

City of Coon Rapids 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



March 2016



City of Coon Rapids 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



March 2016

City of Coon Rapids Wellhead Protection Plan Amendment

March 2016

Contents

1.0	Introduction	1
2.0	Criteria for Wellhead Protection Area Delineation.....	3
2.1	Time of Travel.....	3
2.2	Aquifer Transmissivity.....	3
2.3	Daily Volume of Water Pumped	4
2.4	Conceptual Hydrogeologic Model	4
2.4.1	Regional Bedrock Geology	4
2.4.2	Flow Boundaries.....	5
2.5	Model Description.....	5
2.5.1	Base Model	6
2.5.2	Model Modifications and Updates.....	6
2.6	Groundwater Flow Field	9
3.0	Delineation of the Wellhead Protection Areas.....	10
3.1	Porous Media Flow Evaluation	10
3.1.1	Sensitivity Analysis.....	10
3.2	WHPA Delineations.....	11
3.3	Conjunctive Delineation.....	11
4.0	Delineation of the Drinking Water Supply Management Areas	12
5.0	Well Vulnerability Assessment.....	13
6.0	Drinking Water Supply Management Area Vulnerability Assessment	14
7.0	Recommendations	17
8.0	Supporting Data Files.....	18
9.0	References	19

List of Tables

Table 1	Assessment of Data Elements
Table 2	Water Supply Well Information
Table 3	Annual and Projected Pumping Rates for Coon Rapids Wells
Table 4	Tritium Sampling Results

List of Figures

Figure 1	Bedrock Subcrop
Figure 2	Cross Section A-A'
Figure 3	Cross Section B-B'
Figure 4	Cross Section C-C'
Figure 5	Modeled Heads in Quaternary Glacial Drift, Layer 3
Figure 6	Modeled Heads in Quaternary Glacial Drift, Layer 4
Figure 7	Modeled Heads in Tunnel City Group, Layer 6
Figure 8	Modeled Heads in the Wonewoc Sandstone, Layer 7
Figure 9	Modeled Heads in the Mt. Simon Sandstone, Layer 9
Figure 10	WHPA & DWSMA
Figure 11	Aquifer Vulnerability

List of Appendices

Appendix A	Well Construction Records
Appendix B	Aquifer Test Data and Analysis
Appendix C	Groundwater Model Details
Appendix D	1:24,000 DWSMA Maps
Appendix E	MDH Well Vulnerability Assessments
Appendix F	L-Score and Geologic Sensitivity Maps
Appendix G	Groundwater Model Files and GIS Shapefiles

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
PG #: 30347

March 2, 2016
Date

Public Water Supply Profile

The following persons are the contacts for the Coon Rapids Wellhead Protection Plan:

Public Water Supply Contact

Kory Jorgensen
Utilities Operations Supervisor
City of Coon Rapids
1831 111th Avenue
Coon Rapids, Minnesota 55433
Telephone: 763-767-6576
Email: kjorgensen@coonrapidsmn.gov

Wellhead Protection Manager

Tim Himmer
Public Works Director
City of Coon Rapids
11155 Robinson Drive
Coon Rapids, Minnesota 55433
Telephone: 763-767-6494
Email: thimmer@coonrapidsmn.gov

Wellhead Protection Consultant

John Greer, P.G.
Barr Engineering Company
4700 West 77th Street
Minneapolis, Minnesota 55435-4803
Telephone: 952-832-2600
Fax: 952-832-2601
E-mail: jgreer@barr.com

General Information

UNIQUE WELL NUMBER(S) <u>Primary: 202932, 202931, 202930, 202965, 161413, 110460, 110461, 150357, 110475, 420956, 474384, 674478, 674479; Seasonal: 202926, 202929, 202972, 202951, 202937, 202943, 168721, 168720, 110469, 474385, 463020</u>
SIZE OF POPULATION SERVED <u>61,476 (2010 Census)</u>
COUNTY <u>Anoka</u>

1.0 Introduction

In compliance with the Minnesota Wellhead Protection Rules (MN Rules 4720.5100 through 4720.5590), wellhead protection areas (WHPAs) and Drinking Water Supply Management Areas (DWSMAs) were delineated for the City of Coon Rapids in 2003 (Wells 1-23) (MDH, 2003) and in 2006 (Wells 4, 7, 11, 12, 14, 15, 24, 25) (Bonestroo, 2006). 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 DWSMAs.

