipeline to a refinery or distribution center	100	100		N		

PWS ID / FACILITY ID	1020031 S02	UNIQUE WELL NO.	206674

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				
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.

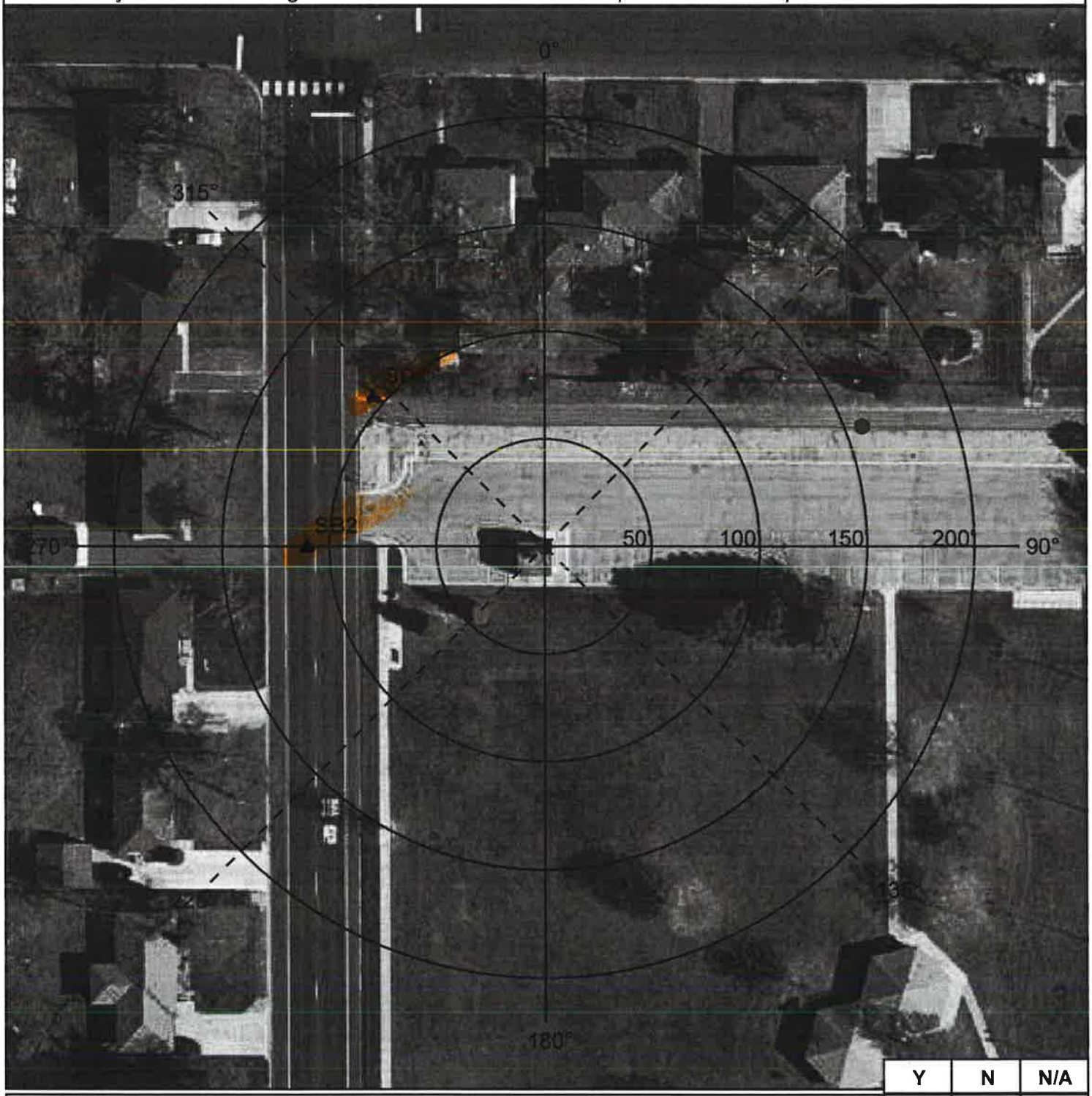
[5] A community public water-supply well must be a minimum of 50 feet from a petroleum tank or container, unless the tank or container is used for emergency pumping and is located in a room or building separate from the community well; and is of double-wall construction with leak detection between walls; 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	1020031 S02	UNIQUE WELL NO.	206674

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?			X

Reminder Question: Were the wellhead protection measure(s) implemented?			
INSPECTOR	McCormack, Simon	DATE	8 - 14 - 2017

PWS ID / FACILITY ID	1020031 S02	UNIQUE WELL NO.	206674

RECOMMENDED WELLHEAD PROTECTION (WHP) MEASURES	WHP MEASURE IMPLEMENTED? Y or N	DATE VERIFIED

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	1020031 **COMMUNITY**
NAME	Fridley
ADDRESS	Fridley Water Superintendent, Commons Water Treatment Plant, 6431 University Avenue NE, Fridley, MN 55432

FACILITY (WELL) INFORMATION

NAME	Well #3
FACILITY ID	S03
UNIQUE WELL NO.	206670
COUNTY	Anoka

IS THERE A WELL LOG OR ADDITIONAL CONSTRUCTION INFORMATION AVAILABLE?

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

PWS ID / FACILITY ID	1020031 S03	UNIQUE WELL NO.	206670

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

PWS ID / FACILITY ID	1020031 S03	UNIQUE WELL NO.	206670

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				
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	82	Y
*WB1	Water treatment backwash holding basin, reclaim basin, or surge tank with a direct sewer connection	50	50		N		
*WB2	Water treatment backwash holding basin, reclaim basin, or surge tank with a backflow protected sewer connection	20	20		N		
Land Application							
SPT	Land spreading area for sewage, septage, or sludge	50	50	100	N		
Solid Waste Related							
COS	Commercial compost site	50	50		N		
CD1	Construction or demolition debris disposal area	50	50	100	N		
*HW1	Household solid waste disposal area, single residence	50	50	100	N		
LF1	Landfill, permitted demolition debris, dump, or mixed municipal solid waste from multiple persons	300	300	600	N		
SVY	Scrap yard	50	50		N		
SWT	Solid waste transfer station	50	50		N		
Storm Water Related							
SD1	Storm water drain pipe, 8 inches or greater in diameter	50	20		Y	48	Y
SD1	Storm water drain pipe, 8 inches or greater in diameter	50	20		Y	127	Y**
SD1	Storm water drain pipe, 8 inches or greater in diameter	50	20		Y	108	Y
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.		Y	70	
UUW	Unused, unsealed well or boring	50	50		N		
General							
*CR1	Cistern or reservoir, buried, nonpressurized water supply	20	20		N		
PLM	Contaminant plume	50	50		N		
*CW1	Cooling water pond, industrial	50	50	100	N		
DC1	Deicing chemicals, bulk road	50	50	100	N		
*ET1	Electrical transformer storage area, oil-filled	50	50		N		
GRV	Grave or mausoleum	50	50		N		
GP1	Gravel pocket or French drain for clear water drainage only	20	20		N		
*HS1	Hazardous substance buried piping	50	50		N		
HS2	Hazardous substance tank or container, above ground or underground, 56 gal. or more, or 100 lbs. or more dry weight, without safeguards	150	150		N		
HS3	Hazardous substance tank or container, above ground or underground, 56 gal. or more, or 100 lbs. or more dry weight with safeguards	100	100		N		
HS4	Hazardous substance multiple storage tanks or containers for residential retail sale or use, no single tank or container exceeding 56 gal. or 100 lbs., but aggregate volume exceeding	50	50		N		
HWF	Highest water or flood level	50	N/A		N		
*HG1	Horizontal ground source closed loop heat exchanger buried piping	50	50		N		
*HG2	Horizontal ground source closed loop heat exchanger buried piping and horizontal piping, approved materials and heat transfer fluid	50	10		N		
IWD	Industrial waste disposal well (Class V well)[2]	illegal[3]	illegal[3]		N		
IWS	Interceptor, including a flammable waste or sediment	50	50		N		
OH1	Ordinary high water level of a stream, river, pond, lake, reservoir, or drainage ditch (holds water six months or more)	50	35		N		

PWS ID / FACILITY ID	1020031 S03	UNIQUE WELL NO.	206670

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?			X

Reminder Question: Were the wellhead protection measure(s) implemented?			
INSPECTOR	McCormack, Simon	DATE	8 - 14 - 2017

PWS ID / FACILITY ID	1020031 S03	UNIQUE WELL NO.	206670

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

* New potential contaminant source.

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

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

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

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

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

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

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

PWS ID / FACILITY ID	1020031 S03	UNIQUE WELL NO.	206670

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

COMMENTS

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

MDH 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	1020031 **COMMUNITY**
NAME	Fridley
ADDRESS	Fridley Water Superintendent, Commons Water Treatment Plant, 6431 University Avenue NE, Fridley, MN 55432

FACILITY (WELL) INFORMATION

NAME	Well #4
FACILITY ID	S04
UNIQUE WELL NO.	201158
COUNTY	Anoka

IS THERE A WELL LOG OR ADDITIONAL CONSTRUCTION INFORMATION AVAILABLE?

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

PWS ID / FACILITY ID	1020031 S04	**UNIQUE WELL NO.**	201158

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

PWS ID / FACILITY ID	1020031 S04	UNIQUE WELL NO.	201158

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				
PR1	Privy, nonportable	50	50	100	N		
PR2	Portable (privy) or toilet	50	20		N		
*SF1	Watertight sand filter; peat filter; or constructed wetland	50	50		N		
SET	Septic tank	50	50		N		
HTK	Sewage holding tank, watertight	50	50		N		
SS1	Sewage sump capacity 100 gal. or more	50	50		N		
SS2	Sewage sump capacity less than 100 gal., tested, conforming to rule	50	20		N		
*ST1	Sewage treatment device, watertight	50	50		N		
SB1	Sewer, buried, approved materials, tested, serving one building, or two or less single-family residences	50	20		N		
SB2	Sewer, buried, collector, municipal, serving a facility handling infectious or pathological wastes, open-jointed or unapproved materials	50	50		N		
*WB1	Water treatment backwash holding basin, reclaim basin, or surge tank with a direct sewer connection	50	50		N		
*WB2	Water treatment backwash holding basin, reclaim basin, or surge tank with a backflow protected sewer connection	20	20		N		
Land Application							
SPT	Land spreading area for sewage, septage, or sludge	50	50	100	N		
Solid Waste Related							
COS	Commercial compost site	50	50		N		
CD1	Construction or demolition debris disposal area	50	50	100	N		
*HW1	Household solid waste disposal area, single residence	50	50	100	N		
LF1	Landfill, permitted demolition debris, dump, or mixed municipal solid waste from multiple persons	300	300	600	N		
SVY	Scrap yard	50	50		N		
SWT	Solid waste transfer station	50	50		N		
Storm Water Related							
SD1	Storm water drain pipe, 8 inches or greater in diameter	50	20		N		
SWI	Storm water drainage well[2] (Class V well - illegal[3])	50	50		N		
SM1	Storm water pond greater than 5000 gal.	50	35		N		
Wells and Borings							
*EB1	Elevator boring, not conforming to rule	50	50		N		
*EB2	Elevator boring, conforming to rule	20	20		N		
MON	Monitoring well	record dist.	record dist.		N		
WEL	Operating well	record dist.	record dist.		N		
UUW	Unused, unsealed well or boring	50	50		N		
General							
*CR1	Cistern or reservoir, buried, nonpressurized water supply	20	20		N		
PLM	Contaminant plume	50	50		N		
*CW1	Cooling water pond, industrial	50	50	100	N		
DC1	Deicing chemicals, bulk road	50	50	100	N		
*ET1	Electrical transformer storage area, oil-filled	50	50		N		
GRV	Grave or mausoleum	50	50		N		
GP1	Gravel pocket or French drain for clear water drainage only	20	20		N		
*HS1	Hazardous substance buried piping	50	50		N		
HS2	Hazardous substance tank or container, above ground or underground, 56 gal. or more, or 100 lbs. or more dry weight, without safeguards	150	150		N		
HS3	Hazardous substance tank or container, above ground or underground, 56 gal. or more, or 100 lbs. or more dry weight with safeguards	100	100		N		
HS4	Hazardous substance multiple storage tanks or containers for residential retail sale or use, no single tank or container exceeding 56 gal. or 100 lbs., but aggregate volume exceeding	50	50		N		
HWF	Highest water or flood level	50	N/A		N		
*HG1	Horizontal ground source closed loop heat exchanger buried piping	50	50		N		
*HG2	Horizontal ground source closed loop heat exchanger buried piping and horizontal piping, approved materials and heat transfer fluid	50	10		N		
IWD	Industrial waste disposal well (Class V well)[2]	illegal[3]	illegal[3]		N		
IWS	Interceptor, including a flammable waste or sediment	50	50		N		
OH1	Ordinary high water level of a stream, river, pond, lake, reservoir, or drainage ditch (holds water six months or more)	50	35		N		
*PP1	Petroleum buried piping	50	50		N		
*PP2	Petroleum or crude oil pipeline to a refinery or distribution center	100	100		N		

PWS ID / FACILITY ID	1020031 S04	UNIQUE WELL NO.	201158

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				
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.

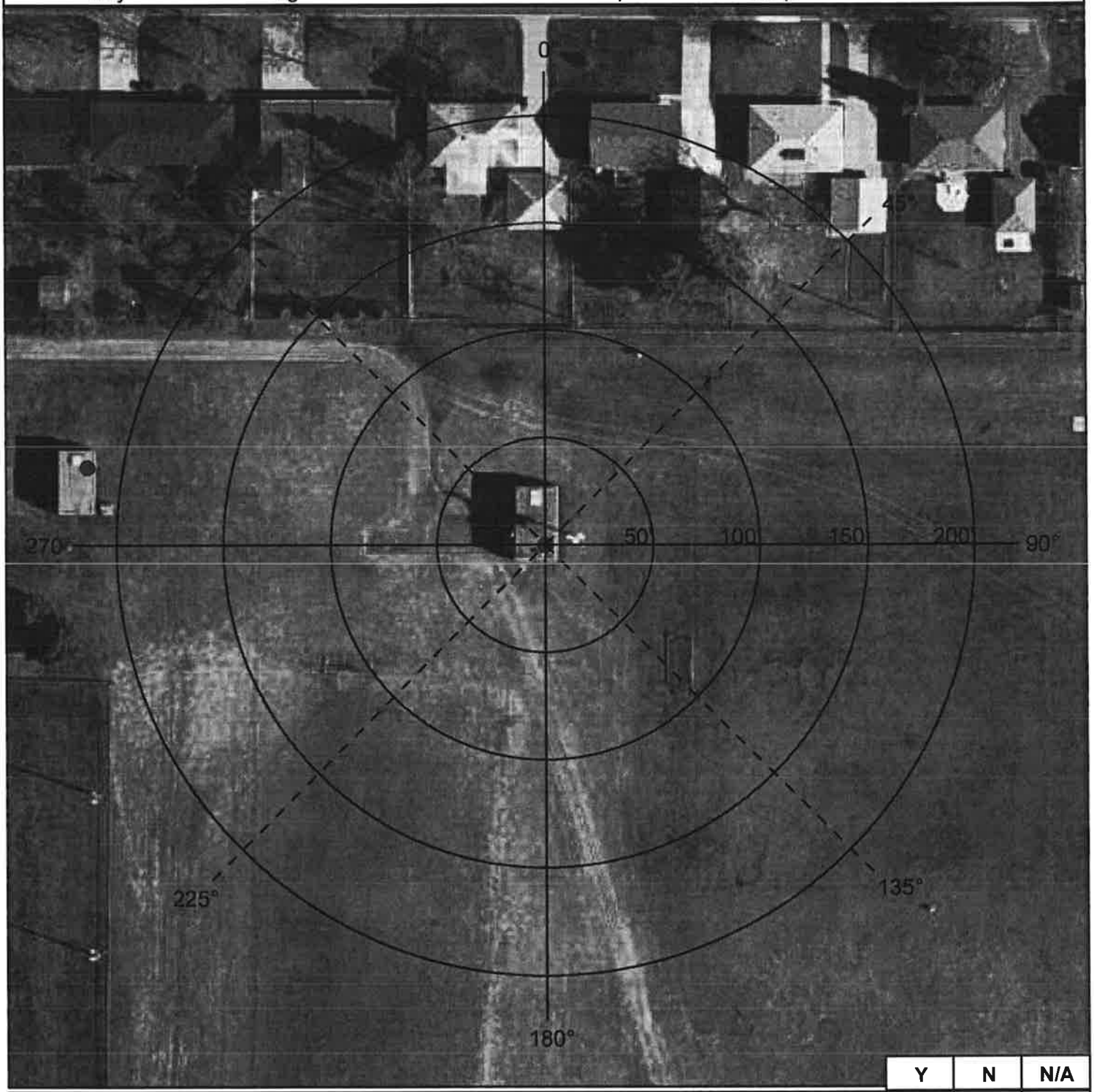
[5] A community public water-supply well must be a minimum of 50 feet from a petroleum tank or container, unless the tank or container is used for emergency pumping and is located in a room or building separate from the community well; and is of double-wall construction with leak detection between walls; 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	1020031 S04	UNIQUE WELL NO.	201158

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?			X

Reminder Question: Were the wellhead protection measure(s) implemented?			
INSPECTOR	McCormack, Simon	DATE	8 - 14 - 2017

PWS ID / FACILITY ID	1020031 S04	UNIQUE WELL NO.	201158

RECOMMENDED WELLHEAD PROTECTION (WHP) MEASURES	WHP MEASURE IMPLEMENTED? Y or N	DATE VERIFIED

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

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

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

PUBLIC WATER SYSTEM INFORMATION

PWS ID	1020031 **COMMUNITY**
NAME	Fridley
ADDRESS	Fridley Water Superintendent, Commons Water Treatment Plant, 6431 University Avenue NE, Fridley, MN 55432

FACILITY (WELL) INFORMATION

NAME	Well #5
FACILITY ID	S05
UNIQUE WELL NO.	206675
COUNTY	Anoka

IS THERE A WELL LOG OR ADDITIONAL CONSTRUCTION INFORMATION AVAILABLE?

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

PWS ID / FACILITY ID	1020031 S05	**UNIQUE WELL NO.**	206675

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

PWS ID / FACILITY ID	1020031 S05	UNIQUE WELL NO.	206675

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				
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	128	Y
*WB1	Water treatment backwash holding basin, reclaim basin, or surge tank with a direct sewer connection	50	50		N		
*WB2	Water treatment backwash holding basin, reclaim basin, or surge tank with a backflow protected sewer connection	20	20		N		
Land Application							
SPT	Land spreading area for sewage, septage, or sludge	50	50	100	N		
Solid Waste Related							
COS	Commercial compost site	50	50		N		
CD1	Construction or demolition debris disposal area	50	50	100	N		
*HW1	Household solid waste disposal area, single residence	50	50	100	N		
LF1	Landfill, permitted demolition debris, dump, or mixed municipal solid waste from multiple persons	300	300	600	N		
SVY	Scrap yard	50	50		N		
SWT	Solid waste transfer station	50	50		N		
Storm Water Related							
SD1	Storm water drain pipe, 8 inches or greater in diameter	50	20		N		
SWI	Storm water drainage well[2] (Class V well - illegal[3])	50	50		N		
SM1	Storm water pond greater than 5000 gal.	50	35		N		
Wells and Borings							
*EB1	Elevator boring, not conforming to rule	50	50		N		
*EB2	Elevator boring, conforming to rule	20	20		N		
MON	Monitoring well	record dist.	record dist.		N		
WEL	Operating well	record dist.	record dist.		N		
UUW	Unused, unsealed well or boring	50	50		N		
General							
*CR1	Cistern or reservoir, buried, nonpressurized water supply	20	20		N		
PLM	Contaminant plume	50	50		N		
*CW1	Cooling water pond, industrial	50	50	100	N		
DC1	Deicing chemicals, bulk road	50	50	100	N		
*ET1	Electrical transformer storage area, oil-filled	50	50		N		
GRV	Grave or mausoleum	50	50		N		
GP1	Gravel pocket or French drain for clear water drainage only	20	20		N		
*HS1	Hazardous substance buried piping	50	50		N		
HS2	Hazardous substance tank or container, above ground or underground, 56 gal. or more, or 100 lbs. or more dry weight, without safeguards	150	150		N		
HS3	Hazardous substance tank or container, above ground or underground, 56 gal. or more, or 100 lbs. or more dry weight with safeguards	100	100		N		
HS4	Hazardous substance multiple storage tanks or containers for residential retail sale or use, no single tank or container exceeding 56 gal. or 100 lbs., but aggregate volume exceeding	50	50		N		
HWF	Highest water or flood level	50	N/A		N		
*HG1	Horizontal ground source closed loop heat exchanger buried piping	50	50		N		
*HG2	Horizontal ground source closed loop heat exchanger buried piping and horizontal piping, approved materials and heat transfer fluid	50	10		N		
IWD	Industrial waste disposal well (Class V well)[2]	illegal[3]	illegal[3]		N		
IWS	Interceptor, including a flammable waste or sediment	50	50		N		
OH1	Ordinary high water level of a stream, river, pond, lake, reservoir, or drainage ditch (holds water six months or more)	50	35		N		
*PP1	Petroleum buried piping	50	50		N		
*PP2	Petroleum or crude oil pipeline to a refinery or distribution center	100	100		N		

PWS ID / FACILITY ID	1020031 S05	UNIQUE WELL NO.	206675

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				
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	1020031 S05	UNIQUE WELL NO.	206675

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?			X

Reminder Question: Were the wellhead protection measure(s) implemented?			
INSPECTOR	McCormack, Simon	DATE	8 - 14 - 2017

PWS ID / FACILITY ID	1020031 S05	UNIQUE WELL NO.	206675

RECOMMENDED WELLHEAD PROTECTION (WHP) MEASURES	WHP MEASURE IMPLEMENTED? Y or N	DATE VERIFIED

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

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

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

PUBLIC WATER SYSTEM INFORMATION

PWS ID	1020031 **COMMUNITY**
NAME	Fridley
ADDRESS	Fridley Water Superintendent, Commons Water Treatment Plant, 6431 University Avenue NE, Fridley, MN 55432

FACILITY (WELL) INFORMATION

NAME	Well #6
FACILITY ID	S06
UNIQUE WELL NO.	206673
COUNTY	Anoka

IS THERE A WELL LOG OR ADDITIONAL CONSTRUCTION INFORMATION AVAILABLE?

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

PWS ID / FACILITY ID	1020031 S06	**UNIQUE WELL NO.**	206673

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

PWS ID / FACILITY ID	1020031 S06	UNIQUE WELL NO.	206673

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				
PR1	Privy, nonportable	50	50	100	N		
PR2	Portable (privy) or toilet	50	20		N		
*SF1	Watertight sand filter; peat filter; or constructed wetland	50	50		N		
SET	Septic tank	50	50		N		
HTK	Sewage holding tank, watertight	50	50		N		
SS1	Sewage sump capacity 100 gal. or more	50	50		N		
SS2	Sewage sump capacity less than 100 gal., tested, conforming to rule	50	20		N		
*ST1	Sewage treatment device, watertight	50	50		N		
SB1	Sewer, buried, approved materials, tested, serving one building, or two or less single-family residences	50	20		N		
SB2	Sewer, buried, collector, municipal, serving a facility handling infectious or pathological wastes, open-jointed or unapproved materials	50	50		N		
*WB1	Water treatment backwash holding basin, reclaim basin, or surge tank with a direct sewer connection	50	50		N		
*WB2	Water treatment backwash holding basin, reclaim basin, or surge tank with a backflow protected sewer connection	20	20		N		
Land Application							
SPT	Land spreading area for sewage, septage, or sludge	50	50	100	N		
Solid Waste Related							
COS	Commercial compost site	50	50		N		
CD1	Construction or demolition debris disposal area	50	50	100	N		
*HW1	Household solid waste disposal area, single residence	50	50	100	N		
LF1	Landfill, permitted demolition debris, dump, or mixed municipal solid waste from multiple persons	300	300	600	N		
SVY	Scrap yard	50	50		N		
SWT	Solid waste transfer station	50	50		N		
Storm Water Related							
SD1	Storm water drain pipe, 8 inches or greater in diameter	50	20		N		
SWI	Storm water drainage well[2] (Class V well - illegal[3])	50	50		N		
SM1	Storm water pond greater than 5000 gal.	50	35		N		
Wells and Borings							
*EB1	Elevator boring, not conforming to rule	50	50		N		
*EB2	Elevator boring, conforming to rule	20	20		N		
MON	Monitoring well	record dist.	record dist.		N		
WEL	Operating well	record dist.	record dist.		N		
UUW	Unused, unsealed well or boring	50	50		N		
General							
*CR1	Cistern or reservoir, buried, nonpressurized water supply	20	20		N		
PLM	Contaminant plume	50	50		N		
*CW1	Cooling water pond, industrial	50	50	100	N		
DC1	Deicing chemicals, bulk road	50	50	100	N		
*ET1	Electrical transformer storage area, oil-filled	50	50		N		
GRV	Grave or mausoleum	50	50		N		
GP1	Gravel pocket or French drain for clear water drainage only	20	20		N		
*HS1	Hazardous substance buried piping	50	50		N		
HS2	Hazardous substance tank or container, above ground or underground, 56 gal. or more, or 100 lbs. or more dry weight, without safeguards	150	150		N		
HS3	Hazardous substance tank or container, above ground or underground, 56 gal. or more, or 100 lbs. or more dry weight with safeguards	100	100		N		
HS4	Hazardous substance multiple storage tanks or containers for residential retail sale or use, no single tank or container exceeding 56 gal. or 100 lbs., but aggregate volume exceeding	50	50		N		
HWF	Highest water or flood level	50	N/A		N		
*HG1	Horizontal ground source closed loop heat exchanger buried piping	50	50		N		
*HG2	Horizontal ground source closed loop heat exchanger buried piping and horizontal piping, approved materials and heat transfer fluid	50	10		N		
IWD	Industrial waste disposal well (Class V well)[2]	illegal[3]	illegal[3]		N		
IWS	Interceptor, including a flammable waste or sediment	50	50		N		
OH1	Ordinary high water level of a stream, river, pond, lake, reservoir, or drainage ditch (holds water six months or more)	50	35		N		
*PP1	Petroleum buried piping	50	50		N		
*PP2	Petroleum or crude oil pipeline to a refinery or distribution center	100	100		N		

PWS ID / FACILITY ID	1020031 S06	UNIQUE WELL NO.	206673

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				
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	1020031 S06	UNIQUE WELL NO.	206673

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?			X

Reminder Question: Were the wellhead protection measure(s) implemented?			
INSPECTOR	McCormack, Simon	DATE	8 - 14 - 2017

PWS ID / FACILITY ID	1020031 S06	UNIQUE WELL NO.	206673

RECOMMENDED WELLHEAD PROTECTION (WHP) MEASURES	WHP MEASURE IMPLEMENTED? Y or N	DATE VERIFIED

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	1020031 **COMMUNITY**
NAME	Fridley
ADDRESS	Fridley Water Superintendent, Commons Water Treatment Plant, 6431 University Avenue NE, Fridley, MN 55432

FACILITY (WELL) INFORMATION

NAME	Well #7
FACILITY ID	S07
UNIQUE WELL NO.	206678
COUNTY	Anoka

IS THERE A WELL LOG OR ADDITIONAL CONSTRUCTION INFORMATION AVAILABLE?

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

PWS ID / FACILITY ID	1020031 S07	**UNIQUE WELL NO.**	206678

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

PWS ID / FACILITY ID	1020031 S07	UNIQUE WELL NO.	206678

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				
PR1	Privy, nonportable	50	50	100	N		
PR2	Portable (privy) or toilet	50	20		N		
*SF1	Watertight sand filter; peat filter; or constructed wetland	50	50		N		
SET	Septic tank	50	50		N		
HTK	Sewage holding tank, watertight	50	50		N		
SS1	Sewage sump capacity 100 gal. or more	50	50		N		
SS2	Sewage sump capacity less than 100 gal., tested, conforming to rule	50	20		N		
*ST1	Sewage treatment device, watertight	50	50		N		
SB1	Sewer, buried, approved materials, tested, serving one building, or two or less single-family residences	50	20		N		
SB2	Sewer, buried, collector, municipal, serving a facility handling infectious or pathological wastes, open-jointed or unapproved materials	50	50		N		
*WB1	Water treatment backwash holding basin, reclaim basin, or surge tank with a direct sewer connection	50	50		N		
*WB2	Water treatment backwash holding basin, reclaim basin, or surge tank with a backflow protected sewer connection	20	20		N		
Land Application							
SPT	Land spreading area for sewage, septage, or sludge	50	50	100	N		
Solid Waste Related							
COS	Commercial compost site	50	50		N		
CD1	Construction or demolition debris disposal area	50	50	100	N		
*HW1	Household solid waste disposal area, single residence	50	50	100	N		
LF1	Landfill, permitted demolition debris, dump, or mixed municipal solid waste from multiple persons	300	300	600	N		
SVY	Scrap yard	50	50		N		
SWT	Solid waste transfer station	50	50		N		
Storm Water Related							
SD1	Storm water drain pipe, 8 inches or greater in diameter	50	20		N		
SWI	Storm water drainage well[2] (Class V well - illegal[3])	50	50		N		
SM1	Storm water pond greater than 5000 gal.	50	35		N		
Wells and Borings							
*EB1	Elevator boring, not conforming to rule	50	50		N		
*EB2	Elevator boring, conforming to rule	20	20		N		
MON	Monitoring well	record dist.	record dist.		N		
WEL	Operating well	record dist.	record dist.		N		
UUW	Unused, unsealed well or boring	50	50		N		
General							
*CR1	Cistern or reservoir, buried, nonpressurized water supply	20	20		N		
PLM	Contaminant plume	50	50		N		
*CW1	Cooling water pond, industrial	50	50	100	N		
DC1	Deicing chemicals, bulk road	50	50	100	N		
*ET1	Electrical transformer storage area, oil-filled	50	50		N		
GRV	Grave or mausoleum	50	50		N		
GP1	Gravel pocket or French drain for clear water drainage only	20	20		N		
*HS1	Hazardous substance buried piping	50	50		N		
HS2	Hazardous substance tank or container, above ground or underground, 56 gal. or more, or 100 lbs. or more dry weight, without safeguards	150	150		N		
HS3	Hazardous substance tank or container, above ground or underground, 56 gal. or more, or 100 lbs. or more dry weight with safeguards	100	100		N		
HS4	Hazardous substance multiple storage tanks or containers for residential retail sale or use, no single tank or container exceeding 56 gal. or 100 lbs., but aggregate volume exceeding	50	50		N		
HWF	Highest water or flood level	50	N/A		N		
*HG1	Horizontal ground source closed loop heat exchanger buried piping	50	50		N		
*HG2	Horizontal ground source closed loop heat exchanger buried piping and horizontal piping, approved materials and heat transfer fluid	50	10		N		
IWD	Industrial waste disposal well (Class V well)[2]	illegal[3]	illegal[3]		N		
IWS	Interceptor, including a flammable waste or sediment	50	50		N		
OH1	Ordinary high water level of a stream, river, pond, lake, reservoir, or drainage ditch (holds water six months or more)	50	35		N		
*PP1	Petroleum buried piping	50	50		N		
*PP2	Petroleum or crude oil pipeline to a refinery or distribution center	100	100		N		

PWS ID / FACILITY ID	1020031 S07	UNIQUE WELL NO.	206678

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				
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.

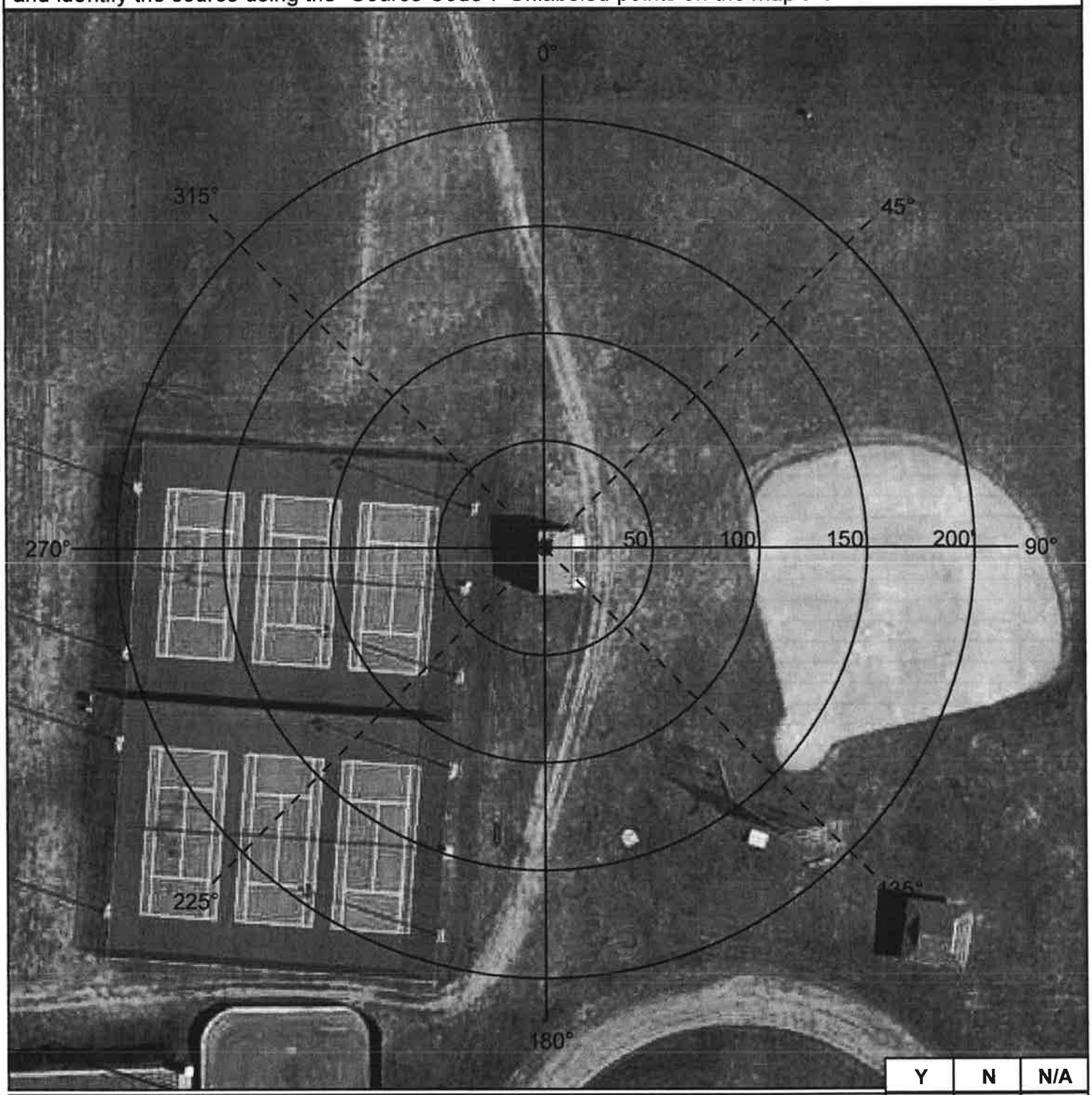
[5] A community public water-supply well must be a minimum of 50 feet from a petroleum tank or container, unless the tank or container is used for emergency pumping and is located in a room or building separate from the community well; and is of double-wall construction with leak detection between walls; 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	1020031 S07	UNIQUE WELL NO.	206678

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?			X

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

INSPECTOR	McCormack, Simon	DATE	8 - 14 - 2017

PWS ID / FACILITY ID	1020031 S07	UNIQUE WELL NO.	206678

RECOMMENDED WELLHEAD PROTECTION (WHP) MEASURES	WHP MEASURE IMPLEMENTED? Y or N	DATE VERIFIED

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	1020031 **COMMUNITY**
NAME	Fridley
ADDRESS	Fridley Water Superintendent, Commons Water Treatment Plant, 6431 University Avenue NE, Fridley, MN 55432

FACILITY (WELL) INFORMATION

NAME	Well #8
FACILITY ID	S08
UNIQUE WELL NO.	206669
COUNTY	Anoka

IS THERE A WELL LOG OR ADDITIONAL CONSTRUCTION INFORMATION AVAILABLE?

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

PWS ID / FACILITY ID	1020031 S08	**UNIQUE WELL NO.**	206669

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

PWS ID / FACILITY ID	1020031 S08	UNIQUE WELL NO.	206669

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				
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	151	Y**
*WB1	Water treatment backwash holding basin, reclaim basin, or surge tank with a direct sewer connection	50	50		N		
*WB2	Water treatment backwash holding basin, reclaim basin, or surge tank with a backflow protected sewer connection	20	20		N		
Land Application							
SPT	Land spreading area for sewage, septage, or sludge	50	50	100	N		
Solid Waste Related							
COS	Commercial compost site	50	50		N		
CD1	Construction or demolition debris disposal area	50	50	100	N		
*HW1	Household solid waste disposal area, single residence	50	50	100	N		
LF1	Landfill, permitted demolition debris, dump, or mixed municipal solid waste from multiple persons	300	300	600	N		
SVY	Scrap yard	50	50		N		
SWT	Solid waste transfer station	50	50		N		
Storm Water Related							
SD1	Storm water drain pipe, 8 inches or greater in diameter	50	20		Y	117	Y**
SD1	Storm water drain pipe, 8 inches or greater in diameter	50	20		Y	123	Y
SD1	Storm water drain pipe, 8 inches or greater in diameter	50	20		Y	136	Y**
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.		Y	70	
UUW	Unused, unsealed well or boring	50	50		N		
General							
*CR1	Cistern or reservoir, buried, nonpressurized water supply	20	20		N		
PLM	Contaminant plume	50	50		N		
*CW1	Cooling water pond, industrial	50	50	100	N		
DC1	Deicing chemicals, bulk road	50	50	100	N		
*ET1	Electrical transformer storage area, oil-filled	50	50		N		
GRV	Grave or mausoleum	50	50		N		
GP1	Gravel pocket or French drain for clear water drainage only	20	20		N		
*HS1	Hazardous substance buried piping	50	50		N		
HS2	Hazardous substance tank or container, above ground or underground, 56 gal. or more, or 100 lbs. or more dry weight, without safeguards	150	150		N		
HS3	Hazardous substance tank or container, above ground or underground, 56 gal. or more, or 100 lbs. or more dry weight with safeguards	100	100		N		
HS4	Hazardous substance multiple storage tanks or containers for residential retail sale or use, no single tank or container exceeding 56 gal. or 100 lbs., but aggregate volume exceeding	50	50		N		
HWF	Highest water or flood level	50	N/A		N		
*HG1	Horizontal ground source closed loop heat exchanger buried piping	50	50		N		
*HG2	Horizontal ground source closed loop heat exchanger buried piping and horizontal piping, approved materials and heat transfer fluid	50	10		N		
IWD	Industrial waste disposal well (Class V well)[2]	illegal[3]	illegal[3]		N		
IWS	Interceptor, including a flammable waste or sediment	50	50		N		
OH1	Ordinary high water level of a stream, river, pond, lake, reservoir, or drainage ditch (holds water six months or more)	50	35		N		

PWS ID / FACILITY ID	1020031 S08	UNIQUE WELL NO.	206669

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

* New potential contaminant source.

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

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

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

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

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

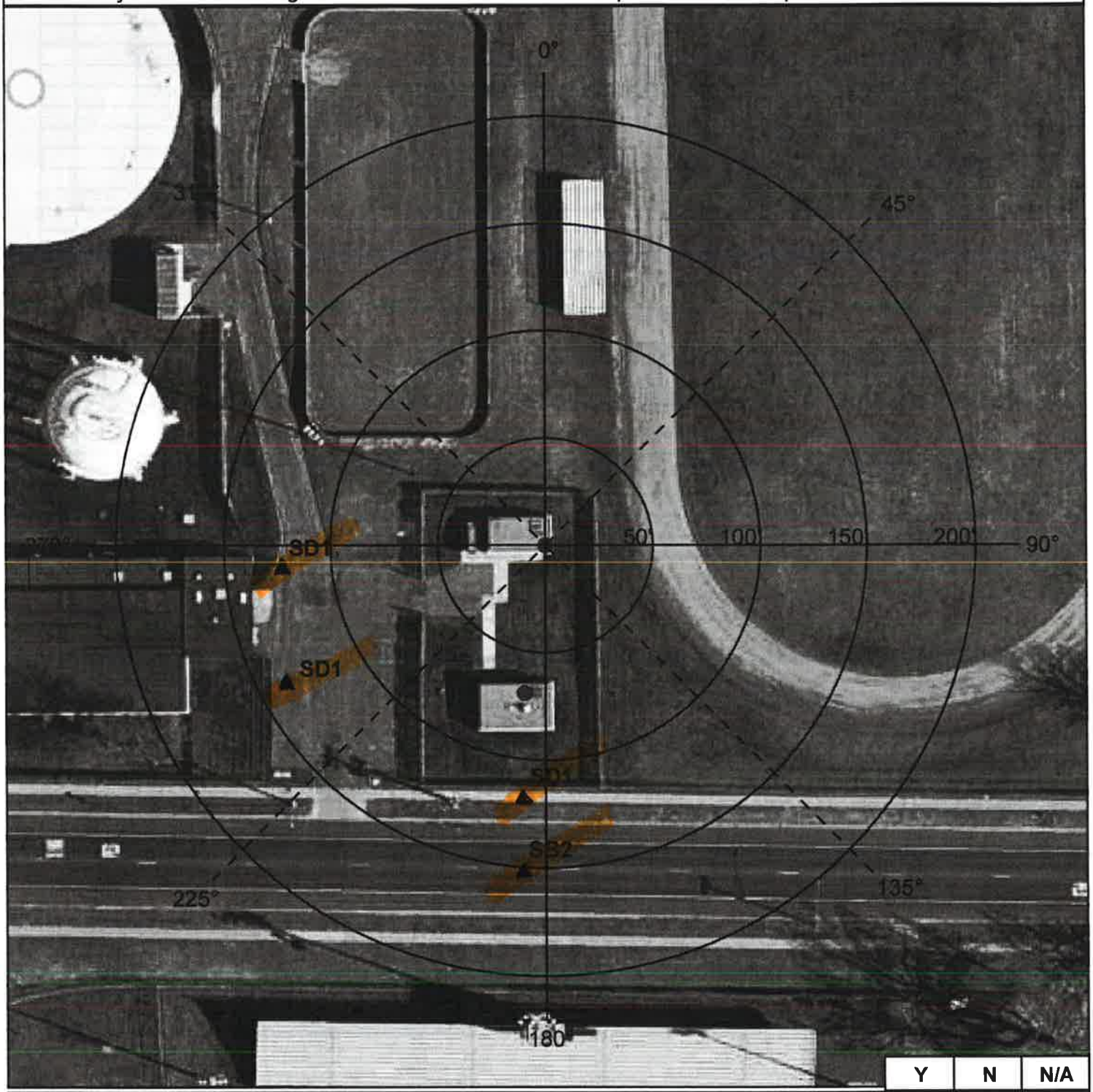
[5] A community public water-supply well must be a minimum of 50 feet from a petroleum tank or container, unless the tank or container is used for emergency pumping and is located in a room or building separate from the community well; and is of double-wall construction with leak detection between walls;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

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

PWS ID / FACILITY ID	1020031 S08	UNIQUE WELL NO.	206669

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?			X

Reminder Question: Were the wellhead protection measure(s) implemented?			
INSPECTOR	McCormack, Simon	DATE	8 - 14 - 2017

PWS ID / FACILITY ID	1020031 S08	UNIQUE WELL NO.	206669

RECOMMENDED WELLHEAD PROTECTION (WHP) MEASURES	WHP MEASURE IMPLEMENTED? Y or N	DATE VERIFIED

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	1020031 **COMMUNITY**
NAME	Fridley
ADDRESS	Fridley Water Superintendent, Commons Water Treatment Plant, 6431 University Avenue NE, Fridley, MN 55432

FACILITY (WELL) INFORMATION

NAME	Well #9
FACILITY ID	S09
UNIQUE WELL NO.	206672
COUNTY	Anoka

IS THERE A WELL LOG OR ADDITIONAL CONSTRUCTION INFORMATION AVAILABLE?