As required by Minnesota Rule 4720.5570, new WHPAs and new DWSMAs have been delineated for the City of Coon Rapids. This report summarizes work completed to update the delineation of the Coon Rapids WHPAs and DWSMAs 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 Coon Rapids currently has 13 primary municipal water supply wells. Wells 9, 24, and 25 (unique numbers 202931, 674478, and 674479, respectively) are completed in the Tunnel City Group-Wonewoc Sandstone (TCW) aquifer (formerly known as the Franconia-Ironton-Galesville, or FIG, aquifer). The open interval of Well 9 also extends into the Eau Claire Formation. Wells 8, 10, 11, 13, 14, and 15 (unique numbers 202932, 202930, 202965, 168720, 110460, and 110461, respectively) are completed in both the TCW and Mt. Simon Sandstone aquifers. Wells 17, 19, 20, and 21 (unique numbers 150357, 110475, 420956, and 474384, respectively) are completed in the confined Quaternary glacial drift aquifer.

The City also has 11 seasonal wells. Well 1 (unique number 202926) is completed in the Tunnel City-Wonewoc aquifer. Wells 2, 4, 5, 7, and 12 (unique numbers 202929, 202972, 202951, 202943, and 168721, respectively) are completed in both the TCW and Mt. Simon Sandstone aquifers. The open intervals of Wells 1 and 2 also intersect the St. Lawrence Formation, and the open interval of Well 1 also intersects the Eau Claire Formation. Well 6 (unique number 202937) is completed in the Tunnel City Group aquifer. Well 16 (unique number 161413) is completed in the Wonewoc Sandstone and Mt. Simon Sandstone aquifers. Well 18 (unique number 110469) is completed in the Mt. Simon Sandstone aquifer. Wells 22 and 23 (unique numbers 474385 and 463020, respectively) are completed in the confined Quaternary glacial drift aquifer.

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

While compiling data for this report, a database discrepancy was identified for Wells 13 and 16. The Minnesota Well Index (MWI) listed unique numbers 168720 for Well 13 and 161413 for Well 16; the Minnesota Department of Natural Resources (MnDNR) Permitting And Reporting System (MPARS) database had unique numbers 161413 for Well 13 and 168720 for Well 16. A check of the unique number tags on the physical wells showed unique number 161413 on Well 13 and 168720 on Well 16; however, through discussions with the MDH and examination of their records it was determined that the unique

number tags for Wells 13 and 16 were transposed when they were installed on the wells (MDH, 2015a).
The MWI database was correct; Well 13 is unique number 168720 and Well 16 is unique number 161413.

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 was also determined for each well addressed in this study.

2.2 Aquifer Transmissivity

For this study, transmissivities of the Quaternary glacial drift aquifer, the Tunnel City Group, the Wonewoc Sandstone, and the Mt. Simon Sandstone were estimated using pumping tests conducted at Coon Rapids Wells 19 and 20 (Quaternary), specific capacity data at Well 21 (Quaternary), specific capacity data at Coon Rapids Wells 24 and 25 (Tunnel City and Wonewoc), specific capacity data at Coon Rapids Well 18 (Mt. Simon), and pumping tests at Andover Well 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 included in the groundwater model.

A pumping test conducted at Well 19 in 2002 estimated a range of transmissivities from 8,120 ft²/day (754.4 m²/day) to 9,420 ft²/day (875.1 m²/day) with a geometric mean of 8,700 ft²/day (808.3 m²/day) for the confined Quaternary glacial drift aquifer. Pumping tests conducted at Coon Rapids Well 20 in 1999 and 2002 estimated a range of transmissivities from 27,000 ft²/day (2,508.4 m²/day) to 66,700 ft²/day (6,196.6 m²/day) with a geometric mean of 45,210 ft²/day (4,200.1 m²/day) for the confined Quaternary glacial drift aquifer. Coon Rapids Well 21 is located far from the City's other Quaternary wells, and available Quaternary stratigraphy mapping (Meyer et al., 2013) appears to indicate that the confined Quaternary aquifer is not continuous throughout the City. Specific capacity data for Well 21 was used to estimate a transmissivity of 5,750 ft²/day (534.2 m²/day) for the confined Quaternary glacial drift aquifer near Well 21.