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

PWS ID / FACILITY ID	1020031 S09	**UNIQUE WELL NO.**	206672

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

PWS ID / FACILITY ID	1020031 S09	UNIQUE WELL NO.	206672

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				
PR1	Privy, nonportable	50	50	100	N		
PR2	Portable (privy) or toilet	50	20		N		
*SF1	Watertight sand filter; peat filter; or constructed wetland	50	50		N		
SET	Septic tank	50	50		N		
HTK	Sewage holding tank, watertight	50	50		N		
SS1	Sewage sump capacity 100 gal. or more	50	50		N		
SS2	Sewage sump capacity less than 100 gal., tested, conforming to rule	50	20		N		
*ST1	Sewage treatment device, watertight	50	50		N		
SB1	Sewer, buried, approved materials, tested, serving one building, or two or less single-family residences	50	20		N		
SB2	Sewer, buried, collector, municipal, serving a facility handling infectious or pathological wastes, open-jointed or unapproved materials	50	50		N		
*WB1	Water treatment backwash holding basin, reclaim basin, or surge tank with a direct sewer connection	50	50		N		
*WB2	Water treatment backwash holding basin, reclaim basin, or surge tank with a backflow protected sewer connection	20	20		N		
Land Application							
SPT	Land spreading area for sewage, septage, or sludge	50	50	100	N		
Solid Waste Related							
COS	Commercial compost site	50	50		N		
CD1	Construction or demolition debris disposal area	50	50	100	N		
*HW1	Household solid waste disposal area, single residence	50	50	100	N		
LF1	Landfill, permitted demolition debris, dump, or mixed municipal solid waste from multiple persons	300	300	600	N		
SVY	Scrap yard	50	50		N		
SWT	Solid waste transfer station	50	50		N		
Storm Water Related							
SD1	Storm water drain pipe, 8 inches or greater in diameter	50	20		N		
SWI	Storm water drainage well[2] (Class V well - illegal[3])	50	50		N		
SM1	Storm water pond greater than 5000 gal.	50	35		N		
Wells and Borings							
*EB1	Elevator boring, not conforming to rule	50	50		N		
*EB2	Elevator boring, conforming to rule	20	20		N		
MON	Monitoring well	record dist.	record dist.		N		
WEL	Operating well	record dist.	record dist.		N		
UUW	Unused, unsealed well or boring	50	50		N		
General							
*CR1	Cistern or reservoir, buried, nonpressurized water supply	20	20		N		
PLM	Contaminant plume	50	50		N		
*CW1	Cooling water pond, industrial	50	50	100	N		
DC1	Deicing chemicals, bulk road	50	50	100	N		
*ET1	Electrical transformer storage area, oil-filled	50	50		N		
GRV	Grave or mausoleum	50	50		N		
GP1	Gravel pocket or French drain for clear water drainage only	20	20		N		
*HS1	Hazardous substance buried piping	50	50		N		
HS2	Hazardous substance tank or container, above ground or underground, 56 gal. or more, or 100 lbs. or more dry weight, without safeguards	150	150		N		
HS3	Hazardous substance tank or container, above ground or underground, 56 gal. or more, or 100 lbs. or more dry weight with safeguards	100	100		N		
HS4	Hazardous substance multiple storage tanks or containers for residential retail sale or use, no single tank or container exceeding 56 gal. or 100 lbs., but aggregate volume exceeding	50	50		N		
HWF	Highest water or flood level	50	N/A		N		
*HG1	Horizontal ground source closed loop heat exchanger buried piping	50	50		N		
*HG2	Horizontal ground source closed loop heat exchanger buried piping and horizontal piping, approved materials and heat transfer fluid	50	10		N		
IWD	Industrial waste disposal well (Class V well)[2]	illegal[3]	illegal[3]		N		
IWS	Interceptor, including a flammable waste or sediment	50	50		N		
OH1	Ordinary high water level of a stream, river, pond, lake, reservoir, or drainage ditch (holds water six months or more)	50	35		N		
*PP1	Petroleum buried piping	50	50		N		
*PP2	Petroleum or crude oil pipeline to a refinery or distribution center	100	100		N		

PWS ID / FACILITY ID	1020031 S09	UNIQUE WELL NO.	206672

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				
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	1020031 S09	UNIQUE WELL NO.	206672

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?			X

Reminder Question: Were the wellhead protection measure(s) implemented?			
INSPECTOR	McCormack, Simon	DATE	8 - 14 - 2017

PWS ID / FACILITY ID	1020031 S09	UNIQUE WELL NO.	206672

RECOMMENDED WELLHEAD PROTECTION (WHP) MEASURES	WHP MEASURE IMPLEMENTED? Y or N	DATE VERIFIED

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	1020031
NAME	Fridley
ADDRESS	Fridley Water Superintendent, Commons Water Treatment Plant, 6431 University Avenue NE, Fridley, MN 55432

COMMUNITY

FACILITY (WELL) INFORMATION

NAME	Well #10
FACILITY ID	S10
UNIQUE WELL NO.	206658
COUNTY	Anoka

IS THERE A WELL LOG OR ADDITIONAL CONSTRUCTION INFORMATION AVAILABLE?

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

PWS ID / FACILITY ID	1020031 S10	UNIQUE WELL NO.	206658

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

PWS ID / FACILITY ID	1020031 S10	UNIQUE WELL NO.	206658

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				
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	71	Y**
SB2	Sewer, buried, collector, municipal, serving a facility handling infectious or pathological wastes, open-jointed or unapproved materials	50	50		Y	169	Y**
*WB1	Water treatment backwash holding basin, reclaim basin, or surge tank with a direct sewer connection	50	50		N		
*WB2	Water treatment backwash holding basin, reclaim basin, or surge tank with a backflow protected sewer connection	20	20		N		
Land Application							
SPT	Land spreading area for sewage, septage, or sludge	50	50	100	N		
Solid Waste Related							
COS	Commercial compost site	50	50		N		
CD1	Construction or demolition debris disposal area	50	50	100	N		
*HW1	Household solid waste disposal area, single residence	50	50	100	N		
LF1	Landfill, permitted demolition debris, dump, or mixed municipal solid waste from multiple persons	300	300	600	N		
SVY	Scrap yard	50	50		N		
SWT	Solid waste transfer station	50	50		N		
Storm Water Related							
SD1	Storm water drain pipe, 8 inches or greater in diameter	50	20		Y	104	Y**
SD1	Storm water drain pipe, 8 inches or greater in diameter	50	20		Y	161	Y**
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.		Y	15	
UUW	Unused, unsealed well or boring	50	50		N		
General							
*CR1	Cistern or reservoir, buried, nonpressurized water supply	20	20		N		
PLM	Contaminant plume	50	50		N		
*CW1	Cooling water pond, industrial	50	50	100	N		
DC1	Deicing chemicals, bulk road	50	50	100	N		
*ET1	Electrical transformer storage area, oil-filled	50	50		N		
GRV	Grave or mausoleum	50	50		N		
GP1	Gravel pocket or French drain for clear water drainage only	20	20		N		
*HS1	Hazardous substance buried piping	50	50		N		
HS2	Hazardous substance tank or container, above ground or underground, 56 gal. or more, or 100 lbs. or more dry weight, without safeguards	150	150		N		
HS3	Hazardous substance tank or container, above ground or underground, 56 gal. or more, or 100 lbs. or more dry weight with safeguards	100	100		N		
HS4	Hazardous substance multiple storage tanks or containers for residential retail sale or use, no single tank or container exceeding 56 gal. or 100 lbs., but aggregate volume exceeding	50	50		N		
HWF	Highest water or flood level	50	N/A		N		
*HG1	Horizontal ground source closed loop heat exchanger buried piping	50	50		N		
*HG2	Horizontal ground source closed loop heat exchanger buried piping and horizontal piping, approved materials and heat transfer fluid	50	10		N		
IWD	Industrial waste disposal well (Class V well)[2]	illegal[3]	illegal[3]		N		
IWS	Interceptor, including a flammable waste or sediment	50	50		N		

PWS ID / FACILITY ID	1020031 S10	UNIQUE WELL NO.	206658

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

* New potential contaminant source.

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

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

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

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

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

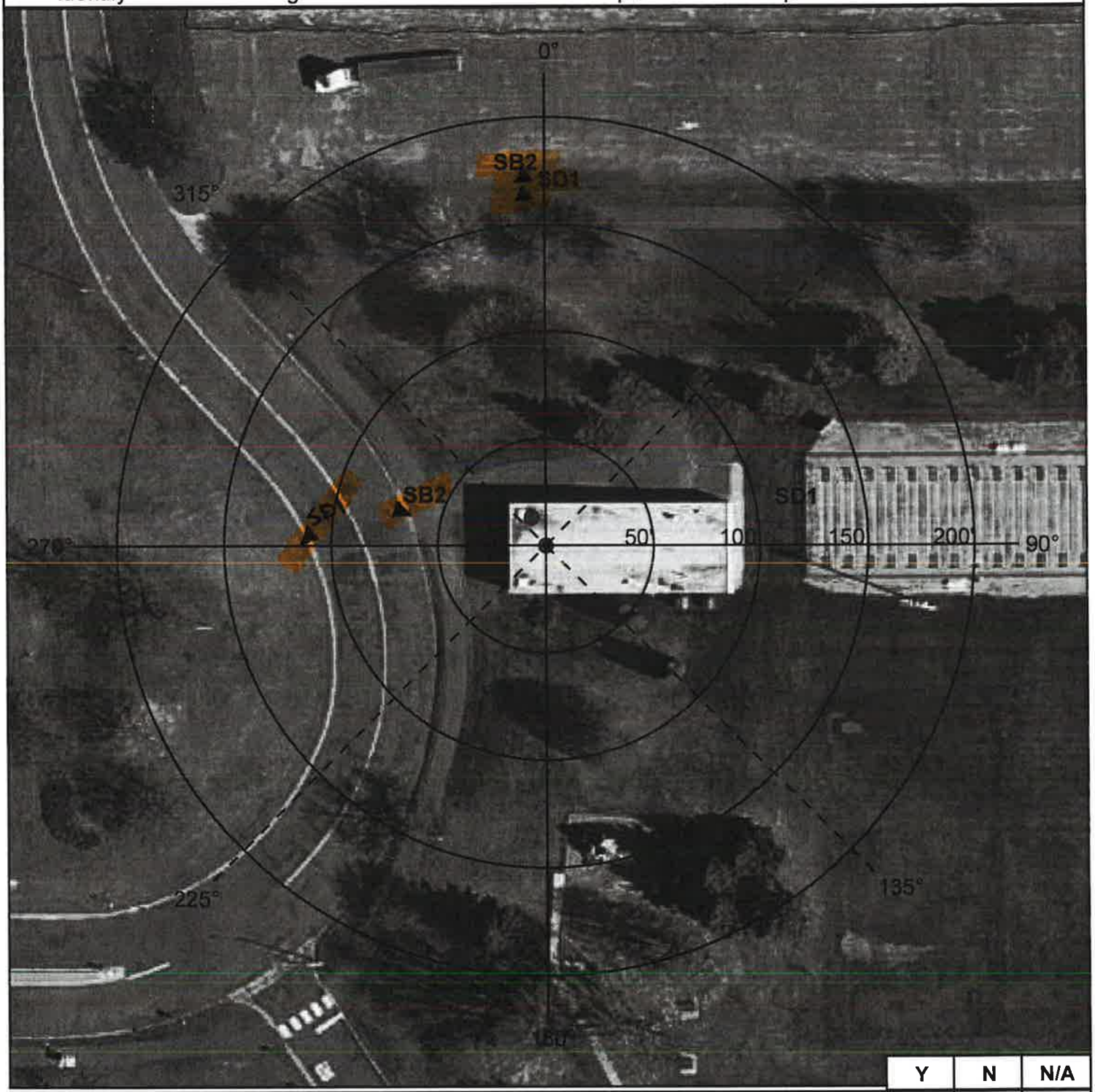
[5] A community public water-supply well must be a minimum of 50 feet from a petroleum tank or container, unless the tank or container is used for emergency pumping and is located in a room or building separate from the community well; and is of double-wall construction with leak detection between walls;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

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

PWS ID / FACILITY ID	1020031 S10	UNIQUE WELL NO.	206658

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?			X

Reminder Question: Were the wellhead protection measure(s) implemented?			
INSPECTOR	McCormack, Simon	DATE	8 - 14 - 2017

PWS ID / FACILITY ID	1020031 S10	UNIQUE WELL NO.	206658

RECOMMENDED WELLHEAD PROTECTION (WHP) MEASURES	WHP MEASURE IMPLEMENTED? Y or N	DATE VERIFIED

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	1020031 **COMMUNITY**
NAME	Fridley
ADDRESS	Fridley Water Superintendent, Commons Water Treatment Plant, 6431 University Avenue NE, Fridley, MN 55432

FACILITY (WELL) INFORMATION

NAME	Well #11
FACILITY ID	S11
UNIQUE WELL NO.	206657
COUNTY	Anoka

IS THERE A WELL LOG OR ADDITIONAL CONSTRUCTION INFORMATION AVAILABLE?

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

PWS ID / FACILITY ID	1020031 S11	**UNIQUE WELL NO.**	206657

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

PWS ID / FACILITY ID	1020031 S11	UNIQUE WELL NO.	206657

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				
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	63	Y
SB2	Sewer, buried, collector, municipal, serving a facility handling infectious or pathological wastes, open-jointed or unapproved materials	50	50		Y	156	Y
*WB1	Water treatment backwash holding basin, reclaim basin, or surge tank with a direct sewer connection	50	50		N		
*WB2	Water treatment backwash holding basin, reclaim basin, or surge tank with a backflow protected sewer connection	20	20		N		
Land Application							
SPT	Land spreading area for sewage, septage, or sludge	50	50	100	N		
Solid Waste Related							
COS	Commercial compost site	50	50		N		
CD1	Construction or demolition debris disposal area	50	50	100	N		
*HW1	Household solid waste disposal area, single residence	50	50	100	N		
LF1	Landfill, permitted demolition debris, dump, or mixed municipal solid waste from multiple persons	300	300	600	N		
SVY	Scrap yard	50	50		N		
SWT	Solid waste transfer station	50	50		N		
Storm Water Related							
SD1	Storm water drain pipe, 8 inches or greater in diameter	50	20		Y	110	Y
SD1	Storm water drain pipe, 8 inches or greater in diameter	50	20		Y	148	Y
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.		Y	15	
UUW	Unused, unsealed well or boring	50	50		N		
General							
*CR1	Cistern or reservoir, buried, nonpressurized water supply	20	20		N		
PLM	Contaminant plume	50	50		N		
*CW1	Cooling water pond, industrial	50	50	100	N		
DC1	Deicing chemicals, bulk road	50	50	100	N		
*ET1	Electrical transformer storage area, oil-filled	50	50		N		
GRV	Grave or mausoleum	50	50		N		
GP1	Gravel pocket or French drain for clear water drainage only	20	20		N		
*HS1	Hazardous substance buried piping	50	50		N		
HS2	Hazardous substance tank or container, above ground or underground, 56 gal. or more, or 100 lbs. or more dry weight, without safeguards	150	150		N		
HS3	Hazardous substance tank or container, above ground or underground, 56 gal. or more, or 100 lbs. or more dry weight with safeguards	100	100		N		
HS4	Hazardous substance multiple storage tanks or containers for residential retail sale or use, no single tank or container exceeding 56 gal. or 100 lbs., but aggregate volume exceeding	50	50		N		
HWF	Highest water or flood level	50	N/A		N		
*HG1	Horizontal ground source closed loop heat exchanger buried piping	50	50		N		
*HG2	Horizontal ground source closed loop heat exchanger buried piping and horizontal piping, approved materials and heat transfer fluid	50	10		N		
IWD	Industrial waste disposal well (Class V well)[2]	illegal[3]	illegal[3]		N		
IWS	Interceptor, including a flammable waste or sediment	50	50		N		

PWS ID / FACILITY ID	1020031 S11	UNIQUE WELL NO.	206657

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

* New potential contaminant source.

[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.

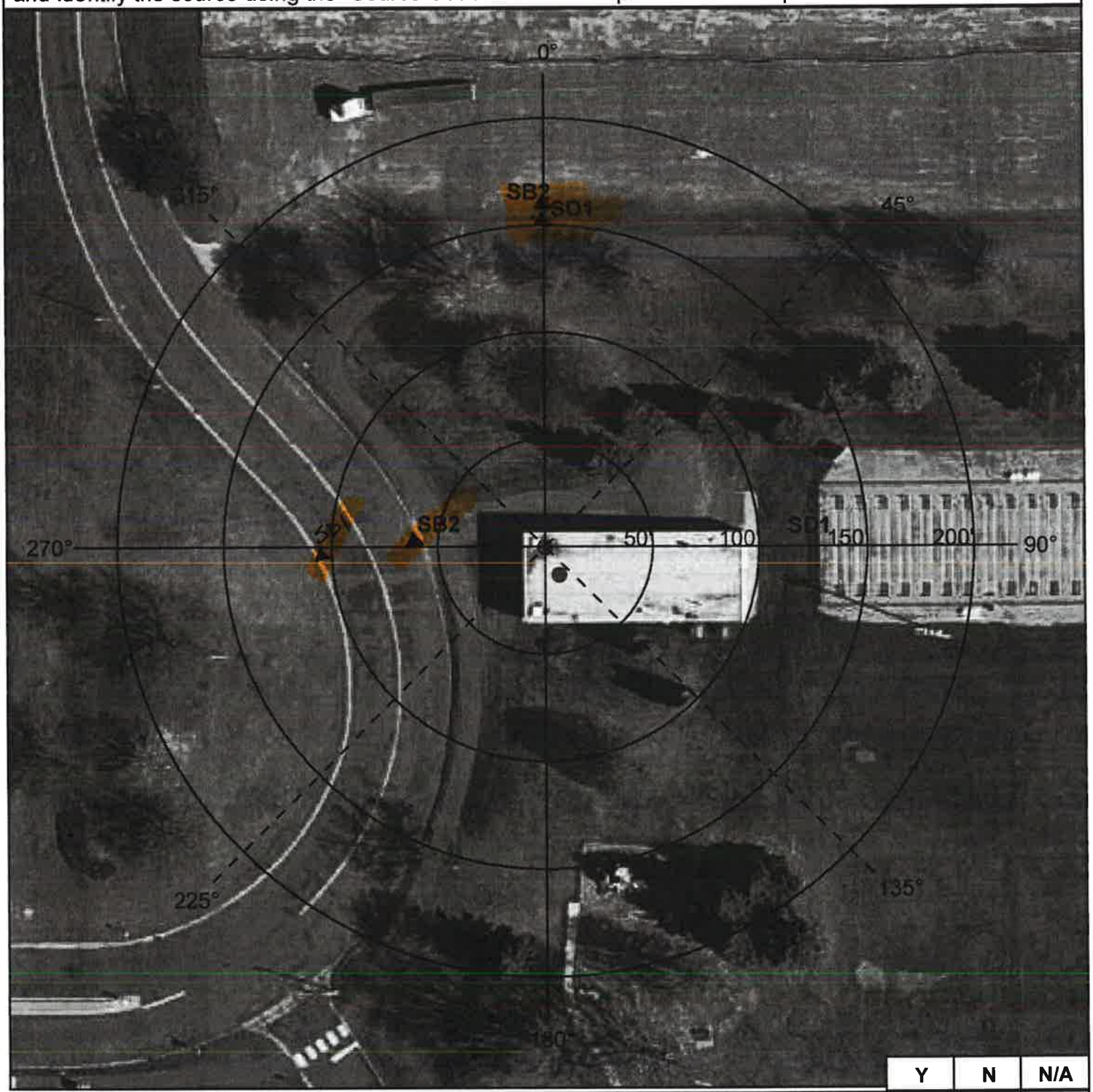
[5] A community public water-supply well must be a minimum of 50 feet from a petroleum tank or container, unless the tank or container is used for emergency pumping and is located in a room or building separate from the community well; and is of double-wall construction with leak detection between walls; 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	1020031 S11	UNIQUE WELL NO.	206657

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?			X

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

INSPECTOR	McCormack, Simon	DATE	8 - 14 - 2017

PWS ID / FACILITY ID	1020031 S11	UNIQUE WELL NO.	206657

RECOMMENDED WELLHEAD PROTECTION (WHP) MEASURES	WHP MEASURE IMPLEMENTED? Y or N	DATE VERIFIED

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

MDH 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	1020031	**COMMUNITY**
NAME	Fridley	
ADDRESS	Fridley Water Superintendent, Commons Water Treatment Plant, 6431 University Avenue NE, Fridley, MN 55432	

FACILITY (WELL) INFORMATION

NAME	Well #12
FACILITY ID	S12
UNIQUE WELL NO.	209207
COUNTY	Anoka

IS THERE A WELL LOG OR ADDITIONAL CONSTRUCTION INFORMATION AVAILABLE?

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

PWS ID / FACILITY ID	1020031 S12	UNIQUE WELL NO.	209207

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

PWS ID / FACILITY ID	1020031 S12	UNIQUE WELL NO.	209207

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				
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	99	Y
SB2	Sewer, buried, collector, municipal, serving a facility handling infectious or pathological wastes, open-jointed or unapproved materials	50	50		Y	110	Y
SB2	Sewer, buried, collector, municipal, serving a facility handling infectious or pathological wastes, open-jointed or unapproved materials	50	50		Y	51	Y
*WB1	Water treatment backwash holding basin, reclaim basin, or surge tank with a direct sewer connection	50	50		N		
*WB2	Water treatment backwash holding basin, reclaim basin, or surge tank with a backflow protected sewer connection	20	20		N		
Land Application							
SPT	Land spreading area for sewage, septage, or sludge	50	50	100	N		
Solid Waste Related							
COS	Commercial compost site	50	50		N		
CD1	Construction or demolition debris disposal area	50	50	100	N		
*HW1	Household solid waste disposal area, single residence	50	50	100	N		
LF1	Landfill, permitted demolition debris, dump, or mixed municipal solid waste from multiple persons	300	300	600	N		
SVY	Scrap yard	50	50		N		
SWT	Solid waste transfer station	50	50		N		
Storm Water Related							
SD1	Storm water drain pipe, 8 inches or greater in diameter	50	20		Y	59	Y
SD1	Storm water drain pipe, 8 inches or greater in diameter	50	20		Y	106	Y
SD1	Storm water drain pipe, 8 inches or greater in diameter	50	20		Y	120	Y
SD1	Storm water drain pipe, 8 inches or greater in diameter	50	20		Y	71	Y
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	1020031 S12	UNIQUE WELL NO.	209207

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		Y	58	Y
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	1020031 S12	UNIQUE WELL NO.	209207

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?			X

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

INSPECTOR	McCormack, Simon	DATE	8 - 14 - 2017

PWS ID / FACILITY ID	1020031 S12	UNIQUE WELL NO.	209207

RECOMMENDED WELLHEAD PROTECTION (WHP) MEASURES	WHP MEASURE IMPLEMENTED? Y or N	DATE VERIFIED

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	1020031 **COMMUNITY**
NAME	Fridley
ADDRESS	Fridley Water Superintendent, Commons Water Treatment Plant, 6431 University Avenue NE, Fridley, MN 55432

FACILITY (WELL) INFORMATION

NAME	Well #13
FACILITY ID	S13
UNIQUE WELL NO.	206696
COUNTY	Anoka

IS THERE A WELL LOG OR ADDITIONAL CONSTRUCTION INFORMATION AVAILABLE?

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

PWS ID / FACILITY ID	1020031 S13	UNIQUE WELL NO.	206696

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

PWS ID / FACILITY ID	1020031 S13	UNIQUE WELL NO.	206696

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				
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	195	Y
SB2	Sewer, buried, collector, municipal, serving a facility handling infectious or pathological wastes, open-jointed or unapproved materials	50	50		Y	120	Y
*WB1	Water treatment backwash holding basin, reclaim basin, or surge tank with a direct sewer connection	50	50		N		
*WB2	Water treatment backwash holding basin, reclaim basin, or surge tank with a backflow protected sewer connection	20	20		N		
Land Application							
SPT	Land spreading area for sewage, septage, or sludge	50	50	100	N		
Solid Waste Related							
COS	Commercial compost site	50	50		N		
CD1	Construction or demolition debris disposal area	50	50	100	N		
*HW1	Household solid waste disposal area, single residence	50	50	100	N		
LF1	Landfill, permitted demolition debris, dump, or mixed municipal solid waste from multiple persons	300	300	600	N		
SVY	Scrap yard	50	50		N		
SWT	Solid waste transfer station	50	50		N		
Storm Water Related							
SD1	Storm water drain pipe, 8 inches or greater in diameter	50	20		Y	185	Y
SWI	Storm water drainage well[2] (Class V well - illegal[3])	50	50		N		
SM1	Storm water pond greater than 5000 gal.	50	35		N		
Wells and Borings							
*EB1	Elevator boring, not conforming to rule	50	50		N		
*EB2	Elevator boring, conforming to rule	20	20		N		
MON	Monitoring well	record dist.	record dist.		N		
WEL	Operating well	record dist.	record dist.		N		
UUW	Unused, unsealed well or boring	50	50		N		
General							
*CR1	Cistern or reservoir, buried, nonpressurized water supply	20	20		N		
PLM	Contaminant plume	50	50		N		
*CW1	Cooling water pond, industrial	50	50	100	N		
DC1	Deicing chemicals, bulk road	50	50	100	N		
*ET1	Electrical transformer storage area, oil-filled	50	50		N		
GRV	Grave or mausoleum	50	50		N		
GP1	Gravel pocket or French drain for clear water drainage only	20	20		N		
*HS1	Hazardous substance buried piping	50	50		N		
HS2	Hazardous substance tank or container, above ground or underground, 56 gal. or more, or 100 lbs. or more dry weight, without safeguards	150	150		N		
HS3	Hazardous substance tank or container, above ground or underground, 56 gal. or more, or 100 lbs. or more dry weight with safeguards	100	100		N		
HS4	Hazardous substance multiple storage tanks or containers for residential retail sale or use, no single tank or container exceeding 56 gal. or 100 lbs., but aggregate volume exceeding	50	50		N		
HWF	Highest water or flood level	50	N/A		N		
*HG1	Horizontal ground source closed loop heat exchanger buried piping	50	50		N		
*HG2	Horizontal ground source closed loop heat exchanger buried piping and horizontal piping, approved materials and heat transfer fluid	50	10		N		
IWD	Industrial waste disposal well (Class V well)[2]	illegal[3]	illegal[3]		N		
IWS	Interceptor, including a flammable waste or sediment	50	50		N		
OH1	Ordinary high water level of a stream, river, pond, lake, reservoir, or drainage ditch (holds water six months or more)	50	35		N		

PWS ID / FACILITY ID	1020031 S13	UNIQUE WELL NO.	206696

PCSI CODE	ACTUAL OR POTENTIAL CONTAMINATION SOURCE	ISOLATION DISTANCES (FEET)				LOCATION	
		Minimum Distances		Sensitive Well[1]	Within 200 Ft. Y / N / U	Dist. from Well	Est. (?)
		Community	Non-community				
*PP1	Petroleum buried piping	50	50		N		
*PP2	Petroleum or crude oil pipeline to a refinery or distribution center	100	100		N		
PT1	Petroleum tank or container, 1100 gal. or more, without safeguards	150	150		N		
PT2	Petroleum tank or container, 1100 gal. or more, with safeguards	100	100		N		
PT3	Petroleum tank or container, buried, between 56 and 1100 gal.	50	50		N		
PT4	Petroleum tank or container, not buried, between 56 and 1100 gal.	50[5]	20		Y	102	Y
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	Y	111	Y
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.

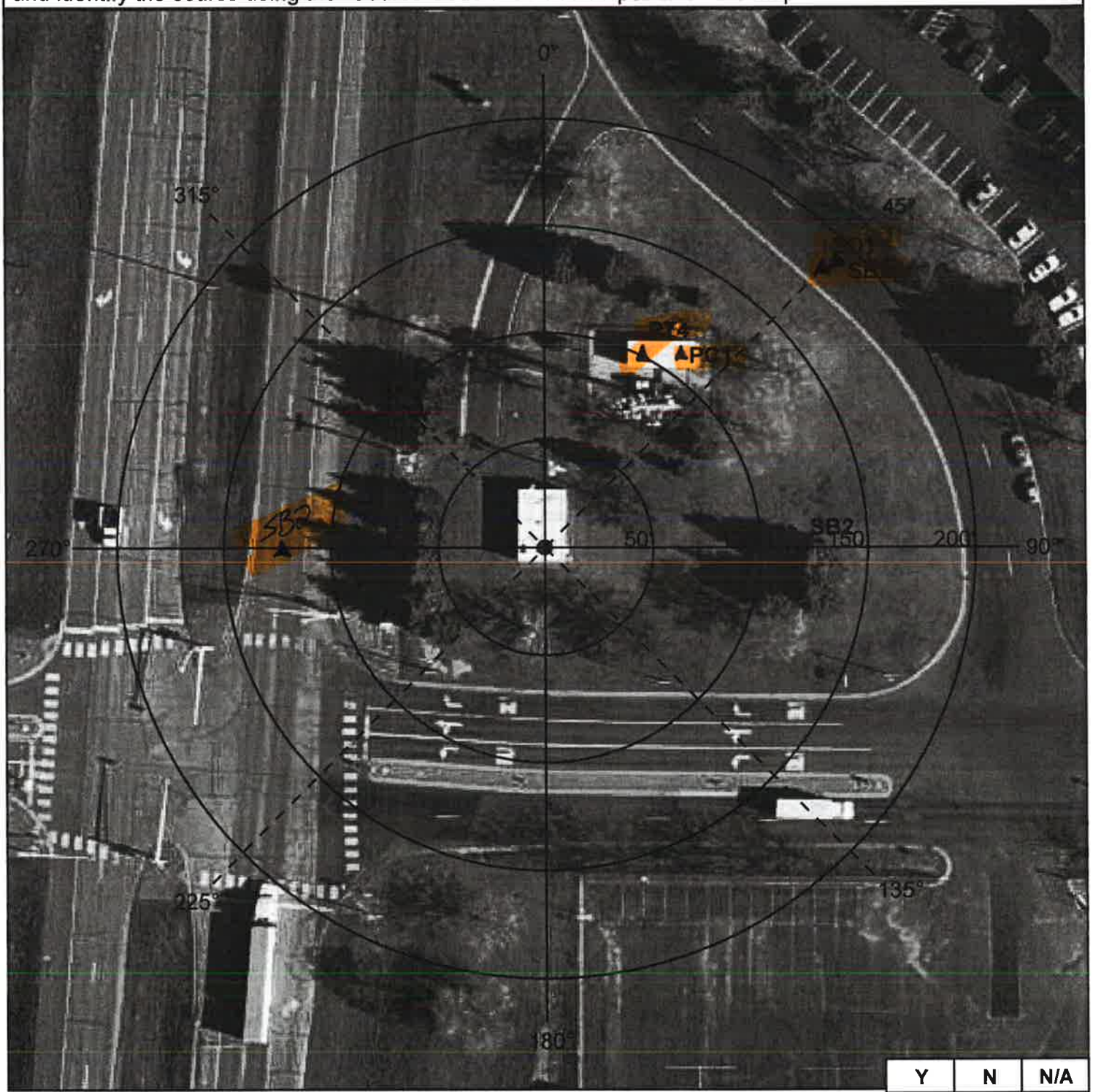
[5] A community public water-supply well must be a minimum of 50 feet from a petroleum tank or container, unless the tank or container is used for emergency pumping and is located in a room or building separate from the community well; and is of double-wall construction with leak detection between walls; 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	1020031 S13	UNIQUE WELL NO.	206696

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?			X

Reminder Question: Were the wellhead protection measure(s) implemented?			
INSPECTOR	McCormack, Simon	DATE	8 - 14 - 2017

PWS ID / FACILITY ID	1020031 S13	UNIQUE WELL NO.	206696

RECOMMENDED WELLHEAD PROTECTION (WHP) MEASURES	WHP MEASURE IMPLEMENTED? Y or N	DATE VERIFIED

COMMENTS

PC1 = Lead Acid Batteries
PT4 = Diesel Fuel

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

Attachment C-3

Sealed Wells

Table C-3-1

Sealed Wells in the DWSMA
City of Fridley Part 2 WHPP Amendment

PCSI ID	PID No.	Unique No.	Status	Use	Well Name	Well Location	City	Total Sealed Depth (Feet)	Date Completed/Sealed	Aquifer	PCS Code	Location Verified
1	003-143024210021	H0097711	Sealed	Not Available	Aasland, Losi	NE 1330 69th Av	Fridley	24	8/21/1990	Not Available	WEL	No
2	Not Available	H289055	Sealed	Not Available	Able Property Management	7479 Able St Ne	Fridley	16	6/14/2010	Not Available	WEL	No
3	Not Available	H289056	Sealed	Not Available	Able Property Management	7479 Able St	Fridley	26	6/16/2010	Not Available	WEL	No
4	Not Available	H289057	Sealed	Not Available	Able Property Management	7479 Able St Ne	Fridley	32	6/16/2010	Not Available	WEL	No
5	123-County RoW	H114464	Sealed	Not Available	Adams, Ada	2380 Long Lake Rd	New Brighton	70	3/21/1997	Not Available	WEL	No
6	003-133024320070	H175914	Sealed	Not Available	Aho, Mark	6304 Hwy 65 Ne	Fridley	36	10/27/2000	Not Available	WEL	No
7	Not Available	H261665	Sealed	Not Available	Al Amal School	1345 Gardena Av	Fridley	122	7/11/2007	Not Available	WEL	No
8	123-083023230009	H0292388	Sealed	Not Available	Alerus Financial	2436 10 Ch	Mounds View	20	2/25/2011	Not Available	WEL	No
9	123-083023230009	H0292389	Sealed	Not Available	Alerus Financial	2442 10 Ch	Mounds View	20	2/25/2011	Not Available	WEL	No
10	123-Municipal RoW	H253273	Sealed	Not Available	Allenson, Mark	2257 Rainbow Av	New Brighton	54	4/25/2007	Not Available	WEL	No
11	Not Available	H32251	Sealed	Not Available	Allie, Robert	1313 Hillcrest Dr Ne	Fridley	175	6/15/1993	Not Available	WEL	No
12	Not Available	H119095	Sealed	Not Available	Amar, Rosella	6121 Sunrise Dr	Fridley	78	6/25/1997	Not Available	WEL	No
13	Not Available	H0294549	Sealed	Not Available	Amburg, Inc.	6231 Sunrise Dr NE	Fridley	68	11/29/2011	Not Available	WEL	No
14	Not Available	H132928	Sealed	Not Available	Amcon Construction	355 Mississippi St Ne	Fridley	85	2/17/1998	Not Available	WEL	No
15	Not Available	H121372	Sealed	Not Available	Ames Construction	7500 Van Buren St Ne	Fridley	75	2/9/1996	Not Available	WEL	No
16	123-County RoW	H50615	Sealed	Not Available	Amoco Corporation	2155 Hwy 10	Mounds View	25	4/5/1995	Not Available	WEL	No
17	Not Available	465237	Sealed	Not Available	Amoco Service Station	7680 Hwy 65 Ne	Fridley	19	4/15/1994	Not Available	WEL	No
18	123-183023310003	H0295834	Sealed	Not Available	Amsrud, Donna	2069 Cedar Dr	New Brighton	29	7/19/2011	Not Available	WEL	No
19	003-123024210031	498847	Sealed	Not Available	Anderson Trucking, Inc.	7600 Old Central Av	Fridley	14	11/4/1993	Not Available	WEL	No
20	003-123024210031	498848	Sealed	Not Available	Anderson Trucking, Inc.	7600 Old Central Av	Fridley	14	11/4/1993	Not Available	WEL	No
21	003-123024210031	498849	Sealed	Not Available	Anderson Trucking, Inc.	7600 Old Central Av	Fridley	14	11/4/1993	Not Available	WEL	No
22	003-123024210031	498850	Sealed	Not Available	Anderson Trucking, Inc.	7600 Old Central Av	Fridley	13	11/4/1993	Not Available	WEL	No
23	123-Municipal RoW	H193680	Sealed	Not Available	Anderson, Doris	2906 16th St	New Brighton	112	4/2/2002	Not Available	WEL	No
24	123-193023240044	H212131	Sealed	Not Available	Anderson, Edwin P.	2651 Nw15th St	New Brighton	141	8/16/2004	Not Available	WEL	No
25	123-Municipal RoW	H4344	Sealed	Not Available	Anderson, Ellen M	2456 Clearview Av	Mounds View	30	5/9/1990	Not Available	WEL	No
26	123-Municipal RoW	H20728	Sealed	Not Available	Anderson, Howard	2201 Oriole Av	New Brighton	61	5/29/1992	Not Available	WEL	No
27	123-073023440078	H170550	Sealed	Not Available	Anderson, Jay	1015 Mississippi St	Mounds View	24	9/24/2001	Not Available	WEL	No
28	123-Municipal RoW	H81474	Sealed	Not Available	Anderson, Jeff	2271 Oriole Av	New Brighton	65	10/23/1992	Not Available	WEL	No
29	003-013024430037	H28621	Sealed	Not Available	Anderson, Jim	7729 Lakeview La	Fridley	80	6/28/1993	Not Available	WEL	No
30	003-013024430037	H100045	Sealed	Not Available	Anderson, Jim	7731 Lakeview La	Fridley	84	2/14/1996	Not Available	WEL	No
31	Not Available	H157983	Sealed	Not Available	Anderson, Ruby	1491 Rice Creek Rd Ne	Fridley	60	1/26/2000	Not Available	WEL	No
32	003-123024210007	555193	Sealed	Not Available	Anoka County Highway Department	County Road 35	Fridley	40	11/9/1998	Not Available	WEL	No
33	003-24302441COND	H30142	Sealed	Not Available	Anoka County Highway Department	10554 University Extension	Fridley	92	1/12/1994	Not Available	WEL	No
34	Not Available	H102272	Sealed	Not Available	Arel, Roger	1521 Ferndale Av	Fridley	171	6/21/1996	Not Available	WEL	No
35	003-123024230002	H0292018	Sealed	Not Available	Ashland, Inc.	7315 65 Hy NE	Fridley	32	1/26/2011	Not Available	WEL	No
36	123-173023220021	H196824	Sealed	Not Available	Ashley, Myron	2504 14th Av Nw	New Brighton	20	3/14/2003	Not Available	WEL	No
37	123-County RoW	H128653	Sealed	Not Available	Asproth, Charles	3025 County Road H	Mounds View	25	1/2/1965	Not Available	WEL	No
38	Not Available	H223456	Sealed	Not Available	Aumock, Brenda	6311 Monroe St Ne	Fridley	19	5/26/2004	Not Available	WEL	No
39	003-243024130013	522954	Sealed	Monitor Well	BURLINGTON NORTHERN RAILROAD MW-1	44TH& E. RIVER RD.	Fridley	27	31/03/1993	Not Available	WEL	No
40	Not Available	H81052	Sealed	Not Available	Bacon, Herb	6525 Central Av Ne	Fridley	71	11/11/1992	Not Available	WEL	No
41	123-Municipal RoW	H73696	Sealed	Not Available	Bader, Irving H.	2387 17th Av Nw	New Brighton	38	10/26/1995	Not Available	WEL	No
42	Not Available	H153353	Sealed	Not Available	Bakke, Lara	6610 Mckinley St Ne	Fridley	90	4/27/1999	Not Available	WEL	No
43	123-Municipal RoW	H3711	Sealed	Not Available	Ball, Linda	1637 Longview Dr	New Brighton	63	6/26/1990	Not Available	WEL	No
44	003-013024340050	H0295049	Sealed	Not Available	Bank West	1229 Osborne Rd NE	Fridley	46	9/15/2011	Not Available	WEL	No
45	Not Available	H135437	Sealed	Not Available	Barrett, Annette	357 66th Av Ne	Fridley	89	5/13/1998	Not Available	WEL	No
46	123-Municipal RoW	H150193	Sealed	Not Available	Barrows, Charles P.	5066 Sunnyside Rd	Mounds View	20	6/21/1999	Not Available	WEL	No
47	003-123024230028	H74813	Sealed	Not Available	Bartel, Kathy	118 Magnolia St	Fridley	35	1/29/1996	Not Available	WEL	No
48	123-Municipal RoW	H159899	Sealed	Not Available	Bartholomew, Thomas	2202 Rainbow Av	New Brighton	60	7/20/2000	Not Available	WEL	No
49	Not Available	H226128	Sealed	Not Available	Baumeister, Rodney	5632 Sixth St Ne	Fridley	15	9/22/2004	Not Available	WEL	No
50	123-County RoW	H288114	Sealed	Not Available	Beach, D L.	2251 Long Lake Rd	New Brighton	40	6/11/2010	Not Available	WEL	No
51	123-County RoW	H142651	Sealed	Not Available	Beach, Larry	1615 Silver Lake Rd	New Brighton	120	8/21/1998	Not Available	WEL	No
52	123-Municipal RoW	H21687	Sealed	Not Available	Beisswenger, Mark	2151 29th Av Nw	New Brighton	90	6/25/1992	Not Available	WEL	No