Analysis of specific capacity data for Wells 24 and 25 using the TGuess Method (Bradbury and Rothschild, 1985) estimated a range of transmissivities from 6,400 ft²/day (594.6 m²/day) to 9,400 ft²/day (873.3 m²/day) with a geometric mean of 7,700 ft²/day (715.4 m²/day) for the combined Tunnel City Group-Wonewoc Sandstone aquifer. The geometric mean value was allocated between the two formations using a ratio determined by comparing mean transmissivities for the two formations in the vicinity of Coon Rapids; see the aquifer test plan for the TCW aquifer in Appendix B for more details. A transmissivity of 5,470 ft²/day (508.2 m²/day) was used for the Tunnel City and a transmissivity of 2,230 ft²/day (207.2 m²/day) was used for the Wonewoc.

Four single-well pumping tests were conducted at Andover Well 3 in 1987. Mt. Simon Sandstone transmissivities estimated by these tests ranged from 1,600 ft²/day (148.6 m²/day) to 2,200 ft²/day

(204.4 m²/day). Analysis of specific capacity data at Coon Rapids Well 18 using the TGuess Method (Bradbury and Rothschild, 1985) estimated a transmissivity of 4,700 ft²/day (436.6 m²/day) for the Mt. Simon Sandstone. The geometric mean value of 2,310 ft²/day (214.6 m²/day) from these tests was used in the model.

2.3 Daily Volume of Water Pumped

Pumping data for the City of Coon Rapids for the period 2010 through 2014 are summarized in Table 3. The largest annual withdrawal for 2010-2014 was 2,959,153,000 gallons in 2012. The City's Comprehensive Water System Plan (Bolton & Menk, 2014) includes projected average daily demands of 8.11 and 8.67 million gallons per year (MGD) for 2019 and 2024, respectively. These values were used to interpolate a 2020 projected average daily demand of 8.22 MGD (3,001,030,000 gallons per year). Projected 2020 pumping rates for each well were calculated by multiplying the total 2020 projected demand by the 2010-2014 average percentage of total withdrawal for each well. The pumping rate used in the model for each Coon Rapids well for the WHPA delineation was either this 2020 projection or the historical maximum for the period 2010-2014, whichever was greater. The maximum 2010-2014 rates were greater than the 2020 projected 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 12% annually from 2004-2013 (Bolton & Menk, 2014).

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 Coon Rapids 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 three geologic cross sections through the study area are also shown on Figure 1. Geologic cross sections A-A' (Figure 2) and C-C' (Figure 4) are roughly parallel northwest to southeast sections that cross west to east cross section B-B' (Figure 3) at Coon Rapids Well 14 and Well 8, respectively.

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 Coon Rapids.

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). It is overlain by the Wonewoc Sandstone throughout Coon Rapids but is the uppermost bedrock just to the northwest of the City in Andover and Anoka. The Eau Claire Formation functions as a regional confining unit where present.

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 and is the uppermost bedrock in far northwestern Coon Rapids.

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 northern Coon Rapids and in the bedrock valleys in the central part of the City. It is 135 to 180 feet thick where not eroded. The Mazomanie Formation is present in the uppermost 60-80 feet of the unit.

Quaternary Glacial Drift

The Quaternary-aged sediments that overlie the bedrock in Coon Rapids were deposited by multiple glacial advances during the Pleistocene Epoch (Meyer et al., 2013) and vary in thickness from approximately 90 feet thick where the Jordan Sandstone is the uppermost bedrock to nearly 300 feet thick where the Tunnel City Group is the uppermost bedrock. As shown on Figures 2-4, the upper 30-50 feet of the Quaternary sediments are typically comprised of sand and gravel. The deeper sediments are comprised of discontinuous sequences of fine-grained sediments (i.e., clays and silts) and sands and gravels. Away from the Mississippi River in northeastern Coon Rapids, Figures 3 and 4 indicate a continuous clay unit separating the shallow sands and gravels from discontinuous deeper confined sand and gravel aquifers. Closer to the river, Figures 2 and 3 show a sandier profile overall with more discontinuous local confining units.

2.4.2 Flow Boundaries

The Mississippi River to the southwest of Coon Rapids is a groundwater flow boundary, though not necessarily for all of the hydrostratigraphic units detailed in the previous section. 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 6) (Environmental Simulations, Inc., 2011) was used to create the model data files and evaluate the model results.

2.5.1 Base Model

Since the previous Coon Rapids 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. This regional model includes Coon Rapids and, per discussions at the Pre-Delineation Meeting (MDH, 2015), Metro Model 3 was used as the base model for the new Coon Rapids WHPA delineations.

Metro Model 3 is divided into 9 layers to represent the major hydrostratigraphic units in the Twin Cities Metropolitan Area. In Coon Rapids, the model layers represent the following (ordered from youngest to oldest; i.e., shallowest to deepest):

- Layer 1: Quaternary glacial drift
- 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 or Quaternary glacial drift (where present)
- Layer 7: Wonewoc Sandstone
- Layer 8: Eau Claire Formation
- Layer 9: Mt. Simon Sandstone

Major rivers near Coon Rapids (i.e., the Mississippi and Rum Rivers) 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).

Modifications made to Metro Model 3 for the Coon Rapids 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:

- A smaller sub-model centered on Coon Rapids was cut from the full Metro Model 3 using the telescopic mesh refinement (TMR) functionality in Groundwater Vistas. The boundaries of this model are approximately 10 miles from Coon Rapids in all directions. Constant-flux boundary conditions derived from the full Metro Model 3 results were applied to the outer boundaries of

the sub-model. A map of the sub-model domain is shown on Figure C1 in Appendix C. The sub-model will be referred to as “the model” hereafter in this report.

- It was determined at the Pre-delineation Meeting (MDH, 2015b) that several of the Coon Rapids well locations were incorrect in the County Well Index (CWI) (MGS, 2015). With information from the City, the locations of Wells 4, 5, 7, 8, 10, 15, 18, 19, 21, 24, and 25 were adjusted based on aerial photos to better reflect their actual locations (MDH, 2015a).
- The pumping rates for the City’s wells were changed to the model input rates shown in Table 3.
- The model grid was refined from the 500-m square cells of the base model down to 125-m square cells within the Coon Rapids city limits. The grid was further refined to 7.81-m square cells in the immediate vicinity of the Coon Rapids wells.
- Edges of partially eroded bedrock units in Coon Rapids (e.g., Jordan Sandstone, St. Lawrence Formation, Tunnel City Group) were re-mapped onto the refined grid using boundaries from the Twin Cities Metro bedrock map (Mossler, 2013).
- Slight differences in model layer contact elevations versus well open intervals noted on the well logs resulted in some of the City’s wells drawing water from inappropriate layers in the model. These issues were corrected for the following wells (well name followed by current open layer(s) in the model, followed in parentheses by the original open layers in the model):
 - Well 11, 5 through 9 (6 through 9)
 - Well 13, 7 through 9 (6 through 9)
 - Well 14, 7 through 9 (6 through 9)
 - Well 20, 4 (3 and 4)
 - Well 21, 4 (4 and 5)
 - Well 22, 3 (2 and 3)
 - Well 23, 4 (3 and 4)
- Horizontal hydraulic conductivity values (K_x) were updated so that model layer transmissivities in the vicinity of the Coon Rapids wells match aquifer test transmissivities (Section 2.2; Appendix B) as described below. The ratio of horizontal to vertical hydraulic conductivity (K_x/K_z) in the base Metro Model 3 was preserved when making these changes up to a maximum ratio of 1,000; i.e., new K_z values were calculated from the updated K_x values. (Values of K_x/K_z greater than 1,000 did not seem reasonable, except for the Layer 2 clay unit described below.) See Appendix C for maps of model hydraulic conductivity fields. Since several of Coon Rapids’ wells are located close to the eastern city limits, some of the areas of updated hydraulic conductivity had to extend east into Blaine in order to encompass the entire well capture zones. This extended modification boundary has its eastern limit approximately 5 km to the east of the Coon Rapids/Blaine line.
 - Quaternary. Detailed mapping of sand and glacial till units from the Anoka County Geologic Atlas (Meyer et al., 2013) was utilized in the model edits.
 - Layer 2: Layer 2 represents a clayey glacial till unit at most Coon Rapids wells, but some of the Metro Model 3 K values were too high to represent this material. Till unit Ce from the Anoka County Atlas appeared to correspond to the till unit observed on the City’s well logs, so the K_x and K_z values for cells representing this till within the extended boundary described above were set

to the Metro Model 3 values in Layer 2 at Well 21 - 2 ft/day and 0.001 ft/day (0.623 m/day and 0.00016 m/day), respectively – which are reasonable for the till.