Table C-3-1

Sealed Wells in the DWSMA
City of Fridley Part 2 WHPP Amendment

PCSI ID	PID No.	Unique No.	Status	Use	Well Name	Well Location	City	Total Sealed Depth (Feet)	Date Completed/Sealed	Aquifer	PCS Code	Location Verified
53	123-183023210001	H0295841	Sealed	Not Available	Benedix, Margy	2083 Longview Dr	New Brighton	28	9/20/2011	Not Available	WEL	No
54	003-143024240036	H0290235	Sealed	Not Available	Bennethum, Scott	368 66th Av NE	Fridley	80	3/31/2011	Not Available	WEL	No
55	Not Available	H100092	Sealed	Not Available	Benson, Robert	1051 64th Av Ne	Fridley	74	3/20/1996	Not Available	WEL	No
56	123-073023430071	H0295969	Sealed	Not Available	Berg, Arnold	5108 Red Oak Dr	Mounds View	15	8/26/2011	Not Available	WEL	No
57	003-133024440010	H143767	Sealed	Not Available	Berg, Tran	1632 Rice Creek Rd Ne	Fridley	130	11/4/1998	Not Available	WEL	No
58	123-County RoW	H70513	Sealed	Not Available	Bergh, Florence S.	2503 Silver Lake Rd	New Brighton	40	6/29/1995	Not Available	WEL	No
59	Not Available	H52954	Sealed	Not Available	Bergman, Jeff/virgini	1324 Hillcrest Dr	Fridley	149	5/24/1994	Not Available	WEL	No
60	Not Available	H142658	Sealed	Not Available	Bergman, Leonard	6435 Pierce St Ne	Fridley	120	8/17/1998	Not Available	WEL	No
61	123-073023340031	H196826	Sealed	Not Available	Bergreth, James	2932 Springview La	Mounds View	112	3/21/2003	Not Available	WEL	No
62	Not Available	H38727	Sealed	Not Available	Bernardson, John	876 76th Av Ne	Fridley	35	8/23/1993	Not Available	WEL	No
63	123-Municipal RoW	H64224	Sealed	Not Available	Bertozzi, Kenneth N.	2453 Gregory Dr	New Brighton	26	5/18/1995	Not Available	WEL	No
64	123-Municipal RoW	H237008	Sealed	Not Available	Bidon, Pat	3017 County Road H2	Mounds View	31	5/31/2007	Not Available	WEL	No
65	Not Available	H55411	Sealed	Not Available	Bigelow, Kenneth/judy	1363 66th Av Ne	Fridley	104	9/5/1994	Not Available	WEL	No
66	Not Available	H91878	Sealed	Not Available	Binckner Builders	5980 Stinson Bl	Fridley	196	4/14/1988	Not Available	WEL	No
67	123-County RoW	H192369	Sealed	Not Available	Bisset, Harold	2577 County Road H	Mounds View	12	8/5/2002	Not Available	WEL	No
68	Not Available	H246967	Sealed	Not Available	Bjerkness, Kris	7011 University Av	Fridley	40	12/7/2006	Not Available	WEL	No
69	123-083023320006	H19797	Sealed	Not Available	Blakely, Rollie	2462 County Road H2	Mounds View	30	4/14/1992	Not Available	WEL	No
70	123-Municipal RoW	H137343	Sealed	Not Available	Blanchard, Lloyd	8005 Groveland Rd	Mounds View	28	5/27/1998	Not Available	WEL	No
71	123-County RoW	H150221	Sealed	Not Available	Bochinski, Peggy Rose	1854 Long Lake Rd	New Brighton	97	9/1/1999	Not Available	WEL	No
72	123-Municipal RoW	H0290243	Sealed	Not Available	Boehm, Dave	7656 Greenfield Av	Mounds View	16	5/5/2011	Not Available	WEL	No
73	123-083023320029	H45915	Sealed	Not Available	Bogenholm, Dick	2439 Ridge La	Mounds View	30	3/3/1994	Not Available	WEL	No
74	123-Municipal RoW	H56855	Sealed	Not Available	Bohl, Ed/kay	2330 17th Av Nw	New Brighton	57	8/24/1994	Not Available	WEL	No
75	003-113024140083	H0294544	Sealed	Not Available	Bohlman, Al	7431 Vanburen St NE	Fridley	35	11/1/2011	Not Available	WEL	No
76	Not Available	H54852	Sealed	Not Available	Bohne, Catherine	1359 Hillcrest St	Fridley	138	8/22/1994	Not Available	WEL	No
77	003-123024340003	235502	Sealed	Not Available	Boise Cascade Corporation	7000 Central Av Ne	Fridley	22	9/27/2001	Not Available	WEL	No
78	Not Available	H150718	Sealed	Not Available	Boise Cascade Corporation	1400 73rd Av Ne	Fridley	25	4/5/1999	Not Available	WEL	No
79	Not Available	H150719	Sealed	Not Available	Boise Cascade Corporation	1400 73rd Av Ne	Fridley	18	4/5/1999	Not Available	WEL	No
80	123-Municipal RoW	H26205	Sealed	Not Available	Bolman, Bruce	7555 Knollwood Dr	Mounds View	40	10/29/1992	Not Available	WEL	No
81	123-Municipal RoW	H231767	Sealed	Not Available	Bona, Shirley	5155 Bona Rd	Mounds View	30	2/7/2005	Not Available	WEL	No
82	123-Municipal RoW	H4348	Sealed	Not Available	Bowman, Larry J	2467 Clearview Av	Mounds View	32	4/26/1990	Not Available	WEL	No
83	Not Available	H193993	Sealed	Not Available	Boyce, Al	6452 Able St	Fridley	19	4/12/2002	Not Available	WEL	No
84	123-Municipal RoW	H54857	Sealed	Not Available	Boyer, Henry K.	2761 15th St Nw	New Brighton	120	9/1/1994	Not Available	WEL	No
85	Not Available	462346	Sealed	Not Available	Bp Products North America, Inc.	7680 Hwy 65 Ne	Fridley	19	11/22/2002	Not Available	WEL	No
86	Not Available	462347	Sealed	Not Available	Bp Products North America, Inc.	7680 Hwy 65 Ne	Fridley	16	11/22/2002	Not Available	WEL	No
87	Not Available	462348	Sealed	Not Available	Bp Products North America, Inc.	7680 Hwy 65 Ne	Fridley	16	11/22/2002	Not Available	WEL	No
88	Not Available	468561	Sealed	Not Available	Bp Products North America, Inc.	7680 Hwy 65 Ne	Fridley	16	11/22/2002	Not Available	WEL	No
89	Not Available	468562	Sealed	Not Available	Bp Products North America, Inc.	7680 Hwy 65 Ne	Fridley	16	11/22/2002	Not Available	WEL	No
90	Not Available	510592	Sealed	Not Available	Bp Products North America, Inc.	7680 Hwy 65 Ne	Fridley	40	11/22/2002	Not Available	WEL	No
91	Not Available	635495	Sealed	Not Available	Bp Products North America, Inc.	7680 Hwy 65 Ne	Fridley	16	11/22/2002	Not Available	WEL	No
92	Not Available	635496	Sealed	Not Available	Bp Products North America, Inc.	1040 Osborne Rd	Fridley	16	11/22/2002	Not Available	WEL	No
93	Not Available	H203259	Sealed	Not Available	Bp Products North America, Inc.	7680 Hwy 65 Ne	Fridley	16	11/22/2002	Not Available	WEL	No
94	123-Municipal RoW	H69645	Sealed	Not Available	Brandell, Bonita	1963 Longview Dr	New Brighton	25	7/6/1995	Not Available	WEL	No
95	Not Available	H67981	Sealed	Not Available	Brandt, Wayne	6231 Sunrise Dr Ne	Fridley	65	5/2/1995	Not Available	WEL	No
96	123-Municipal RoW	H118840	Sealed	Not Available	Briggs, John R	2580 17th Av Nw	New Brighton	35	6/17/1997	Not Available	WEL	No
97	123-Municipal RoW	H182425	Sealed	Not Available	Brockway, Thomas E.	5045 Longview Dr	Mounds View	21	8/29/2001	Not Available	WEL	No
98	123-Municipal RoW	H13083	Sealed	Not Available	Brockway, Verna	5059 Red Oak Dr	Mounds View	43	6/27/1991	Not Available	WEL	No
99	Not Available	H284191	Sealed	Not Available	Brodal, Wayne	931 Mississippi St	Fridley	74	3/18/2010	Not Available	WEL	No
100	Not Available	H52040	Sealed	Not Available	Brouillette, Daniel/sally	1358 Hillcrest Dr Ne	Fridley	122	6/10/1994	Not Available	WEL	No
101	123-Municipal RoW	H126215	Sealed	Not Available	Brown, Gary E.	7500 Knollwood Av	Mounds View	32	8/13/1997	Not Available	WEL	No
102	123-083023320007	H29758	Sealed	Not Available	Brown, Joann L.	2468 County Road H2 W	Mounds View	22	5/20/1993	Not Available	WEL	No
103	Not Available	H161888	Sealed	Not Available	Brubak, Ron	6360 Monroe St Ne	Fridley	16	11/30/1999	Not Available	WEL	No
104	Not Available	H161889	Sealed	Not Available	Brubak, Ron	6360 Monroe St Ne	Fridley	20	11/30/1999	Not Available	WEL	No

Table C-3-1

Sealed Wells in the DWSMA
City of Fridley Part 2 WHPP Amendment

PCSI ID	PID No.	Unique No.	Status	Use	Well Name	Well Location	City	Total Sealed Depth (Feet)	Date Completed/Sealed	Aquifer	PCS Code	Location Verified
105	Not Available	H130983	Sealed	Not Available	Bruce Larson, Estate Of	6420 Arthur St	Fridley	0	2/4/1998	Not Available	WEL	No
106	123-Municipal RoW	H285967	Sealed	Not Available	Brush Masters	1854 Longview Dr	New Brighton	66	5/10/2010	Not Available	WEL	No
107	Not Available	H100079	Sealed	Not Available	Buck, Elsie	372 66th Av	Fridley	78	3/11/1996	Not Available	WEL	No
108	123-Municipal RoW	H126231	Sealed	Not Available	Bultena, Bernita	1906 Cedar Dr	New Brighton	38	9/30/1997	Not Available	WEL	No
109	Not Available	H29754	Sealed	Not Available	Burch, Richard	1490 64th Av Ne	Fridley	75	5/20/1993	Not Available	WEL	No
110	003-243024130013	H136889	Sealed	Not Available	Burlington Northern	44th (& River Rd E)	Fridley	27	6/22/1998	Not Available	WEL	No
111	003-243024130013	522950	Sealed	Not Available	Burlington Northern Railroad	44th (& River Rd E)	Fridley	27	6/22/1998	Not Available	WEL	No
112	003-243024130013	533630	Sealed	Not Available	Burlington Northern Railroad	44th (& River Rd E)	Fridley	24	6/22/1998	Not Available	WEL	No
113	003-243024130013	533632	Sealed	Not Available	Burlington Northern Railroad	44th (& River Rd E)	Fridley	24	6/22/1998	Not Available	WEL	No
114	003-243024130013	H136886	Sealed	Not Available	Burlington Northern Railroad	44th (& River Rd E)	Fridley	26	6/22/1998	Not Available	WEL	No
115	003-243024130013	H136887	Sealed	Not Available	Burlington Northern Railroad	44th (& River Rd E)	Fridley	25	6/22/1998	Not Available	WEL	No
116	003-243024130013	H136888	Sealed	Not Available	Burlington Northern Railroad	44th (& River Rd E)	Fridley	25	6/23/1998	Not Available	WEL	No
117	003-143024340091	496482	Sealed	Not Available	Burlington Northern Santa Fe Railway Co.	Not Available	Fridley	28	7/12/2001	Not Available	WEL	No
118	003-243024110044	H123339	Sealed	Not Available	Burrow, Joan	5924 Oakwood Manor	Fridley	150	6/25/1997	Not Available	WEL	No
119	123-193023240052	H20463	Sealed	Not Available	Burt, Larry	2700 14th St Nw	New Brighton	75	4/27/1992	Not Available	WEL	No
120	003-113024330005	636459	Sealed	Monitor Well	CITY OF FRIDLEY	400 71ST AV NE	Fridley	45	14/09/1999	Not Available	WEL	No
121	003-113024330005	636458	Sealed	Monitor Well	CITY OF FRIDLEY	400 71ST AV NE	Fridley	45	14/09/1999	Not Available	WEL	No
122	003-113024330005	636457	Sealed	Monitor Well	CITY OF FRIDLEY	6431 UNIVERSITY AV NE	Fridley	75	13/09/1999	Not Available	WEL	No
123	003-113024330005	636456	Sealed	Monitor Well	CITY OF FRIDLEY	400 71ST AV NE	Fridley	75	14/09/1999	Not Available	WEL	No
124	003-113024330005	643983	Sealed	Monitor Well	CITY OF FRIDLEY	400 71ST AV NE	Fridley	40	05/05/2000	Not Available	WEL	No
125	003-113024330005	643982	Sealed	Monitor Well	CITY OF FRIDLEY	400 71ST AV NE	Fridley	78	04/05/2000	Not Available	WEL	No
126	003-113024330005	643981	Sealed	Monitor Well	CITY OF FRIDLEY	400 71ST AV NE	Fridley	100	04/05/2000	Not Available	WEL	No
127	003-013024340003	768963	Sealed	Dewatering Wel	CITY OF SPRING LAKE PARK	7741 65 HC NE	Fridley	40	28/10/2011	Not Available	WEL	No
128	Not Available	H208065	Sealed	Not Available	Calistro, Betty	543 66th Av	Fridley	65	5/20/2003	Not Available	WEL	No
129	123-Municipal RoW	H22462	Sealed	Not Available	Calkins, Lou	5092 Longview Dr	Mounds View	35	7/22/1992	Not Available	WEL	No
130	123-Municipal RoW	H18220	Sealed	Not Available	Caovette, Therese	5093 Irondale Rd	Mounds View	194	3/10/1992	Not Available	WEL	No
131	123-Municipal RoW	H259690	Sealed	Not Available	Carbaugh, Curt	2005 Sunnyside Te	New Brighton	25	6/16/2008	Not Available	WEL	No
132	Not Available	H126223	Sealed	Not Available	Cardinal, Bruce J.	573 Bennett Dr Ne	Fridley	16	9/4/1997	Not Available	WEL	No
133	Not Available	H160008	Sealed	Not Available	Carlier, Margaret	374 66th Av Ne	Fridley	76	9/22/1999	Not Available	WEL	No
134	Not Available	H160010	Sealed	Not Available	Carlier, Margaret	374 66th Av Ne	Fridley	98	9/22/1999	Not Available	WEL	No
135	123-063023240023	H56711	Sealed	Not Available	Carlson, Beverly/mich	8132 Groveland Rd	Mounds View	20	4/1/1995	Not Available	WEL	No
136	Not Available	H216957	Sealed	Not Available	Carlson, Kathy	7601 Jackson St	Fridley	18	12/12/2003	Not Available	WEL	No
137	Not Available	H163718	Sealed	Not Available	Chappa, Jerry/judy	6516 Pierce St Ne	Fridley	90	4/27/2000	Not Available	WEL	No
138	123-Municipal RoW	H108760	Sealed	Not Available	Checky, Linda	2463 Woodale Dr	Mounds View	15	7/18/1996	Not Available	WEL	No
139	Not Available	H122833	Sealed	Not Available	Chismar, Becky	6428 Dellwood Dr	Fridley	15	6/20/1996	Not Available	WEL	No
140	Not Available	H72248	Sealed	Not Available	Chmiel, Michael	6039 Second St Ne	Fridley	62	10/18/1995	Not Available	WEL	No
141	123-County RoW	H289737	Sealed	Not Available	Christen Properties	2310 Hwy 10	Mounds View	42	8/16/2010	Not Available	WEL	No
142	123-County RoW	H289728	Sealed	Not Available	Christen Properties	2310 Hwy 10 Ne	Mounds View	110	8/16/2010	Not Available	WEL	No
143	Not Available	H246075	Sealed	Not Available	Christianson, Karl	1327 66th Av Ne	Fridley	86	6/1/2006	Not Available	WEL	No
144	123-County RoW	H153376	Sealed	Not Available	Ciesmer, Pat	1470 Silver Lake Rd	New Brighton	155	5/18/1999	Not Available	WEL	No
145	003-243024320002	544144	Sealed	Not Available	Citgo Gas Station	5695 Hackmann Av	Fridley	73	4/30/1999	Not Available	WEL	No
146	003-243024320002	564027	Sealed	Not Available	Citgo Gas Station	5695 Hackmann Av	Fridley	105	4/30/1999	Not Available	WEL	No
147	Not Available	H102724	Sealed	Not Available	Clair, Helen	6609 Channel Rd	Fridley	67	4/25/1996	Not Available	WEL	No
148	Not Available	H41302	Sealed	Not Available	Colins, Everet	5908 Fifth St	Fridley	12	8/26/1993	Not Available	WEL	No
149	003-233024210049	H0301949	Sealed	Not Available	Collen Larson Estate	6031 Fourth St	Fridley	18	3/29/2012	Not Available	WEL	No
150	123-Municipal RoW	H151728	Sealed	Not Available	Collins, Michael/meli	5101 Brighton La	Mounds View	14	10/29/1999	Not Available	WEL	No
151	123-083023320037	H34586	Sealed	Not Available	Collins, Stan	2432 Ridge La	Mounds View	28	3/12/1993	Not Available	WEL	No
152	123-Municipal RoW	H18511	Sealed	Not Available	Comben,	2824 Woodcrest Dr	Mounds View	17	10/4/1991	Not Available	WEL	No
153	Not Available	H243518	Sealed	Not Available	Combs, David	1245 Norton Av Ne	Fridley	16	12/23/2005	Not Available	WEL	No
154	Not Available	H11893	Sealed	Not Available	Conley, Edward	5621 Sixth St Ne	Fridley	23	7/18/1991	Not Available	WEL	No
155	003-143024340091	H3203	Sealed	Not Available	Coon Rapids, City Of	12727 Round Lake Bl	Fridley	23	4/4/1990	Not Available	WEL	No
156	003-143024340091	H3205	Sealed	Not Available	Coon Rapids, City Of	12727 Round Lake Bl	Fridley	65	4/4/1990	Not Available	WEL	No

Table C-3-1

Sealed Wells in the DWSMA
City of Fridley Part 2 WHPP Amendment

PCSI ID	PID No.	Unique No.	Status	Use	Well Name	Well Location	City	Total Sealed Depth (Feet)	Date Completed/Sealed	Aquifer	PCS Code	Location Verified
157	Not Available	H164285	Sealed	Not Available	Costello, Anita	7314 Hayes St Ne	Fridley	21	4/18/2001	Not Available	WEL	No
158	Not Available	H142657	Sealed	Not Available	Costello, Anna M.	1623 Gardena Av Ne	Fridley	142	8/27/1998	Not Available	WEL	No
159	Not Available	H0297835	Sealed	Not Available	Cummings Power Generation	1440 73rd Av NE	Fridley	20	9/23/2011	Not Available	WEL	No
160	Not Available	H0297833	Sealed	Not Available	Cummings Power Generation	1440 73rd Av NE	Fridley	15	9/23/2011	Not Available	WEL	No
161	Not Available	H282604	Sealed	Not Available	Cummins Power Generation	1400 73rd Av Ne	Fridley	7	8/11/2009	Not Available	WEL	No
162	Not Available	H279092	Sealed	Not Available	Cummins Power Generation	1400 73rd Av	Fridley	16	8/20/2009	Not Available	WEL	No
163	Not Available	H287492	Sealed	Not Available	Cummins Power Generation	1440 73rd Av	Fridley	20	5/26/2010	Not Available	WEL	No
164	Not Available	H259441	Sealed	Not Available	Cummins, Inc.	1400 73rd Av Ne	Fridley	21	9/23/2008	Not Available	WEL	No
165	123-Municipal RoW	H26157	Sealed	Not Available	Curtis, Robert A.	2021 Longview Dr	New Brighton	25	10/26/1992	Not Available	WEL	No
166	Not Available	H36993	Sealed	Not Available	Cypress Development Company	Not Available	Fridley	0	3/8/1994	Not Available	WEL	No
167	123-Municipal RoW	H118818	Sealed	Not Available	Dahlin, Michelyn	1745 Cedar Dr	New Brighton	35	5/6/1997	Not Available	WEL	No
168	123-Municipal RoW	H118819	Sealed	Not Available	Dandt, Joretta	2451 17th Av	New Brighton	35	5/15/1997	Not Available	WEL	No
169	Not Available	H65330	Sealed	Not Available	Decker, Toni S.	6030 Seventh St Ne	Fridley	24	6/2/1995	Not Available	WEL	No
170	Not Available	H70011	Sealed	Not Available	Demarais, Rose	6411 Pierce St	Fridley	74	6/1/1995	Not Available	WEL	No
171	003-123024240004	H118398	Sealed	Not Available	Demars, Deloris	1130 Fireside Dr	Fridley	179	5/15/1997	Not Available	WEL	No
172	Not Available	H94862	Sealed	Not Available	Demars, Dennis	1500 Osborne Rd	Fridley	22	6/5/1989	Not Available	WEL	No
173	123-Municipal RoW	H80297	Sealed	Not Available	Demars, Michael	7564 Spring Lake Rd	Mounds View	28	12/11/1992	Not Available	WEL	No
174	123-Municipal RoW	H57749	Sealed	Not Available	Deppa, John	5072 Brighton La	Mounds View	30	9/27/1994	Not Available	WEL	No
175	Not Available	632114	Sealed	Not Available	Determan Brownie	1241 72nd Av Ne	Fridley	25	3/13/2009	Not Available	WEL	No
176	Not Available	632116	Sealed	Not Available	Determan Brownie	1241 72nd Av Ne	Fridley	18	3/13/2009	Not Available	WEL	No
177	Not Available	614163	Sealed	Not Available	Determan Brownie	1241 72nd Av Ne	Fridley	22	3/13/2009	Not Available	WEL	No
178	Not Available	614162	Sealed	Not Available	Determan Brownie	1241 72nd Av Ne	Fridley	22	3/13/2009	Not Available	WEL	No
179	Not Available	557523	Sealed	Not Available	Determan Brownie	1241 72nd Av Ne	Fridley	18	3/13/2009	Not Available	WEL	No
180	Not Available	622605	Sealed	Not Available	Determan Brownie	1200 72nd Av Ne	Fridley	19	3/13/2009	Not Available	WEL	No
181	Not Available	632115	Sealed	Not Available	Determan Brownie	1200 72nd Av Ne	Fridley	19	3/13/2009	Not Available	WEL	No
182	Not Available	560633	Sealed	Not Available	Determan Brownie, Inc.	1241 72nd Av Ne	Fridley	35	7/5/2007	Not Available	WEL	No
183	Not Available	586417	Sealed	Not Available	Determan Brownie, Inc.	1241 72nd Av Ne	Fridley	56	7/5/2007	Not Available	WEL	No
184	Not Available	557529	Sealed	Not Available	Determan Brownie, Inc.	1241 72nd Av Ne	Fridley	35	7/5/2007	Not Available	WEL	No
185	Not Available	557524	Sealed	Not Available	Determan Brownie, Inc.	1241 72nd Av Ne	Fridley	18	7/5/2007	Not Available	WEL	No
186	Not Available	557522	Sealed	Not Available	Determan Brownie, Inc.	1241 72nd Av Ne	Fridley	18	7/5/2007	Not Available	WEL	No
187	Not Available	557519	Sealed	Not Available	Determan Brownie, Inc.	1241 72nd Av Ne	Fridley	18	7/5/2007	Not Available	WEL	No
188	Not Available	557520	Sealed	Not Available	Determan Brownie, Inc.	1241 72nd Av Ne	Fridley	15	7/5/2007	Not Available	WEL	No
189	Not Available	557521	Sealed	Not Available	Determan Brownie, Inc.	1241 72nd Av Ne	Fridley	15	7/5/2007	Not Available	WEL	No
190	Not Available	H146409	Sealed	Not Available	Determan Welding & Tank	1241 72nd Av Ne	Fridley	16	9/22/1998	Not Available	WEL	No
191	Not Available	H0097721	Sealed	Not Available	Determan Welding And Tank Service, Inc.	1241 72nd Av NE	Fridley	18	11/17/1989	Not Available	WEL	No
192	Not Available	H0097722	Sealed	Not Available	Determan Welding And Tank Service, Inc.	1241 72nd Av NE	Fridley	17	11/17/1989	Not Available	WEL	No
193	Not Available	H0097723	Sealed	Not Available	Determan Welding And Tank Service, Inc.	1241 72nd Av NE	Fridley	16	11/17/1989	Not Available	WEL	No
194	123-083023320108	H130729	Sealed	Not Available	Dockter, Orville	2474 County Road H2	Mounds View	29	3/30/1998	Not Available	WEL	No
195	123-Municipal RoW	H152647	Sealed	Not Available	Dockter, Sheryl	3077 Spring Creek Dr	New Brighton	88	6/4/1999	Not Available	WEL	No
196	003-123024310096	H0296699	Sealed	Not Available	Don Harstad Co.	7101 65 Hy NE	Fridley	12	5/8/2012	Not Available	WEL	No
197	123-063023320005	H108840	Sealed	Not Available	Dougherty, Mona	7925 Spring Lake Park Rd	Spring Lake Park	28	10/22/1996	Not Available	WEL	No
198	Not Available	H119027	Sealed	Not Available	Dowma, Naomi	5809 Arthur St	Fridley	180	4/29/1997	Not Available	WEL	No
199	123-Municipal RoW	H237006	Sealed	Not Available	Downing, Harlan	5071 Greenwood Dr	Mounds View	29	5/10/2007	Not Available	WEL	No
200	Not Available	H111766	Sealed	Not Available	Dufault, Ronald A.	7566 Stinson Bl	Fridley	30	10/7/1996	Not Available	WEL	No
201	123-Municipal RoW	H81284	Sealed	Not Available	Dziewieczynski, Adeline	2230 Thorndale	New Brighton	67	10/28/1992	Not Available	WEL	No
202	003-153024410073	H26698	Sealed	Not Available	Edina Realty	71 63┴╨ Wa Ne	Fridley	34	5/25/1993	Not Available	WEL	No
203	123-Municipal RoW	H22196	Sealed	Not Available	Edina Realty Corporation Relocation	3044 16th St Nw	New Brighton	158	7/14/1992	Not Available	WEL	No
204	003-143024340091	H22478	Sealed	Not Available	Edson, Maynard	7805 Beech St Ne	Fridley	20	7/23/1992	Not Available	WEL	No
205	Not Available	H268759	Sealed	Not Available	Ehlert, Jim	6041 Sixth St Ne	Fridley	15	4/1/2008	Not Available	WEL	No
206	Not Available	H140648	Sealed	Not Available	El-tronic Precision, Inc.	7345 Baker St	Fridley	14	7/31/1998	Not Available	WEL	No
207	123-Municipal RoW	H211029	Sealed	Not Available	Elias Nordgren, Estate Of	3032 Bronson Dr	Mounds View	34	7/23/2003	Not Available	WEL	No
208	123-063023310036	H159867	Sealed	Not Available	Emerson, Erick R.	7971 Spring Lake Park Rd	Spring Lake Park	33	5/1/2000	Not Available	WEL	No

Table C-3-1

Sealed Wells in the DWSMA
City of Fridley Part 2 WHPP Amendment

PCSI ID	PID No.	Unique No.	Status	Use	Well Name	Well Location	City	Total Sealed Depth (Feet)	Date Completed/Sealed	Aquifer	PCS Code	Location Verified
209	003-133024330004	H91850	Sealed	Not Available	Enebeck Construct.	6222 Old Century Rd	Fridley	150	8/1/1988	Not Available	WEL	No
210	123-Municipal RoW	H200400	Sealed	Not Available	England, Lorius	2285 Oriole Av	New Brighton	50	4/22/2003	Not Available	WEL	No
211	123-073023340057	H236688	Sealed	Not Available	Engquist, Lou Ella	2940 Spring View La	Mounds View	156	7/28/2005	Not Available	WEL	No
212	123-Municipal RoW	H278283	Sealed	Not Available	Erickson, Bruce	2216 Rainbow Av	New Brighton	66	12/15/2009	Not Available	WEL	No
213	123-Municipal RoW	H32112	Sealed	Not Available	Erickson, Darwin	2530 17th Av Nw	New Brighton	30	3/31/1993	Not Available	WEL	No
214	123-Municipal RoW	H74265	Sealed	Not Available	Erickson, Harlan	1771 Longview Dr	New Brighton	70	12/4/1995	Not Available	WEL	No
215	003-143024130047	H151034	Sealed	Not Available	Erlandson, Eleanor S.	521 Mississippi St	Fridley	81	5/5/1999	Not Available	WEL	No
216	123-County RoW	H232467	Sealed	Not Available	Estates Of	2378 Long Lake Rd	New Brighton	59	5/24/2005	Not Available	WEL	No
217	Not Available	H216990	Sealed	Not Available	Evans, Mike	1561 Ferndale Av Ne	Fridley	175	3/24/2004	Not Available	WEL	No
218	123-County RoW	H4358	Sealed	Not Available	Everest Construction Investment Co.	2244 Hwy 10	Mounds View	127	8/28/1989	Not Available	WEL	No
219	123-County RoW	H4359	Sealed	Not Available	Everest Construction Investment Co.	2260 Hwy 10	Mounds View	20	8/8/1989	Not Available	WEL	No
220	003-243024120055	247487	Sealed	Domestic	FLOLID, TOM	6053 WOODY LA	Fridley	121	29/12/1992	QUUU	WEL	No
221	003-013024440010	206636	Sealed	Test Well	FRIDLEY TW-6	Not Available	Fridley	164	18/02/1969	Not Available	WEL	No
222	003-113024330005	629510	Sealed	Monitor Well	FRIDLEY, CITY OF	400 71 AV NE	Fridley	41	14/06/1999	Not Available	WEL	No
223	003-113024330005	629513	Sealed	Monitor Well	FRIDLEY, CITY OF - LAWER	400 71 AV NE	Fridley	15	14/06/1999	Not Available	WEL	No
224	003-113024330005	629512	Sealed	Monitor Well	FRIDLEY, CITY OF - LAWER	400 71 AV	Fridley	15	14/06/1999	Not Available	WEL	No
225	003-113024330005	629511	Sealed	Monitor Well	FRIDLEY, CITY OF - LAWER	400 71 AV	Fridley	15	14/06/1999	Not Available	WEL	No
226	003-113024330005	629509	Sealed	Monitor Well	FRIDLEY, CITY OF - LAWER	400 71 AV	Fridley	15	15/06/1999	Not Available	WEL	No
227	Not Available	H125465	Sealed	Not Available	Faber, Pat	6200 Sunrise Dr	Fridley	38	9/5/1997	Not Available	WEL	No
228	003-243024120030	H91859	Sealed	Not Available	Fahs, Tim	6105 Woody La	Fridley	100	2/26/1988	Not Available	WEL	No
229	003-243024120030	H91860	Sealed	Not Available	Fahs, Tim	6105 Woody La	Fridley	125	2/26/1988	Not Available	WEL	No
230	Not Available	H135191	Sealed	Not Available	Fair Banks Capital	6241 Carol Dr	Fridley	15	4/24/1998	Not Available	WEL	No
231	123-073023430071	H0295371	Sealed	Not Available	Falk, Jeff	5053 Longview Dr	Mounds View	24	11/22/2011	Not Available	WEL	No
232	Not Available	H190647	Sealed	Not Available	Falkner, Jim	6230 Trinity Dr	Fridley	35	4/26/2002	Not Available	WEL	No
233	123-Municipal RoW	H182413	Sealed	Not Available	Faraci, Kathleen E.	2362 Brighton La	New Brighton	85	7/22/2001	Not Available	WEL	No
234	Not Available	H191485	Sealed	Not Available	Faymoville, Jean	1029 64th Av Ne	Fridley	94	7/9/2002	Not Available	WEL	No
235	003-013024330058	H0300229	Sealed	Not Available	Federal Home Loan Mortgage, Corp.	916 Raleigh La	Fridley	42	11/22/2011	Not Available	WEL	No
236	123-Municipal RoW	H126237	Sealed	Not Available	Ferris, Robert	1906 Longview Dr	New Brighton	38	10/23/1997	Not Available	WEL	No
237	Not Available	479060	Sealed	Not Available	Fina Inc.	7298 Hwy 65 Ne	Fridley	13	9/11/2002	Not Available	WEL	No
238	Not Available	479061	Sealed	Not Available	Fina Inc.	7298 Hwy 65 N	Fridley	14	9/11/2002	Not Available	WEL	No
239	Not Available	479062	Sealed	Not Available	Fina Inc.	7298 Hwy 65 N	Fridley	15	9/11/2002	Not Available	WEL	No
240	Not Available	522958	Sealed	Not Available	Fina Inc.	7298 Hwy 65 Ne	Fridley	14	9/11/2002	Not Available	WEL	No
241	Not Available	H43283	Sealed	Not Available	Fina Oil And Chemical Company	7298 Hwy 65 N	Fridley	0	5/12/1994	Not Available	WEL	No
242	Not Available	514116	Sealed	Not Available	Fina Service Inc.	7298 Hwy 65 Ne	Fridley	14	9/11/2002	Not Available	WEL	No
243	Not Available	H17855	Sealed	Not Available	Finch, Joella	7450 Stinson Bl Ne	Fridley	14	2/19/1992	Not Available	WEL	No
244	Not Available	H28461	Sealed	Not Available	Fink, Debra	6864 Channel Rd Ne	Fridley	58	7/20/1993	Not Available	WEL	No
245	Not Available	H29167	Sealed	Not Available	Fischer, Gary	6378 Pierce St	Fridley	19	7/6/1994	Not Available	WEL	No
246	Not Available	H11730	Sealed	Not Available	Flattum, Steve	6566 Brookview Dr	Fridley	43	6/16/1991	Not Available	WEL	No
247	123-Municipal RoW	H182401	Sealed	Not Available	Flaws, Robert S.	2817 Bronson Dr	Mounds View	105	6/18/2001	Not Available	WEL	No
248	003-243024210046	H80293	Sealed	Not Available	Flolid, Thomas	6053 Woody La	Fridley	125	12/30/1992	Not Available	WEL	No
249	003-133024240026	H58576	Sealed	Not Available	Ford Consumer Finance Company	6645 Lucia La	Fridley	17	10/13/1994	Not Available	WEL	No
250	123-Municipal RoW	H126229	Sealed	Not Available	Forslund, Delores	2176 Cedar Dr	New Brighton	40	9/30/1997	Not Available	WEL	No
251	123-Municipal RoW	H126209	Sealed	Not Available	Foss, Lawrence H.	2529 Eastman Dr	New Brighton	19	7/28/1997	Not Available	WEL	No
252	123-Municipal RoW	H126210	Sealed	Not Available	Foss, Lawrence H.	2529 Eastman Dr	New Brighton	16	7/28/1997	Not Available	WEL	No
253	Not Available	H111769	Sealed	Not Available	Fowler, Douglas	6151 Sunrise Dr	Fridley	55	10/11/1996	Not Available	WEL	No
254	003-233024240201	H63464	Sealed	Not Available	Frank Gabrelcik, Sr., Estate Of	5740 University Av	Fridley	58	5/30/1995	Not Available	WEL	No
255	Not Available	H256384	Sealed	Not Available	Frantzen, Leo	6620 Mckinley St	Fridley	90	6/25/2008	Not Available	WEL	No
256	Not Available	H79071	Sealed	Not Available	Frattalone Excavating	348 57th Pl Ne	Fridley	16	9/12/1992	Not Available	WEL	No
257	Not Available	H38720	Sealed	Not Available	Frazee, Genivieve	6130 Sunrise Dr	Fridley	60	8/23/1993	Not Available	WEL	No
258	Not Available	H70540	Sealed	Not Available	Frazier, Myrna S.	8060 Buchanan St Ne	Fridley	46		Not Available	WEL	No
259	Not Available	H208540	Sealed	Not Available	Freeberg, Quentin	301 Rice Creek Te	Fridley	18	8/1/2003	Not Available	WEL	No
260	123-183023210048	H234564	Sealed	Not Available	Freuenfels, Tom	2629 Valleyview La	New Brighton	26	5/10/2005	Not Available	WEL	No

Table C-3-1

Sealed Wells in the DWSMA
City of Fridley Part 2 WHPP Amendment

PCSI ID	PID No.	Unique No.	Status	Use	Well Name	Well Location	City	Total Sealed Depth (Feet)	Date Completed/Sealed	Aquifer	PCS Code	Location Verified
261	Not Available	554303	Sealed	Not Available	Fridley Community Education Center	6085 Seventh St Ne	Fridley	34	3/22/1999	Not Available	WEL	No
262	Not Available	554304	Sealed	Not Available	Fridley Community Education Center	6085 Seventh St Ne	Fridley	30	3/22/1999	Not Available	WEL	No
263	Not Available	554302	Sealed	Not Available	Fridley School District	6085 Seventh St Ne	Fridley	37	2/11/1997	Not Available	WEL	No
264	Not Available	563365	Sealed	Not Available	Fridley, City Of	6490 University Av	Fridley	50	4/27/2001	Not Available	WEL	No
265	Not Available	563366	Sealed	Not Available	Fridley, City Of	6490 University Av	Fridley	50	4/27/2001	Not Available	WEL	No
266	Not Available	563367	Sealed	Not Available	Fridley, City Of	6490 University Av	Fridley	50	4/27/2001	Not Available	WEL	No
267	Not Available	563368	Sealed	Not Available	Fridley, City Of	6490 University Av	Fridley	50	4/27/2001	Not Available	WEL	No
268	Not Available	598223	Sealed	Not Available	Fridley, City Of	6431 University Av Ne	Fridley	46	10/27/2003	Not Available	WEL	No
269	Not Available	576202	Sealed	Not Available	Fridley, City Of	6431 University Av Ne	Fridley	36	10/27/2003	Not Available	WEL	No
270	003-143024310101	576203	Sealed	Not Available	Fridley, City Of	6431 University Av Ne	Fridley	36	10/27/2003	Not Available	WEL	No
271	003-143024310101	576204	Sealed	Not Available	Fridley, City Of	6431 University Av Ne	Fridley	36	10/27/2003	Not Available	WEL	No
272	Not Available	H28511	Sealed	Not Available	Fridley, City Of	6911 University Av	Fridley	195	4/26/1993	Not Available	WEL	No
273	003-243024210048	H52506	Sealed	Not Available	Fridley, City Of	6070 Central Av	Fridley	75	8/8/1994	Not Available	WEL	No
274	003-133024430063	H52507	Sealed	Not Available	Fridley, City Of	6116 Central Av	Fridley	80	8/8/1994	Not Available	WEL	No
275	Not Available	H66468	Sealed	Not Available	Fridley, City Of	6000 Second St Ne	Fridley	110	7/31/1995	Not Available	WEL	No
276	Not Available	H71701	Sealed	Not Available	Fridley, City Of	6490 University Av	Fridley	71	7/18/1995	Not Available	WEL	No
277	Not Available	H100854	Sealed	Not Available	Fridley, City Of	6431 University Av Ne	Fridley	43	2/23/1996	Not Available	WEL	No
278	Not Available	H100855	Sealed	Not Available	Fridley, City Of	6490 University Av Ne	Fridley	43	2/23/1996	Not Available	WEL	No
279	003-243024210006	H105864	Sealed	Not Available	Fridley, City Of	Hwy 65	Fridley	40	2/16/1999	Not Available	WEL	No
280	Not Available	H124407	Sealed	Not Available	Fridley, City Of	6431 University Av Ne	Fridley	38	7/16/1997	Not Available	WEL	No
281	Not Available	H141223	Sealed	Not Available	Fridley, City Of	6028 Central Av Ne	Fridley	60	9/25/1998	Not Available	WEL	No
282	Not Available	H135135	Sealed	Not Available	Fridley, City Of	Not Available	Fridley	30	6/29/1999	Not Available	WEL	No
283	003-113024340008	H140463	Sealed	Not Available	Fridley, City Of	400 71st Av Ne	Fridley	36	7/29/1998	Not Available	WEL	No
284	Not Available	H176064	Sealed	Not Available	Fridley, City Of	Not Available	Fridley	36	8/29/2000	Not Available	WEL	No
285	Not Available	H176065	Sealed	Not Available	Fridley, City Of	Not Available	Fridley	61	8/31/2000	Not Available	WEL	No
286	Not Available	H192275	Sealed	Not Available	Fridley, City Of	Third (& 59th Av Ne) St Ne	Fridley	25	6/25/2002	Not Available	WEL	No
287	003-133024220003	H284490	Sealed	Not Available	Fridley, City Of	6005 University	Fridley	75	12/23/2009	Not Available	WEL	No
288	003-143024130075	H91854	Sealed	Not Available	Fridley, City Of Schools	611 Mississippi St	Fridley	87	9/17/1987	Not Available	WEL	No
289	123-Municipal RoW	H119086	Sealed	Not Available	Fuller, Nathaniel	5065 Longview Dr	Mounds View	24	6/20/1997	Not Available	WEL	No
290	123-Municipal RoW	H9397	Sealed	Not Available	Fykson, Charles	2539 Rainbow La	New Brighton	36	11/12/1990	Not Available	WEL	No
291	Not Available	H59339	Sealed	Not Available	Gabler, Bob	5948 Sixth St Ne	Fridley	15	7/14/1995	Not Available	WEL	No
292	Not Available	H108817	Sealed	Not Available	Gale, Doug	6331 Jefferson St Ne	Fridley	20	10/3/1996	Not Available	WEL	No
293	123-Municipal RoW	H240928	Sealed	Not Available	Galloway, Donna	2605 Eastman Dr	New Brighton	30	2/14/2006	Not Available	WEL	No
294	123-Municipal RoW	H240929	Sealed	Not Available	Galloway, Donna	2605 Eastman Dr	New Brighton	18	2/14/2006	Not Available	WEL	No
295	123-Municipal RoW	H46128	Sealed	Not Available	Garfield, Steve	2857 Bronson Dr	Mounds View	40	12/16/1993	Not Available	WEL	No
296	003-223024110023	H0300024	Sealed	Not Available	Ge Capital Corp. Real Estate	E 5401 River Rd	Fridley	32	11/3/2011	Not Available	WEL	No
297	123-073023440054	H161965	Sealed	Not Available	Gebhardt, Richard	5071 Rainbow La	Mounds View	25	11/16/1999	Not Available	WEL	No
298	Not Available	H196845	Sealed	Not Available	Gelhar, Roy	6140 Sunrise Dr	Fridley	72	8/28/2003	Not Available	WEL	No
299	003-143024410078	H164256	Sealed	Not Available	Gerhard, Russell L.	810 Mississippi St	Fridley	115	8/25/2000	Not Available	WEL	No
300	003-133024120024	H146764	Sealed	Not Available	Germundson, Ronald	1390 69th Av Ne	Fridley	102	1/15/1999	Not Available	WEL	No
301	Not Available	H142648	Sealed	Not Available	Gerrety, Christine	1051 67th Av Ne	Fridley	96	8/10/1998	Not Available	WEL	No
302	123-County RoW	H45331	Sealed	Not Available	Giering, Dawn	5054 Long Lake Rd	Mounds View	38	1/22/1994	Not Available	WEL	No
303	123-183023210039	H159860	Sealed	Not Available	Gilbreth, James	2658 Valley View La	New Brighton	28	4/4/2000	Not Available	WEL	No
304	123-Municipal RoW	H4355	Sealed	Not Available	Gintzner, S.j.	5053 Red Oak Dr	Mounds View	24	2/12/1990	Not Available	WEL	No
305	Not Available	H54888	Sealed	Not Available	Girard, Marvin J.	6531 Mckinley St Ne	Fridley	90	10/24/1994	Not Available	WEL	No
306	123-Municipal RoW	H169642	Sealed	Not Available	Girard, Russell	6900 Pleasant View Dr	Mounds View	22	5/21/2001	Not Available	WEL	No
307	123-Municipal RoW	H13587	Sealed	Not Available	Gjere, Greg	2650 15th St Nw	New Brighton	68	6/17/1991	Not Available	WEL	No
308	Not Available	H91872	Sealed	Not Available	Glader, Kate	6810 Channel Rd	Fridley	75	10/14/1988	Not Available	WEL	No
309	123-Municipal RoW	H234603	Sealed	Not Available	Gleerdenn, Cody	2901 County Road H2	Mounds View	42	7/20/2005	Not Available	WEL	No
310	Not Available	H199956	Sealed	Not Available	Gliniany, Mary	5884 Washington St Ne	Fridley	20	8/9/2002	Not Available	WEL	No
311	123-Municipal RoW	H130716	Sealed	Not Available	Glomski, Gerald	3001 County Road H2	Mounds View	32	3/11/1998	Not Available	WEL	No
312	003-143024320012	H25790	Sealed	Not Available	Glynn, Timothy	180 Sylvan La Ne	Fridley	8	10/12/1992	Not Available	WEL	No