- Layers 3 and 4: Sand unit Sr appeared to represent the aquifer in which Well 19 is screened. Sand unit Sr also appeared to represent the shallow portion of the sand aquifer in Layer 3 at Well 20. Layer 3 should be clay at Well 19, and till unit Xt appeared to represent this material. Wells 17, 22, and 23 appeared to be screened in sand unit Sx, which overlapped Sr and Sp in the area of the primary Coon Rapids Quaternary well field. Well 21 appeared to be screened in overlapping Sx and Sr units in Layer 4. This information was accounted for in the model as follows:
 - The Layer 3 Kx and Kz values within the till unit Xt extent were set to the values used for till unit Ce in Layer 2.
 - The transmissivity determined from the pumping test at Well 19 was 8,700 ft²/day (808.3 m²/day) and the model Layer 4 thickness at Well 19 was 37.4 feet (11.4 m), resulting in an effective Kx of 233 ft/day (71.1 m/day). The Layer 4 Kx values within the “hole” in sand unit Sp around Well 19 were set to this value.
 - Layer 3 Kx values in the sand unit Sr extents that did not overlap till unit Xt were set to 233 ft/day (71.1 m/day).
 - The transmissivity determined from the pumping test at Well 20 was 45,210 ft²/day (4,200.1 m²/day), the model Layer 3 thickness at Well 20 was 31.8 ft (9.7 m), and the model Layer 4 thickness at Well 20 was 36.7 ft (11.2 m). Combining this information with the Sr Kx of 71.1 m/day in Layer 3 resulted in an effective Layer 4 Kx of 1,030 ft/day (314.4 m/day) to match the Well 20 transmissivity in Layers 3 and 4. This K value was applied to the combined Sp and Sx extent in Layer 4 that includes Wells 17, 20, 22, and 23.
 - The transmissivity determined from the specific capacity measurement in Well 21 was 5,750 ft²/day (534.2 m²/day). The thickness of Layer 4 at Well 21 was 44.9 ft (13.7 m), resulting in an effective Layer 4 Kx of 128 ft/day (39.1 m/day). This value was uniformly assigned to Layer 4 cells within the combined Sr and Sx extents near Well 21.
- St. Lawrence. As noted above, Layer 5 represents the St. Lawrence formation, a regional confining unit, over much of Coon Rapids. Partially due to the remapping of bedrock units described above, some cells representing St. Lawrence Formation in the model ended up with horizontal hydraulic conductivities greater than the largest measured Kx value for the St. Lawrence (46 ft/day or 14 m/day) in Runkel et al. (2003). The Kx was set to 14 m/day in all St. Lawrence cells within the extended boundary described above with original Kx values greater than 14 m/day.
- Tunnel City and Wonewoc. As discussed above in Section 2.2, a transmissivity of 5,470 ft²/day (508.2 m²/day) was estimated for the Tunnel City Group and a

transmissivity of 2,230 ft²/day (207.2 m²/day) was estimated for the Wonewoc Sandstone. The model thicknesses at Well 24 in Layers 6 and 7 were 113 ft (34.4 m) and 61.0 ft (18.6 m), respectively. Dividing the pumping test T values by these model thicknesses gave effective K values of 48.6 ft/day (14.8 m/day) for the Tunnel City Group and 36.4 ft/day (11.1 m/day) for the Wonewoc sandstone. These K values were uniformly applied to cells representing the Tunnel City Group or Wonewoc Sandstone, respectively, within the extended boundary described above.

- Mt. Simon. Dividing the pumping test transmissivity value of 2,310 ft²/day (214.6 m²/day) by the model Layer 9 thickness at Well 18 of 195 ft (59.5 m) gave an effective Mt. Simon K of 11.8 ft/day (3.6 m/day). The Layer 9 Kx values within the extended boundary described above were uniformly set to the calculated effective K.

As discussed at the Pre-Delineation Meeting, no additional recalibration of the model was deemed necessary. Calibration summary plots for the updated model are included in Appendix C (Figures C9 and C10). Full discussion of the Metro Model 3 calibration is presented in Metropolitan Council (2014). 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 confined Quaternary glacial drift (model layers 3 and 4), Tunnel City Group, Wonewoc Sandstone, and Mt. Simon Sandstone are shown on Figures 5, 6, 7, 8, and 9, respectively.

In general, Figures 5-8 show southerly to westerly flow directions in the confined Quaternary and Tunnel City-Wonewoc aquifers. No published groundwater contours are known for these aquifers in Anoka County, but the modeled contours seem reasonable since they indicate groundwater flow towards the Mississippi River. Based on this modeled flow toward the regional groundwater discharge zones and the acceptable calibration of the groundwater model, the groundwater flow field was determined to be of acceptable accuracy.

As shown on Figures 5-8, the cones of depression from the western Coon Rapids well field extend under the Mississippi River, which results in capture zones crossing the river into Champlin and Brooklyn Park (Figure 10). See Section 3.2 below for more discussion.

As expected due to the presence of the Eau Claire Formation aquitard, flow in the Mt. Simon Sandstone is less influenced by the Mississippi River and more dependent on high capacity pumping. Figure 9 shows flow in the Mt. Simon in Coon Rapids to be primarily directed towards the south and southwest. The southerly flow is consistent with the large cone of depression centered on southeastern Hennepin County depicted on the Mt. Simon groundwater contour map included in the Hennepin County Geologic Atlas (Kanivetsky, 1989). In northwestern Coon Rapids, flow directions in the Mt. Simon are influenced by the Champlin well field to the west.

3.0 Delineation of the Wellhead Protection Areas

Delineation of the WHPAs for the Coon Rapids wells involved the evaluation of porous media flow only. Per discussions at the Pre-Delineation Meeting (MDH, 2015b), a fracture flow evaluation was deemed unnecessary.

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 Coon Rapids. The porous media capture zone for the Coon Rapids well field was delineated using the software program MODPATH (Version 5) with the modeled groundwater flow field. A minimum of 180 particles were tracked from each well. The particles were released from 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
- Tunnel City Group = 0.2
- Wonewoc Sandstone = 0.2
- 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 confined Quaternary glacial drift, TCW, and Mt. Simon aquifers. The ranges of transmissivities estimated for the various aquifers by the pumping test analyses and specific capacity calculations (Appendix B) were used to calculate upper bounds on hydraulic conductivity for the model sensitivity analysis. The original Metro Model 3 hydraulic conductivities in these aquifers were smaller than the values calculated from the lower bounds of the transmissivity ranges, so the Metro Model 3 values were used as the lower bounds for the sensitivity analysis. The ratio of horizontal to vertical hydraulic conductivity in the base Metro Model 3 was preserved for each sensitivity run except where modified as discussed above in Section 2.5.2. The model was most sensitive to lowering the hydraulic conductivity of the TCW and confined Quaternary aquifers. A plot of the sensitivity analysis results is included in Appendix C.

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 (Figure 10).

3.2 WHPA Delineations

The composite 10-year porous media capture zones define the WHPAs. There are seven distinct WHPAs due to the spacing of the City's wells. The Emergency Response Area (ERA) is delineated for each well by the composite 1-year porous media capture zones. The WHPAs and ERAs are shown on Figure 10.

As mentioned above in Section 2.6, portions of the Coon Rapids WHPA extend under the Mississippi River into Champlin and Brooklyn Park. The particle traces that crossed beneath the River originated at confined Quaternary Wells 17, 20, and 23 and TCW-Mt. Simon Wells 7 and 11. While the traces from the Quaternary wells originated where Layer 4 represents Quaternary sediments, they crossed the River where Layer 4 represents the Jordan Sandstone. The degree of connection between the bedrock aquifers (Jordan and TCW) and the Mississippi River does not appear to be strong enough to prevent the aquifer stress from concentrated high-capacity pumping in Coon Rapids from extending to the west of the River.

3.3 Conjunctive Delineation

As discussed below in section 6.0, a region of High vulnerability is present within one of the Coon Rapids DWSMAs; however, there is no water quality data available that definitively indicates that groundwater pumped from this region is under the influence of surface water. Therefore, delineation of a surface water capture area (i.e., a conjunctive delineation) was not performed. Section 7.0 below discusses recommendations to address this data gap for the next WHPP amendment.

4.0 Delineation of the Drinking Water Supply Management Areas

The Coon Rapids DWSMAs encompass the WHPAs with boundaries that correspond to geographically identifiable features (e.g., roads, parcel boundaries, quarter-quarter section lines). Anoka County 2015 parcel data and Hennepin County 2011 parcel data were used to delineate the DWSMAs. There are three distinct DWSMAs: the West DWSMA encompasses the WHPAs for Wells 4, 6, 7, 11, 12, 14, 15, 17, 19, 20, 22, 23, 24, and 15; the Northeast DWSMA encompasses the WHPAs for Wells 1, 2, 8, 9, 10, 13, 16, 18, and 21; and the Southeast DWSMA encompasses the Well 5 WHPA. The Southeast DWSMA is contained entirely within the Coon Rapids city limits, while the Northeast DWSMA extends east into Blaine and the West DWSMA extends southwest into Champlin and Brooklyn Park. The Coon Rapids DWSMAs are shown on Figure 10. To satisfy Minnesota Rule 4720.5500, Subpart 2, 1:24,000 scale maps of the DWSMAs are included in Appendix D.