Table C-3-1

Sealed Wells in the DWSMA
City of Fridley Part 2 WHPP Amendment

PCSI ID	PID No.	Unique No.	Status	Use	Well Name	Well Location	City	Total Sealed Depth (Feet)	Date Completed/Sealed	Aquifer	PCS Code	Location Verified
313	003-133024240113	H208051	Sealed	Not Available	Goerdt, Darrel	6610 Lucia La	Fridley	19	4/22/2003	Not Available	WEL	No
314	123-Municipal RoW	H35439	Sealed	Not Available	Golden, Michael T.	5092 Sunnyside Rd Ne	Mounds View	41	7/19/1993	Not Available	WEL	No
315	123-Municipal RoW	H286765	Sealed	Not Available	Golias, Julie	5079 Red Oak Dr	Mounds View	18	5/27/2010	Not Available	WEL	No
316	Not Available	H107212	Sealed	Not Available	Gorton, Dean/trudy	1035 64th Av Ne	Fridley	100	6/20/1996	Not Available	WEL	No
317	Not Available	H19518	Sealed	Not Available	Gough, Mike W.	6020 Fifth St Ne	Fridley	22	5/13/1992	Not Available	WEL	No
318	123-063023330001	H26657	Sealed	Not Available	Gould, Jim	7879 Spring Lake Rd	Mounds View	16	3/16/1993	Not Available	WEL	No
319	123-063023330001	H26658	Sealed	Not Available	Gould, Jim	7879 Spring Lake Rd	Mounds View	27	3/16/1993	Not Available	WEL	No
320	123-Municipal RoW	H119088	Sealed	Not Available	Grabowski, Marjorie	5060 Longview Dr	Mounds View	25	6/20/1997	Not Available	WEL	No
321	Not Available	H91855	Sealed	Not Available	Graves, Clarence	6220 Sunrise Dr	Fridley	53	9/24/1987	Not Available	WEL	No
322	123-Municipal RoW	H73722	Sealed	Not Available	Griebel, Mark A.	2952 16th St Nw	New Brighton	144		Not Available	WEL	No
323	123-Municipal RoW	H142694	Sealed	Not Available	Grover, Ileen M.	8127 Groveland Rd	Mounds View	20	12/13/1998	Not Available	WEL	No
324	123-Municipal RoW	H165122	Sealed	Not Available	Gruhlke, Ken	2022 Longview Dr	New Brighton	24	3/8/2000	Not Available	WEL	No
325	123-Municipal RoW	H119087	Sealed	Not Available	Guenther, Richard	5059 Longview Dr	Mounds View	26	6/20/1997	Not Available	WEL	No
326	123-Municipal RoW	H61522	Sealed	Not Available	Gunderson, Byron	5101 Sunnyside Rd	Mounds View	20	1/4/1994	Not Available	WEL	No
327	123-Municipal RoW	H61523	Sealed	Not Available	Gunderson, Byron	5101 Sunnyside Rd	Mounds View	20	1/4/1995	Not Available	WEL	No
328	Not Available	H52028	Sealed	Not Available	Gustafson, John	1121 80th Av N	Fridley	32	5/28/1994	Not Available	WEL	No
329	003-013024440005	H60584	Sealed	Not Available	Haapanen, Ray	7717 Lakeview La	Fridley	135	12/9/1994	Not Available	WEL	No
330	Not Available	H286316	Sealed	Not Available	Habedank, Gary	7972 Pleasant View Dr	Fridley	18	5/12/2010	Not Available	WEL	No
331	123-County RoW	H77457	Sealed	Not Available	Hable, Ray	2529 County Road H	Mounds View	20	5/16/1991	Not Available	WEL	No
332	123-Municipal RoW	H126234	Sealed	Not Available	Hagel, Thomas	1666 29th Av Nw	New Brighton	165	10/7/1997	Not Available	WEL	No
333	123-183023120005	H48292	Sealed	Not Available	Haglund, Kay	2554 Sunbow La	New Brighton	31	12/16/1994	Not Available	WEL	No
334	Not Available	H46130	Sealed	Not Available	Hall, Bob	1012 64th Av Ne	Fridley	120	12/16/1993	Not Available	WEL	No
335	Not Available	H18035	Sealed	Not Available	Hall, Nancy	716 63rd Av	Fridley	21	2/28/1992	Not Available	WEL	No
336	123-County RoW	H32355	Sealed	Not Available	Hall, Richard	5055 Long Lake Rd	Mounds View	36	8/4/1993	Not Available	WEL	No
337	Not Available	H130709	Sealed	Not Available	Halpin, Charlotte	6390 Monroe St	Fridley	15	2/24/1998	Not Available	WEL	No
338	123-Municipal RoW	H67980	Sealed	Not Available	Hanggi, Ralph A.	2475 Woodale Dr	Mounds View	30	5/2/1995	Not Available	WEL	No
339	123-083023320029	H45344	Sealed	Not Available	Hanlon, Laurie	2447 Ridge La	Mounds View	32	3/29/1994	Not Available	WEL	No
340	123-083023320029	H45346	Sealed	Not Available	Hanlon, Laurie	2447 Ridge La	Mounds View	42	3/29/1994	Not Available	WEL	No
341	Not Available	H11487	Sealed	Not Available	Hansen, Laurie	1318 Hillcrest Dr Ne	Fridley	126	6/20/1991	Not Available	WEL	No
342	Not Available	H108808	Sealed	Not Available	Hansmann, Earl	1344 Hillcrest Dr Ne	Fridley	152	9/23/1996	Not Available	WEL	No
343	123-Municipal RoW	H182410	Sealed	Not Available	Hanson, Christopher J.	5072 Longview Dr	Mounds View	80	7/17/2001	Not Available	WEL	No
344	123-Municipal RoW	H4331	Sealed	Not Available	Hanson, Duane	2415 17th Av Nw	New Brighton	24	5/3/1990	Not Available	WEL	No
345	Not Available	H108788	Sealed	Not Available	Hanson, Duane	365 66th Av Ne	Fridley	68	9/5/1996	Not Available	WEL	No
346	123-Municipal RoW	H167196	Sealed	Not Available	Hanson, Mark	8180 Spring Lake Park Rd	Mounds View	18	5/22/2000	Not Available	WEL	No
347	003-243024210043	H11729	Sealed	Not Available	Hanson, Roger	6065 Central Av Ne	Fridley	150	6/17/1991	Not Available	WEL	No
348	Not Available	H224640	Sealed	Not Available	Hardel, Travis	5922 Seventh St Ne	Fridley	23	8/13/2004	Not Available	WEL	No
349	Not Available	H3225	Sealed	Not Available	Harmon, Roger	388 66th Av Ne	Fridley	80	9/19/1990	Not Available	WEL	No
350	Not Available	H38909	Sealed	Not Available	Harris, Delbert	6542 Brookview Dr	Fridley	80	10/14/1993	Not Available	WEL	No
351	123-County RoW	H182443	Sealed	Not Available	Harrison, Ralph N.	2253 County Road H W	Mounds View	33	10/4/2001	Not Available	WEL	No
352	Not Available	H0097720	Sealed	Not Available	Harry Miller Estate	6170 Rainbow Dr	Fridley	35	1/8/1990	Not Available	WEL	No
353	003-123024330005	H0305955	Sealed	Not Available	Harstad Co.	7101 65 Hy NE	Fridley	43	7/5/2012	Not Available	WEL	No
354	123-073023440052	H29657	Sealed	Not Available	Hartin, Jeff/julie	5091 Rainbow La	Mounds View	28	4/1/1993	Not Available	WEL	No
355	Not Available	H253358	Sealed	Not Available	Hassan, Ali	6599 Channel Rd Ne	Fridley	40	10/6/2006	Not Available	WEL	No
356	Not Available	507117	Sealed	Not Available	Hayes Elementary School	615 Mississippi St	Fridley	16	3/22/1999	Not Available	WEL	No
357	Not Available	507118	Sealed	Not Available	Hayes Elementary School	615 Mississippi St	Fridley	18	3/22/1999	Not Available	WEL	No
358	Not Available	507119	Sealed	Not Available	Hayes Elementary School	615 Mississippi St	Fridley	20	3/22/1999	Not Available	WEL	No
359	123-Municipal RoW	H15685	Sealed	Not Available	Heaton, Alene J	1790 29th Av Nw	New Brighton	138	10/18/1991	Not Available	WEL	No
360	123-Municipal RoW	H12350	Sealed	Not Available	Helen Bodine, Estate Of	2530 Oriole La	New Brighton	33	7/9/1991	Not Available	WEL	No
361	123-183023110101	H276550	Sealed	Not Available	Helen M. Larson Estate	2587 Oriole La	New Brighton	36	6/9/2010	Not Available	WEL	No
362	123-Municipal RoW	H11292	Sealed	Not Available	Hemauer, Jeff	5071 Red Oak Dr	Mounds View	35	6/14/1991	Not Available	WEL	No
363	003-123024110086	H0286238	Sealed	Not Available	Henderson, Mike	7600 Stinson Bl	Fridley	24	12/2/2010	Not Available	WEL	No
364	Not Available	H108778	Sealed	Not Available	Henrich, Jill	6525 Main St	Fridley	38	8/22/1996	Not Available	WEL	No

Table C-3-1

Sealed Wells in the DWSMA
City of Fridley Part 2 WHPP Amendment

PCSI ID	PID No.	Unique No.	Status	Use	Well Name	Well Location	City	Total Sealed Depth (Feet)	Date Completed/Sealed	Aquifer	PCS Code	Location Verified
365	Not Available	H286756	Sealed	Not Available	Herman Capital	6342 Baker Av Ne	Fridley	90	5/3/2010	Not Available	WEL	No
366	Not Available	H164691	Sealed	Not Available	Hess, Donna	7600 Van Buren St Ne	Fridley	25	7/12/2000	Not Available	WEL	No
367	123-Municipal RoW	H222549	Sealed	Not Available	Heupel, Dennis	2542 Sunbow Av	New Brighton	30	6/15/2004	Not Available	WEL	No
368	123-Municipal RoW	H119085	Sealed	Not Available	Hicke, Ronald	5065 Red Oak Dr	Mounds View	32	6/20/1997	Not Available	WEL	No
369	123-Municipal RoW	H108781	Sealed	Not Available	Hildebrandt, Bruce	7039 Knollwood Dr	Mounds View	18	8/26/1996	Not Available	WEL	No
370	123-073023230014	H0289948	Sealed	Not Available	Hildreth, Nancy	7325 Pleasantview Dr	Mounds View	27	2/16/2012	Not Available	WEL	No
371	123-183023210048	H0295968	Sealed	Not Available	Hill, Arthur	2181 Rice Creek Rd	New Brighton	115	11/1/2011	Not Available	WEL	No
372	123-073023440053	H217127	Sealed	Not Available	Hillerns, Mary	5085 Rainbow La	Mounds View	27	1/18/2005	Not Available	WEL	No
373	123-193023130135	H209216	Sealed	Not Available	Hillstrom, Roger	1531 Stinson Bl	New Brighton	31	7/29/2003	Not Available	WEL	No
374	123-193023130135	H209215	Sealed	Not Available	Hillstrom, Roger	1531 Stinson Bl	New Brighton	33	8/4/2003	Not Available	WEL	No
375	Not Available	H19996	Sealed	Not Available	Hitzemann, John C.	378 66th St Ne	Fridley	85	5/20/1992	Not Available	WEL	No
376	Not Available	H213102	Sealed	Not Available	Hjort, Harriet	1434 Onondaga St Ne	Fridley	20	8/1/2003	Not Available	WEL	No
377	123-183023120006	H218431	Sealed	Not Available	Hohenstein, Harlen	2530 Sunbow La	New Brighton	30	3/25/2004	Not Available	WEL	No
378	003-243024320002	564035	Sealed	Not Available	Holiday Companies	5695 Hackman Av	Fridley	14	12/3/1999	Not Available	WEL	No
379	003-243024320002	564036	Sealed	Not Available	Holiday Companies	5695 Nehackmann Av Ne	Fridley	15	12/3/1999	Not Available	WEL	No
380	Not Available	H116230	Sealed	Not Available	Holiday Companies	251 57th Av Ne	Fridley	20	3/7/1997	Not Available	WEL	No
381	003-243024320002	H234457	Sealed	Not Available	Holiday Companies	5695 Hackmann Av Ne	Fridley	70	6/8/2005	Not Available	WEL	No
382	003-243024320002	694198	Sealed	Not Available	Holiday Cos.	5695 Hackmann Av Ne	Fridley	68	7/14/2006	Not Available	WEL	No
383	003-243024320002	644723	Sealed	Not Available	Holiday Cos.	5695 Hackmann Av Ne	Fridley	72	7/14/2006	Not Available	WEL	No
384	003-243024230039	544142	Sealed	Not Available	Holiday Cos.	5695 Nehackmann Av Ne	Fridley	36	7/14/2006	Not Available	WEL	No
385	003-243024320002	719143	Sealed	Not Available	Holiday Cos.	5695 Hackman Av	Fridley	70	7/14/2006	Not Available	WEL	No
386	003-243024320002	719144	Sealed	Not Available	Holiday Cos.	5695 Hackman Av	Fridley	15	7/14/2006	Not Available	WEL	No
387	003-233024320010	H248032	Sealed	Not Available	Holiday Cos.	250 57th Av	Fridley	28	8/23/2006	Not Available	WEL	No
388	003-243024320002	694184	Sealed	Not Available	Holiday Cos.	5695 Hackmann Av Ne	Fridley	20	7/14/2006	Not Available	WEL	No
389	003-243024320002	544143	Sealed	Not Available	Holiday Cos.	5695 Nehackmann Av Ne	Fridley	70	7/14/2006	Not Available	WEL	No
390	003-133024310084	H242288	Sealed	Not Available	Holloway, Melanie	1132 Mississippi St	Fridley	103	4/25/2006	Not Available	WEL	No
391	Not Available	H125482	Sealed	Not Available	Holm, Gladys	6120 Sunrise Dr Ne	Fridley	74	9/24/1997	Not Available	WEL	No
392	Not Available	H196846	Sealed	Not Available	Holmberg, Lilly	6150 Sunrise Dr Ne	Fridley	78	8/28/2003	Not Available	WEL	No
393	123-Municipal RoW	H100081	Sealed	Not Available	Holmboe, John	5053 Eastwood Rd	Mounds View	28	3/13/1996	Not Available	WEL	No
394	Not Available	H69622	Sealed	Not Available	Holmes, Judy	6367 Dellwood Dr	Fridley	99	6/8/1995	Not Available	WEL	No
395	003-123024240022	H0295908	Sealed	Not Available	Hoosline, Barry	1240 73╤ Av	Fridley	20	6/2/2011	Not Available	WEL	No
396	123-073023340031	H4349	Sealed	Not Available	Hoppe, Dennis	2916 Springview La	Mounds View	95	4/13/1990	Not Available	WEL	No
397	Not Available	H142552	Sealed	Not Available	Huebner, Glen	6061 Sixth St	Fridley	22	8/12/1998	Not Available	WEL	No
398	123-Municipal RoW	H265817	Sealed	Not Available	Hufkins, Cathy	2808 Ardan Av	Mounds View	24	5/13/2008	Not Available	WEL	No
399	123-183023110101	H275775	Sealed	Not Available	Huhtala, Jane	2575 Rainbow La	New Brighton	32	5/19/2009	Not Available	WEL	No
400	003-223024410009	H80722	Sealed	Not Available	Humann, Ray	40 62nd Wa	Fridley	36	12/1/1992	Not Available	WEL	No
401	123-Municipal RoW	H118831	Sealed	Not Available	Hunstad, Earl A.	2578 17th Av Nw	New Brighton	35	6/17/1997	Not Available	WEL	No
402	123-Municipal RoW	H118822	Sealed	Not Available	Hunt, Gaylord E.	7485 Knollwood Dr	Mounds View	42	5/23/1997	Not Available	WEL	No
403	123-Municipal RoW	H118836	Sealed	Not Available	Hurley, Bernard	2430 17th Av Nw	New Brighton	55	6/23/1997	Not Available	WEL	No
404	Not Available	H211003	Sealed	Not Available	Huseby, George	6301 Quincy St Ne	Fridley	19	6/5/2003	Not Available	WEL	No
405	003-233024130134	H10782	Sealed	Not Available	Ideal Homes	5730 Jefferson St Ne	Fridley	68	3/6/1991	Not Available	WEL	No
406	003-133024140066	H7406	Sealed	Not Available	Inglells Nelson, Grace	6645 Arthur St	Fridley	85	11/29/1990	Not Available	WEL	No
407	003-143024420108	H77053	Sealed	Not Available	Ipsen, John W.	680 63rd Av Ne	Fridley	18	9/2/1993	Not Available	WEL	No
408	003-223024410009	H121336	Sealed	Not Available	Irene White, Estate Of	6032 2╤ St Ne	Fridley	40	12/6/1995	Not Available	WEL	No
409	Not Available	H120921	Sealed	Not Available	Isaacson, William	7890 Hwy 65 Ne	Fridley	20	5/2/1996	Not Available	WEL	No
410	Not Available	571544	Sealed	Not Available	Isd 14	6085 Seventh St Ne	Fridley	0	8/6/2010	Not Available	WEL	No
411	Not Available	H57786	Sealed	Not Available	Isd 16	8000 Hwy 65 Ne	Fridley	30	10/6/1998	Not Available	WEL	No
412	Not Available	H252151	Sealed	Not Available	Isd 16	895 76th Av Ne	Fridley	25	11/2/2006	Not Available	WEL	No
413	003-013024320001	206635	Sealed	Not Available	Isd 6	8001 Able St	Fridley	390	10/29/2008	Not Available	WEL	No
414	123-Municipal RoW	H4346	Sealed	Not Available	Iverson, Eldora	2470 Clearview Av	Mounds View	30	5/9/1990	Not Available	WEL	No
415	123-County RoW	H12610	Sealed	Not Available	Jackson, Randy	2451 Silver Lake Rd	New Brighton	35	7/24/1991	Not Available	WEL	No
416	123-Municipal RoW	H59129	Sealed	Not Available	Jacobson, David/kathy	1957 Sunnyside Te	New Brighton	25	12/15/1994	Not Available	WEL	No

Table C-3-1

Sealed Wells in the DWSMA
City of Fridley Part 2 WHPP Amendment

PCSI ID	PID No.	Unique No.	Status	Use	Well Name	Well Location	City	Total Sealed Depth (Feet)	Date Completed/Sealed	Aquifer	PCS Code	Location Verified
417	Not Available	H249531	Sealed	Not Available	Jacobus, Sharonah	6562 Anoka St Ne	Fridley	18	9/4/2007	Not Available	WEL	No
418	Not Available	H20569	Sealed	Not Available	Jannesari, Mike	7943 Mckinley St Ne	Fridley	15	5/22/1992	Not Available	WEL	No
419	123-Municipal RoW	H150244	Sealed	Not Available	Janssen, Roger H.	2440 Clearview Av	Mounds View	30		Not Available	WEL	No
420	Not Available	H102366	Sealed	Not Available	Jenewein, Thomas A.	1342 Hillcrest Dr	Fridley	155	7/11/1996	Not Available	WEL	No
421	Not Available	H155202	Sealed	Not Available	Jerkovich, Dorothy	49 62nd Wa	Fridley	32	6/16/1999	Not Available	WEL	No
422	123-Municipal RoW	H73740	Sealed	Not Available	Johannes, John W.	1884 Cedar Dr	New Brighton	44	6/10/1996	Not Available	WEL	No
423	123-183023120074	H4338	Sealed	Not Available	Johnson, Carolyn	2055 Cedar Dr	New Brighton	30	5/15/1989	Not Available	WEL	No
424	Not Available	H150223	Sealed	Not Available	Johnson, Daniel M.	5941 Benjamin St Ne	Fridley	174	9/9/1999	Not Available	WEL	No
425	123-Municipal RoW	H28522	Sealed	Not Available	Johnson, Don	8110 Groveland Rd	Mounds View	30	5/12/1993	Not Available	WEL	No
426	123-Municipal RoW	H70549	Sealed	Not Available	Johnson, Doriene	2386 Brighton La	New Brighton	42	8/18/1995	Not Available	WEL	No
427	Not Available	H162507	Sealed	Not Available	Johnson, Doris	6201 Sixth St Ne	Fridley	21	11/16/1999	Not Available	WEL	No
428	123-Municipal RoW	H70502	Sealed	Not Available	Johnson, Elaine	2095 Longview Dr	New Brighton	40	6/1/1995	Not Available	WEL	No
429	Not Available	H111788	Sealed	Not Available	Johnson, George A.	7358 Van Buren Ne	Fridley	88	11/20/1996	Not Available	WEL	No
430	123-083023320031	H79518	Sealed	Not Available	Johnson, Gregg/kathy	2425 Ridge La	Mounds View	31	2/4/1993	Not Available	WEL	No
431	123-County RoW	H21712	Sealed	Not Available	Johnson, Jack	2105 Long Lake Rd	New Brighton	53	6/26/1992	Not Available	WEL	No
432	Not Available	H150164	Sealed	Not Available	Johnson, Jon G	6382 Baker Av Ne	Fridley	16	4/7/1999	Not Available	WEL	No
433	Not Available	H150163	Sealed	Not Available	Johnson, Jon G.	6382 Baker Av Ne	Fridley	28	4/7/1999	Not Available	WEL	No
434	123-073023440056	H258107	Sealed	Not Available	Johnson, Kelly	5045 Rainbow La	Mounds View	24	6/7/2007	Not Available	WEL	No
435	003-243024210030	H242472	Sealed	Not Available	Johnson, Mark	5947 Central Av Ne	Fridley	80	8/15/2006	Not Available	WEL	No
436	123-063023320043	H118805	Sealed	Not Available	Johnson, Marvin W.	7964 Spring Lake Rd Ne	Spring Lake Park	24	4/19/1997	Not Available	WEL	No
437	Not Available	H130696	Sealed	Not Available	Johnson, Nolan	363 66th Av Ne	Fridley	79	1/6/1998	Not Available	WEL	No
438	123-Municipal RoW	H182463	Sealed	Not Available	Johnson, Olive	3040 Bronson Dr	Mounds View	0	3/27/2002	Not Available	WEL	No
439	Not Available	H29773	Sealed	Not Available	Johnson, Raymond/mary	5948 Seventh St Ne	Fridley	18	5/26/1993	Not Available	WEL	No
440	Not Available	H114681	Sealed	Not Available	Johnson, Tim	6212 Carol Ci	Fridley	20	2/27/1997	Not Available	WEL	No
441	123-063023230039	474412	Sealed	Not Available	Johnston, Gary	1700 Hwy 10	Spring Lake Park	22	4/16/2003	Not Available	WEL	No
442	123-063023230039	474413	Sealed	Not Available	Johnston, Gary	1700 Hwy 10	Spring Lake Park	22	12/30/1991	Not Available	WEL	No
443	123-063023230039	473497	Sealed	Not Available	Johnston, Gary	1700 Hwy 10	Spring Lake Park	20	4/16/2003	Not Available	WEL	No
444	123-063023230039	481770	Sealed	Not Available	Johnston, Gary	1700 Hwy 10	Spring Lake Park	30	4/17/2003	Not Available	WEL	No
445	123-063023230039	480113	Sealed	Not Available	Johnston, Gary	1700 Hwy 10	Spring Lake Park	19	4/16/2003	Not Available	WEL	No
446	123-063023230039	492385	Sealed	Not Available	Johnston, Gary	1700 Hwy 10	Spring Lake Park	18	12/30/1991	Not Available	WEL	No
447	123-063023320043	H21573	Sealed	Not Available	Johnston, Gary	1700 Hwy 10	Spring Lake Park	22	12/30/1991	Not Available	WEL	No
448	123-Municipal RoW	H20471	Sealed	Not Available	Jorgensen, Carol	8206 Groveland Rd	Mounds View	31	5/4/1992	Not Available	WEL	No
449	123-Municipal RoW	H20472	Sealed	Not Available	Jorgensen, Carol	8206 Groveland Rd	Mounds View	9	5/4/1992	Not Available	WEL	No
450	Not Available	H144863	Sealed	Not Available	Jrs Construction	601 58th Av Ne	Fridley	43	10/2/1998	Not Available	WEL	No
451	Not Available	H206452	Sealed	Not Available	Juaire, Mike	1170 Norton Av Ne	Fridley	21	3/24/2003	Not Available	WEL	No
452	Not Available	H206473	Sealed	Not Available	Juaire, Mike	1275 Norton Av	Fridley	16	6/18/2003	Not Available	WEL	No
453	Not Available	H0301792	Sealed	Not Available	Judith V. Jones Estate	6735 Channel Dr NE	Fridley	84	4/13/2012	Not Available	WEL	No
454	123-Municipal RoW	H0300915	Sealed	Not Available	June, Susan	1500 Mississippi St	New Brighton	64	5/4/2012	Not Available	WEL	No
455	123-Municipal RoW	H19340	Sealed	Not Available	Kaczmerek, Marsha/frome	2506 17th Av Nw	New Brighton	38	3/31/1992	Not Available	WEL	No
456	Not Available	H252921	Sealed	Not Available	Kahlhamer, Tony	5837 Arthur St	Fridley	184	3/20/2007	Not Available	WEL	No
457	123-County RoW	H73673	Sealed	Not Available	Kaluza, Gene J.	2527 Silver Lake Rd	New Brighton	36	9/22/1995	Not Available	WEL	No
458	123-Municipal RoW	H232761	Sealed	Not Available	Kalvig, Connie	2550 14th St Nw	New Brighton	105	2/17/2005	Not Available	WEL	No
459	123-Municipal RoW	H118816	Sealed	Not Available	Kappauf, Eileen	2375 17th Av Nw	New Brighton	35	5/19/1997	Not Available	WEL	No
460	Not Available	H73494	Sealed	Not Available	Karpinski, Jim	5872 Washington Av Ne	Fridley	24	11/16/1995	Not Available	WEL	No
461	Not Available	H100098	Sealed	Not Available	Kassow, Ida	1400 Rice Creek Rd	Fridley	104	4/12/1996	Not Available	WEL	No
462	Not Available	H212650	Sealed	Not Available	Katherine Pluff Estate	7450 Able St Ne	Fridley	104	9/24/2003	Not Available	WEL	No
463	Not Available	H51094	Sealed	Not Available	Kathryn Coughlan, Estate Of	924 Viceroy Dr	Fridley	28	5/13/1994	Not Available	WEL	No
464	123-Municipal RoW	H12351	Sealed	Not Available	Keeler, Debbie	2258 Rainbow Av	New Brighton	63	6/25/1991	Not Available	WEL	No
465	Not Available	H104171	Sealed	Not Available	Keith, Delores	6041 Fifth St Ne	Fridley	73	5/6/1996	Not Available	WEL	No
466	003-143024410117	H182476	Sealed	Not Available	Kelley, Darline	840 Mississippi St	Fridley	82	5/20/2002	Not Available	WEL	No
467	Not Available	H0303015	Sealed	Not Available	Kenow, Bill	6640 Mckinley St	Fridley	145	5/23/2012	Not Available	WEL	No
468	003-133024130068	H73726	Sealed	Not Available	Kerner, Richard D.	1400 66th Av Ne	Fridley	110	5/3/1996	Not Available	WEL	No

Table C-3-1

Sealed Wells in the DWSMA
City of Fridley Part 2 WHPP Amendment

PCSI ID	PID No.	Unique No.	Status	Use	Well Name	Well Location	City	Total Sealed Depth (Feet)	Date Completed/Sealed	Aquifer	PCS Code	Location Verified
469	123-183023140083	H0294249	Sealed	Not Available	Kerns, Bill	2229 Rainbow Av	New Brighton	48	5/5/2011	Not Available	WEL	No
470	123-Municipal RoW	H118843	Sealed	Not Available	Kirchoff, Joan E	2515 Longview Dr	New Brighton	40	7/8/1997	Not Available	WEL	No
471	123-County RoW	H73702	Sealed	Not Available	Kirchoff, Robert C.	2456 Silver Lake Rd	New Brighton	34	11/7/1995	Not Available	WEL	No
472	003-113024320034	H176116	Sealed	Not Available	Kirk, Jack	Not Available	Fridley	39	11/30/2000	Not Available	WEL	No
473	123-Municipal RoW	H25383	Sealed	Not Available	Klavu, Randy	1711 Longview Dr	New Brighton	72	10/3/1992	Not Available	WEL	No
474	123-Municipal RoW	H182470	Sealed	Not Available	Kloeppner, Bill	5092 Red Oak Dr	Mounds View	22	5/1/2002	Not Available	WEL	No
475	123-County RoW	H142695	Sealed	Not Available	Knobel, Robert P.	2909 County Road H	Mounds View	20	1/13/1999	Not Available	WEL	No
476	Not Available	H170676	Sealed	Not Available	Knoll, Kathy	7528 Van Buren St	Fridley	18	10/11/2000	Not Available	WEL	No
477	Not Available	H91871	Sealed	Not Available	Knudson, Robert	1322 Hillcrest Dr	Fridley	135	7/28/1988	Not Available	WEL	No
478	Not Available	H213492	Sealed	Not Available	Kohlhase, Mark	6434 Taylor St	Fridley	97	12/5/2003	Not Available	WEL	No
479	123-Municipal RoW	H100094	Sealed	Not Available	Koller, Ken	5045 Eastwood Rd	Mounds View	27	3/21/1996	Not Available	WEL	No
480	Not Available	H134187	Sealed	Not Available	Kowalke, Kenneth	1152 Norton Av Ne	Fridley	16	4/6/1998	Not Available	WEL	No
481	123-County RoW	H125424	Sealed	Not Available	Kraska, Paul	5092 Silver Lake Rd	Mounds View	30	8/11/1997	Not Available	WEL	No
482	123-Municipal RoW	H150165	Sealed	Not Available	Krebsback, James A.	1530 Long Lake Rd	New Brighton	115	4/8/1999	Not Available	WEL	No
483	Not Available	H11485	Sealed	Not Available	Krekelberg, Joseph	7451 Van Buren St	Fridley	105	5/21/1991	Not Available	WEL	No
484	123-083023320039	H32284	Sealed	Not Available	Kroska, Mark	2448 Ridge La	Mounds View	31	3/24/1993	Not Available	WEL	No
485	123-Municipal RoW	H118814	Sealed	Not Available	Kruta, Stanley J.	1746 Cedar Dr	New Brighton	40	5/12/1997	Not Available	WEL	No
486	Not Available	H46141	Sealed	Not Available	Kubat, Edward J.	7986 Pleasant View Dr	Fridley	40	4/4/1994	Not Available	WEL	No
487	003-123024330005	576960	Sealed	Not Available	Kuether Distributing	6982 Hwy 65 Ne	Fridley	19	7/2/1996	Not Available	WEL	No
488	003-123024330005	576961	Sealed	Not Available	Kuether Distributing	6982 Hwy 65 Ne	Fridley	17	7/2/1996	Not Available	WEL	No
489	003-123024330001	576959	Sealed	Not Available	Kuether Distributing Company	6982 Hwy 65 Ne	Fridley	19	7/2/1996	Not Available	WEL	No
490	Not Available	H69197	Sealed	Not Available	Kuether Distributing Company	6982 Hwy 65 Ne	Fridley	17	2/9/1996	Not Available	WEL	No
491	Not Available	H101354	Sealed	Not Available	Kuether Distributing Company	6982 Hwy 65 Ne	Fridley	31	4/10/1996	Not Available	WEL	No
492	Not Available	H146434	Sealed	Not Available	Kuether Distributing Company	6982 Hwy 65 Ne	Fridley	36	11/23/1998	Not Available	WEL	No
493	123-Municipal RoW	H73654	Sealed	Not Available	Kuluvar, H. Gordon	7815 Gloria Ci	Mounds View	35	8/30/1995	Not Available	WEL	No
494	Not Available	H269646	Sealed	Not Available	Kumi Properties, Llc	6071 University Av	Fridley	44	6/27/2008	Not Available	WEL	No
495	123-County RoW	476871	Sealed	Not Available	Kunz Oil Company	2901 Hwy 10	Mounds View	29	1/12/1999	Not Available	WEL	No
496	123-County RoW	477608	Sealed	Not Available	Kunz Oil Company	2901 Hwy 10	Mounds View	17	1/12/1999	Not Available	WEL	No
497	123-County RoW	477609	Sealed	Not Available	Kunz Oil Company	2901 Hwy 10	Mounds View	17	1/12/1999	Not Available	WEL	No
498	123-County RoW	477610	Sealed	Not Available	Kunz Oil Company	2901 Hwy 10	Mounds View	17	1/12/1999	Not Available	WEL	No
499	123-County RoW	477611	Sealed	Not Available	Kunz Oil Company	2901 Hwy 10	Mounds View	15	1/12/1999	Not Available	WEL	No
500	123-County RoW	487738	Sealed	Not Available	Kunz Oil Company	2901 Hwy 10	Mounds View	17	1/12/1999	Not Available	WEL	No
501	123-063023230044	517624	Sealed	Not Available	Kunz Oil Company	2901 Hwy 10	Mounds View	16	1/12/1999	Not Available	WEL	No
502	123-063023230044	H39159	Sealed	Not Available	Kunz Oil Company	2901 Hwy 10	Mounds View	29	9/10/1993	Not Available	WEL	No
503	123-County RoW	H149156	Sealed	Not Available	Kunz Oil Company	2901 Hwy 10	Mounds View	25	1/12/1999	Not Available	WEL	No
504	123-County RoW	H149157	Sealed	Not Available	Kunz Oil Company	2901 Hwy 10	Mounds View	23	3/23/1999	Not Available	WEL	No
505	123-County RoW	H149158	Sealed	Not Available	Kunz Oil Company	2901 Hwy 10	Mounds View	14	1/12/1999	Not Available	WEL	No
506	Not Available	H3223	Sealed	Not Available	Kurn, Bill	6630 Mckinley St Ne	Fridley	90	8/8/1990	Not Available	WEL	No
507	Not Available	H143774	Sealed	Not Available	Labandz, Vince	1631 Kristin Ct	Fridley	175	11/4/1998	Not Available	WEL	No
508	Not Available	H146757	Sealed	Not Available	Labreche, John	1381 Onondaga St	Fridley	25	11/25/1998	Not Available	WEL	No
509	123-Municipal RoW	H59063	Sealed	Not Available	Lammers, Ray	2454 Longview Dr	New Brighton	22	10/14/1994	Not Available	WEL	No
510	123-County RoW	H54822	Sealed	Not Available	Lampman, Thomas C.	1804 Silver Lake Rd	New Brighton	145	8/22/1994	Not Available	WEL	No
511	123-Municipal RoW	H29693	Sealed	Not Available	Lance, Gary D.	5079 Brighton La	Mounds View	25	4/20/1993	Not Available	WEL	No
512	003-143024340091	H0097714	Sealed	Not Available	Landis, Dave	5928 Woody La	Fridley	100	5/16/1990	Not Available	WEL	No
513	003-133024310088	H0298978	Sealed	Not Available	Landmark Senior Living, Llc	6490 Central Av NE	Fridley	84	10/6/2011	Not Available	WEL	No
514	Not Available	H51073	Sealed	Not Available	Landt, Nina	5830 Sixth St	Fridley	22	4/5/1994	Not Available	WEL	No
515	123-County RoW	H3713	Sealed	Not Available	Laporte, Kenneth	2080 Long Lake Rd	New Brighton	85	6/28/1990	Not Available	WEL	No
516	Not Available	H230485	Sealed	Not Available	Larson, Carla	1340 66th Av Ne	Fridley	23	4/20/2005	Not Available	WEL	No
517	Not Available	H230486	Sealed	Not Available	Larson, Carla	1340 66th Av Ne	Fridley	69	4/20/2005	Not Available	WEL	No
518	Not Available	H289753	Sealed	Not Available	Larson, Marilyn	Not Available	Fridley	151	10/11/2010	Not Available	WEL	No
519	Not Available	H24217	Sealed	Not Available	Larson, Randy	1357 Hillcrest Dr Ne	Fridley	105	6/23/1992	Not Available	WEL	No
520	123-County RoW	H169437	Sealed	Not Available	Larson, Steve	2917 County Road H	Mounds View	25	6/21/2000	Not Available	WEL	No

Table C-3-1

Sealed Wells in the DWSMA
City of Fridley Part 2 WHPP Amendment

PCSI ID	PID No.	Unique No.	Status	Use	Well Name	Well Location	City	Total Sealed Depth (Feet)	Date Completed/Sealed	Aquifer	PCS Code	Location Verified
521	Not Available	H225859	Sealed	Not Available	Laser Applications	7645 Baker St Ne	Fridley	20	7/20/2004	Not Available	WEL	No
522	Not Available	H25202	Sealed	Not Available	Latham, Jim	7342 Hayes Ne	Fridley	80	8/28/1992	Not Available	WEL	No
523	123-County RoW	H3701	Sealed	Not Available	Lawrence, Robert L	2409 County Road H	Mounds View	25	9/11/1990	Not Available	WEL	No
524	Not Available	H258935	Sealed	Not Available	Lawson, Curt	1026 64th Av N	Fridley	68	8/21/2007	Not Available	WEL	No
525	123-Municipal RoW	H126262	Sealed	Not Available	Laznicka, Matthew J.	2229 Oriole Av	New Brighton	65	4/29/1998	Not Available	WEL	No
526	123-083023320036	H239624	Sealed	Not Available	Leary, Lois	2426 Ridge La	Mounds View	32	12/6/2005	Not Available	WEL	No
527	Not Available	H102001	Sealed	Not Available	Lebrasseue, Terri	401 Mississippi St Ne	Fridley	80	3/14/1996	Not Available	WEL	No
528	003-133024420020	H210816	Sealed	Not Available	Leffingwell, Anna	1314 Mississippi St Ne	Fridley	18	6/25/2003	Not Available	WEL	No
529	Not Available	H243405	Sealed	Not Available	Legeault, Debbie	6396 Baker Av Ne	Fridley	17	4/5/2006	Not Available	WEL	No
530	Not Available	H243409	Sealed	Not Available	Legeault, Debbie	6396 Baker Av Ne	Fridley	15	4/5/2006	Not Available	WEL	No
531	003-143024340091	H13439	Sealed	Not Available	Lein, Gary	495 Mississippi St Ne	Fridley	80	8/2/1991	Not Available	WEL	No
532	123-Municipal RoW	H192299	Sealed	Not Available	Leiser, Mark	1901 17th St Nw	New Brighton	149	7/25/2002	Not Available	WEL	No
533	123-County RoW	H26581	Sealed	Not Available	Leon, Mike	5066 Silver Lake Rd	Mounds View	29	2/21/1993	Not Available	WEL	No
534	Not Available	H120539	Sealed	Not Available	Levoir, Pat	6278 Baker Av E	Fridley	14	4/5/1996	Not Available	WEL	No
535	123-Municipal RoW	H190690	Sealed	Not Available	Li, Ling Ling	5046 Eastwood Av	Mounds View	28	10/21/2002	Not Available	WEL	No
536	003-133024230071	H50440	Sealed	Not Available	Liemgruber,	1027 Mississippi	Fridley	65	5/24/1994	Not Available	WEL	No
537	123-Municipal RoW	H230450	Sealed	Not Available	Lieser, Ann	5054 Longview Rd	Mounds View	24	12/7/2004	Not Available	WEL	No
538	123-183023210048	H53178	Sealed	Not Available	Lieser, Chris	2617 Valley View La	New Brighton	15	7/21/1994	Not Available	WEL	No
539	123-183023210048	H53179	Sealed	Not Available	Lieser, Chris	2617 Valley View La	New Brighton	10	7/21/1994	Not Available	WEL	No
540	Not Available	H129000	Sealed	Not Available	Lind, Stephen/jan	6620 Stinson Bl	Fridley	143	7/11/1989	Not Available	WEL	No
541	123-Municipal RoW	H38664	Sealed	Not Available	Lindgren, Dave	1491 Mississippi St	New Brighton	28	7/19/1993	Not Available	WEL	No
542	123-063023320002	H208091	Sealed	Not Available	Lindgren, Norma	7890 Spring Lake Park Rd	Spring Lake Park	34	7/21/2003	Not Available	WEL	No
543	123-County RoW	H41134	Sealed	Not Available	Lindquist, Jennice	5086 Silver Lake Rd	Mounds View	48	10/11/1993	Not Available	WEL	No
544	003-133024320015	H55176	Sealed	Not Available	Lindstrom, Gene	1010 Mississippi St	Fridley	63	8/18/1994	Not Available	WEL	No
545	123-County RoW	H55164	Sealed	Not Available	Linke, Alfaratta M.	2491 County Road H	Mounds View	28	6/29/1994	Not Available	WEL	No
546	123-County RoW	H19286	Sealed	Not Available	Linquist, Orville	2521 County Road H	Mounds View	25	3/27/1992	Not Available	WEL	No
547	123-Municipal RoW	H159869	Sealed	Not Available	Lloyd, Aretha	7523 Groveland Rd	Mounds View	27	5/4/2000	Not Available	WEL	No
548	123-Municipal RoW	H94958	Sealed	Not Available	Loeding, Neil	5046 Longview Dr	Mounds View	26	12/14/1988	Not Available	WEL	No
549	123-183023120015	H35401	Sealed	Not Available	Loflus, Norbert	2575 Robin La Ne	New Brighton	45	4/24/1993	Not Available	WEL	No
550	Not Available	H52960	Sealed	Not Available	Loftness, Greg	7666 Van Buren St Ne	Fridley	68	6/7/1994	Not Available	WEL	No
551	Not Available	H20811	Sealed	Not Available	Lorbeski, Bev	6101 Sunrise Dr Ne	Fridley	66	5/5/1992	Not Available	WEL	No
552	123-Municipal RoW	H70550	Sealed	Not Available	Lorenson, Russell	2374 Brighton La	New Brighton	36	8/28/1995	Not Available	WEL	No
553	123-Municipal RoW	H251792	Sealed	Not Available	Lorenz, Jean	2552 Knollwood Dr	New Brighton	90	10/17/2006	Not Available	WEL	No
554	Not Available	H69612	Sealed	Not Available	Loschy, Curtis B.	1399 66th Av Ne	Fridley	75	5/26/1995	Not Available	WEL	No
555	123-Municipal RoW	H73656	Sealed	Not Available	Lossing, Burnie D.	7805 Gloria Ci	Mounds View	35	8/31/1995	Not Available	WEL	No
556	123-Municipal RoW	H91223	Sealed	Not Available	Loverude, Chet	1806 Cedar Dr	New Brighton	23	9/26/1988	Not Available	WEL	No
557	123-Municipal RoW	H4339	Sealed	Not Available	Loverude, Chet & Gail	1806 Cedar Dr	New Brighton	23	9/26/1988	Not Available	WEL	No
558	Not Available	H22600	Sealed	Not Available	Lucas, Dave/mary	1320 Hillcrest Dr	Fridley	140	5/12/1992	Not Available	WEL	No
559	Not Available	H163110	Sealed	Not Available	Luhman, John	1611 66th Av Ne	Fridley	144	7/25/2000	Not Available	WEL	No
560	123-073023340022	H159885	Sealed	Not Available	Lykke, Richard G.	2909 Springview La	Mounds View	93	6/22/2000	Not Available	WEL	No
561	003-013024340050	786923	Sealed	Monitor Well	MW-1	1229 OSBORNE RD NE	Fridley	14	09/09/2011	Not Available	WEL	No
562	Not Available	552105	Sealed	Monitor Well	MW-1	5311 UNIVERSITY AV	Fridley	27	09/11/1994	Not Available	WEL	No
563	123-083023310071	478982	Sealed	Monitor Well	MW-1	2390 HIGHWAY 10	Mounds View	25	11/02/1992	Not Available	WEL	No
564	123-083023410008	505604	Sealed	Monitor Well	MW-1	7300 PROGRAM AV	Mounds View	28.7	27/09/1989	Not Available	WEL	No
565	Not Available	552106	Sealed	Monitor Well	MW-10	5311 UNIVERSITY AV	Fridley	27	09/11/1994	Not Available	WEL	No
566	003-113024330005	696197	Sealed	Monitor Well	MW-13	400 71ST AV	Fridley	45	04/09/2003	Not Available	WEL	No
567	003-113024330005	696198	Sealed	Monitor Well	MW-14	400 71ST AV NE	Fridley	75	03/09/2003	Not Available	WEL	No
568	003-013024340050	786924	Sealed	Monitor Well	MW-2	1229 OSBORNE RD NE	Fridley	14	09/09/2011	Not Available	WEL	No
569	Not Available	532309	Sealed	Monitor Well	MW-2	5300 CENTRAL AV	Fridley	22	06/08/1993	Not Available	WEL	No
570	003-013024340050	786925	Sealed	Monitor Well	MW-3	1229 OSBORNE RD NE	Fridley	15	08/09/2011	Not Available	WEL	No
571	Not Available	532310	Sealed	Monitor Well	MW-3	5300 CENTRAL AV	Fridley	36	06/08/1993	Not Available	WEL	No
572	003-013024340027	786926	Sealed	Monitor Well	MW-4	1229 OSBORNE RD NE	Fridley	14	08/09/2011	Not Available	WEL	No

Table C-3-1

Sealed Wells in the DWSMA
City of Fridley Part 2 WHPP Amendment

PCSI ID	PID No.	Unique No.	Status	Use	Well Name	Well Location	City	Total Sealed Depth (Feet)	Date Completed/Sealed	Aquifer	PCS Code	Location Verified
573	003-013024340050	786927	Sealed	Monitor Well	MW-5	1229 OSBORNE RD NE	Fridley	14	08/09/2011	Not Available	WEL	No
574	123-063023230039	480112	Sealed	Monitor Well	MW-5	1700 10 HY	Spring Lake Park	18.5	24/03/1992	Not Available	WEL	No
575	123-083023310071	478984	Sealed	Monitor Well	MW-6	2390 HIGHWAY 10	Mounds View	22.8	10/02/1992	Not Available	WEL	No
576	Not Available	H166906	Sealed	Not Available	Mabel, Cynthia	1214 Norton Av	Fridley	24	3/26/2001	Not Available	WEL	No
577	123-Municipal RoW	H73653	Sealed	Not Available	Mac Donald, Gladys E.	7825 Gloria Ci	Mounds View	35	8/30/1995	Not Available	WEL	No
578	Not Available	H0299036	Sealed	Not Available	Malinak, Margaret	6110 Sunrise Dr NE	Fridley	64	9/28/2011	Not Available	WEL	No
579	Not Available	H119272	Sealed	Not Available	Manning, Tom	1315 Hillcrest Dr	Fridley	130	5/13/1997	Not Available	WEL	No
580	Not Available	H11728	Sealed	Not Available	Manual, Mike	6315 Baker Av	Fridley	43	3/26/1991	Not Available	WEL	No
581	Not Available	H186002	Sealed	Not Available	Marquardt, Tammy	6588 Central Av Ne	Fridley	75	9/6/2001	Not Available	WEL	No
582	123-Municipal RoW	H35410	Sealed	Not Available	Marren, Ann Marie	6952 Pleasant View Dr	Mounds View	40	5/17/1993	Not Available	WEL	No
583	Not Available	H259732	Sealed	Not Available	Martin, Henry	515 66th Av Ne	Fridley	60	10/20/2008	Not Available	WEL	No
584	123-Municipal RoW	H118815	Sealed	Not Available	Martin, Walter B	2439 17th Av Nw	New Brighton	35	5/15/1997	Not Available	WEL	No
585	123-Municipal RoW	H239675	Sealed	Not Available	Martinson, Troy	2056 Cedar Dr	New Brighton	32	7/11/2006	Not Available	WEL	No
586	123-083023310064	H275786	Sealed	Not Available	Mary Jurek Estate	2431 Ridge La	Mounds View	32	6/13/2009	Not Available	WEL	No
587	123-Municipal RoW	H52532	Sealed	Not Available	Maske, Doris	2564 Woodcrest Dr	Mounds View	23	7/14/1994	Not Available	WEL	No
588	123-Municipal RoW	H111756	Sealed	Not Available	Matanowski, Ralph F.	5086 Red Oak Dr	Mounds View	38	9/16/1996	Not Available	WEL	No
589	123-183023110036	H100040	Sealed	Not Available	Mauro, Len	2527 Oriole La	New Brighton	30	2/7/1996	Not Available	WEL	No
590	123-063023330001	H73677	Sealed	Not Available	Mayo, Harry	7865 Spring Lake Rd	Mounds View	27	9/28/1995	Not Available	WEL	No
591	003-143024340091	H0097710	Sealed	Not Available	Mccluski, James	6350 Able St NE	Fridley	31	8/28/1990	Not Available	WEL	No
592	123-Municipal RoW	H73737	Sealed	Not Available	Mcconn, Clara	2327 17th Av Nw	New Brighton	88	4/25/1996	Not Available	WEL	No
593	123-Municipal RoW	H150212	Sealed	Not Available	Mcdonald, Jeannine	2554 Eastman Dr	New Brighton	120	8/1/1999	Not Available	WEL	No
594	123-073023440067	H41144	Sealed	Not Available	Mcelmurry, Brian L.	5086 Brighton La	Mounds View	44	10/29/1993	Not Available	WEL	No
595	003-243024110044	H91873	Sealed	Not Available	Mcguire, Sylvia	5928 Oakwood Av	Fridley	165	9/11/1987	Not Available	WEL	No
596	123-083023320027	H17674	Sealed	Not Available	Mckenzie, Dan	2463 Ridge La	Mounds View	24	2/9/1992	Not Available	WEL	No
597	003-013024430038	H102011	Sealed	Not Available	Mcmahon, Anthony	7733 Lakeview La	Fridley	45	3/28/1996	Not Available	WEL	No
598	123-Municipal RoW	H73705	Sealed	Not Available	Mcnaughton, Charles	1731 Longview Dr	New Brighton	84	4/8/1996	Not Available	WEL	No
599	Not Available	H22143	Sealed	Not Available	Mcnaughton, Edith	7514 Van Buren St Ne	Fridley	27	7/14/1992	Not Available	WEL	No
600	123-Municipal RoW	H21124	Sealed	Not Available	Mcnulty, Robin P.	2069 Sunnyside Te	New Brighton	40	6/16/1992	Not Available	WEL	No
601	123-Municipal RoW	H73694	Sealed	Not Available	Mcrae, Donald	2406 17th Av Nw	New Brighton	37	10/26/1995	Not Available	WEL	No
602	123-Municipal RoW	H73695	Sealed	Not Available	Mcrae, Donald	2406 17th Av Nw	New Brighton	16	10/26/1995	Not Available	WEL	No
603	Not Available	H66437	Sealed	Not Available	Meadowview Homes	1540 Rice Creek Rd Ne	Fridley	78	11/6/2003	Not Available	WEL	No
604	003-123024430001	H116427	Sealed	Not Available	Medtronic	7000 Central Av Ne	Fridley	25	6/6/1997	Not Available	WEL	No
605	003-123024430001	H116428	Sealed	Not Available	Medtronic	7000 Central Av Ne	Fridley	21	6/6/1997	Not Available	WEL	No
606	003-123024340003	H35346	Sealed	Not Available	Medtronics	7000 Central Av Ne	Fridley	28	5/24/1993	Not Available	WEL	No
607	003-133024320012	H52039	Sealed	Not Available	Melton, Donald	980 Mississippi St	Fridley	103	6/10/1994	Not Available	WEL	No
608	Not Available	H161962	Sealed	Not Available	Menard, John	5801 Sixth St Ne	Fridley	35	11/4/1999	Not Available	WEL	No
609	Not Available	H161979	Sealed	Not Available	Menard, John	5801 Sixth St Ne	Fridley	18	11/4/1999	Not Available	WEL	No
610	123-Municipal RoW	H239623	Sealed	Not Available	Mendez, Chris	1779 Cedar Dr	New Brighton	30	12/1/2005	Not Available	WEL	No
611	123-Municipal RoW	H111767	Sealed	Not Available	Mennell, James	7880 Spring Lake Rd	Mounds View	20	10/9/1996	Not Available	WEL	No
612	123-Municipal RoW	H111768	Sealed	Not Available	Mennell, James	7880 Spring Lake Rd	Mounds View	52	10/9/1996	Not Available	WEL	No
613	003-243024120063	H130714	Sealed	Not Available	Meyer Investments	6083 Woody La Ne	Fridley	98	3/16/1998	Not Available	WEL	No
614	Not Available	H125466	Sealed	Not Available	Michalik, Al	6210 Sunrise Dr	Fridley	37	9/5/1997	Not Available	WEL	No
615	123-County RoW	H287335	Sealed	Not Available	Mielke, Manfred	2853 County Road H	Mounds View	154	5/5/2010	Not Available	WEL	No
616	003-133024230071	H242278	Sealed	Not Available	Miller, Diane	953 Mississippi St	Fridley	22	1/10/2006	Not Available	WEL	No
617	003-133024230071	H242279	Sealed	Not Available	Miller, Diane	953 Mississippi St	Fridley	90	1/10/2006	Not Available	WEL	No
618	Not Available	H28454	Sealed	Not Available	Milligan, Michael	392 66th Av Ne	Fridley	63	7/12/1993	Not Available	WEL	No
619	123-County RoW	H4330	Sealed	Not Available	Miscko, Daniel	2505 County Road H W	New Brighton	40	5/22/1990	Not Available	WEL	No
620	003-123024110001	H71692	Sealed	Not Available	Miska, Marilyn	1646 Osborne Rd	Fridley	21	9/11/1995	Not Available	WEL	No
621	Not Available	498876	Sealed	Not Available	Mn Dot	6071 University Av	Fridley	43	12/17/1993	Not Available	WEL	No
622	003-143024330060	498877	Sealed	Not Available	Mn Dot	6070 University Av Ne	Fridley	41	9/22/1995	Not Available	WEL	No
623	123-183023410044	234455	Sealed	Not Available	Mn Pca	1856 Rice Creek Rd	New Brighton	95	10/2/1995	Not Available	WEL	No
624	123-Municipal RoW	H54829	Sealed	Not Available	Moe, Margaret P.	2366 17th Av Nw	New Brighton	30	8/3/1994	Not Available	WEL	No

Table C-3-1

Sealed Wells in the DWSMA
City of Fridley Part 2 WHPP Amendment

PCSI ID	PID No.	Unique No.	Status	Use	Well Name	Well Location	City	Total Sealed Depth (Feet)	Date Completed/Sealed	Aquifer	PCS Code	Location Verified
625	003-133024430029	H10359	Sealed	Not Available	Moe, Mitchell K	6283 Kerry La	Fridley	180	4/26/1991	Not Available	WEL	No
626	Not Available	H132931	Sealed	Not Available	Moen, Vern	7717 Able St Ne	Fridley	20	2/18/1998	Not Available	WEL	No
627	Not Available	H142675	Sealed	Not Available	Molina, Mary Ann	384 66th Av Ne	Fridley	89	10/20/1998	Not Available	WEL	No
628	123-183023110039	H251421	Sealed	Not Available	Mollan, Donald E.	2515 Rainbow La	New Brighton	65	1/25/2008	Not Available	WEL	No
629	003-143024240066	H260430	Sealed	Not Available	Montano Noriega, Ruben	400 Rice Creek Te	Fridley	40	8/7/2007	Not Available	WEL	No
630	003-133024240110	H163211	Sealed	Not Available	Moore, Tom	6580 Central Av Ne	Fridley	80	1/28/2000	Not Available	WEL	No
631	123-County RoW	H70527	Sealed	Not Available	Moris, Andrew D.	2463 Silver Lake Rd	New Brighton	36	7/11/1995	Not Available	WEL	No
632	123-Municipal RoW	H67970	Sealed	Not Available	Morris, Willard	2566 17th Av Ne	New Brighton	42	4/26/1995	Not Available	WEL	No
633	123-County RoW	H56231	Sealed	Not Available	Mounds View School District	2425 Long Lake Rd	New Brighton	16	1/15/1997	Not Available	WEL	No
634	123-County RoW	H91195	Sealed	Not Available	Mounds View, City Of	8101 Spring Lake Park Rd	Mounds View	14	3/10/1987	Not Available	WEL	No
635	123-083023340003	H176077	Sealed	Not Available	Mounds View, City Of	County Road H	Mounds View	31	2/7/2001	Not Available	WEL	No
636	123-County RoW	H173440	Sealed	Not Available	Mounds Vista Inc.	2200 Hwy 10	Mounds View	26	8/30/2001	Not Available	WEL	No
637	Not Available	H20675	Sealed	Not Available	Mowery, Don	6610 Stinson Bl Ne	Fridley	35	5/5/1992	Not Available	WEL	No
638	123-Municipal RoW	H45506	Sealed	Not Available	Muller, Joe	1488 Long Lake Rd	New Brighton	94	11/4/1993	Not Available	WEL	No
639	Not Available	H162294	Sealed	Not Available	Munter, Marlin	1564 75th Av	Fridley	75	4/25/2000	Not Available	WEL	No
640	123-183023110101	H108541	Sealed	Not Available	Murdick, Rob	2442 Long Lake Rd	New Brighton	25	8/5/1996	Not Available	WEL	No
641	Not Available	H257394	Sealed	Not Available	Murphy, Daryl	1491 Onondaga St Ne	Fridley	76	5/8/2007	Not Available	WEL	No
642	123-Municipal RoW	H125403	Sealed	Not Available	Murphy, James	5059 Eastwood Rd	Mounds View	0	6/30/1997	Not Available	WEL	No
643	123-Municipal RoW	H102738	Sealed	Not Available	Murphy, Willard	7830 Gloria Ci	Mounds View	26	5/30/1996	Not Available	WEL	No
644	123-Municipal RoW	H25638	Sealed	Not Available	Myers, Clarence	2215 Oriole Av	New Brighton	69	10/5/1992	Not Available	WEL	No
645	Not Available	H192329	Sealed	Not Available	Myking, Susan	881 W Moore Lake Dr	Fridley	22	4/8/2002	Not Available	WEL	No
646	123-Municipal RoW	H45134	Sealed	Not Available	Nash, Eleanor	5072 Red Oak Dr	Mounds View	27	2/2/1994	Not Available	WEL	No
647	Not Available	H203322	Sealed	Not Available	Neilson, Ralph	5876 Stinson Bl Ne	Fridley	173	1/8/2003	Not Available	WEL	No
648	003-143024410113	H218703	Sealed	Not Available	Neisius, Patricia	776 Mississippi St	Fridley	64	1/28/2004	Not Available	WEL	No
649	123-County RoW	H268012	Sealed	Not Available	Nelson, Beth	2530 Silver Lake Rd	New Brighton	25	8/22/2008	Not Available	WEL	No
650	123-Municipal RoW	H4332	Sealed	Not Available	Nelson, Earl H	17991 Longview Dr	New Brighton	80	4/24/1990	Not Available	WEL	No
651	123-County RoW	H4362	Sealed	Not Available	Nelson, Eric	5046 Red Oak Dr	Mounds View	25	7/7/1989	Not Available	WEL	No
652	Not Available	H25480	Sealed	Not Available	Nelson, Glen	7723 Tyler St	Fridley	23	9/22/1992	Not Available	WEL	No
653	Not Available	H43758	Sealed	Not Available	Nelson, Lawrence	6366 Pierce St Ne	Fridley	16	10/12/1993	Not Available	WEL	No
654	123-Municipal RoW	H60581	Sealed	Not Available	Nerase, Allen	2451 Longview Dr	New Brighton	24	12/7/1994	Not Available	WEL	No
655	123-County RoW	H216986	Sealed	Not Available	Nevale, Harold	5054 Silver Lake Rd	Mounds View	27	3/17/2004	Not Available	WEL	No
656	Not Available	H73668	Sealed	Not Available	Nevela, Shirley	1476 64th Av Ne	Fridley	85	9/20/1995	Not Available	WEL	No
657	003-143024340091	H4337	Sealed	Not Available	New Brighton, City Of	1550 29th Av	Fridley	145	11/13/1989	Not Available	WEL	No
658	123-183023240016	H185347	Sealed	Not Available	Nichols, Tara	2275 Leona Dr	New Brighton	130	3/15/2002	Not Available	WEL	No
659	123-Municipal RoW	H60534	Sealed	Not Available	Nickerson, Irene	2173 Cedar Dr	New Brighton	24	10/18/1994	Not Available	WEL	No
660	123-183023110040	H182460	Sealed	Not Available	Nielsen, Bruce	2527 Rainbow La	New Brighton	24	2/15/2002	Not Available	WEL	No
661	Not Available	H142687	Sealed	Not Available	Nieswoog, Barbara K.	7471 Van Buren St Ne	Fridley	100	11/10/1998	Not Available	WEL	No
662	123-073023440081	H137327	Sealed	Not Available	Noecker, Randy	5066 Rainbow La	Mounds View	28	4/29/1998	Not Available	WEL	No
663	123-Municipal RoW	H288088	Sealed	Not Available	Noel, Elaine	Not Available	New Brighton	63	6/3/2010	Not Available	WEL	No
664	123-Municipal RoW	H16799	Sealed	Not Available	Norberg, Artis	2880 Mississippi St	New Brighton	88	11/19/1991	Not Available	WEL	No
665	003-233024110003	H24392	Sealed	Not Available	Norberg, Maybelle	6524 Baker Av N	Fridley	102	6/30/1992	Not Available	WEL	No
666	123-Municipal RoW	H11585	Sealed	Not Available	Nordahl, Cathy	2461 Clearview	Mounds View	30	5/4/1991	Not Available	WEL	No
667	123-Municipal RoW	H10494	Sealed	Not Available	Nordahl, Kathy	2461 Clearview Av	Mounds View	25	4/9/1991	Not Available	WEL	No
668	123-County RoW	H150222	Sealed	Not Available	Norell, Robert G.	1842 Long Lake Rd	New Brighton	92	9/3/1999	Not Available	WEL	No
669	003-133024130022	692839	Sealed	Not Available	Northeast Towing	6519 Central Av	Fridley	78	2/25/2004	Not Available	WEL	No
670	Not Available	H211497	Sealed	Not Available	Northeast Towing	6519 Central Av	Fridley	160	3/2/2004	Not Available	WEL	No
671	003-123024340004	H154563	Sealed	Not Available	Not Available	7000 Central Av Ne	Fridley	32	6/24/1999	Not Available	WEL	No
672	Not Available	552369	Sealed	Monitor Well	Not Available	5300 CENTRAL AV	Fridley	38	28/10/1994	Not Available	WEL	No
673	123-County RoW	H182419	Sealed	Not Available	Nowlan, David	2430 Long Lake Rd	New Brighton	50	8/10/2001	Not Available	WEL	No
674	Not Available	H25092	Sealed	Not Available	Nyberg, Doug	1376 66th Av Ne	Fridley	75	8/25/1992	Not Available	WEL	No
675	Not Available	H164276	Sealed	Not Available	Nyberg, Mark	1501 Rice Creek Rd	Fridley	128	3/18/2001	Not Available	WEL	No
676	123-Municipal RoW	H229619	Sealed	Not Available	Nyberg, Ronald	3059 16th St Nw	New Brighton	177	1/4/2005	Not Available	WEL	No

Table C-3-1

Sealed Wells in the DWSMA
City of Fridley Part 2 WHPP Amendment

PCSI ID	PID No.	Unique No.	Status	Use	Well Name	Well Location	City	Total Sealed Depth (Feet)	Date Completed/Sealed	Aquifer	PCS Code	Location Verified
677	123-Municipal RoW	H230497	Sealed	Not Available	Nystrom, Lowell	2115 29th Av Nw	New Brighton	23	5/13/2005	Not Available	WEL	No
678	Not Available	H114697	Sealed	Not Available	Nyvold, Betty	1325 Hillcrest Dr Ne	Fridley	155	3/18/1997	Not Available	WEL	No
679	Not Available	H132317	Sealed	Not Available	O'brian, Joy	7371 Hayes St	Fridley	20	4/14/1998	Not Available	WEL	No
680	123-Municipal RoW	H221128	Sealed	Not Available	O'connor, Mike	2215 Rainbow Av	New Brighton	48	8/18/2004	Not Available	WEL	No
681	123-Municipal RoW	H118828	Sealed	Not Available	O'kasick, William C	2403 17th Av Nw	New Brighton	30	6/12/1997	Not Available	WEL	No
682	123-Municipal RoW	H23287	Sealed	Not Available	O'keefe, Dan	5054 Red Oak Dr	Mounds View	10	7/6/1992	Not Available	WEL	No
683	003-123024340004	235511	Sealed	Test Well	ONAN INC. B-9A	Not Available	Fridley	118	05/10/1981	OPDC	WEL	No
684	003-133024410083	H17362	Sealed	Not Available	Olson, Clarence	1668 Mississippi St	Fridley	55	1/23/1992	Not Available	WEL	No
685	123-063023330001	H242052	Sealed	Not Available	Olson, Don	7851 Spring Lake Rd	Mounds View	15	2/15/2006	Not Available	WEL	No
686	123-Municipal RoW	H142653	Sealed	Not Available	Olson, Elroy F.	2833 Bronson Dr	Mounds View	28	8/13/1998	Not Available	WEL	No
687	123-Municipal RoW	H160629	Sealed	Not Available	Olson, Gordy	2860 Mississippi St	New Brighton	39	1/12/2000	Not Available	WEL	No
688	Not Available	H223105	Sealed	Not Available	Olson, Greg	6437 Dellwood Dr	Fridley	22	6/23/2005	Not Available	WEL	No
689	Not Available	H223106	Sealed	Not Available	Olson, Greg	6437 Dellwood Dr	Fridley	18	6/23/2005	Not Available	WEL	No
690	123-Municipal RoW	H239656	Sealed	Not Available	Olson, Myron	5091 Brighton La	Mounds View	23	5/5/2006	Not Available	WEL	No
691	Not Available	H258980	Sealed	Not Available	Olson, Peter	1568 Ferndale Av Ne	Fridley	197	7/11/2007	Not Available	WEL	No
692	123-Municipal RoW	H4341	Sealed	Not Available	Olson, Robert	5085 Eastwood Rd	Mounds View	30	6/29/1990	Not Available	WEL	No
693	123-Municipal RoW	H15686	Sealed	Not Available	Olson, Ronald	2257 Thorndale Av	New Brighton	75	10/4/1991	Not Available	WEL	No
694	123-Municipal RoW	H152428	Sealed	Not Available	Olson, Ruth	5069 Irondale Rd	Mounds View	30	6/28/1999	Not Available	WEL	No
695	Not Available	H212631	Sealed	Not Available	Olson, Shirly	1141 80th Av Ne	Fridley	24	9/4/2003	Not Available	WEL	No
696	Not Available	H150166	Sealed	Not Available	Olson, Ted E.	6121 Rainbow Dr Ne	Fridley	38	4/8/1999	Not Available	WEL	No
697	123-Municipal RoW	H0301055	Sealed	Not Available	Olson, Thomas	1983 Sunnyside Te	New Brighton	23	11/28/2011	Not Available	WEL	No
698	Not Available	H150362	Sealed	Not Available	Onan	1400 73rd Av Ne	Fridley	28	4/28/1999	Not Available	WEL	No
699	003-123024410004	H132714	Sealed	Not Available	Onan Corp	Not Available	Fridley	51	10/2/1998	Not Available	WEL	No
700	003-123024410004	H91848	Sealed	Not Available	Onan Corp.	1600 71st Av Ne	Fridley	23	7/7/1988	Not Available	WEL	No
701	003-123024410004	H91849	Sealed	Not Available	Onan Corp.	1600 71st Av Ne	Fridley	25	7/7/1988	Not Available	WEL	No
702	Not Available	571536	Sealed	Not Available	Onan Corporation	1400 73rd Av Ne	Fridley	17	2/3/1997	Not Available	WEL	No
703	Not Available	571537	Sealed	Not Available	Onan Corporation	1400 73rd Av Ne	Fridley	18	1/8/1997	Not Available	WEL	No
704	Not Available	571538	Sealed	Not Available	Onan Corporation	1400 73rd Av Ne	Fridley	18	1/8/1997	Not Available	WEL	No
705	Not Available	514119	Sealed	Not Available	Onan Corporation	1400 73rd Av Ne	Fridley	12	2/3/1997	Not Available	WEL	No
706	Not Available	H48619	Sealed	Not Available	Onan Corporation	1400 73rd Av N	Fridley	0	5/23/1994	Not Available	WEL	No
707	Not Available	H57134	Sealed	Not Available	Onan Corporation	1400 73rd Av	Fridley	29	9/20/1994	Not Available	WEL	No
708	Not Available	H57135	Sealed	Not Available	Onan Corporation	1400 73rd Av	Fridley	28	9/20/1994	Not Available	WEL	No
709	Not Available	H105885	Sealed	Not Available	Onan Corporation	1400 73rd Av Ne	Fridley	30	10/4/1999	Not Available	WEL	No
710	Not Available	H105886	Sealed	Not Available	Onan Corporation	1400 73rd Av Ne	Fridley	29	10/4/1999	Not Available	WEL	No
711	Not Available	H105887	Sealed	Not Available	Onan Corporation	1400 73rd Av Ne	Fridley	30	10/4/1999	Not Available	WEL	No
712	Not Available	H105888	Sealed	Not Available	Onan Corporation	1400 73rd Av Ne	Fridley	28	10/1/1999	Not Available	WEL	No
713	Not Available	H105889	Sealed	Not Available	Onan Corporation	1700 73rd Av Ne	Fridley	24	10/1/1999	Not Available	WEL	No
714	Not Available	H105890	Sealed	Not Available	Onan Corporation	1700 73rd Av Ne	Fridley	26	10/1/1999	Not Available	WEL	No
715	Not Available	H105891	Sealed	Not Available	Onan Corporation	1700 73rd Av Ne	Fridley	21	10/14/1999	Not Available	WEL	No
716	Not Available	H150744	Sealed	Not Available	Onan Corporation	1400 73rd Av Ne	Fridley	16	4/26/1999	Not Available	WEL	No
717	Not Available	H150745	Sealed	Not Available	Onan Corporation	1400 73rd Av Ne	Fridley	17	4/26/1999	Not Available	WEL	No
718	Not Available	H150746	Sealed	Not Available	Onan Corporation	1400 73rd Av Ne	Fridley	17	4/26/1999	Not Available	WEL	No
719	Not Available	H150747	Sealed	Not Available	Onan Corporation	1400 73rd Av Ne	Fridley	28	4/26/1999	Not Available	WEL	No
720	Not Available	H150748	Sealed	Not Available	Onan Corporation	1400 73rd Av Ne	Fridley	31	4/26/1999	Not Available	WEL	No
721	Not Available	H158060	Sealed	Not Available	Onan Corporation	1400 73rd Av Ne	Fridley	18	8/2/1999	Not Available	WEL	No
722	Not Available	H150366	Sealed	Not Available	Onan Corporation	1400 73rd Av Ne	Fridley	20	5/14/1999	Not Available	WEL	No
723	Not Available	H168869	Sealed	Not Available	Onan Corporation	1400 73rd Av Ne	Fridley	28	10/2/2000	Not Available	WEL	No
724	Not Available	H233794	Sealed	Not Available	Onan Cummins Power Generation	1400 73rd Av N	Fridley	37	6/23/2005	Not Available	WEL	No
725	Not Available	H150720	Sealed	Not Available	Oran Corporation	1400 73rd Av Ne	Fridley	23	4/5/1999	Not Available	WEL	No
726	Not Available	H150721	Sealed	Not Available	Oran Corporation	1400 73rd Av Ne	Fridley	16	4/5/1999	Not Available	WEL	No
727	123-Municipal RoW	H10493	Sealed	Not Available	Orball, Ray	5072 Eastwood	Mounds View	44	4/22/1991	Not Available	WEL	No
728	Not Available	H0097731	Sealed	Not Available	Orikken, Lesley	1400 69th Av NE	Fridley	98	7/10/1989	Not Available	WEL	No

Table C-3-1

Sealed Wells in the DWSMA
City of Fridley Part 2 WHPP Amendment

PCSI ID	PID No.	Unique No.	Status	Use	Well Name	Well Location	City	Total Sealed Depth (Feet)	Date Completed/Sealed	Aquifer	PCS Code	Location Verified
729	123-County RoW	H70505	Sealed	Not Available	Ortgiesen, Delbert M.	2468 Silver Lake Rd	New Brighton	34	6/27/1995	Not Available	WEL	No
730	Not Available	H77252	Sealed	Not Available	Osterlund, David	381 66th Av Ne	Fridley	82	6/15/1989	Not Available	WEL	No
731	Not Available	H94860	Sealed	Not Available	Overland, Suzzane	6816 Channel Rd	Fridley	140	5/25/1989	Not Available	WEL	No
732	Not Available	H155502	Sealed	Not Available	Paguin, George	6361 Quincy St	Fridley	16	6/8/1999	Not Available	WEL	No
733	Not Available	H155503	Sealed	Not Available	Paguin, George	6361 Quincy St	Fridley	16	6/8/1999	Not Available	WEL	No
734	123-Municipal RoW	H45338	Sealed	Not Available	Palmer, Karen	2809 Bronson Dr	Mounds View	45	3/19/1994	Not Available	WEL	No
735	123-Municipal RoW	H45339	Sealed	Not Available	Palmer, Karen	2809 Bronson Dr	Mounds View	25	3/19/1994	Not Available	WEL	No
736	123-Municipal RoW	H4333	Sealed	Not Available	Palmer, Stanley	2315 Brighton La	New Brighton	80	4/19/1990	Not Available	WEL	No
737	Not Available	H134201	Sealed	Not Available	Panning, Michael	6351 Quincy St Ne	Fridley	13	3/24/1998	Not Available	WEL	No
738	Not Available	H0276899	Sealed	Not Available	Passon, Leonard	6211 Rainbow Dr NE	Fridley	96	3/12/2012	Not Available	WEL	No
739	Not Available	H213484	Sealed	Not Available	Patterson, Richard/bett	6328 Dellwood Dr	Fridley	21	11/26/2003	Not Available	WEL	No
740	Not Available	H155462	Sealed	Not Available	Peek, George	6633 Central Av	Fridley	66	10/5/1999	Not Available	WEL	No
741	003-123024210026	H140640	Sealed	Not Available	Pelstring Capital Corporation	Osborne (& Viron) Rd	Fridley	9	7/17/1998	Not Available	WEL	No
742	Not Available	472961	Sealed	Not Available	Pennzoil	7000 Hwy 65 Ne	Fridley	21	5/6/2005	Not Available	WEL	No
743	Not Available	472962	Sealed	Not Available	Pennzoil	7000 Hwy 65 Ne	Fridley	17	5/6/2005	Not Available	WEL	No
744	Not Available	472964	Sealed	Not Available	Pennzoil	7000 Hwy 65 Ne	Fridley	15	5/6/2005	Not Available	WEL	No
745	Not Available	539654	Sealed	Not Available	Pennzoil	7000 Hwy 65 Ne	Fridley	18	5/6/2005	Not Available	WEL	No
746	Not Available	539656	Sealed	Not Available	Pennzoil	7000 Hwy 65 Ne	Fridley	17	5/6/2005	Not Available	WEL	No
747	Not Available	539657	Sealed	Not Available	Pennzoil	7000 Hwy 65 Ne	Fridley	14	5/6/2005	Not Available	WEL	No
748	Not Available	539658	Sealed	Not Available	Pennzoil	7000 Hwy 65 Ne	Fridley	14	5/6/2005	Not Available	WEL	No
749	Not Available	533624	Sealed	Not Available	Pennzoil	7000 Hwy 65 Ne	Fridley	15	5/6/2005	Not Available	WEL	No
750	Not Available	533625	Sealed	Not Available	Pennzoil	7000 Hwy 65 Ne	Fridley	14	5/16/2005	Not Available	WEL	No
751	Not Available	533626	Sealed	Not Available	Pennzoil	7000 Hwy 65 Ne	Fridley	15	5/6/2005	Not Available	WEL	No
752	Not Available	H68510	Sealed	Not Available	Pennzoil	7600 Central Av	Fridley	14	5/10/1995	Not Available	WEL	No
753	Not Available	H157216	Sealed	Not Available	Pennzoil Products Company	7000 Hwy 65 Ne	Fridley	21	8/17/1999	Not Available	WEL	No
754	Not Available	533627	Sealed	Not Available	Pennzoil Quaker State Co.	7000 Hwy 65 Ne	Fridley	0	5/31/2007	Not Available	WEL	No
755	003-123024320009	539655	Sealed	Not Available	Penzoil Company	7000 Hwy 65 Ne	Fridley	14	11/6/1998	Not Available	WEL	No
756	Not Available	H35809	Sealed	Not Available	Penzoil Products Company	7000 Hwy 65 Ne	Fridley	10	8/12/1993	Not Available	WEL	No
757	123-Municipal RoW	H73655	Sealed	Not Available	Perleberg, Vera M.	7801 Gloria Ci	Mounds View	35	8/31/1995	Not Available	WEL	No
758	Not Available	H9370	Sealed	Not Available	Peterson, Bob	6160 Sunrise Dr	Fridley	92	10/8/1990	Not Available	WEL	No
759	003-133024310088	H115746	Sealed	Not Available	Peterson, Bob/doran	1282 Mississippi St Ne	Fridley	70	4/30/1997	Not Available	WEL	No
760	Not Available	H0097728	Sealed	Not Available	Peterson, Brian	1340 64th Av NE	Fridley	84	9/20/1989	Not Available	WEL	No
761	123-County RoW	H126264	Sealed	Not Available	Peterson, Ernest O.	2111 Long Lake Rd	New Brighton	176	5/6/1998	Not Available	WEL	No
762	Not Available	H150740	Sealed	Not Available	Peterson, John	6301 Hwy 65	Fridley	12	4/23/1999	Not Available	WEL	No
763	Not Available	625071	Sealed	Not Available	Peterson, Jon	6301 Hwy 65	Fridley	14	12/28/2000	Not Available	WEL	No
764	Not Available	625072	Sealed	Not Available	Peterson, Jon	6301 Hwy 65	Fridley	15	12/28/2000	Not Available	WEL	No
765	Not Available	625073	Sealed	Not Available	Peterson, Jon	6301 Hwy 65	Fridley	15	12/28/2000	Not Available	WEL	No
766	Not Available	625074	Sealed	Not Available	Peterson, Jon	6319 Hwy 65	Fridley	15	12/29/2000	Not Available	WEL	No
767	Not Available	H71210	Sealed	Not Available	Peterson, Jon	6301 Hwy 65	Fridley	12	6/28/1999	Not Available	WEL	No
768	Not Available	H224352	Sealed	Not Available	Peterson, Shirley	1140 80th Av Ne	Fridley	23	6/17/2004	Not Available	WEL	No
769	Not Available	H73405	Sealed	Not Available	Peterson, Wes	1339 66th Av Ne	Fridley	84	8/17/1995	Not Available	WEL	No
770	Not Available	H169489	Sealed	Not Available	Pladsen, Scott	5909 Fifth St Ne	Fridley	18	8/22/2000	Not Available	WEL	No
771	Not Available	H206489	Sealed	Not Available	Pm Group	1163 Norton Av	Fridley	65	8/21/2003	Not Available	WEL	No
772	Not Available	H206488	Sealed	Not Available	Pmj Group	1175 Norton Av	Fridley	65	8/21/2003	Not Available	WEL	No
773	Not Available	H213675	Sealed	Not Available	Pmj Group, Inc.	1215 Norton Av Ne	Fridley	12	11/13/2003	Not Available	WEL	No
774	Not Available	H20677	Sealed	Not Available	Poehls, Duane	1631 66th Av Ne	Fridley	65	5/5/1992	Not Available	WEL	No
775	Not Available	H263572	Sealed	Not Available	Poorman, Clarke	1130 80th Av Ne	Fridley	45	8/29/2007	Not Available	WEL	No
776	003-143024330040	H0292879	Sealed	Not Available	Popowitz, Scott	6250 Rainbow Dr	Fridley	70	2/17/2011	Not Available	WEL	No
777	003-133024420022	H263598	Sealed	Not Available	Prior, Marge	1340 Mississippi St	Fridley	18	10/10/2007	Not Available	WEL	No
778	003-133024420019	H266207	Sealed	Not Available	Prior, Marge	1340 Mississippi St	Fridley	15	10/23/2007	Not Available	WEL	No
779	123-County RoW	H111781	Sealed	Not Available	Prochazka, Frank A.	2841 County Road H	Mounds View	40	10/29/1996	Not Available	WEL	No
780	Not Available	H20734	Sealed	Not Available	Prochniak, Wayne	7305 Van Buren Ne	Fridley	105	6/1/1992	Not Available	WEL	No

Table C-3-1

Sealed Wells in the DWSMA
City of Fridley Part 2 WHPP Amendment

PCSI ID	PID No.	Unique No.	Status	Use	Well Name	Well Location	City	Total Sealed Depth (Feet)	Date Completed/Sealed	Aquifer	PCS Code	Location Verified
781	123-Municipal RoW	H73731	Sealed	Not Available	Prosser, Thor	1831 Sunnyside Te	New Brighton	40	5/21/1996	Not Available	WEL	No
782	Not Available	H73652	Sealed	Not Available	Puumala, Edward	1755 Hillview Rd	Fridley	35	8/30/1995	Not Available	WEL	No
783	Not Available	H150198	Sealed	Not Available	Quam, Terry	6895 Channel Rd	Fridley	95		Not Available	WEL	No
784	003-113024330005	719470	Sealed	Monitor Well	RW 1	400 71ST AV NE	Fridley	20	15/11/2004	Not Available	WEL	No
785	003-113024330005	719469	Sealed	Monitor Well	RW 2	400 71ST AV NE	Fridley	20	15/11/2004	Not Available	WEL	No
786	003-113024330005	719468	Sealed	Monitor Well	RW 3	400 71ST AV NE	Fridley	20	15/11/2004	Not Available	WEL	No
787	003-113024330005	728924	Sealed	Remedial	RW#4	400 71ST AV NE	Fridley	20	22/08/2005	Not Available	WEL	No
788	003-113024330005	728925	Sealed	Remedial	RW#5	400 71ST AV NE	Fridley	20	22/08/2005	Not Available	WEL	No
789	003-113024330005	730000	Sealed	Remedial	RW#6	400 71ST AV NE	Fridley	20	23/08/2005	Not Available	WEL	No
790	003-113024330005	730001	Sealed	Remedial	RW#7	400 71ST AV NE	Fridley	20	22/08/2005	Not Available	WEL	No
791	Not Available	H278265	Sealed	Not Available	Raddon, Donna	6520 Able St Ne	Fridley	70	10/22/2009	Not Available	WEL	No
792	123-Municipal RoW	H49381	Sealed	Not Available	Raiche, Warren	2951 16th St Nw	New Brighton	128	5/18/1994	Not Available	WEL	No
793	123-Municipal RoW	H34641	Sealed	Not Available	Ramsey, County Of	3009 County Road I W	Mounds View	201	10/8/1993	Not Available	WEL	No
794	Not Available	H16217	Sealed	Not Available	Ranger, John	6211 Sunrise Dr	Fridley	70	10/31/1991	Not Available	WEL	No
795	Not Available	H233104	Sealed	Not Available	Rao Manufacturing	200 Mississippi St	Fridley	20	3/16/2005	Not Available	WEL	No
796	003-233024240185	514118	Sealed	Not Available	Rapid Oil Change	5701 University Av	Fridley	32	5/8/1995	Not Available	WEL	No
797	003-233024240185	501654	Sealed	Not Available	Rapid Oil Change	5701 University Av N	Fridley	27	5/8/1995	Not Available	WEL	No
798	003-233024240185	501655	Sealed	Not Available	Rapid Oil Change	5701 University Av N	Fridley	31	5/8/1995	Not Available	WEL	No
799	003-233024240185	501656	Sealed	Not Available	Rapid Oil Change	5701 University Av N	Fridley	33	5/8/1995	Not Available	WEL	No
800	003-233024240185	501741	Sealed	Not Available	Rapid Oil Change	5701 University Av N	Fridley	32	5/8/1995	Not Available	WEL	No
801	003-233024240185	501742	Sealed	Not Available	Rapid Oil Change	5701 University Av N	Fridley	35	5/8/1995	Not Available	WEL	No
802	003-233024240185	H67560	Sealed	Not Available	Rapid Oil Change	5701 University Av N	Fridley	40	5/8/1995	Not Available	WEL	No
803	123-Municipal RoW	H3709	Sealed	Not Available	Rebucki, Darlyne	1525 28th Av	New Brighton	128	5/23/1990	Not Available	WEL	No
804	003-153024140085	H42988	Sealed	Not Available	Redeemer Luthern Church	61 Mississippi Wa	Fridley	30	10/22/1993	Not Available	WEL	No
805	Not Available	H212646	Sealed	Not Available	Reed, Addy	7556 Van Buren St	Fridley	18	10/7/2003	Not Available	WEL	No
806	003-133024320033	H234637	Sealed	Not Available	Reinecke, Gary	932 Mississippi St	Fridley	12	12/28/2005	Not Available	WEL	No
807	123-Municipal RoW	H234559	Sealed	Not Available	Reineke, Gary	7373 Knollwood Dr	Mounds View	25	4/27/2005	Not Available	WEL	No
808	Not Available	H7407	Sealed	Not Available	Rejmen, Alfred	633 Bennett Dr	Fridley	63	11/28/1990	Not Available	WEL	No
809	Not Available	H97884	Sealed	Not Available	Rennaker, Wendle	7915 Buchanan St Ne	Fridley	11	7/24/1990	Not Available	WEL	No
810	Not Available	H59057	Sealed	Not Available	Renner, Ray	1564 Gardena Av	Fridley	180	3/23/1995	Not Available	WEL	No
811	123-083023320040	H150191	Sealed	Not Available	Rieken, Laurie M.	2464 Ridge La	Mounds View	82	6/11/1999	Not Available	WEL	No
812	Not Available	H41996	Sealed	Not Available	Riewe, Larue	6617 Central Av Ne	Fridley	118	9/17/1993	Not Available	WEL	No
813	123-Municipal RoW	H3708	Sealed	Not Available	Riley, Jenine	2527 Longview Dr	New Brighton	30	10/31/1990	Not Available	WEL	No
814	123-Municipal RoW	H26689	Sealed	Not Available	Ringgold, Yvonne	3125 Mississippi St	New Brighton	71	5/13/1993	Not Available	WEL	No
815	123-Municipal RoW	H4342	Sealed	Not Available	Ripley, Charles A	2432 Clearview Av	Mounds View	30	5/9/1990	Not Available	WEL	No
816	Not Available	H59168	Sealed	Not Available	Rittinger, Mike/carol	6170 Sunrise Dr	Fridley	53	2/24/1995	Not Available	WEL	No
817	123-Municipal RoW	H91222	Sealed	Not Available	Roberts, Jim	2972 16th St Nw	New Brighton	165	7/20/1988	Not Available	WEL	No
818	Not Available	H67974	Sealed	Not Available	Rodemeyer, Douglas	6031 Fifth St Ne	Fridley	23	4/24/1995	Not Available	WEL	No
819	Not Available	H22712	Sealed	Not Available	Roeske, Jason W.	7564 Jackson St Ne	Fridley	15	7/27/1992	Not Available	WEL	No
820	003-143024340038	H26396	Sealed	Not Available	Roleck, Alan	6251 Sixth St Ne	Fridley	24	11/11/1992	Not Available	WEL	No
821	123-Municipal RoW	H77258	Sealed	Not Available	Rollie, Ken	2258 Thorndale Av	New Brighton	62	4/18/1990	Not Available	WEL	No
822	Not Available	H9202	Sealed	Not Available	Romig, Robert	6391 Madison St Ne	Fridley	22	12/7/1990	Not Available	WEL	No
823	Not Available	H7952	Sealed	Not Available	Romig, Rubert	6391 Madison St Ne	Fridley	22	12/7/1990	Not Available	WEL	No
824	123-183023110035	H152620	Sealed	Not Available	Romslo, Marlys	2539 Oriole La	New Brighton	30	4/28/1999	Not Available	WEL	No
825	123-Municipal RoW	H122913	Sealed	Not Available	Rosaasen, Jeff/paula	2315 17th Av Nw	New Brighton	61	6/6/1996	Not Available	WEL	No
826	123-073023440054	H78557	Sealed	Not Available	Rosenbush, Robert	5065 Rainbow La	Mounds View	23	6/10/1992	Not Available	WEL	No
827	Not Available	H26745	Sealed	Not Available	Roussin, Jim	5995 Benjamin St Ne	Fridley	217	8/3/1993	Not Available	WEL	No
828	123-183023120001	H159598	Sealed	Not Available	Rowland, Patrick	1563 Robin La	New Brighton	24	4/11/2000	Not Available	WEL	No
829	123-Municipal RoW	H204491	Sealed	Not Available	Ruble, Tami	5065 Greenwood Dr	Mounds View	24	5/20/2003	Not Available	WEL	No
830	Not Available	H73661	Sealed	Not Available	Rupe, Brian	1645 Mississippi St	Fridley	85	9/12/1995	Not Available	WEL	No
831	Not Available	H0305465	Sealed	Not Available	Ruth Ollila Estate	6310 Able St	Fridley	20	9/25/2012	Not Available	WEL	No
832	Not Available	H160588	Sealed	Not Available	Ruth Saba, Estate Of	1485 73rd Av Ne	Fridley	28	11/4/1999	Not Available	WEL	No