5.0 Well Vulnerability Assessment

MDH evaluated the vulnerability of the Coon Rapids municipal wells to contamination from contaminants released at the surface. The evaluation parameters include geology, well construction, pumping rate, and water quality. Coon Rapids Wells 6, 7, 11, 15, 17, 19, 20, 21, 22, 23, and 24 are classified as “vulnerable” and Wells 1, 2, 4, 5, 8, 9, 10, 12, 13, 14, 16, 18, and 25 are classified as “not vulnerable.” Copies of the MDH well vulnerability scoring sheets for the Coon Rapids wells are presented in Appendix E.

6.0 Drinking Water Supply Management Area Vulnerability Assessment

The vulnerabilities of the Quaternary glacial drift, Tunnel City Group, Wonewoc Sandstone, and Mt. Simon Sandstone within the DWSMAs associated with the Coon Rapids 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 Coon Rapids 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

Geologic logs listed in the CWI for wells in the vicinity of the WHPAs were reviewed and “L scores” based on the thickness of low permeability units at each well location were assigned to each well. [See MnDNR (1991) for a discussion of how to determine L scores]. The MDH L score tool was used to compute the L scores and assign geologic sensitivity ratings. Well logs lacking detail in the Quaternary stratigraphy were excluded from the L score calculations. L score calculations were performed for the uppermost aquifer in each composite WHPA. Figure F1 in Appendix F shows geologic sensitivity for the regions of the WHPAs where the confined Quaternary aquifer is the uppermost aquifer, and Figure F2 shows geologic sensitivity for the regions of the WHPAs where bedrock aquifers (e.g., TCW, Mt. Simon) are the uppermost aquifers.

Quaternary geologic sensitivity in the Coon Rapids WHPAs is primarily Low or Moderate, though there is a region of High geologic sensitivity between Wells 15 and 25. Quaternary Wells 17, 22, and 23 are located in areas of Moderate geologic sensitivity, and Quaternary Wells 19, 20, and 21 are located in areas of Low geologic sensitivity.

Bedrock geologic sensitivity is Low except for approximately the northern two-thirds of the Well 6 WHPA where the geologic sensitivity of the TCW aquifer is Moderate.

The second step in the assessment is to refine the geologic sensitivity using water quality data from the water supply wells. Recent tritium sampling was conducted in summer 2010 at Coon Rapids Wells 11, 17, 20, 23, and 24 (see Appendix E) and in July 2015 at Wells 2, 5, 6, 9, 14, 18, and 21 (MDH, 2015c). Tritium (^3H), 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 ^3H in precipitation reached a maximum of approximately 10,000 T.U. (tritium units) in 1963 (Mazor, 2004). Natural production of ^3H in the upper atmosphere introduces approximately 5 T.U. to precipitation each

year (Mazor, 2004). Because ^3H 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 ^3H is used mostly for relative age dating today. Groundwater that has little or no detectable ^3H is stated to be "vintage" or pre-bomb. Groundwater with detectable values of ^3H 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-1954 (i.e., recently infiltrated) water in the groundwater sample. Table 4 summarizes the results of the 2010 and 2015 tritium sampling events. Tritium was not detected in the samples collected at Wells 5 and 18. Tritium was detected at similar concentrations of 2.6, 2.9, 2.7, 1.8, and 2.0 NTU at Wells 2, 9, 11, 14, and 17, respectively, and at higher concentrations of 6.8, 6.9, 8.6, 7.7, and 7.7 NTU at Wells 6, 20, 21, 23, and 24, 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 moderate to explain the presence of tritium in the well.

Figure 11 shows the final aquifer vulnerability map for the uppermost aquifer supplying water to municipal wells in each of the Coon Rapids DWSMAs. Within the West DWSMA, tritium was detected at Wells 6, 11, 14, 17, 20, 23, and 24. The parcels intersected by the Well 6 WHPA were assigned Moderate vulnerability; while the geologic sensitivity at Well 6 itself was Low, a Moderate vulnerability at minimum must be assigned to this region due to the tritium detection at Well 6. Wells 11, 14, 17, 23, 24, and 25 are located within regions of Moderate geologic sensitivity. The geologic sensitivity is Low at Well 20. Due to the tritium detections at multiple wells, most of the West DWSMA was assigned Moderate vulnerability. The area of High geologic sensitivity near Wells 15 and 25 was assigned High vulnerability; mapping of the boundaries of the High vulnerability area to correspond to geographically identifiable features resulted in Wells 14 and 25 being located in the High vulnerability area. In the absence of recent water quality data for Wells 4 and 12, Low geologic sensitivity was mapped to Low vulnerability where the Well 4 and Well 12 capture zone are the uppermost capture zones in the DWSMA.