Table C-3-1

Sealed Wells in the DWSMA
City of Fridley Part 2 WHPP Amendment

PCSI ID	PID No.	Unique No.	Status	Use	Well Name	Well Location	City	Total Sealed Depth (Feet)	Date Completed/Sealed	Aquifer	PCS Code	Location Verified
833	Not Available	H18264	Sealed	Not Available	Ruud, Charles	7590 Van Buren St Ne	Fridley	24	3/12/1992	Not Available	WEL	No
834	123-Municipal RoW	H100080	Sealed	Not Available	Ryan, Rose	5085 Greenwood Dr	Mounds View	29	3/13/1996	Not Available	WEL	No
835	123-173023110003	H63452	Sealed	Not Available	Rybeck, Francis	4949 Hwy 8, Old	Mounds View	178	2/21/1995	Not Available	WEL	No
836	123-173023110003	H63453	Sealed	Not Available	Rybeck, Francis	4949 Hwy 8, Old	Mounds View	19		Not Available	WEL	No
837	123-Municipal RoW	225645	Sealed	Level Augment	SPRING LAKE UNIT NO. 11	Not Available	Mounds View	201	00/00/1932	QBAA	WEL	No
838	Not Available	H243209	Sealed	Not Available	Sakariason, Gale	5965 Oakwood Manor	Fridley	174	11/30/2005	Not Available	WEL	No
839	123-083023320038	H18891	Sealed	Not Available	Salyers, Joan	2440 Ridge La	Mounds View	40	4/16/1992	Not Available	WEL	No
840	Not Available	H267639	Sealed	Not Available	Sams Auto Parts	7350 Central Av N	Fridley	40	4/20/2009	Not Available	WEL	No
841	123-Municipal RoW	H0296751	Sealed	Not Available	Sauter, Cia	1661 Longview Dr	New Brighton	65	8/8/2011	Not Available	WEL	No
842	003-143024230071	H0097726	Sealed	Not Available	Sayther, Octaze L.	375 66th Av	Fridley	84	9/22/1989	Not Available	WEL	No
843	123-Municipal RoW	H152403	Sealed	Not Available	Schable, Jack	2113 29th Av Nw	New Brighton	88	4/13/1999	Not Available	WEL	No
844	Not Available	H104198	Sealed	Not Available	Schaffran, Jim	1443 64th Av Ne	Fridley	88	6/12/1996	Not Available	WEL	No
845	123-Municipal RoW	H221084	Sealed	Not Available	Scherer, Tom/leona	2156 Cedar Dr	New Brighton	26	7/26/2004	Not Available	WEL	No
846	003-133024210030	H0294524	Sealed	Not Available	Schlemmer, Pam	6875 Channel Rd	Fridley	63	8/9/2011	Not Available	WEL	No
847	123-Municipal RoW	H3704	Sealed	Not Available	Schlicklman, Alice	2475 Clearview	Mounds View	30	5/16/1990	Not Available	WEL	No
848	123-Municipal RoW	H142671	Sealed	Not Available	Schlieper, Randall	5079 Longview Av	Mounds View	40	10/8/1998	Not Available	WEL	No
849	003-223024410009	H107528	Sealed	Not Available	Schluender, Tim	60 62nd Wa	Fridley	3	8/13/1996	Not Available	WEL	No
850	123-Municipal RoW	H70541	Sealed	Not Available	Schmid, Steven E.	1871 Longview Dr	New Brighton	40	8/3/1995	Not Available	WEL	No
851	Not Available	H286320	Sealed	Not Available	Schmidt, Adam	6388 Pierce St Ne	Fridley	118	5/24/2010	Not Available	WEL	No
852	123-County RoW	H91213	Sealed	Not Available	Schmidt, Jay	2833 County Road H	Mounds View	22	2/1/1988	Not Available	WEL	No
853	Not Available	H0301073	Sealed	Not Available	Schnobrich, James	5649 Fifth St NE	Fridley	24	1/18/2012	Not Available	WEL	No
854	Not Available	H55001	Sealed	Not Available	Schoen, Estate Of	6800 Brookview Dr	Fridley	17	6/23/1994	Not Available	WEL	No
855	Not Available	H185131	Sealed	Not Available	Schoffman, Jim	7420 Van Buren St Ne	Fridley	90	9/17/2001	Not Available	WEL	No
856	123-Municipal RoW	H126253	Sealed	Not Available	Schultz, Charles	7581 Spring Lake Rd	Mounds View	26	4/3/1998	Not Available	WEL	No
857	123-Municipal RoW	H190676	Sealed	Not Available	Seaburg, Erick	5119 Red Oak Dr	Mounds View	24	8/14/2002	Not Available	WEL	No
858	Not Available	H199928	Sealed	Not Available	Seaholm, Laurence	403 Rice Creek Te	Fridley	51	10/24/2002	Not Available	WEL	No
859	Not Available	H182459	Sealed	Not Available	Serdahl, Roger	409 57th Pl	Fridley	22	1/23/2002	Not Available	WEL	No
860	Not Available	H15559	Sealed	Not Available	Serum, Edwin	1331 Hillcrest Dr	Fridley	138	10/16/1991	Not Available	WEL	No
861	Not Available	H234623	Sealed	Not Available	Shaffer, Helen	6805 Channel Rd Ne	Fridley	48	9/2/2005	Not Available	WEL	No
862	003-133024130035	H80574	Sealed	Not Available	Shaw, Julie	1351 66th Av Ne	Fridley	103	11/24/1992	Not Available	WEL	No
863	Not Available	H278289	Sealed	Not Available	Sheay, Joan	6381 Jefferson St Ne	Fridley	18	2/1/2010	Not Available	WEL	No
864	123-Municipal RoW	H59412	Sealed	Not Available	Shepard, Garret	5060 Red Oak Dr	Mounds View	36	10/10/1995	Not Available	WEL	No
865	123-Municipal RoW	H215915	Sealed	Not Available	Sherman, William	2163 29th Av Nw	New Brighton	72	4/19/2004	Not Available	WEL	No
866	Not Available	H142639	Sealed	Not Available	Shimanski, Delores	6560 Stinson Bl Ne	Fridley	120	7/28/1998	Not Available	WEL	No
867	123-County RoW	H111762	Sealed	Not Available	Shipley, Louis V.	5091 Long Lake Rd	Mounds View	35	9/30/1996	Not Available	WEL	No
868	003-013024340050	H0295042	Sealed	Not Available	Shortys Auto Service	1229 Osborne Rd NE	Fridley	45	8/15/2011	Not Available	WEL	No
869	Not Available	H46163	Sealed	Not Available	Shute, Helen	1501 Mississippi St Ne	Fridley	30	5/4/1994	Not Available	WEL	No
870	123-Municipal RoW	H3715	Sealed	Not Available	Sieka, Clara	2510 Knollwood Dr	New Brighton	55	7/31/1990	Not Available	WEL	No
871	123-Municipal RoW	H153073	Sealed	Not Available	Simonson, Wayne	2069 Longview Dr	New Brighton	26	11/18/1999	Not Available	WEL	No
872	Not Available	492773	Sealed	Not Available	Sinclair Inc.	6071 University Av	Fridley	37	12/17/1993	Not Available	WEL	No
873	Not Available	492774	Sealed	Not Available	Sinclair Inc.	6071 University Av	Fridley	36	12/17/1993	Not Available	WEL	No
874	Not Available	492783	Sealed	Not Available	Sinclair Inc.	6071 University Av	Fridley	36	12/17/1993	Not Available	WEL	No
875	Not Available	462301	Sealed	Not Available	Sinclair Marketing	6290 Hwy 65	Fridley	14	7/12/1993	Not Available	WEL	No
876	Not Available	462302	Sealed	Not Available	Sinclair Marketing	6290 Hwy 65	Fridley	14	7/12/1993	Not Available	WEL	No
877	Not Available	462303	Sealed	Not Available	Sinclair Marketing	6290 Hwy 65	Fridley	14	7/12/1993	Not Available	WEL	No
878	Not Available	462304	Sealed	Not Available	Sinclair Marketing	6290 Hwy 65	Fridley	14	7/12/1993	Not Available	WEL	No
879	Not Available	478148	Sealed	Not Available	Sinclair Marketing	6290 Hwy 65	Fridley	15	12/10/1992	Not Available	WEL	No
880	Not Available	478149	Sealed	Not Available	Sinclair Marketing	6290 Hwy 65	Fridley	15	12/10/1992	Not Available	WEL	No
881	Not Available	486748	Sealed	Not Available	Sinclair Marketing	2520 Ferry St	Fridley	41	12/10/1992	Not Available	WEL	No
882	Not Available	486749	Sealed	Not Available	Sinclair Marketing	2520 Ferry St	Fridley	41	12/10/1992	Not Available	WEL	No
883	Not Available	486750	Sealed	Not Available	Sinclair Marketing	2520 Ferry St	Fridley	41	12/10/1992	Not Available	WEL	No
884	Not Available	H56182	Sealed	Not Available	Sinclair Marketing	6071 University Av	Fridley	30	3/28/1995	Not Available	WEL	No

Table C-3-1

Sealed Wells in the DWSMA
City of Fridley Part 2 WHPP Amendment

PCSI ID	PID No.	Unique No.	Status	Use	Well Name	Well Location	City	Total Sealed Depth (Feet)	Date Completed/Sealed	Aquifer	PCS Code	Location Verified
885	Not Available	H117979	Sealed	Not Available	Sinclair Marketing Company	6290 Hwy 65	Fridley	30	5/20/1997	Not Available	WEL	No
886	003-233024210094	568205	Sealed	Not Available	Sinclair Oil	6071 University Av	Fridley	30	7/1/1999	Not Available	WEL	No
887	003-233024210094	568206	Sealed	Not Available	Sinclair Oil	6071 University Av	Fridley	30	7/1/1999	Not Available	WEL	No
888	003-233024120003	568214	Sealed	Not Available	Sinclair Oil	6071 University Av	Fridley	33	7/1/1999	Not Available	WEL	No
889	003-233024210094	568215	Sealed	Not Available	Sinclair Oil	6071 University Av	Fridley	30	7/1/1999	Not Available	WEL	No
890	003-233024210094	492772	Sealed	Not Available	Sinclair Oil	6071 University Av	Fridley	36	7/1/1999	Not Available	WEL	No
891	Not Available	594134	Sealed	Not Available	Sinclair Oil	6071 University Av	Fridley	30	7/1/1999	Not Available	WEL	No
892	Not Available	594133	Sealed	Not Available	Sinclair Oil	6071 University Av	Fridley	30	7/1/1999	Not Available	WEL	No
893	Not Available	H191472	Sealed	Not Available	Sinclair Oil Corporation	6290 Hwy 65	Fridley	124	5/8/2002	Not Available	WEL	No
894	123-Municipal RoW	H69614	Sealed	Not Available	Skalicky, Alan	2909 County Road H2	Mounds View	104	5/31/1995	Not Available	WEL	No
895	Not Available	H42773	Sealed	Not Available	Skillings, Betty	5925 Main St	Fridley	62	10/4/1993	Not Available	WEL	No
896	123-183023110086	H0293655	Sealed	Not Available	Smith, Bruce	2406 Long Lake Rd	New Brighton	63	5/9/2011	Not Available	WEL	No
897	123-Municipal RoW	H196807	Sealed	Not Available	Smith, Gladys L.	1711 Sunnyside Te	New Brighton	28	9/9/2002	Not Available	WEL	No
898	123-Municipal RoW	H118823	Sealed	Not Available	Smith, Robert	2363 17th Av Nw	New Brighton	38	6/2/1997	Not Available	WEL	No
899	Not Available	H150245	Sealed	Not Available	Smolik, Ronald R.	5921 Benjamin St	Fridley	195	12/8/1999	Not Available	WEL	No
900	Not Available	H121328	Sealed	Not Available	Snow, Ester	6619 Channel Rd	Fridley	60	12/6/1995	Not Available	WEL	No
901	123-Municipal RoW	H225677	Sealed	Not Available	Soberg, Stephan	2202 Oriole Av	New Brighton	64	4/13/2005	Not Available	WEL	No
902	123-County RoW	H3710	Sealed	Not Available	Sorenson, Dave	1875 Long Lake Rd	New Brighton	83	5/29/1990	Not Available	WEL	No
903	Not Available	H23987	Sealed	Not Available	Sorenson, Ellen	5864 Stinson Bl	Fridley	170	6/22/1992	Not Available	WEL	No
904	003-143024240004	H38907	Sealed	Not Available	Sorum, Gladys	411 Mississippi St	Fridley	80	10/13/1993	Not Available	WEL	No
905	003-113024130099	H239159	Sealed	Not Available	Speedway Superamerica	7299 Hwy 65 Ne	Fridley	15	8/18/2005	Not Available	WEL	No
906	Not Available	H256720	Sealed	Not Available	Speedway Superamerica	1130 73rd Av Ne	Fridley	16	1/17/2007	Not Available	WEL	No
907	003-123024410004	H256718	Sealed	Not Available	Speedway Superamerica	7299 Hwy 6 Ne	Fridley	16	1/17/2007	Not Available	WEL	No
908	003-123024310051	735903	Sealed	Not Available	Speedway Superamerica	7299 Hwy 65 Ne	Fridley	17	5/21/2009	Not Available	WEL	No
909	003-123024310052	747713	Sealed	Not Available	Speedway Superamerica	1130 73rd Av Ne	Fridley	17	5/21/2009	Not Available	WEL	No
910	003-123024310051	735900	Sealed	Not Available	Speedway Superamerica	7299 Hwy 65 Ne	Fridley	17	5/21/2009	Not Available	WEL	No
911	003-123024310051	735901	Sealed	Not Available	Speedway Superamerica	7299 Hwy 65 Ne	Fridley	17	5/21/2009	Not Available	WEL	No
912	003-123024310051	735902	Sealed	Not Available	Speedway Superamerica	7299 Hwy 65 Ne	Fridley	17	5/21/2009	Not Available	WEL	No
913	003-233024310107	H175889	Sealed	Not Available	Speedway Superamerica Llc	5667 University Av Ne	Fridley	24	10/26/2000	Not Available	WEL	No
914	Not Available	H21003	Sealed	Not Available	St. Phillips Lutheran	6180 Hwy 65 Ne	Fridley	80	6/9/1992	Not Available	WEL	No
915	123-Municipal RoW	H104208	Sealed	Not Available	Staff, Kim	5045 Greenwood Dr	Mounds View	25	6/25/1996	Not Available	WEL	No
916	003-233024210014	H164898	Sealed	Not Available	Stasik, Bonnie	5981 Fourth St	Fridley	15	4/13/2000	Not Available	WEL	No
917	003-143024130019	H11486	Sealed	Not Available	Steelz, Viktorin	542 66th Av Ne	Fridley	102	6/11/1991	Not Available	WEL	No
918	Not Available	H285974	Sealed	Not Available	Steffen, Linda	7718 Central Av Ne	Fridley	30	5/14/2010	Not Available	WEL	No
919	123-Municipal RoW	H239657	Sealed	Not Available	Stephens, Don	5092 Brighton La	Mounds View	30	5/15/2006	Not Available	WEL	No
920	123-073023440032	H80850	Sealed	Not Available	Stewart, Harvey	5124 Rainbow La	Mounds View	27	11/19/1992	Not Available	WEL	No
921	003-123024220029	H0097712	Sealed	Not Available	Stienle, Kirk	7680 65 Hy NE	Fridley	90	6/10/1990	Not Available	WEL	No
922	003-133024420013	H245987	Sealed	Not Available	Stone, Tom	1400 Mississippi St Ne	Fridley	25	4/3/2006	Not Available	WEL	No
923	Not Available	H46151	Sealed	Not Available	Strand, Rodney L.	8000 Pleasant View Dr	Fridley	44	4/25/1994	Not Available	WEL	No
924	Not Available	H126220	Sealed	Not Available	Stuber, Neil W.	6452 Dellwood Dr Ne	Fridley	123	8/19/1997	Not Available	WEL	No
925	Not Available	H91875	Sealed	Not Available	Sund, Marlin	776 63rd Av Ne	Fridley	21	9/16/1987	Not Available	WEL	No
926	123-Municipal RoW	H108790	Sealed	Not Available	Sundvall, Joan	6942 Pleasant View Dr	Mounds View	22	9/5/1996	Not Available	WEL	No
927	123-County RoW	540707	Sealed	Not Available	Super America	2010 Silver Lake Rd	New Brighton	24	8/14/1995	Not Available	WEL	No
928	123-County RoW	540708	Sealed	Not Available	Super America	2010 Silver Lake Rd	New Brighton	23	8/14/1995	Not Available	WEL	No
929	123-County RoW	540709	Sealed	Not Available	Super America	2010 Silver Lake Rd	New Brighton	45	8/14/1995	Not Available	WEL	No
930	003-233024310107	H140700	Sealed	Not Available	Super America	5667 University Av	Fridley	28	1/22/1999	Not Available	WEL	No
931	123-County RoW	H39965	Sealed	Not Available	Super America Group, Inc.	2501 Silver Lake Rd	New Brighton	17	9/6/1993	Not Available	WEL	No
932	123-County RoW	H39966	Sealed	Not Available	Super America Group, Inc.	2501 Silver Lake Rd	New Brighton	15	9/6/1993	Not Available	WEL	No
933	123-County RoW	H39967	Sealed	Not Available	Super America Group, Inc.	2501 Silver Lake Rd	New Brighton	15	9/6/1993	Not Available	WEL	No
934	123-County RoW	H39968	Sealed	Not Available	Super America Group, Inc.	2501 Silver Lake Rd	New Brighton	14	9/6/1993	Not Available	WEL	No
935	123-County RoW	H39969	Sealed	Not Available	Super America Group, Inc.	2501 Silver Lake Rd	New Brighton	12	9/21/1993	Not Available	WEL	No
936	123-County RoW	H145803	Sealed	Not Available	Superamerica	2010 Silver Lake Rd	New Brighton	28	9/22/1998	Not Available	WEL	No

Table C-3-1

Sealed Wells in the DWSMA
City of Fridley Part 2 WHPP Amendment

PCSI ID	PID No.	Unique No.	Status	Use	Well Name	Well Location	City	Total Sealed Depth (Feet)	Date Completed/Sealed	Aquifer	PCS Code	Location Verified
937	Not Available	H256751	Sealed	Not Available	Superamerica	7299 Hwy 65 Ne	Fridley	14	2/8/2007	Not Available	WEL	No
938	123-County RoW	H44946	Sealed	Not Available	Superamerica Group, Inc.	2010 Silver Lake Rd	New Brighton	15	2/1/1994	Not Available	WEL	No
939	Not Available	H17398	Sealed	Not Available	Swanson, Curt	1054 64th Av Ne	Fridley	60	2/6/1992	Not Available	WEL	No
940	Not Available	H243410	Sealed	Not Available	Swanson, David	6382 Baker Av Ne	Fridley	25	4/5/2006	Not Available	WEL	No
941	123-County RoW	H19287	Sealed	Not Available	Swanson, Spencer	2505 County Road H	Mounds View	25	3/27/1992	Not Available	WEL	No
942	003-133024320070	657312	Sealed	Not Available	Taho Sportswear	6304 Hwy 65 Ne	Fridley	15	11/6/2002	Not Available	WEL	No
943	003-133024320070	657313	Sealed	Not Available	Taho Sportswear	6304 Hwy 65 Ne	Fridley	34	11/6/2002	Not Available	WEL	No
944	003-133024320070	657314	Sealed	Not Available	Taho Sportswear	6304 Hwy 65 Ne	Fridley	14	11/6/2002	Not Available	WEL	No
945	003-133024310087	657315	Sealed	Not Available	Taho Sportswear	6304 Hwy 65 Ne	Fridley	14	11/6/2002	Not Available	WEL	No
946	Not Available	H118202	Sealed	Not Available	Tam, Oliver	1160 Fireside Dr Ne	Fridley	109	5/19/1997	Not Available	WEL	No
947	Not Available	H183546	Sealed	Not Available	Terwisscha, Mike	7460 Able St Ne	Fridley	96	6/7/2002	Not Available	WEL	No
948	123-073023430099	H118824	Sealed	Not Available	Tetrick, William J.	5080 Sunnyside Rd Ne	Mounds View	38	6/2/1997	Not Available	WEL	No
949	Not Available	H52006	Sealed	Not Available	Thayer, Jim	377 66th Av	Fridley	79	4/23/1994	Not Available	WEL	No
950	Not Available	H0296752	Sealed	Not Available	Theisen, Eugene	6021 Fifth St NE	Fridley	25	6/17/2011	Not Available	WEL	No
951	123-Municipal RoW	H159896	Sealed	Not Available	Theobald, Teresa A.	2477 Gregory Dr	New Brighton	55	7/13/2000	Not Available	WEL	No
952	123-183023210001	H4329	Sealed	Not Available	Thomas, Donald M	1751 Longview Dr Ne	New Brighton	75	5/25/1990	Not Available	WEL	No
953	123-Municipal RoW	H39003	Sealed	Not Available	Thompson, Diane M.	2908 Brookshire La	New Brighton	155	8/23/1993	Not Available	WEL	No
954	Not Available	H234618	Sealed	Not Available	Thompson, Marion	1351 Hillcrest Dr	Fridley	145	8/23/2005	Not Available	WEL	No
955	123-Municipal RoW	H259683	Sealed	Not Available	Thompson, Tom	7810 Gloria Ci	Mounds View	19	5/28/2008	Not Available	WEL	No
956	Not Available	H28378	Sealed	Not Available	Tiller, Bailey	1535 Gardena Av	Fridley	187	5/18/1993	Not Available	WEL	No
957	123-Municipal RoW	H256390	Sealed	Not Available	Tilleskjor, Wanda	7406 Spring Lake Rd	Mounds View	19	8/18/2008	Not Available	WEL	No
958	123-Municipal RoW	H67967	Sealed	Not Available	Tjosvold, K. K.	2542 Longview Dr	New Brighton	32	4/27/1995	Not Available	WEL	No
959	123-073023430071	H73730	Sealed	Not Available	Tomala, David	5072 Silver Lake Rd	Mounds View	30	5/17/1996	Not Available	WEL	No
960	Not Available	H11731	Sealed	Not Available	Tooze, Sharon	369 66th Av	Fridley	88	6/18/1991	Not Available	WEL	No
961	123-073023440107	H18300	Sealed	Not Available	Torgerson, John	5067 Long Lake Rd	Mounds View	20	3/14/1992	Not Available	WEL	No
962	003-143024110039	H0295615	Sealed	Not Available	Tostenson, Cathy	704 63rd Av NE	Fridley	18	11/11/2011	Not Available	WEL	No
963	Not Available	H49014	Sealed	Not Available	Total Mart	6071 University Av	Fridley	30	5/20/1994	Not Available	WEL	No
964	Not Available	518542	Sealed	Not Available	Total Petroleum, Inc.	6101 University Av	Fridley	36	9/22/1995	Not Available	WEL	No
965	Not Available	518543	Sealed	Not Available	Total Petroleum, Inc.	6101 University Av	Fridley	35	9/22/1995	Not Available	WEL	No
966	Not Available	518544	Sealed	Not Available	Total Petroleum, Inc.	6101 University Av	Fridley	35	9/22/1995	Not Available	WEL	No
967	Not Available	527387	Sealed	Not Available	Total Petroleum, Inc.	6101 University Av	Fridley	29	9/22/1995	Not Available	WEL	No
968	Not Available	527388	Sealed	Not Available	Total Petroleum, Inc.	6101 University Av	Fridley	35	9/22/1995	Not Available	WEL	No
969	Not Available	H71717	Sealed	Not Available	Total Petroleum, Inc.	6101 University Av Ne	Fridley	43	9/22/1995	Not Available	WEL	No
970	Not Available	H180706	Sealed	Not Available	Trimble, Karen	5614 Fifth St	Fridley	60	7/13/2001	Not Available	WEL	No
971	123-Municipal RoW	H217083	Sealed	Not Available	Tucker, Darlene	2351 Brighton La	New Brighton	65	9/20/2004	Not Available	WEL	No
972	123-073023220013	244354	Sealed	Observation We	USGS SPRING LAKE	Not Available	Mounds View	32	21/10/1966	QWTA	WEL	No
973	Not Available	H155942	Sealed	Not Available	Uecker, Carol J.	6545 Arthur St	Fridley	56	10/7/1999	Not Available	WEL	No
974	123-183023210050	H222290	Sealed	Not Available	Ulrich, Greg	2857 Valley View La	New Brighton	98	6/8/2004	Not Available	WEL	No
975	Not Available	H150179	Sealed	Not Available	Underhill, Carol	7379 Memory La	Fridley	24	5/20/1999	Not Available	WEL	No
976	003-233024110001	H275651	Sealed	Not Available	Unglaub, Jerome	830 W Moore Lake Dr	Fridley	12	4/22/2009	Not Available	WEL	No
977	Not Available	H111785	Sealed	Not Available	Urista, John P.	6599 Channel Rd	Fridley	110	11/5/1996	Not Available	WEL	No
978	003-123024130044	H0292908	Sealed	Not Available	Uthe, Jim	7315 65 Hy NE	Fridley	16	12/20/2010	Not Available	WEL	No
979	123-Municipal RoW	H13586	Sealed	Not Available	Va	2650 15th St Nw	New Brighton	66	6/17/1991	Not Available	WEL	No
980	123-Municipal RoW	H211385	Sealed	Not Available	Vadnais, Jerry	1905 Sunnyside Te	New Brighton	24	10/16/2003	Not Available	WEL	No
981	003-013024340041	H54804	Sealed	Not Available	Vados, Gordon	7855 Hwy 65	Fridley	135	6/16/1994	Not Available	WEL	No
982	Not Available	H139816	Sealed	Not Available	Vanderwerf, Cynthia	1630 66th Av Ne	Fridley	65	7/16/1998	Not Available	WEL	No
983	Not Available	H194572	Sealed	Not Available	Vanous, Roger	5860 Third St	Fridley	66	6/18/2002	Not Available	WEL	No
984	123-183023210048	H128949	Sealed	Not Available	Vanzandt, Suzanne	2643 Valley View La	New Brighton	135	4/24/1991	Not Available	WEL	No
985	Not Available	H150202	Sealed	Not Available	Varichak, Steve	1583 Gardena Av Ne	Fridley	245	7/15/1999	Not Available	WEL	No
986	Not Available	H240783	Sealed	Not Available	Veit And Co.	271 57th Pl Ne	Fridley	25	10/3/2005	Not Available	WEL	No
987	Not Available	H235331	Sealed	Not Available	Velmeir Companies	5696 University Av Ne	Fridley	23	6/28/2005	Not Available	WEL	No
988	003-233024310107	H230532	Sealed	Not Available	Vermeir Companies, The	5676 University Av Ne	Fridley	25	5/2/2005	Not Available	WEL	No

Table C-3-1

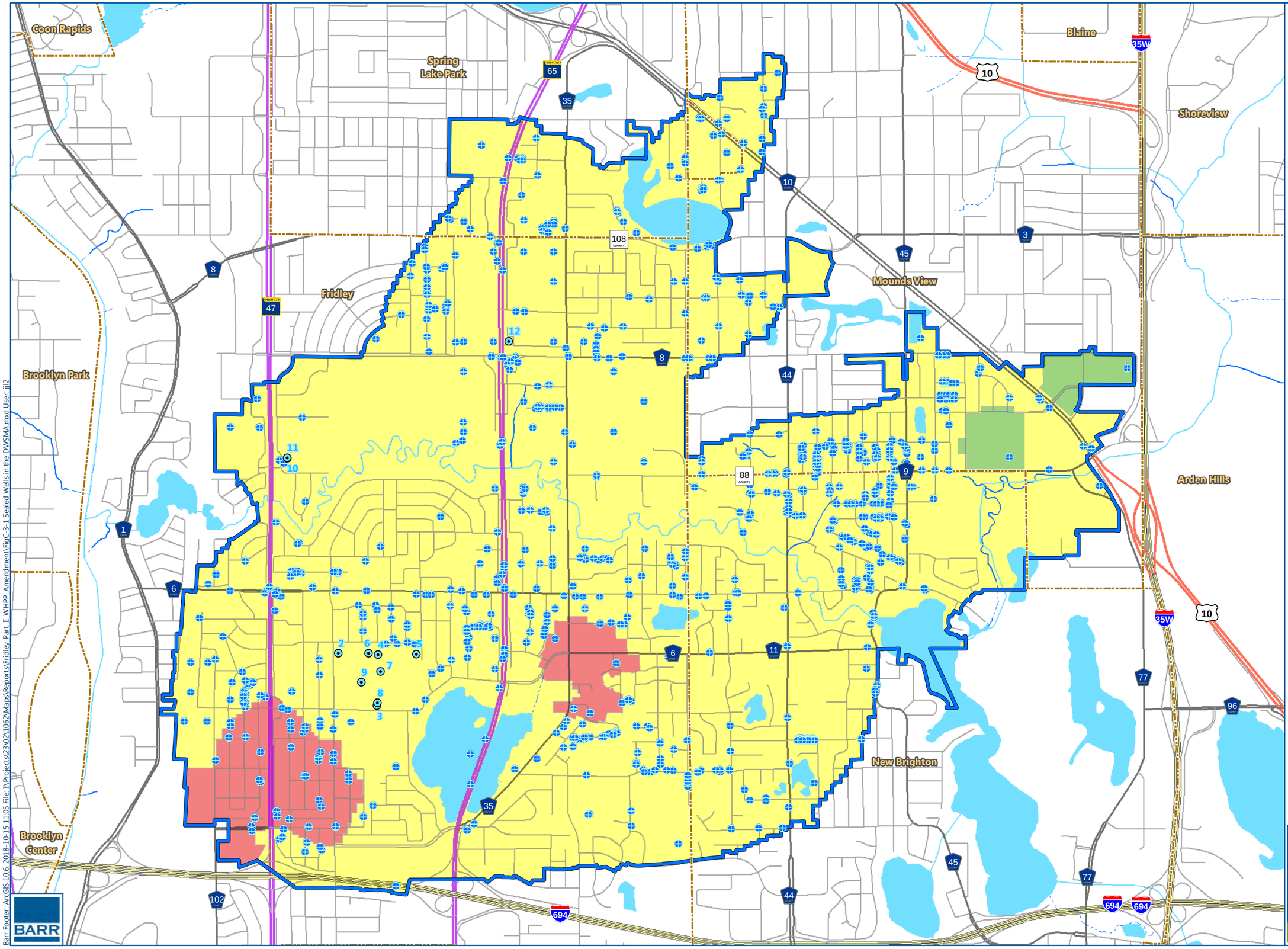
Sealed Wells in the DWSMA
City of Fridley Part 2 WHPP Amendment

PCSI ID	PID No.	Unique No.	Status	Use	Well Name	Well Location	City	Total Sealed Depth (Feet)	Date Completed/Sealed	Aquifer	PCS Code	Location Verified
989	Not Available	H21447	Sealed	Not Available	Vfw	1040 Osborne Rd	Fridley	18	6/5/1992	Not Available	WEL	No
990	Not Available	H21448	Sealed	Not Available	Vfw	1040 Osborne Rd	Fridley	16	6/5/1992	Not Available	WEL	No
991	Not Available	H21449	Sealed	Not Available	Vfw	1040 Osborne Rd	Fridley	20	6/5/1992	Not Available	WEL	No
992	Not Available	H21450	Sealed	Not Available	Vfw	1040 Osborne Rd	Fridley	16	6/5/1992	Not Available	WEL	No
993	123-County RoW	H112871	Sealed	Not Available	Visser, Marlene	5046 Long Lake Rd	Mounds View	28	11/12/1996	Not Available	WEL	No
994	123-Municipal RoW	H4345	Sealed	Not Available	Vogelpohl, Dennis	2466 Clearview Av	Mounds View	30	5/9/1990	Not Available	WEL	No
995	Not Available	H19202	Sealed	Not Available	Volstad, Barb	6440 Baker Av Ne	Fridley	74	3/26/1992	Not Available	WEL	No
996	123-Municipal RoW	H73734	Sealed	Not Available	Vroman, Daniel J.	2418 17th Av Nw	New Brighton	44	5/22/1996	Not Available	WEL	No
997	123-Municipal RoW	H18512	Sealed	Not Available	Wagner, Dave	2286 Oriole Av	New Brighton	58	12/20/1991	Not Available	WEL	No
998	Not Available	H155572	Sealed	Not Available	Wagner, Duncan	7656 Van Buren St Ne	Fridley	75	8/23/1999	Not Available	WEL	No
999	123-Municipal RoW	H213104	Sealed	Not Available	Wahl, Mary	2300 Thorndale	New Brighton	55	7/31/2003	Not Available	WEL	No
1000	123-County RoW	H35395	Sealed	Not Available	Waldock, Robert	2120 Long Lake Rd	New Brighton	180	4/15/1993	Not Available	WEL	No
1001	123-County RoW	H70516	Sealed	Not Available	Walker, Byron R.	2475 Silver Lake Rd	New Brighton	35	7/10/1995	Not Available	WEL	No
1002	Not Available	H208528	Sealed	Not Available	Walkner, Leroy	1538 Gardena Av Ne	Fridley	140	7/14/2003	Not Available	WEL	No
1003	Not Available	H142685	Sealed	Not Available	Walling, John	380 66th Av Ne	Fridley	90	11/4/1998	Not Available	WEL	No
1004	Not Available	H149797	Sealed	Not Available	Walton, Grace	1040 64th Av Ne	Fridley	134	3/3/1999	Not Available	WEL	No
1005	123-Municipal RoW	H202466	Sealed	Not Available	Ward, Ron	2849 Bronson Dr	Mounds View	30	10/28/2002	Not Available	WEL	No
1006	Not Available	H163278	Sealed	Not Available	Ward, Terriann E.	5956 Sixth St Ne	Fridley	16	3/23/2000	Not Available	WEL	No
1007	Not Available	H217071	Sealed	Not Available	Warner, Betty	1354 Hillcrest Dr Ne	Fridley	80	8/30/2004	Not Available	WEL	No
1008	Not Available	H80906	Sealed	Not Available	Watlov, Reuben/glady	1355 Hillcrest Dr Ne	Fridley	120	11/17/1992	Not Available	WEL	No
1009	Not Available	H29479	Sealed	Not Available	Watson, Mary Jane	7328 Hayes St Ne	Fridley	76	3/2/1993	Not Available	WEL	No
1010	Not Available	H228763	Sealed	Not Available	Weber, Carol	5860 Washington St Ne	Fridley	28	12/1/2004	Not Available	WEL	No
1011	123-Municipal RoW	H217082	Sealed	Not Available	Weberg, Clarise	2395 Brighton La	New Brighton	24	9/19/2004	Not Available	WEL	No
1012	123-Municipal RoW	H67979	Sealed	Not Available	Weissman, Donald P.	2530 Longview Dr	New Brighton	30	4/28/1995	Not Available	WEL	No
1013	123-Municipal RoW	H48129	Sealed	Not Available	Welte, Carrol	8045 Groveland Rd	Mounds View	20	4/21/1994	Not Available	WEL	No
1014	123-183023110026	H152602	Sealed	Not Available	Wensaut, Ernie	2554 Oriole La	New Brighton	34	3/31/1999	Not Available	WEL	No
1015	Not Available	H164699	Sealed	Not Available	Wenzel, John	870 Mississippi St	Fridley	20	8/1/2000	Not Available	WEL	No
1016	123-Municipal RoW	H4347	Sealed	Not Available	Werner, Robert L	2426 Clearview Av	Mounds View	30	4/30/1990	Not Available	WEL	No
1017	123-Municipal RoW	H229393	Sealed	Not Available	Westling, Alan	1989 Longview Dr	New Brighton	56	4/30/2005	Not Available	WEL	No
1018	Not Available	H222921	Sealed	Not Available	Wharton, Twila	6887 Channel Rd Ne	Fridley	74	6/16/2004	Not Available	WEL	No
1019	003-123024330005	H112006	Sealed	Not Available	Wick, Mark	11709 March St	Fridley	26	12/19/1996	Not Available	WEL	No
1020	Not Available	H45113	Sealed	Not Available	Wilder, Judy	6845 Channel Rd	Fridley	78	11/23/1993	Not Available	WEL	No
1021	123-Municipal RoW	H21514	Sealed	Not Available	Wildman, Julie	2554 17th Av Nw	New Brighton	30	7/22/1992	Not Available	WEL	No
1022	123-Municipal RoW	H7824	Sealed	Not Available	Williams Pipe Line Co	2523 Woodcrest Dr	Mounds View	17	9/8/1988	Not Available	WEL	No
1023	123-County RoW	H55587	Sealed	Not Available	Williams Pipe Line Co.	5084 Long Lake Rd	Mounds View	35	9/9/1994	Not Available	WEL	No
1024	123-County RoW	H55588	Sealed	Not Available	Williams Pipe Line Co.	5084 Long Lake Rd	Mounds View	35	9/9/1994	Not Available	WEL	No
1025	123-County RoW	H55589	Sealed	Not Available	Williams Pipe Line Co.	5084 Long Lake Rd	Mounds View	35	9/9/1994	Not Available	WEL	No
1026	123-County RoW	H55590	Sealed	Not Available	Williams Pipe Line Co.	5084 Long Lake Rd	Mounds View	35	9/9/1994	Not Available	WEL	No
1027	123-County RoW	H55591	Sealed	Not Available	Williams Pipe Line Co.	5084 Long Lake Rd	Mounds View	18	9/12/1994	Not Available	WEL	No
1028	123-County RoW	H55593	Sealed	Not Available	Williams Pipe Line Co.	5084 Long Lake Rd	Mounds View	19	9/12/1994	Not Available	WEL	No
1029	123-County RoW	H55594	Sealed	Not Available	Williams Pipe Line Co.	5084 Long Lake Rd	Mounds View	20	9/12/1994	Not Available	WEL	No
1030	123-County RoW	H55595	Sealed	Not Available	Williams Pipe Line Co.	5084 Long Lake Rd	Mounds View	40	9/9/1994	Not Available	WEL	No
1031	123-County RoW	H55596	Sealed	Not Available	Williams Pipe Line Co.	5084 Long Lake Rd	Mounds View	16	9/9/1994	Not Available	WEL	No
1032	123-083023330061	H23084	Sealed	Not Available	Williams Pipe Line Company	Woodcrest Dr	Mounds View	18	7/30/1992	Not Available	WEL	No
1033	123-County RoW	H23085	Sealed	Not Available	Williams Pipe Line Company	5074 Long Lake Rd	Mounds View	21	7/30/1992	Not Available	WEL	No
1034	123-County RoW	H55592	Sealed	Not Available	Williams Pipe Line Company	5084 Long Lake Rd	Mounds View	18	9/12/1994	Not Available	WEL	No
1035	123-Municipal RoW	H182412	Sealed	Not Available	Williams, Robert P.	5066 Longview Dr	Mounds View	55	7/20/2001	Not Available	WEL	No
1036	003-153024440081	H226145	Sealed	Not Available	Willman, Steve	65 61┬╜ Wa	Fridley	17	11/5/2004	Not Available	WEL	No
1037	123-Municipal RoW	H199249	Sealed	Not Available	Winderf, Ginger	5085 Longview Dr	Mounds View	18	12/24/2002	Not Available	WEL	No
1038	123-Municipal RoW	H56861	Sealed	Not Available	Windingstad, Larry/mary	2595 Woodcrest Dr	Mounds View	28	8/29/1994	Not Available	WEL	No
1039	Not Available	H142679	Sealed	Not Available	Winters, Jesse J.	1647 Gardena Av Ne	Fridley	158	10/22/1998	Not Available	WEL	No
1040	Not Available	H19239	Sealed	Not Available	Wipper, Mary Ann	7470 Able St Ne	Fridley	86	3/24/1992	Not Available	WEL	No

Table C-3-1

Sealed Wells in the DWSMA
City of Fridley Part 2 WHPP Amendment

PCSI ID	PID No.	Unique No.	Status	Use	Well Name	Well Location	City	Total Sealed Depth (Feet)	Date Completed/Sealed	Aquifer	PCS Code	Location Verified
1041	Not Available	H142676	Sealed	Not Available	Wood, Katherine A.	6371 Jefferson St Ne	Fridley	30	10/16/1998	Not Available	WEL	No
1042	123-Municipal RoW	H4343	Sealed	Not Available	Woods, Dennis J	2448 Clearview Av	Mounds View	30	5/9/1990	Not Available	WEL	No
1043	Not Available	H67969	Sealed	Not Available	Wright, Jan	6800 Channel Rd	Fridley	28	4/24/1995	Not Available	WEL	No
1044	123-Municipal RoW	H9399	Sealed	Not Available	Wulff, Charles	3207 Mississippi St	New Brighton	82	10/3/1990	Not Available	WEL	No
1045	123-Municipal RoW	H100095	Sealed	Not Available	Wuornos, Ray/ann	5054 Eastwood Rd	Mounds View	0	3/21/1996	Not Available	WEL	No
1046	123-Municipal RoW	H18189	Sealed	Not Available	Young, Charles	3032 County Road I	Mounds View	110	3/9/1992	Not Available	WEL	No
1047	Not Available	H126250	Sealed	Not Available	Yurick, Stephen	6359 Baker Av Ne	Fridley	102	4/8/1998	Not Available	WEL	No
1048	123-Municipal RoW	H0309784	Sealed	Not Available	Yvonne Ringgold Estate	3070 Rice Creek Rd	New Brighton	140	11/14/2012	Not Available	WEL	No
1049	Not Available	H16218	Sealed	Not Available	Zabinski, Anthony A	6161 Sunrise Dr	Fridley	70	10/31/1991	Not Available	WEL	No
1050	Not Available	H52011	Sealed	Not Available	Zacharias, Roland	1387 66th Av Ne	Fridley	110	5/6/1994	Not Available	WEL	No
1051	123-Municipal RoW	H252922	Sealed	Not Available	Zbikowski, Roger	1805 Sunnyside Te	New Brighton	30	4/2/2007	Not Available	WEL	No
1052	123-Municipal RoW	H111760	Sealed	Not Available	Zedicher, Grant	1779 Sunnyside Te	New Brighton	32	9/25/1996	Not Available	WEL	No
1053	Not Available	H287053	Sealed	Not Available	Ziegler, Tim	6425 Dellwood Dr Ne	Fridley	21	3/24/2010	Not Available	WEL	No
1054	Not Available	H38993	Sealed	Not Available	Zingsheim, Tom	5991 Benjamin St Ne	Fridley	182	8/4/1993	Not Available	WEL	No
1055	123-Municipal RoW	H164258	Sealed	Not Available	Zwieg, Grace	5309 Greenfield Av	Mounds View	85	8/31/2000	Not Available	WEL	No
1056	123-183023440038	H0295975	Sealed	Not Available	Zwieg, James	2286 Thorndale Av	New Brighton	50	6/7/2011	Not Available	WEL	No



SEALED WELLS
IN THE DWSMAS
Part 2 WHPP Amendment
City of Fridley
Anoka County, MN

FIGURE C-3-1

BARR

Barr Footer: ArcGIS 10.6, 2018-10-15 11:05 File: I:\Projects\23\02\1062\Maps\Reports\Fridley_Part_II_WHPP_Amendment\FigC-3-1 Sealed Wells in the DWSMA.mxd User: jil2

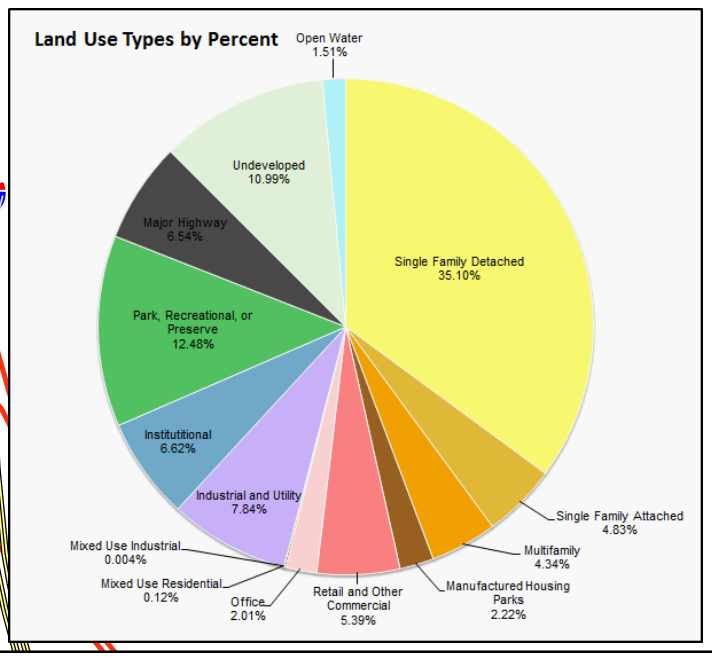
Attachment C-4

Maps for other Jurisdictions

Current (2010) Land Use

- Single Family Detached
- Manufactured Housing Park
- Single Family Attached
- Multifamily
- Retail and Other Commercial
- Office
- Mixed Use Residential
- Mixed Use Industrial
- Industrial and Utility
- Institutional
- Park, Recreational or Preserve
- Major Highway
- Undeveloped
- Water

Blaine
Lexington
Anoka County
Ramsey County
Shoreview
Spring Lake Park
Mounds View
Spring Lake
Wood Lake
Arden Hills
New Brighton
105
23
35W
10
45
44
3
9
77
810A
88



Land Use Data (Met Council 2010 Generalized Land Use)

Mounds View Municipal Well
3 - Municipal Well Location Map ID
(Map ID refers to Table C-2)

Lake

Mounds View DWSMA

Municipal Boundary

County Boundary

Emergency Response Area

N

Feet
1,500 0 1,500

BARR

Figure C-6

CURRENT LAND USE (2010)
Part 2 WHPP
City of Mounds View
Mounds View, Minnesota

City of Mounds View Zoning

- Single-Family Residential
- Single & Two Family Residential
- Medium Density Residential
- High Density Residential
- Mobile Home
- Residential Office
- Neighborhood Business
- Limited Business
- Highway Business
- Regional Business
- Industrial
- Public Facilities
- Planned Unit Development
- Conservancy, Recreation & Preservation
- Right-of-Way
- Open Water

See Attachment C-2 for Blaine Zoning Map

See Attachment C-2 for Lexington Zoning Map

See Attachment C-2 for Shoreview Zoning Map

See Attachment C-2 for Arden Hills Zoning Map

See Attachment C-2 for New Brighton Zoning Map

Anoka County
Ramsey County

Williams Pipe Line - Liquid (12,777')

Williams Pipe Line - Liquid (38,645')

Spring Lake

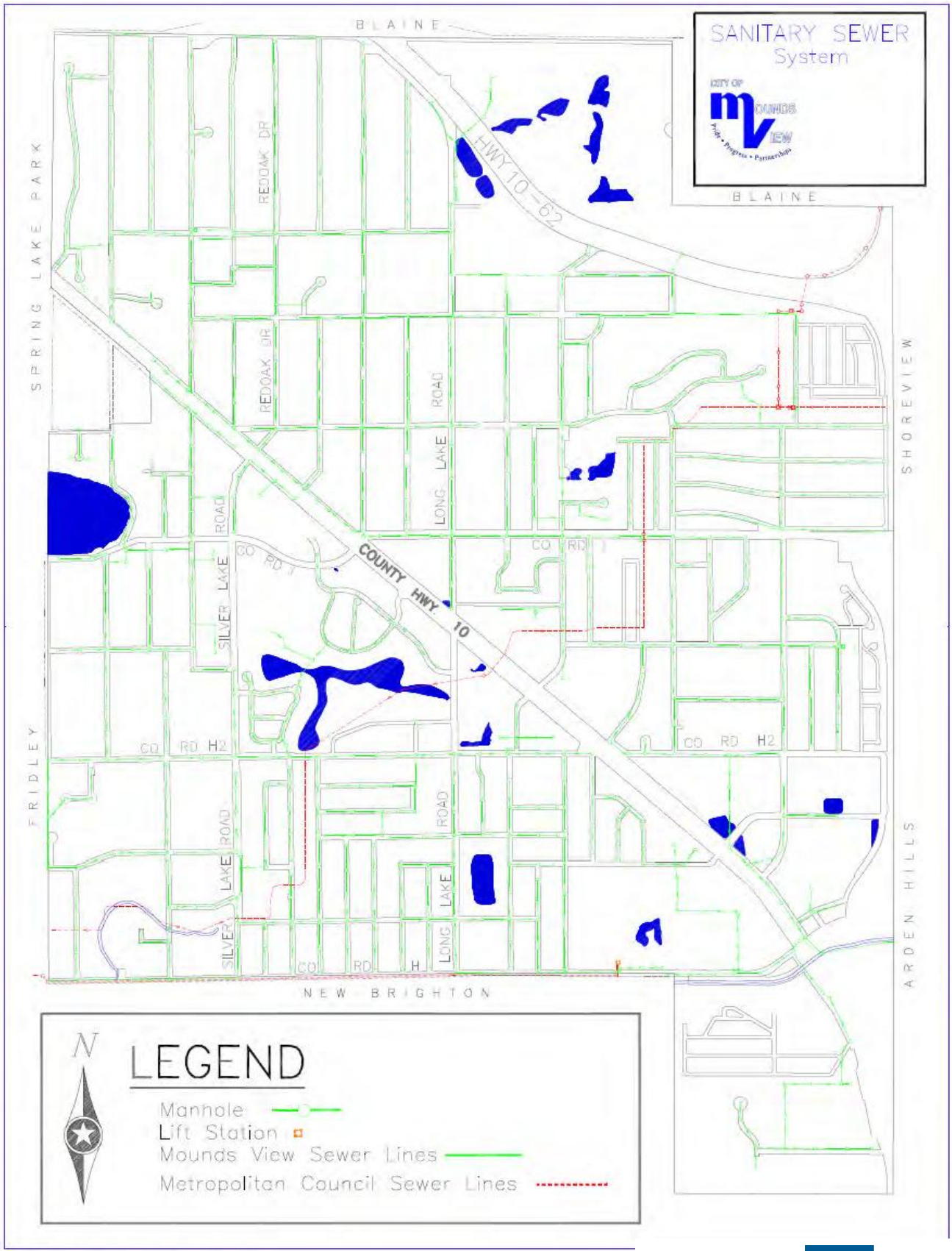
Wood Lake

- Mounds View Municipal Well
- 3 - Municipal Well Location Map ID (Map ID refers to Table C-2)
- Lake
- Mounds View DWSMA
- Municipal Boundary
- County Boundary
- Emergency Response Area

Feet
1,500 0 1,500

Figure C-7

CURRENT ZONING
MOUNDS VIEW
Part 2 WHPP
City of Mounds View
Mounds View, Minnesota

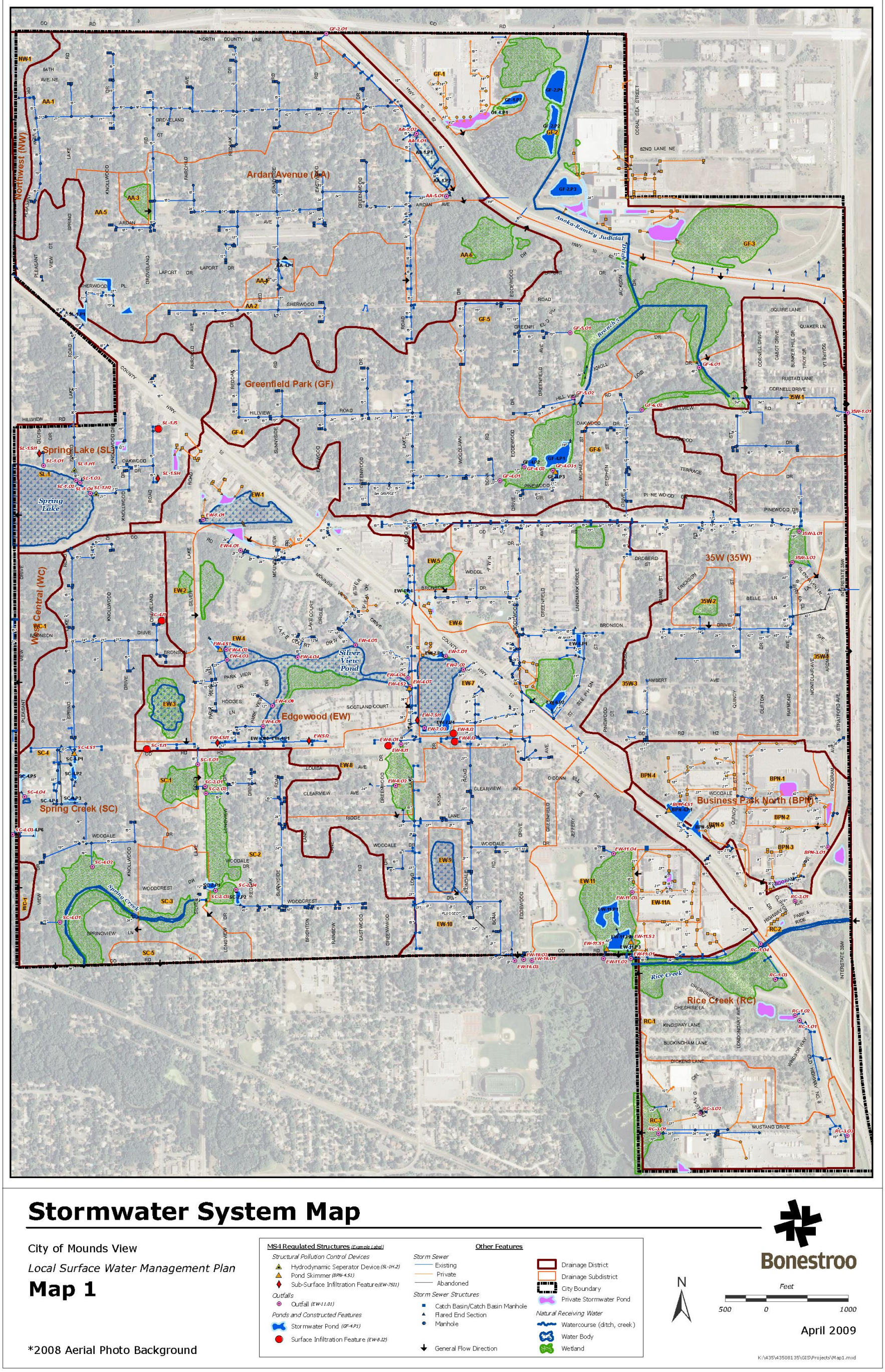


Map Source: Mounds View (2010)

BARR

Figure C-13

SANITARY SEWER – MOUNDS VIEW
Part 2 WHPP
City of Mounds View
Mounds View, Minnesota



Stormwater System Map

City of Mounds View

Local Surface Water Management Plan

Map 1

*2008 Aerial Photo Background

Bonestroo

April 2009

K:\435\43508135\GIS\Projects\Map1.mxd

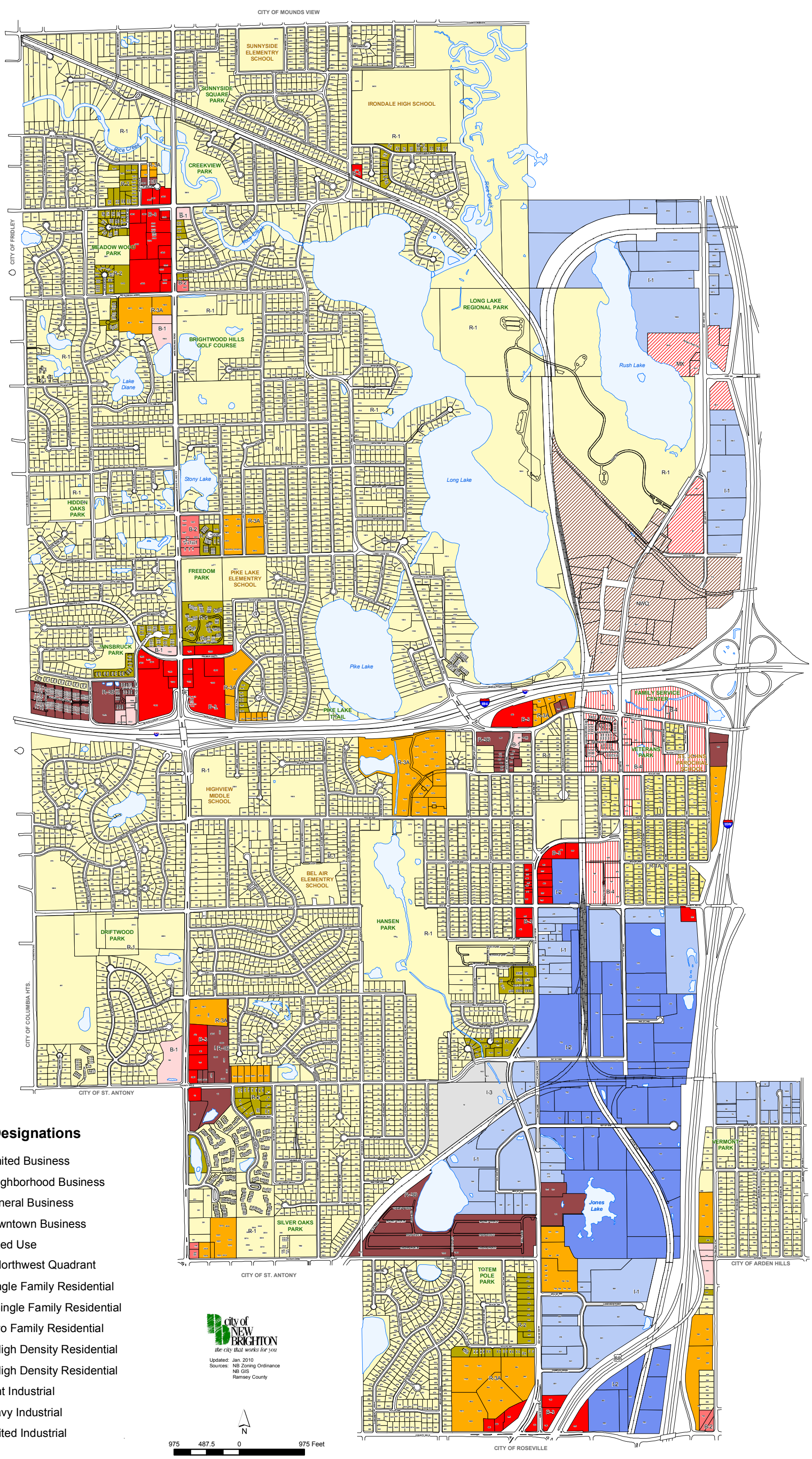
Map Source: Bonestroo (2009)

BARR

Figure C-14

STORM SEWER MAP – MOUNDS VIEW
Part 2 WHPP
City of Mounds View
Mounds View, Minnesota

Current Zoning - City of New Brighton



Zoning Designations

- B-1, Limited Business
- B-2, Neighborhood Business
- B-3, General Business
- B-4, Downtown Business
- MX, Mixed Use
- NWQ, Northwest Quadrant
- R-1, Single Family Residential
- R-1A, Single Family Residential
- R-2, Two Family Residential
- R-3A, High Density Residential
- R-3B, High Density Residential
- I-1, Light Industrial
- I-2, Heavy Industrial
- I-3, Limited Industrial

city of NEW BRIGHTON
the city that works for you

Updated: Jan. 2010
Sources: NB Zoning Ordinance
NB GIS
Ramsey County

N

975 487.5 0 975 Feet

i:\gis\newbrighton\comdev\projects\zoning

City of New Brighton - Existing Land Use

COUNTY RD H
LONG LAKE RD
SILVER LAKE ROAD
MISSISSIPPI ST
RICE CREEK ROAD
LONG LAKE RD
16TH ST NW
SILVER LAKE RD
14TH ST NW
LONG LAKE RD
Rush Lake
Long Lake
OLD HWY 8 NW
Pike Lake
I-694
10TH ST NW
CLEVELAND AVE SE
7TH ST NW
7TH ST NW
OLD HWY 8 NW
SILVER LAKE ROAD
5TH ST NW
COUNTY RD E
SILVER LANE
FOSS ROAD
OLD HWY 8
LONG LAKE RD
COUNTY RD D

- SFD - Single Family Detached
- SFA - Single Family Attached
- MF - Multiple Family
- MH - Mobile Home Park
- NC - Neighborhood Commercial
- CC - Community Commercial
- RC - Regional Commercial
- HC - Highway Convenience
- OFC - Office
- MU - Mixed Use
- LI - Light Industrial
- HI - Heavy Industrial
- IN - Institutional
- SRO - Outdoo Sport/Recreation
- SRI - Indoor Sport/Recreation
- OSN - Natural Open Space
- OSP - Passive Open Space
- RR - Railway
- UTL - Utility
- VAC - Vacant

N

1,000 500 0 1,000 Feet

city of NEW BRIGHTON
the city that works for you

Updated: Jan. 2011
Sources: CD Dept.
NB GIS
Ramsey County

i:\gis\new brighton\comdev\projects\existing land use

Future Land Use - City Of New Brighton

COUNTY RD H
LONG LAKE RD
SILVER LAKE ROAD
MISSISSIPPI ST
RICE CREEK ROAD
16TH ST NW
SILVER LAKE RD
14TH ST NW
LONG LAKE RD
Rush Lake
Long Lake
OLD HWY 8 NW
Pike Lake
10TH ST NW
694
35W
7TH ST NW
7TH ST NW
OLD HWY 8 NW
SILVER LAKE ROAD
5TH ST NW
COUNTY RD E
SILVER LANE
OLD HWY 8
CLEVELAND AVE SE
COUNTY RD D

- LDR, Low Density Residential
- MDR, Medium Density Residential
- HDR, High Density Residential
- NB, Neighborhood Business
- CB, Community Business
- LB, Limited Business
- MU, Mixed Use
- BP, Business Park
- LI, Light Industrial
- HI, Heavy Industrial
- CC, City Center
- P, Park
- OSP, Open Space Preservation
- P-QP, Public & Quasi-Public
- WATER

N

1,000 500 0 1,000 Feet

city of NEW BRIGHTON
the city that works for you

Updated: Jan. 2011
Data Sources: NB Comp. Plan
NB GIS
Ramsey County

I:\GIS\New Brighton Data\Community Development\Projects\

Figure 3: 2030 Future Land Use

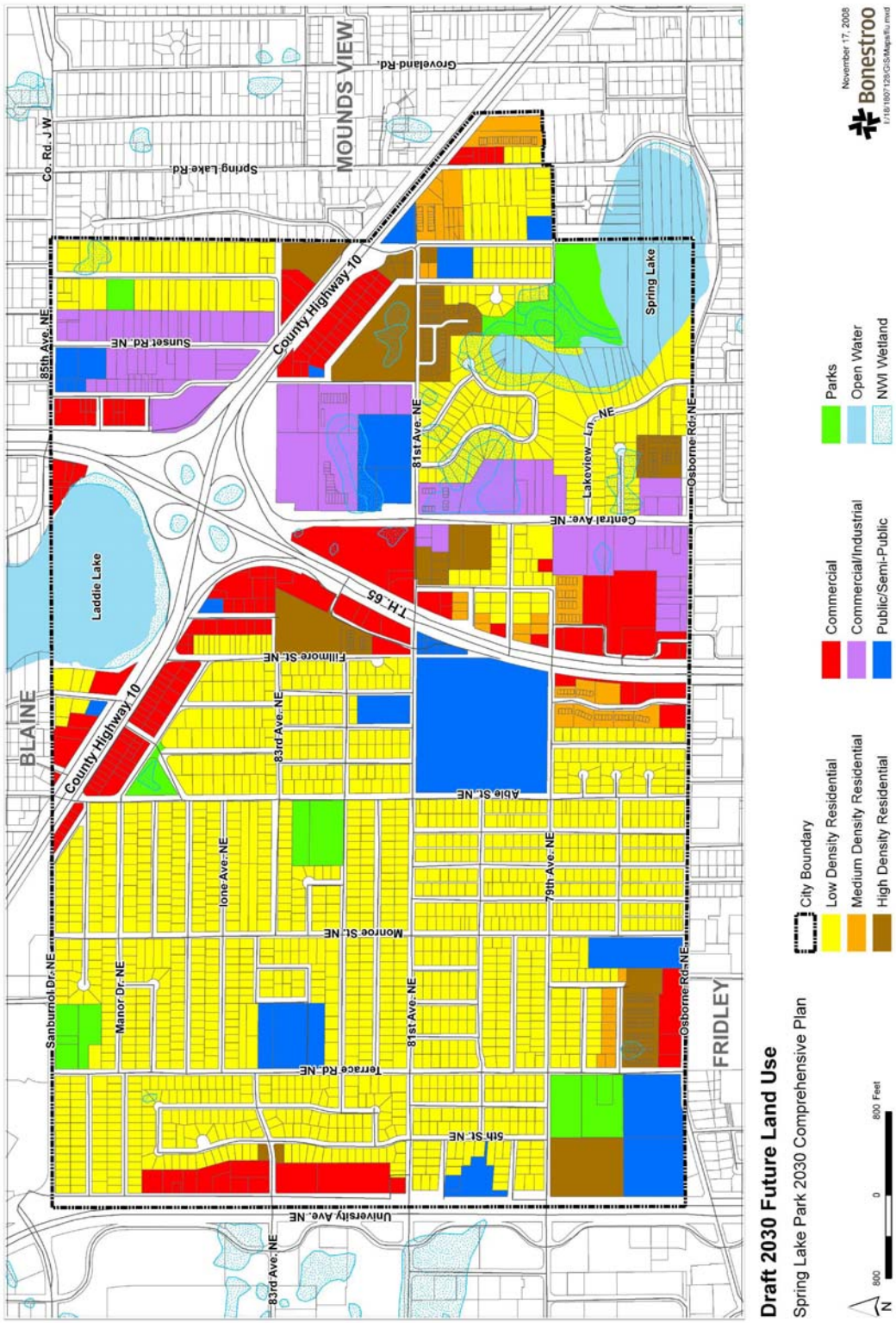
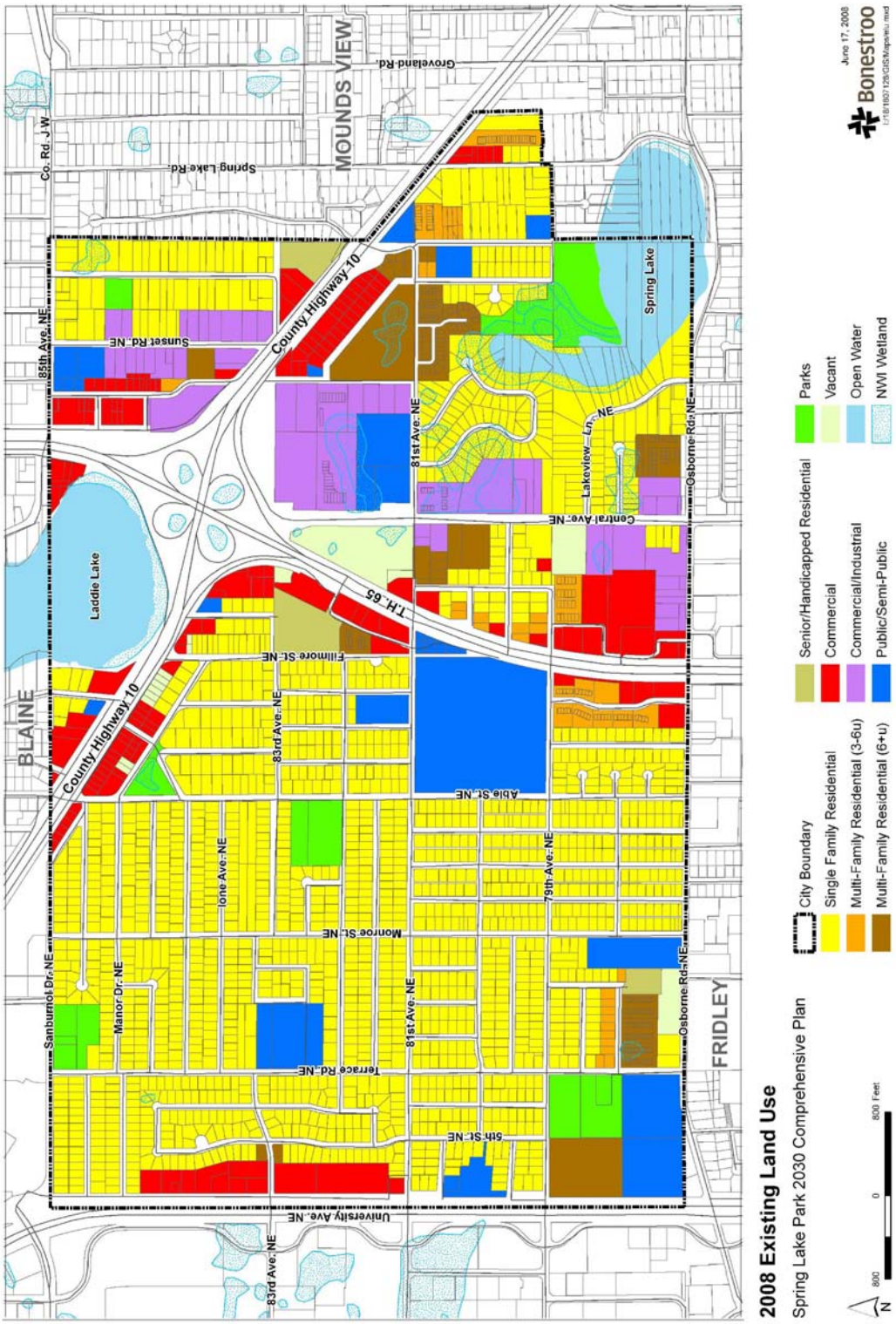
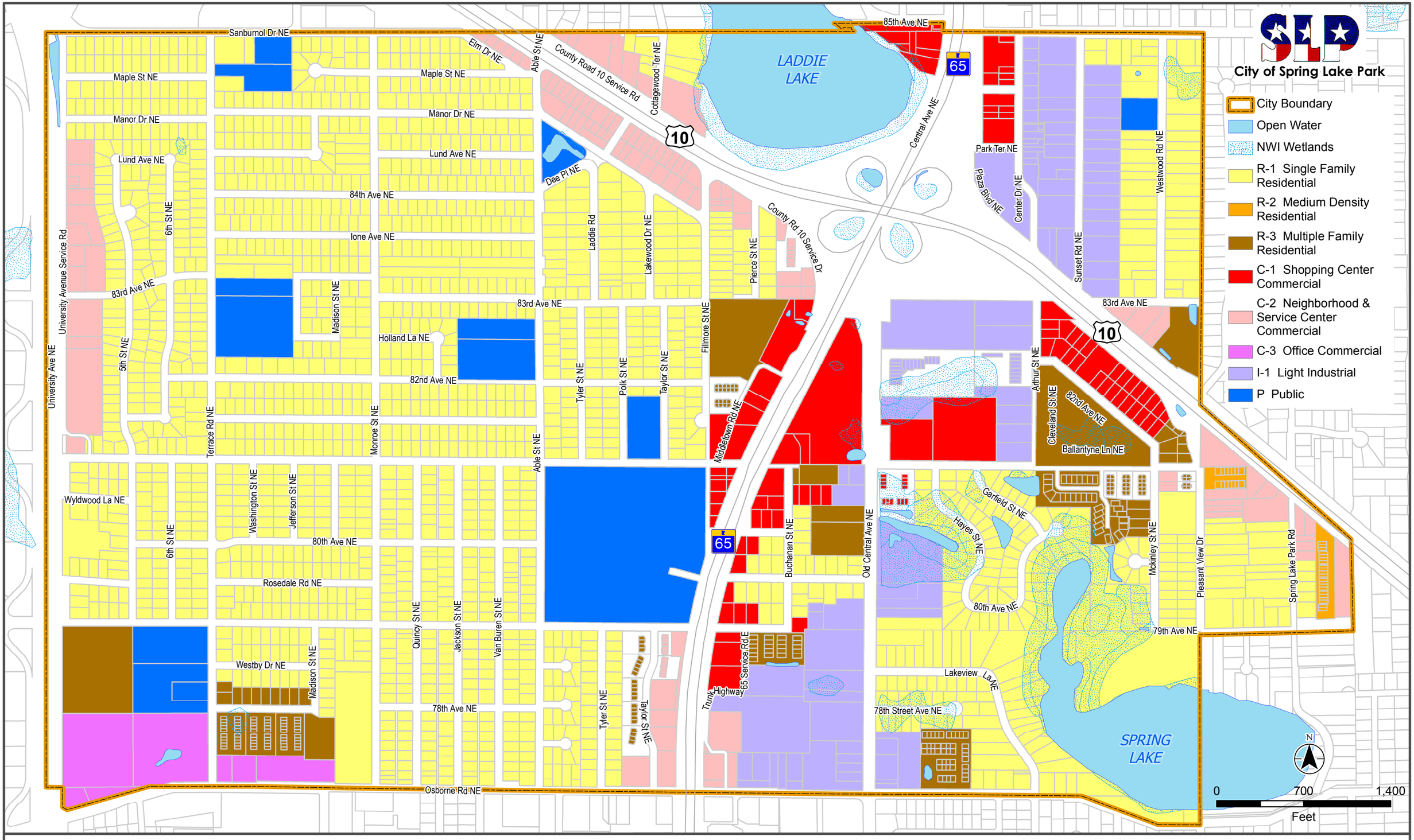


Figure 2: Existing Land Use





October 6, 2015

Stantec

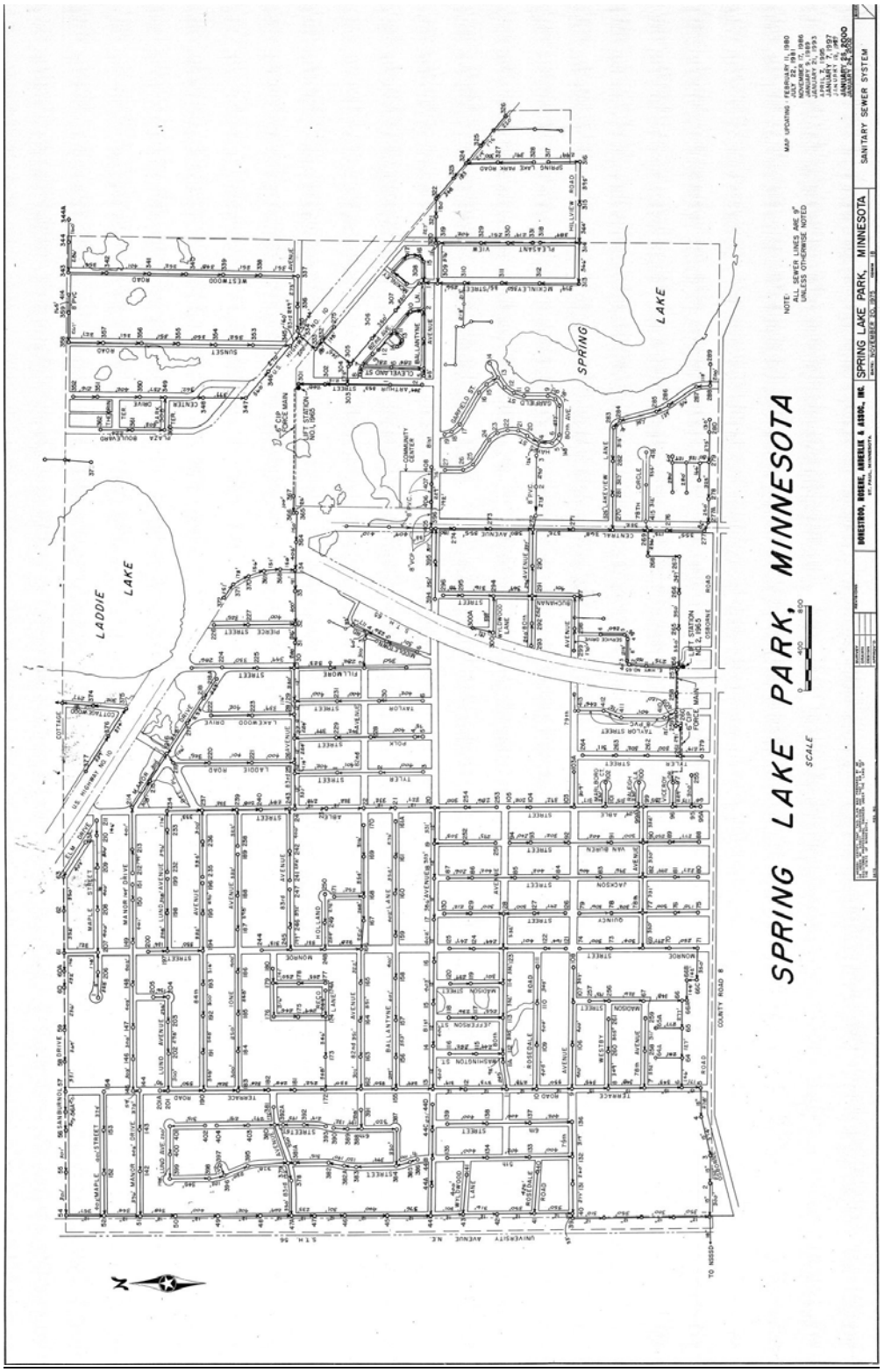
V:\1938\active\193803266\GIS\Projects\Zoning draft 11X17.mxd

Draft

OFFICIAL ZONING MAP

Spring Lake Park, MN

Figure 6: Sewer System Map

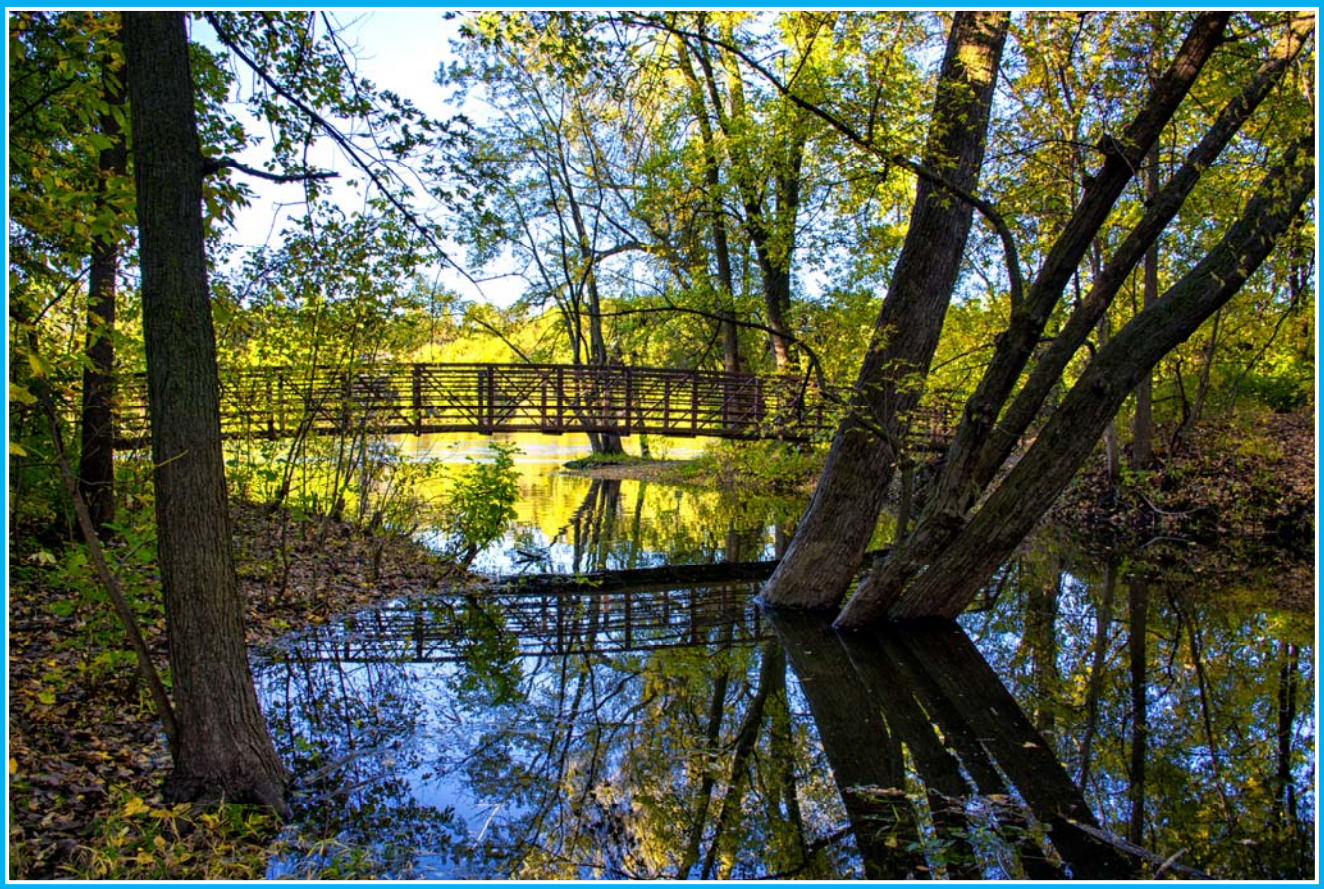


Appendix D

Water Quality Information

CITY OF FRIDLEY

2017 DRINKING WATER REPORT



PRESENTED BY YOUR PUBLIC WORKS DEPARTMENT

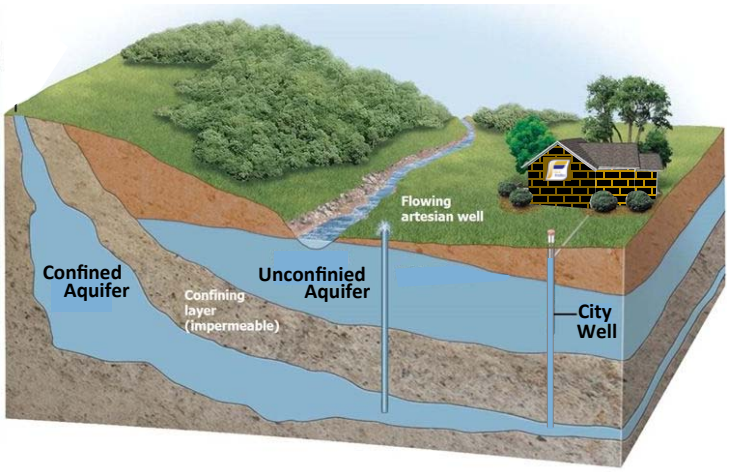
City of Fridley

Keeping You Informed

Fridley drinking water continues to meet all State and Federal standards. The City of Fridley is issuing the results of monitoring done on its drinking water for the period from January 1 to December 31, 2017. *The purpose of this report is to provide you with information on your drinking water and how to protect our precious water resources.*

Making Clean Drinking Water

Your drinking water comes from a groundwater source: eleven wells ranging from 199 to 870 feet deep, that draw water from the Prairie Du Chien -Jordan, Prairie Du Chien Group, Mt. Simon, Quaternary Buried Artesian, Jordan-Mt.Simon and Jordan aquifers.



Fridley works hard to provide you with clean and reliable drinking water that meets federal and state water quality requirements.

The U.S. Environmental Protection Agency sets safe drinking water standards. These standards limit the amounts of specific contaminants allowed in drinking water. This ensures that tap water is safe to drink for most people. The U.S. Food and Drug Administration regulates the amount of certain contaminants in bottled water. Bottled water must provide the same public health protection as public tap water.

Drinking water, including bottled water, may reasonably be expected to contain at least small amounts of some contaminants. The presence of contaminants does not necessarily indicate that water poses a health risk. More information about contaminants and potential health effects can be obtained by calling the Environmental Protection Agency's Safe Drinking Water Hotline at 1-800-426-4791.

Translations

This report contains important information about your drinking water. Have someone translate it for you, or speak with someone who understands it.

Este informe contiene información muy importante sobre su agua potable. Tradúzcalo o hable con alguien que lo entienda bien.

Daim ntawv teev num no muaj cov ntaub ntawv tseem ceeb hais txog koj cov dej haus. Nrhaiv ib tug neeg pab txhais cov ntaub ntawv no rau koj, lossis tham nrog ib tug neeg uas paub cov lus no.

Warbixintan waxay wadataa macluumaad muhiim ah ee la xiriira biyaha aad cabtid. Cid ha kuu tarjunto ama la hadl cid fahmaysa.

Tài liệu này có tin tức quan trọng về nuốc uống của quỳ vị. Hãy nhò nguối dịch cho quỳ vị, hoặc hỏi nguối nào hiểu tài liệu này.

هذا التقرير يحتوي على معولمات مهمة عن ماء الشرب الذي تسخدمه. اطلب من شخص ما ان يترجمه لك او يستطيع فهمه.

Questions, Concerns or Want to Get Involved?

Call (763) 572-3554 if you have questions about the City of Fridley drinking water or would like information about opportunities for public participation in decisions that may affect the quality of your drinking water.

Clean Drinking Water

< $0.006/Gallon

City of Fridley
Friendly. Responsive. Driven.
Tel. (763) 572-3554

Above: Cost Per Gallon For Base Tier, 2018 Residential Rate

Working for YOU!

The Fridley Water Division maintains the operation of 13 wells, 4 reservoirs and 3 filtration plants. In 2017, we repaired and upgraded water mains in some of the oldest areas of the community including the North Park neighborhood.

The City also repaired a 50-year old watermain under I-694. The project successfully rehabilitated 435 lineal feet of 12-inch watermain beneath I-694 using the no-dig method of installing a structural cured-in-place pipe liner (CIPP). This is one of the three remaining I-694 crossings we plan to proactively rehabilitate before emergency repair is necessary.

Public Works staff successfully completed the accelerated residential meter replacement program. We are also entering the design phase for a major renovation at the Locke Park Filtration Plant.

2017 by the Numbers

The City of Fridley's 2017 water by the numbers are as follows:

- 1.121 billion gallons of clean water sold
- 2017 residential usage = 60 gallons per capita per day (down 2% from 2016)
- Through the Clean Water Land and Legacy Amendment, Anoka Conservation District provided $518,000 in funding for the Oak Glen Creek Pond Expansion Project, further protecting our water sources.
- Mississippi Watershed Management Organization also provided $248,000 in funding for stormwater quality improvements as part of the Main Street Drainage Improvements Project.
- 18 watermain breaks repaired and 43 service leaks repaired.
- Total Hardness: 205-290 mg/l or 12-17 grains/gal. About half the homes in Fridley use a water softener.

The Value of Water

Throughout history, civilizations have risen and fallen based on access to a plentiful, safe water supply. That's still the case today. Water is key to healthy people and healthy communities. Water is also vital to our economy. Systems are in place to provide you with clean drinking water. The state of Minnesota and local water systems work to protect drinking water sources.

If we detect a problem, we take corrective action and notify the public.

Fridley Monitoring Results

We work with the Minnesota Department of Health to test drinking water for more than 100 contaminants. It is not unusual to detect contaminants in small amounts. No water supply is ever completely free of contaminants. Drinking water standards protect Minnesotans from substances that may be harmful to their health.

Learn more by visiting the Minnesota Department of Health's webpage Basics of Monitoring and Testing of Drinking Water in Minnesota (http://www.health.state.mn.us/divs/eh/water/factsheet/com/sampling.html).

We sample for some contaminants less than once a year because their levels in water are not expected to change from year to year. If we found any of these contaminants the last time we sampled for them, we included them in the tables below with the detection date.

We may have done additional monitoring for contaminants that are not included in the Safe Drinking Water Act. To request a copy of these results, call the Minnesota Department of Health at 651-201-4700 or 1-800-818-9318 between 8:00 a.m. and 4:30 p.m., Monday through Friday.

Supplemental Contaminant Monitoring

The City of Fridley performs supplemental monitoring of regulated and unregulated contaminants to ensure that your drinking water is clean and safe. No contaminants were detected at levels that violated federal drinking water standards or exceeded Minnesota Department of health risk guidelines.

Supplemental monitoring performed in 2017 included regular testing for contaminants that have impacted the city's wells recently and in the past. Monitoring for Trichloroethylene (TCE) indicated no detection in treated water, and one detection in a single well below established standards and health risk guidelines. The City of Fridley also continues to monitor concentration of 1,4-Dioxane in multiple wells, and trace levels were found. These were over nine times below the strictest health standard. Most recently, one city well was impacted by Perfluorochemicals (PFCs), and was immediately taken out of service in late 2016. While levels were again substantially lower than the strictest health risk guidelines, the city has taken this added precautionary measure to protect public health.

The City of Fridley is continuing to work to identify and eliminate sources of these contaminants impacting specific well sources.

Definitions

AL—Action Level: The concentration of a contaminant which, if exceeded, triggers treatment or other requirements which a water system must follow.

EPA—Environmental Protection Agency

MCL—Maximum Contaminant Level: The highest level of a contaminant that is allowed in drinking water. MCLs are set as close to the MCLGs as feasible using the best available treatment technology.

MCLG—Maximum Contaminant Level Goal: The level of a contaminant in drinking water below which there is no known or expected risk to health. MCLGs allow for a margin of safety.

MRDL—Maximum Residual Disinfectant Level: The highest level of a disinfectant allowed in drinking water. There is convincing evidence that addition of a disinfectant is necessary for control of microbial contaminants.

MRDLG—Maximum Residual Disinfectant Level Goal: The level of a drinking water disinfectant below which there is no known or expected risk to health. MRDLGs do not reflect the benefits of the use of disinfectants to control microbial contaminants.

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

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

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

The water quality data table is on the following page.

2017 Water Quality Data

The table below show the contaminants we found last year or the most recent time we sampled for that contaminant. It also shows the levels of those contaminants and the EPA's limits. Substances that we tested for but did not find are not included in the table.

DETECTED COMPOUNDS *CONTAMINANT NAME*	*UNITS*	EPA LIMITS GOAL *(MCLG)*	EPA LIMITS MAXIMUM *(MCL)*	FRIDLEY LEVELS *RESULT**	FRIDLEY LEVELS *RANGE*	VIOLATION	TYPICAL SOURCES
Nitrate (as Nitrogen)	(ppm)	10	10	0.28	0 - 0.28	No	Runoff from fertilizer use; Leaching from septic tanks, sewage; Erosion of natural deposits.
Gross Alpha	(pCi/l)	0	15.4	6.4	N/A	No	Erosion of natural deposits.
Combined Radium	(pCi/l)	0	5.4	5	N/A	No	Erosion of natural deposits.
TTHM (Total trihalomethanes)	(ppb)	--	80	1	0.6 - 1.0	No	By-product of drinking water disinfection.
Haloacetic Acids (HAA5)	(ppb)	--	60	1	0-1	No	By-product of drinking water disinfection.
Fluoride	(ppm)	4	4	0.83	0.65-0.83	No	State of Minnesota requires all municipal water systems to add fluoride to the drinking water to promote strong teeth; Erosion of natural deposits; Discharge from fertilizer and aluminum factories.
TCE (Trichloroethylene) [a]	(ppb)	0	5 [b]	0	0[c]	No	Discharge from metal degreasing sites and other factories.
1,4-Dioxane [a]	(ppb)	No EPA Limit Established [d]		--	0 - 0.11	No	Discharge from metal degreasing sites and other factories.
PFOA	(ppb)	No EPA Limit Established [e]		0	0[f]	No	Manmade chemicals that have been used for decades to make products that resist heat, oil, stains, grease and water.
		GOAL (MRDLG)	**MAXIMUM (MRDL)**	**HIGH AVG QUARTER**	**HIGH/LOW AVG MONTH**		
Chlorine	(ppm)	4	4	1.24	1.10 - 1.35	No	Water additive used to control microbes.
		GOAL (MCLG)	**MAXIMUM (AL)**	**90% LEVEL**	**SITES OVER AL**		
Copper (2016)	(ppm)	0	1.3	0.73	0 out of 31	No	Corrosion of household plumbing systems; Erosion of natural deposits.
Lead (2016)	(ppb)	0	15	5.7	1 out of 31	No	Corrosion of household plumbing systems; Erosion of natural deposits.

* Results are values used to determine compliance with federal standards. They sometimes are the highest value detected and sometimes are an average of all the detected values. If an average is used, results may include sampling from the previous year.

[a] Results from City of Fridley supplemental monitoring.

[b] The Minnesota Department of Health has set a Health Risk Limit of 0.4 ppb for TCE. See www.health.state.mn.us/divs/eh/risk/guidance/gw/tceinfosheet.pdf for further information.

[c] Note that one operational well sampled from 0 to 0.21 ppb (Well 9).

[d] The Minnesota Department of Health has set a Health Risk Limit of 1 ppb for 1,4-Dioxane. See www.health.state.mn.us/divs/eh/risk/guidance/dwec/dioxaneinfo.pdf for further information.

[e] The Minnesota Department of Health has set a Health Based Value of 0.035 ppb. See http://www.health.state.mn.us/divs/eh/risk/guidance/gw/pfosinfo.pdf for further information.

[f] Note that one **non-operational** well sampled from 0 to 0.014 ppb (Well 10).

Lead in Drinking Water

You may be in contact with lead through paint, water, dust, soil, food, hobbies, or your job. Coming in contact with lead can cause serious health problems for everyone. There is no safe level of lead. Babies, children under six years, and pregnant women are at the highest risk.

Lead is rarely in a drinking water source, but it can get in your drinking water as it passes through lead service lines and your household plumbing system. Fridley provides high quality drinking water, but it cannot control the plumbing materials used in private buildings.

Continue reading to learn how you can protect yourself from lead in drinking water.

1. **Let the water run for 30-60 seconds** before using it for drinking or cooking if the water has not been turned on in over six hours. If you have a lead service line, you may need to let the water run longer. A service line is the underground pipe that brings water from the main water pipe under the street to your home.

- You can find out if you have a lead service line by contacting your public water system, or you can check by following the steps at: *Are your pipes made of lead? Here's a quick way to find out* (https://www.mprnews.org/story/2016/06/24/npr-find-lead-pipes-in-your-home).
- The only way to know if lead has been reduced by letting it run is to check with a test. If letting the water run does not reduce lead, consider other options to reduce your exposure.

2. **Use cold water** for drinking, making food, and making baby formula. Hot water releases more lead from pipes than cold water.
3. **Test your water.** In most cases, letting the water run and using cold water for drinking and cooking should keep lead levels low in your drinking water. If you are still concerned about lead, arrange with a laboratory to test your tap water. Testing your water is important if young children or pregnant women drink your tap water.

- Contact a Minnesota Department of Health accredited laboratory to get a sample container and instructions on how to submit a sample: Environmental Laboratory Accreditation Program (https://apps.health.state.mn.us/eldo/public/accreditedlabs/labsearch.seam)
  The Minnesota Department of Health can help you understand your test results.

4. Treat your water if a test shows your water has high levels of lead after you let the water run.

- Read about water treatment units: Point-of-Use Water Treatment Units for Lead Reduction (http://www.health.state.mn.us/divs/eh/water/factsheet/com/poulead.html)

Learn more:

- Visit Lead in Drinking Water (http://www.health.state.mn.us/divs/eh/water/contaminants/lead.html#Protect)
- Visit Basic Information about Lead in Drinking Water (http://www.epa.gov/safewater/lead)
- Call the EPA Safe Drinking Water Hotline at 1-800-426-4791.To learn about how to reduce your contact with lead from sources other than your drinking water, visit Lead Poisoning Prevention: Common Sources (http://www.health.state.mn.us/divs/eh/lead/sources.html).

Fluoride in Drinking Water

Fluoride is nature's cavity fighter, with small amounts present naturally in many drinking water sources. There is an overwhelming weight of credible, peer-reviewed, scientific evidence that fluoridation reduces tooth decay and cavities in children and adults, even when there is availability of fluoride from other sources, such as fluoride toothpaste and mouth rinses. Since studies show that optimal fluoride levels in drinking water benefit public health, municipal community water systems adjust the level of fluoride in the water to a concentration between 0.5 to 1.5 parts per million (ppm), with an optimal fluoridation goal between 0.7 and 1.2 ppm to protect your teeth. Fluoride levels below 2.0 ppm are not expected to increase the risk of a cosmetic condition known as enamel fluorosis.

Some People Are More Vulnerable To Contaminants in Drinking Water

Some people may be more vulnerable to contaminants in drinking water than the general population. Immuno-compromised persons such as persons with cancer undergoing chemotherapy, persons who have undergone organ transplants, people with HIV/AIDS or other immune system disorders, some elderly, and infants can be particularly at risk from infections. The developing fetus and therefore pregnant women may also be more vulnerable to contaminants in drinking water. These people or their caregivers should seek advice about drinking water from their health care providers. EPA/Centers for Disease Control (CDC) guidelines on appropriate means to lessen the risk of infection by Cryptosporidium and other microbial contaminants are available from the Safe Drinking Water Hotline at 1-800-426-4791.

Home Water Treatment

Most Minnesotans, whether they drink from a public water supply or a private well, have drinking water that does not need treatment for health protection. Water treatment units are best for improving the physical qualities of water—the taste, color, or odor.

No single treatment process can remove all substances in water. If you decide to install a home water treatment unit, choose a unit certified and labeled to reduce or remove the substance of concern. If there is more than one substance you want to remove from your water, you may need to combine several treatment processes into one system.

Even well-designed treatments systems can fail. You should continue to test your drinking water after you install a treatment unit. All home water treatment units need regular maintenance to work correctly. Regular maintenance may include changing filters, disinfecting the unit, or cleaning scale buildup. Always install, clean, and maintain a treatment unit according to the manufacturer's recommendations.

Learn more at Home Water Treatment (http://www.health.state.mn.us/divs/eh/water/factsheet/com/pou.html).

Beware of Scams

False claims, deceptive sales pitches, or scare tactics have been used by some water treatment companies. Every person has a right to decide what is best for themselves and their family, and you may choose to install additional water treatment to further lower the levels of contaminants of emerging concern, chlorine, and other chemicals in your water. However, you should be cautious about purchasing a water treatment system. If you are considering the purchase of a home water treatment system, please read the Minnesota Department of Health's recommendations online at Warning: Beware of Water Treatment Scams (http://www.health.state.mn.us/divs/eh/water/factsheet/com/beware.html).

Pros & Cons of Water Softening

Water softeners are a water treatment device. They remove water hardness (dissolved calcium and magnesium). The decision to soften your water is a personal choice that can affect your home and the environment. It is important to understand your home's water quality. This will help you decide if a home water softener is necessary and choose the best treatment device(s). Water softeners must be installed and maintained properly to be safe and effective.

The advantages of home water softening include:

- Prevents build-up of minerals (scale) on the inside of pipes, fixtures, and hot water heaters.
- Lengthens the life of some appliances.
- Reduces or prevents mineral spots on glassware.
- Prevents or reduces soap films and detergent curds in sinks, bathtubs, and washing machines.

The disadvantages of home water softening include:

- Can corrode your pipes. The corroded metal from the pipes can end up in your water.
- Potential health implications from additional sodium from water softening.
- Regular testing of the water and maintenance of the softener is necessary to make sure the softener is working properly.
- Salt use negatively impacts the environment.
- Water waste: The water used to regenerate the softener beads ends up as waste water.

Reduce Backflow at Cross Connections

Bacteria and chemicals can enter the drinking water supply from polluted water sources in a process called backflow. Backflow occurs at connection points between drinking water and non-drinking water supplies (cross connections) due to water pressure differences.

For example, if a person sprays an herbicide with a garden hose, the herbicide could enter the home's plumbing and then enter the drinking water supply. This could happen if the water pressure in the hose is greater than the water pressure in the home's pipes.

Property owners can help prevent backflow. Pay attention to cross connections, such as garden hoses.

The Minnesota Department of Health and American Water Works Association recommend the following:

- Do not submerge hoses in buckets, pools, tubs, or sinks.
- Keep the end of hoses clear of possible contaminants.
- Do not use spray attachments without a backflow prevention device. Attach these devices to threaded faucets. Such devices are inexpensive and available at hardware stores.
- Use a licensed plumber to install backflow prevention devices.
- Maintain air gaps between hose outlets and liquids. An air gap is a vertical space between the water outlet and the flood level of a fixture (e.g. the space between a wall-mounted faucet and the sink rim). It must be at least twice the diameter of the water supply outlet, and at least one inch.
- Commercial property owners should develop a plan for flushing or cleaning water systems to minimize the risk of drawing contaminants into uncontaminated areas.

Conservation

Conservation is essential, even in the land of 10,000 lakes. For example, in parts of the metropolitan area, groundwater is being used faster than it can be replaced. Some agricultural regions in Minnesota are vulnerable to drought, which can affect crop yields and municipal water supplies.

We must use our water wisely. Below are some tips to help you and your family conserve – and save money in the process.

- Fix running toilets—they can waste hundreds of gallons of water.
- Turn off the tap while shaving or brushing your teeth.
- Shower instead of bathe. Bathing uses more water than showering, on average.
- Only run full loads of laundry, and set the washing machine to the correct water level.
- Only run the dishwasher when it's full.
- Use water-efficient appliances (look for the WaterSense label).
- Use water-friendly landscaping, such as native plants.
- When you do water your yard, water slowly, deeply, and less frequently. Water early in the morning and close to the ground.

Learn more:

- Minnesota Pollution Control Agency's Conserving Water webpage (https://www.pca.state.mn.us/living-green/conserving-water)
- U.S. Environmental Protection Agency's WaterSense webpage: (https://www.epa.gov/watersense)

Drinking Water Sources

Minnesota's primary drinking water sources are groundwater and surface water. Groundwater is the water found in aquifers beneath the surface of the land. Groundwater supplies 75 percent of Minnesota's drinking water. Surface water is the water in lakes, rivers, and streams above the surface of the land. Surface water supplies 25 percent of Minnesota's drinking water.

Contaminants can get in drinking water sources from the natural environment and from people's daily activities. There are five main types of contaminants in drinking water sources.

- *Microbial contaminants*, such as viruses, bacteria, and parasites. Sources include sewage treatment plants, septic systems, agricultural livestock operations, pets, and wildlife.
- *Inorganic contaminants* include salts and metals from natural sources (e.g. rock and soil), oil and gas production, mining and farming operations, urban stormwater runoff, and wastewater discharges.
- *Pesticides and herbicides* are chemicals used to reduce or kill unwanted plants and pests. Sources include agriculture, urban stormwater runoff, and commercial and residential properties.
- *Organic chemical contaminants* include synthetic and volatile organic compounds. Sources include industrial processes and petroleum production, gas stations, urban stormwater runoff, and septic systems.
- *Radioactive contaminants* such as radium, thorium, and uranium isotopes come from natural sources (e.g. radon gas from soils and rock), mining operations, and oil and gas production.

The Minnesota Department of Health provides information about your drinking water sources in a source water assessment, including:

- How Fridley is protecting your drinking water sources;
- Nearby threats to your drinking water sources;
- How easily water and pollution can move from the surface of the land into drinking water sources, based on natural geology and the way wells are constructed.

Find your source water assessment at Source Water Assessments (www.health.state.mn.us/divs/eh/water/swp/swa/) or call 651-201-4700 or 1-800-818-9318 between 8:00 a.m. and 4:30 p.m., Monday through Friday.

YOU Can Prevent Pollution

Many of our daily activities contribute to the pollution of Minnesota's surface water and groundwater. You can help protect these drinking water sources by taking the following actions:

Lawn & Property

- Limit use of herbicides, pesticides, and fertilizers on your property.
- Keep soil in place with plants, grass, or rocks.
- Cover temporary piles of dirt with a tarp or burlap sack.
- Keep leaves and grass off of streets and sidewalks.
- Maintain any septic systems, private wells, and storage tanks to prevent leaks. Seal any unused wells.

Medications

- Never flush unwanted or out-of-date medications down the toilet or sink. Always take them to a waste disposal or prescription medication drop-off site. More information is available at Managing unwanted medications.

Hazardous Materials

- Safety store hazardous materials such as paint, batteries, herbicides, pesticides, and pool chemicals. Dispose of them at a proper waste disposal facility or drop-off event. Do not dump down storm drains, sink or onto your land. Learn more at: Keep hazardous waste out of the garbage (http://www.pca.state.mn.us/featured/keep-hazardous-waste-out-garbage).

Pet Waste

- Pick up after your pet and put waste in the trash.

Winter Ice Removal

- Winter ice removal: Chemicals used to break up the ice are called deicers or anti-icers. They can be harmful to the environment, corrosive to driveways and sidewalks and harmful to plants, pets and humans. Always shovel first, and then only apply deicers/anti-icers lightly if needed. Learn more at 10 smart salting tips to protect Minnesota waters (https://www.pca.state.mn.us/featured/10-smart-salting-tips-protect-minnesota-waters).

Please Be A Water Advocate

Spread the word! Get involved! There are many groups and individuals working to protect water across Minnesota.

The City of

FRIDLEY

2016 DRINKING WATER QUALITY REPORT

PRESENTED BY PUBLIC WORKS

City of Fridley

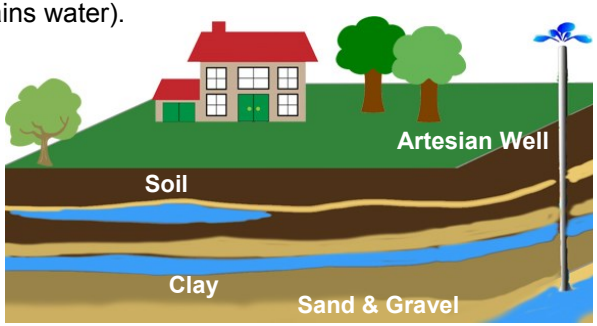
Keeping You Informed:

Fridley drinking water continues to meet all State and Federal standards.

The City of Fridley is issuing the results of monitoring done on its drinking water for the period from January 1 to December 31, 2016. *The purpose of this report is to advance consumers' understanding of drinking water and heighten awareness of the need to protect precious water resources.*

Source of Water

All water supplied by the City of Fridley is treated groundwater. In 2016, we operated 11 wells, ranging in depth from 199 to 870 feet, that draw water from the Quaternary Buried Artesian, Jordan-Mt. Simon, Prairie Du Chien/Jordan, and Prairie Du Chien Group aquifers (underground layers of permeable rock or sediment that contains water).



The Minnesota Department of Health has made a determination as to how vulnerable our systems' source(s) of water may be to future contamination incidents. If you wish to obtain the entire source water assessment regarding your drinking water, please call 651-201-4700 or 1-800-818-9318 (and press 5) during normal business hours. Also, you can view it on line at www.health.state.mn.us/divs/eh/water/swp/swa.

Questions, Concerns or Want to Get Involved?

Call (763) 572-3554 if you have questions about the City of Fridley drinking water or would like information about opportunities for public participation in decisions that may affect the quality of your drinking water.

Keeping your drinking water safe at Commons Park Filtration Plant.

Working for YOU!

The Fridley Water Division maintains the operation of 13 wells, 4 reservoirs and 3 filtration plants. In 2016, we repaired and upgraded water mains in some of the oldest areas of the community including the Plymouth neighborhood. We also made needed upgrades to Commons Park Filtration Plant and we are preparing for a major renovation at the Locke Park Filtration Plant. We have also started an accelerated residential meter replacement program, aiming to complete all residential areas by the end of 2017.

2016 Water By the Numbers

- *1.121 billion gallons of clean water sold*
- *2016 residential usage = 61 gallons per capita per day (down 7% from 2015)*
- *Mississippi Watershed Management Organization provided $800,000 in funding for stormwater quality improvements, further protecting our water sources.*
- *16 water main breaks repaired and 25 private service leaks repaired.*
- *Total Hardness: 210-215 mg/l or 12-15 grains/gal. About half the homes in Fridley use a water softener.*

Daimntawv tshaj tawm no muaj lus tseemceeb txog koj cov dej haus. Tshab txhais nws, los yog tham nrog tej tug neeg uas totaub txog nws.

Este informe contiene información muy importante sobre su agua potable. Tradúzcalo o hable con alguien que lo entienda bien.

Warbixintan waxaa ku jira macluumaad muhiim ah oo ku saabsan biyaha la cabbo oo aad. waxaa Translate, ama wey-dii qof kale oo fahmaysa.

Fridley Results of Monitoring:

The City of Fridley produces its own water and is not currently supplementing its supply with water produced by the City of New Brighton. The additional supply from New Brighton was stopped in 2015 upon discovery of unacceptable levels of 1,4-Dioxane. No contaminants were detected at levels that violated federal drinking water standards. However, some contaminants were detected in trace amounts that were below required limits. It is our responsibility to supply every home and business in the city with safe drinking water. The table that follows shows the contaminants that were detected in trace amounts last year. See opposite page for key to abbreviations and the following pages for additional notes and details about your drinking water.

Key to abbreviations:

***MCLG**—Maximum Contaminant Level Goal:* The level of a contaminant in drinking water below which there is no known or expected risk to health. MCLGs allow for a margin of safety.

***MCL**—Maximum Contaminant Level:* The highest level of a contaminant that is allowed in drinking water. MCLs are set as close to the MCLGs as feasible using the best available treatment technology.

***MRDLG**—Maximum Residual Disinfectant Level Goal.*

***MRDL**—Maximum Residual Disinfectant Level.*

***AL**—Action Level:* The concentration of a contaminant which, if exceeded, triggers treatment or other requirements which a water system must follow.

***90th Percentile Level**—*This is the value obtained after disregarding 10 percent of the samples taken that had the highest levels. (For example, in a situation in which 10 samples were taken, the 90th percentile level is determined by disregarding the highest result, which represents 10 percent of the samples).

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

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

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

***nd**—No Detection.*

DETECTED COMPOUNDS			EPA LIMITS		FRIDLEY LEVELS		TYPICAL SOURCES
			GOAL	MAXIMUM			
CONTAMINANT NAME	*UNITS*	*YEAR*	*(MCLG)*	*(MCL)*	*RESULT**	*RANGE*	
Alpha Emitters	(pCi/l)	2016	0	15.4	5.2	N/A	Erosion of natural deposits.
Combined Radium	(pCi/l)	2016	0	5.4	4	N/A	Erosion of natural deposits.
Fluoride	(ppm)	2016	4	4	0.92	0.46 - 0.99	State of Minnesota requires all municipal water systems to add fluoride to the drinking water to promote strong teeth; Erosion of natural deposits; Discharge from fertilizer and aluminum factories.
Haloacetic Acids (HAA5)	(ppb)	2016	0	60	1.3	nd - 1.3	By-product of drinking water disinfection.
Nitrate (as Nitrogen)	(ppm)	2016	10.4	10.4	0.1	nd - 0.1	Runoff from fertilizer use; Leaching from septic tanks, sewage; Erosion of natural deposits.
TTHM (Total trihalomethanes)	(ppb)	2016	0	80	1.5	nd - 1.5	By-product of drinking water disinfection.
TCE (Trichloroethylene) [a]	(ppb)	2016	0	5 [b]	nd	nd [c]	Discharge from metal degreasing sites and other factories.
1,4-Dioxane [a]	(ppb)	2016	No EPA Limit Established [d]		--	nd - 0.11	Discharge from metal degreasing sites and other factories.
			GOAL (MRDLG)	MAXIMUM (MRDL)	HIGH AVG QUARTER	HIGH/LOW AVG MONTH	
Chlorine	(ppm)	2016	4	4	1.23	1.0 - 1.4	Water additive used to control microbes.
			GOAL (MCLG)	MAXIMUM (AL)	90% LEVEL	SITES OVER AL	
Copper	(ppm)	2016	1.3	1.3	0.73	0 out of 30	Corrosion of household plumbing systems; Erosion of natural deposits.
Lead	(ppb)	2016	0	15	5.7	1 out of 30	Corrosion of household plumbing systems; Erosion of natural deposits.

* Results are values used to determine compliance with federal standards. They sometimes are the highest value detected and sometimes are an average of all the detected values. If an average is used, results may include sampling from the previous year.

[a] Results from City of Fridley supplemental monitoring.

[b] The Minnesota Department of Health has set a Health Risk Limit of 0.4 ppb for TCE. See www.health.state.mn.us/divs/eh/risk/guidance/gw/tceinfosheet.pdf for further information.

[c] One well had a positive sample result of 0.2 ppb prior to treatment and distribution.

[d] The Minnesota Department of Health has set a Health Risk Limit of 1 ppb for 1,4-Dioxane. See www.health.state.mn.us/divs/eh/risk/guidance/dwec/dioxaneinfo.pdf for further information.

Additional Notes and Details

Some contaminants are sampled less frequently than once a year; as a result, not all contaminants were sampled for in 2015. If any of these contaminants were detected the last time they were sampled for, they are included in the table along with the date that the detection occurred. Monitoring may have been done for additional contaminants that do not have MCLs established for them and are not required to be monitored under the Safe Drinking Water Act. Results may be available by calling 651-201-4700 or 1-800-818-9318 during normal business hours.

Explaining Contaminants

The sources of drinking water (both tap water and bottled water) include rivers, lakes, streams, ponds, reservoirs, springs, and wells. As water travels over the surface of the land or through the ground, it dissolves naturally□occurring minerals and, in some cases, radioactive material, and can pick up substances resulting from the presence of animals or from human activity. Drinking water, including bottled water, may reasonably be expected to contain at least small amounts of some contaminants. The presence of contaminants does not necessarily indicate that water poses a health risk. More information about contaminants and potential health effects can be obtained by calling the Environmental Protection Agency's Safe Drinking Water Hotline at 1□800□426□4791.

Contaminants That May Be In Your Water

Microbial contaminants, such as viruses and bacteria, which may come from sewage treatment plants, septic systems, agricultural livestock operations, and wildlife.

Inorganic contaminants, such as salts and metals, which can be naturally□occurring or result from urban stormwater runoff, industrial or domestic wastewater discharges, oil and gas production, mining, or farming.

Pesticides and herbicides, which may come from a variety of sources such as agriculture, urban stormwater runoff, and residential uses.

Organic chemical contaminants, including synthetic and volatile organic chemicals, which are by□products of industrial processes and petroleum production, and can also come from gas stations, urban stormwater runoff, and septic systems.

Drinking water, including bottled water, may reasonably be expected to contain at least small amounts of some contaminants. The presence of contaminants does not necessarily indicate that water poses a health risk. More information about contaminants and potential health effects can be obtained by calling the Environmental Protection Agency's Safe Drinking Water Hotline at 1□800□426□4791.

In order to ensure that tap water is safe to drink, the U. S. Environmental Protection Agency (EPA) prescribes regulations which limit the amount of certain contaminants in water provided by public water systems. Food and Drug Administration regulations establish limits for contaminants in bottled water which must provide the same protection for public health.

AWARENESS - Special Health Needs

Some people may be more vulnerable to contaminants in drinking water than the general population. Immuno-compromised persons such as persons with cancer undergoing chemotherapy, persons who have undergone organ transplants, people with HIV/AIDS or other immune system disorders, some elderly, and infants can be particularly at risk from infections. These people should seek advice about drinking water from their health care providers. EPA/CDC guidelines on appropriate means to lessen the risk of infection by Cryptosporidium and other microbial contaminants are available from the Safe Drinking Water Hotline at 1□800□426□4791.

If present, elevated levels of ***LEAD*** can cause serious health problems, especially for pregnant women and young children. Lead in drinking water is primarily from materials and components associated with service lines and home plumbing. The City of Fridley is responsible for providing high quality drinking water, but cannot control the variety of materials used in plumbing components. When your tap water has been sitting for several hours, you can minimize the potential for lead exposure by flushing your tap for 30 seconds to 2 minutes before drinking or cooking. If you are concerned about lead in your water, you may wish to have your water tested. Information on lead in drinking water, testing methods, and steps you can take to minimize exposure is available from the Safe Drinking Water Hotline at 1-800-426-4791 or at www.epa.gov/safewater/lead.

A Closer Look at Lead in Drinking Water

Lead in drinking water has been a hot topic in the news lately. Do you have questions about lead in your water?

- ***Why is lead in drinking water a problem?***
- ***How does lead get into my drinking water?***
- ***How can I reduce lead in my drinking water?***
- ***Will water treatment devices help?***
- ***How can I get my water tested for lead?***

Find the answers on the MN Dept. of Health website:
http://www.health.state.mn.us and search "Get the Lead Out".

The City of Fridley is in full compliance with the Lead and Copper Rule, and has completed sampling in 2016. We are not aware of any lead pipe services or distribution mains in the City. In addition to the resources above, to test your drinking water for lead, you can contact the City at (763) 572-3566 and ask about our lead testing program.

Results Summary
September 21, 2017 Sampling Event

Parameter	Units	Distribution-City Hall	Distribution-Country Store	Distribution-Marion Hills	Well 2	Well 3	Well 4	Well 5	Well 6	Well 7	Well 8
Chlorine, Free	mg/L	1.20	0.50	0.08	NA*	NA*	NA*	NA*	NA*	NA*	NA*
Chlorine, Total Residual	mg/L	2.20	1.20	0.24	NA*	NA*	NA*	NA*	NA*	NA*	NA*
Field Temperature	deg C	16.5	18.0	16.5	12.0	12.5	12.0	12.0	12.5	12.0	11.0
Oxygen, Dissolved	mg/L	1.80	1.62	1.73	1.46	1.29	3.12	5.99	1.49	1.70	2.50
Field pH	Std. Units	7.4	7.5	7.5	7.4	7.3	7.5	7.5	7.6	7.5	7.3
pH at 25 ° C (lab)	Std. Units	8.0	8.0	8.0	8.1	8.1	8.1	8.1	8.1	8.1	8.1
Specific Conductance	umhos/cm	535	483	519	532	473	469	418	522	584	569
Calcium	mg/L	58.9	57.1	59.3	55.1	50.9	50.3	47.7	60.7	64.0	63.5
Iron	mg/L	<0.0500	<0.0500	<0.0500	0.931	0.923	0.933	0.890	<0.0500	<0.0500	<0.0500
Magnesium	mg/L	20.4	18.4	20.3	17.3	16.6	16.9	15.9	20.8	23.8	23.6
Manganese	mg/L	0.0145	0.0053	0.0113	0.0190	0.0192	0.0193	0.0179	0.415	0.374	0.337
Sodium	mg/L	13.6	10.3	12.8	19.4	14.4	14.9	11.5	10.7	12.5	9.30
Total Hardness by 2340B	mg/L	231	218	232	209	196	195	185	237	258	256
Chloride	mg/L	29.9	21.3	28.2	34.2	19.7	13.4	7.9	28.1	38.9	24.5
Sulfate	mg/L	18.8	13.3	17.0	3.1	3.2	2.6	3.0	26.5	32.3	28.2
Nitrogen, Ammonia	mg/L	0.42	0.39	<0.040	0.35	0.34	0.33	0.30	0.29	0.21	0.18
Alkalinity, Total as CaCO3	mg/L	216	205	213	228	220	216	211	219	220	234
Total Dissolved Solids	mg/L	299	281	295	275	252	258	231	312	349	337
Total Coliforms	---	Absent	Absent	Absent	Absent	Absent	Absent	Absent	Absent	Absent	Absent
Lanelier Index[1]	---	-0.14	-0.02	-0.04	-0.24	-0.39	-0.21	-0.23	-0.03	-0.10	-0.31

Parameter	Units	Well 9	Well 10	Well 11	Well 12	Well 13
Chlorine, Free	mg/L	NA*	NA*	NA*	NA*	NA*
Chlorine, Total Residual	mg/L	NA*	NA*	NA*	NA*	NA*
Field Temperature	deg C	12.0	11.5	10.5	11.0	11.5
Oxygen, Dissolved	mg/L	1.93	1.12	1.40	2.06	4.40
Field pH	Std. Units	7.5	7.5	7.3	7.6	7.3
pH at 25 ° C (lab)	Std. Units	8.1	8.0	8.0	8.1	8.0
Specific Conductance	umhos/cm	601	1240	476	437	755
Calcium	mg/L	69.8	88.0	56.7	55.1	90.2
Iron	mg/L	<0.0500	2.30	0.426	0.731	0.689
Magnesium	mg/L	22.3	23.6	18.6	15.2	36.8
Manganese	mg/L	0.467	0.618	0.0400	0.835	0.160
Sodium	mg/L	13.4	129	9.10	5.90	9.06
Total Hardness by 2340B	mg/L	266	317	218	200	377
Chloride	mg/L	47.7	265	4.1	13.4	29.1
Sulfate	mg/L	48.4	39.5	3.9	10.2	97.6
Nitrogen, Ammonia	mg/L	0.26	0.26	0.39	0.40	0.41
Alkalinity, Total as CaCO3	mg/L	202	226	255	196	275
Total Dissolved Solids	mg/L	389	771	263	257	481
Total Coliforms	---	Absent	Absent	Absent	Absent	Absent
Langelier Index[1]	---	-0.11	0.01	-0.33	-0.13	-0.08

Langelier Index[1] Negative values indicate that the water may have a tendency to be corrosive. Postive values indicate that the water may have a tendency to be scale forming.

MINNESOTA DEPARTMENT OF HEALTH
DEPARTMENT OF HEALTH
P.O. Box 64975 St. Paul MN 55164 - 0975
625 Robert St. N. St. Paul MN 55155

MINNESOTA DEPARTMENT OF HEALTH

SECTION OF DRINKING WATER PROTECTION

Drinking Water Protection

Report of Analytical Results

Project Name: **General Water Chemistry Project**

System Name: **Fridley** PWSID: **1020031**

ANALYSIS RESULTS -- SOURCES

Date Collected: 07/23/2013
Date Received: 07/23/2013
Collected by: Schammel, Blake

Constituent	Well #10	Well #12	Well #2	MCL or Secondary Standard
Alkalinity, Bicarbonate (mg/L)	210	200	220	
Alkalinity, Carbonate (mg/L)	2.2	2.4	2.4	
Alkalinity, Total (mg/L)	210	200	220	
Ammonia Nitrogen, Total (mg/L)	.34	.34	.32	
Arsenic (ug/L)	6.42	1.94	< 1	10.4
Barium (ug/L)	157	163	76.2	2000
Bromide (mg/L)	.0344	.0273	.179	
Ca as CaCO3 (mg/L)	200	140	150	
Chloride (mg/L)	55.1	8.75	38.2	250*
Dissolved Oxygen (mg/L)	.52	.76	.54	
Iron (ug/L)	2150	786	971	300*
Manganese (ug/L)	668	769	19.7	50*
Mg as CaCO3 (mg/L)	85	67	80	
Nitrite Nitrogen, Total (mg/L)	< .01	< .01	< .01	1
Oxidation Reduction Potential (mV)	42.5	45.4	55.4	
pH (units)	8.1	8.1	8.1	6.5-8.5*
Phosphate, Total (mg/L)	.292	.14	.034	
Potassium (mg/L)	1.62	1.3	5.64	
Sodium (mg/L)	17.7	5.76	20.9	
Specific Conductance (uS/cm)	622	399	518	
Strontium (ug/L)	228	168	371	
Sulfate (mg/L)	38.4	8.02	2.93	250*
Temperature (deg C)	10.15	10.18	11.64	
Total Organic Carbon (mg/L)	1.7	1.3	< 1	

Constituent	Well #3	Well #5	Well #6	MCL or Secondary Standard
Alkalinity, Bicarbonate (mg/L)	220	210	200	
Alkalinity, Carbonate (mg/L)	2	2.1	2.9	

*USEPA has established these concentrations as secondary (aesthetic) standards. The EPA recommends secondary standards to water systems but does not require systems to comply.

FRIDLEY WATER SUPERINTENDENT
COMMONS WATER TREATMENT PLANT
6431 UNIVERSITY AVENUE NE
FRIDLEY MN 55432

Date Report Generated: 01/10/2014

FRIENDLY
RESPONSIVE
DRIVEN

City of Fridley

Appendix E

Written Comments from Local Units of Government

December 7th, 2018

Jim Kosluchar
Public Works Director / City Engineer
Fridley Municipal Center
6431 University Avenue NE
Fridley, MN 55432

RE: Fridley Wellhead Protection Plan, Part 2
Metropolitan Council District 2
Referral File No. 22146-1

Dear Mr. Kosluchar:

Thank you for submitting Part 2 of the City of Fridley wellhead protection plan (WHPP). Metropolitan Council (Council) staff review completed plans under the provisions of Minnesota Rules, Chapter 4720.

The Council evaluates wellhead protection plans in comparison with information reported in the Council's Master Water Supply Plan, including: population and water demand information, predicted issues associated with water supply development, and identified opportunities for inter-jurisdictional cooperation. This wellhead protection plan provides a good overview of the supply source and measures to protect it. Council staff offer the following comments to highlight how the plan could be made even stronger.

The City of Fridley WHPP contains excellent information and demonstrates a significant understanding of WHP issues. The City's plan also does an outstanding job of identifying risks, issues, goals, and defines measures of success. The Council thanks the City for identifying the collaborative opportunity with DWSMA-overlapping communities of Spring Lake Park, New Brighton, and Mounds View; creating an opportunity for the sharing of ideas and resources for wellhead protection implementation. The Anoka County Wellhead Protection Group provides a forum for coordinated wellhead protection (WHP) to facilitate communication and drinking water protection planning activities. This group supports the goals outlined in Chapter 7 and could aid the wellhead protection manager in their efforts to identify problems, share information, and communicate source water protection activities. The Coon and Rice Creek Watershed Districts, along with the Mississippi Watershed Management Organization, can be resources that aid the City with its WHP education efforts as well.

The integration of the WHPP with the City's planning process is a critical task in strengthening source water protection. There are a number of resources available to communities to aid in the wellhead and source water planning and protection effort. Some examples include:

- 2015 Fridley Systems Statement
- 2015 Master Water Supply Plan
- Water Conservation Toolbox
- Stormwater Reuse Guide

- Metropolitan Council 2010 Report: Evaluation of Groundwater and Surface-Water Interaction: Guidance for Resource Assessment
- The Minnesota Technical Assistance Program
- University of Minnesota Extension: Lawn and Turfgrass Management Program
- Thrive MSP 2040 Regional Plan

Please let me know if you are interested in learning more about these tools or any other resources.

This letter completes the Council's review process. On behalf of the Council, I thank you for your efforts in preparing this plan. Please send us a copy of the finalized WHPP, if any revisions are made. Should any questions arise regarding the Council's review comments, please feel free to contact John Clark of the Council's Environmental Services Division at (651) 602-1452 or johnd.clark@metc.state.mn.us.

Sincerely,

Sam Paske
Assistant General Manager, Environmental Quality Assurance

cc: Lona Schreiber, Metropolitan Council Member, District 2
Eric Wojchik, Metropolitan Council Sector Representative
John Freitag, Minnesota Department of Health

From:	Kyle Axtell
To:	Kosluchar, Jim
Cc:	John Greer
Subject:	Fridley WHPP Part 2
Date:	Thursday, December 13, 2018 4:13:59 PM
Attachments:	image001.png

Jim,

The RCWD has no comment on the City's WHPP Part 2. Please forward us GIS shapefiles for your DWSMA (including vulnerability information) and Emergency Response Areas so we can include the most up-to-date information in our system for permit reviews.

Kyle Axtell
Project Manager
Rice Creek Watershed District
4325 Pheasant Ridge Dr. NE #611
Blaine, MN 55449-4539
P: (763) 398-3072
F: (763) 398-3088
E: kaxtell@ricecreek.org

Please consider following the RCWD on Facebook

Appendix G

Water Supply Plan Documentation

Part 2. Emergency Preparedness Procedures

The emergency preparedness procedures outlined in this plan are intended to comply with the contingency plan provisions required by MDH in the WHP and SWP. Water emergencies can occur as a result of vandalism, sabotage, accidental contamination, mechanical problems, power failings, drought, flooding, and other natural disasters. The purpose of emergency planning is to develop emergency response procedures and to identify actions needed to improve emergency preparedness. In the case of a municipality, these procedures should be in support of, and part of, an all-hazard emergency operations plan. Municipalities that already have written procedures dealing with water emergencies should review the following information and update existing procedures to address these water supply protection measures.

A. Federal Emergency Response Plan

Section 1433(b) of the Safe Drinking Water Act, (Public Law 107-188, Title IV- Drinking Water Security and Safety) requires community water suppliers serving over 3,300 people to prepare an Emergency Response Plan.

Do you have a federal emergency response plan? Yes ■ No □

If yes, what was the date it was certified? 1/1/2011

Complete Table 15 by inserting the noted information regarding your completed Federal Emergency Response Plan.

Table 15. Emergency Preparedness Plan contact information

Emergency Response Plan Role	Contact Person	Contact Phone Number	Contact Email
Emergency Response Lead	BRIAN WEIERKE		BRIAN.WEIERKE@FRIDLEYMN.GOV
Alternate Emergency Response Lead	MIKE MONSRUD		MIKE.MONSRUD@FRIDLEYMN.GOV

B. Operational Contingency Plan

All utilities should have a written operational contingency plan that describes measures to be taken for water supply mainline breaks and other common system failures as well as routine maintenance.

Do you have a written operational contingency plan? Yes ■ No □

At a minimum, a water supplier should prepare and maintain an emergency contact list of contractors and suppliers.

C. Emergency Response Procedures

Water suppliers must meet the requirements of MN Rules 4720.5280 . Accordingly, the Minnesota Department of Natural Resources (DNR) requires public water suppliers serving more than 1,000 people to submit Emergency and Conservation Plans. Water emergency and conservation plans that have been

approved by the DNR, under provisions of Minnesota Statute 186 and Minnesota Rules, part 6115.0770, will be considered equivalent to an approved WHP contingency plan.

Emergency Telephone List

A list of emergency contacts, including the MN Duty Officer is provided in **Appendix 5**.

Current Water Sources and Service Area

Quick access to concise and detailed information on water sources, water treatment, and the distribution system may be needed in an emergency. System operation and maintenance records should be maintained in secured central and back-up locations so that the records are accessible for emergency purposes. A detailed map of the system showing the treatment plants, water sources, storage facilities, supply lines, interconnections, and other information that would be useful in an emergency should also be readily available. It is critical that public water supplier representatives and emergency response personnel communicate about the response procedures and be able to easily obtain this kind of information both in electronic and hard copy formats (in case of a power outage).

Do records and maps exist? Yes ■ No □

Can staff access records and maps from a central secured location in the event of an emergency?

Yes ■ No □

Does the appropriate staff know where the materials are located?

Yes ■ No □

Procedure for Augmenting Water Supplies

Tables 16 and 17 by list all available sources of water that can be used to augment or replace existing sources in an emergency.

Table 16. Interconnections with other water supply systems to supply water in an emergency

Other Water Supply System Owner	Capacity (GPM & MGD)	Note Any Limitations On Use	List of services, equipment, supplies available to respond
CITY OF NEW BRIGHTON	3 MGD	CURRENTLY OFFLINE UNTIL 2018 FOR TREATMENT UPGRADE	
CITY OF MOUNDS VIEW	0.5 MGD		
CITY OF MINNEAPOLIS	2.19 MGD	SURFACE WATER SOURCE WOULD NEED TO EVALUATE WATER QUALITY PRIOR TO OPERATING	

GPM – Gallons per minute MGD – million gallons per day

Table 17. Utilizing surface water as an alternative source

Surface Water Source Name	Capacity (GPM)	Capacity (MGD)	Treatment Needs	Note Any Limitations On Use

The New Brighton supply is not available until treatment processes are in place, anticipated in the end of 2018.

The Minneapolis emergency supply is surface water and would take time to set up to provide proper drinking water quality; this supply may only be suited to be made available in the events of 1) a catastrophic emergency, 2) a long-term loss of capacity.

Allocation and Demand Reduction Procedures

Table 18 prioritizes allocation of water and reduction in demand during an emergency.

Water use categories has been prioritized in a way that is consistent with Minnesota Statutes 103G.261 (#1 is highest priority) as follows:

1. Water use for human needs such as cooking, cleaning, drinking, washing and waste disposal; use for on-farm livestock watering; and use for power production that meets contingency requirements.
2. Water use involving consumption of less than 10,000 gallons per day (usually from private wells or surface water intakes)
3. Water use for agricultural irrigation and processing of agricultural products involving consumption of more than 10,000 gallons per day (usually from private high-capacity wells or surface water intakes)
4. Water use for power production above the use provided for in the contingency plan.
5. All other water use involving consumption of more than 10,000 gallons per day.
6. Nonessential uses – car washes, golf courses, etc.

Water used for human needs at hospitals, nursing homes and similar types of facilities should be designated as a high priority to be maintained in an emergency. Lower priority uses will need to address water used for human needs at other types of facilities such as hotels, office buildings, and manufacturing plants. The volume of water and other types of water uses at these facilities must be carefully considered. After reviewing the data, common sense should dictate local allocation priorities to

protect domestic requirements over certain types of economic needs. Water use for lawn sprinkling, vehicle washing, golf courses, and recreation are legislatively considered non-essential.

Table 18. Water use priorities

Customer Category	Allocation Priority	Average Daily Demand (MGD)	Short-Term Emergency Demand Reduction Potential (MGD)
Institutional	**1**	**0.24**	**0.00**
Residential	**2**	**1.98**	**0.20**
Commercial	**3**	**0.15**	**0.05**
Industrial	**4**	**0.70**	**0.40**
Irrigation	**5**	**0.15**	**0.15**
Non-Essential	**6**	**0.04**	**0.04**
Wholesale	**7**	**0.00**	**0.00**
TOTAL		**3.26**	**0.84**

MGD – Million Gallons per Day

Table 19 indicates the possible triggers and actions during water supply disruption conditions.

Table 19. Emergency demand reduction conditions, triggers and actions

Emergency Triggers	Short-term Actions	Long-term Actions
■ Contamination ■ Loss of production ■ Infrastructure failure ■ Executive order by Governor □ Other: _____	■ Supply augmentation through New Brighton, Mounds View ■ Adopt (if not already) and enforce a critical water deficiency ordinance to penalize lawn watering, vehicle washing, golf course and park irrigation & other nonessential uses. □ Water allocation through____ ■ Meet with large water users to discuss their contingency plan.	■ Supply augmentation through New Brighton, Mounds View, Minneapolis ■ Adopt (if not already) and enforce a critical water deficiency ordinance to penalize lawn watering, vehicle washing, golf course and park irrigation & other nonessential uses. □ Water allocation through____ ■ Meet with large water users to discuss their contingency plan.

Notification Procedures

Table 20 shows selected triggers for informing customers regarding conservation requests, water use restrictions, and suspensions; notification frequencies; and partners that may assist in the notification process.

Table 20. Plan to inform customers regarding conservation requests, water use restrictions, and suspensions

Notification Trigger(s)	Methods (select all that apply)	Update Frequency	Partners
■ Short-term demand reduction declared (< 1 year)	■ Website □ Email list serve ■ Social media (e.g. Twitter, Facebook) ■ Direct customer mailing, ■ Press release (TV, radio, newspaper), ■ Meeting with large water users (> 10% of total city use) □ Other: _____	□ Daily ■ Weekly ■ Monthly □ Annually	
■ Long-term Ongoing demand reduction declared	■ Website □ Email list serve ■ Social media (e.g. Twitter, Facebook) ■ Direct customer mailing, ■ Press release (TV, radio, newspaper), □ Meeting with large water users (> 10% of total city use) □ Other: _____	□ Daily □ Weekly ■ Monthly ■ Annually	
■ Governor's critical water deficiency declared	■ Website □ Email list serve ■ Social media (e.g. Twitter, Facebook) □ Direct customer mailing, □ Press release (TV, radio, newspaper), ■ Meeting with large water users (> 10% of total city use) □ Other: _____	□ Daily ■ Weekly ■ Monthly □ Annually	

Enforcement

Does the city have a critical water deficiency restriction/official control in place that includes provisions to restrict water use and enforce the restrictions? (This restriction may be an ordinance, rule, regulation, policy under a council directive, or other official control) Yes ■ No □

The official control document is attached to this WSP as **Appendix 7**.

Irrespective of whether a critical water deficiency control is in place, does the public water supply utility, city manager, mayor, or emergency manager have standing authority to implement water restrictions? Yes ■ No □

If yes, cite the regulatory authority reference: _____.