The Southeast DWSMA was assigned Low vulnerability due to Low geologic sensitivity in the Well 5 WHPA and a tritium non-detect at Well 5.

Low vulnerability was assigned to the parcels within the Northeast DWSMA that intersect the Well 18 WHPA because the geologic sensitivity of the Mt. Simon Sandstone is Low and no tritium was detected at Well 18. The remainder of the Northeast DWSMA was assigned Moderate vulnerability. Although the geologic sensitivity of this region is primarily low, tritium was detected at Wells 2, 9, and 21, requiring a

minimum Moderate vulnerability. While the tritium value of 8.6 NTU at Well 21 is high, this value is not inconsistent with the definition of Moderate vulnerability (travel times from years to decades) and the Quaternary stratigraphy near Well 21 (Figures 3 and 4) includes some confining units.

7.0 Recommendations

It is recommended that the City work with the MDH to conduct tritium sampling of the municipal wells at least every ten years in order to have current data available when updating the aquifer vulnerability assessment as part of the required decennial wellhead protection plan amendments.

A conjunctive delineation was not performed due to the absence of water quality data that definitively indicate groundwater under the influence of surface water. Per current MDH policy, it is recommended that additional water quality sampling (e.g., oxygen isotopes) be conducted at the City wells nearest the region of High vulnerability and Quaternary wells whose capture zones extend under the Mississippi River (e.g., Wells 14, 15, 17, 20, 22, 23, and 25) during the life of this WHPP in order to assess the need for a conjunctive delineation in the next WHPP amendment.

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 5.

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

- Bonestroo, Rosene, Anderlik & Associates (Bonestroo), 2006. City of Coon Rapids Wellhead Protection Plan, Part I, Amendment. Prepared for the City of Coon Rapids, February 2006.
- Bradbury, K.B., and E.R. Rothschild, 1985. A computerized technique for estimating the hydraulic conductivity of aquifer from specific capacity data. *Ground Water* v. 23, no. 2, pp. 240-246.
- Bolton & Menk, 2014. Comprehensive Water System Plan, City of Coon Rapids, Minnesota. Prepared for City of Coon Rapids, Bolton & Menk Project No. N21.107935, October 2014.
- Environmental Simulations, Inc., 2011. Guide to using Groundwater Vistas, Version 6, Environmental Simulations Inc.
- Kanivetsky, R., 1989. Bedrock Hydrogeology. Plate 6 of 9, in *Geologic Atlas of Hennepin County, Minnesota*: N.H. Balaban (ed.). Minnesota Geological Survey County Atlas Series, Atlas C-4. University of Minnesota, St. Paul.
- 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), 2015a. *RE: Revised Coon Rapids Well Shapefile Corrected in CWI*. [email] Message from Amal Djerrari of the MDH to Adam Janzen of Barr Engineering and Sean Hunt of the MnDNR. Sent 8/13/2015.
- Minnesota Department of Health (MDH), 2015b. Personal communication: Pre-Delineation Meeting with MDH, City of Coon Rapids, and Barr Engineering staffs held on August 11, 2015 at Barr Engineering Company, Edina, MN.
- Minnesota Department of Health (MDH), 2015c. *RE: Coon Rapids Tritium*. [email] Message from Amal Djerrari of the MDH to Adam Janzen and John Greer of Barr Engineering. Sent 10/23/2015.
- Minnesota Department of Health (MDH), 2003. Wellhead Protection Plan for the City of Coon Rapids, Part I, Delineation of Wellhead Protection Areas, Delineation of Drinking Water Supply Management Areas,

Assessment of Well and Aquifer Vulnerability. Prepared by Stephen W. Robertson of the MDH for the City of Coon Rapids, March 2003.

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.

Minnesota Geological Survey (MGS), 2015. Minnesota Well Index, update November 2015.

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.

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

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.

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
Coon Rapids 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 Coon Rapids
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)

Data Element	Present and Future Implications				Data Source
	Use of the Well s	Delineation Criteria	Quality and Quantity of Well Water	Land and Groundwater Use in DWSMA	
Public drainage systems map/lis	L	L	L	L	City of Coon Rapids
Records of well construction, maintenance, and use	H	H	L	L	City of Coon Rapids, 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
Coon Rapids WHPP Amendment

Local Well ID	Unique Number	Use/ Status ¹	Casing Diameter (in.)	Casing Depth (ft.)	Well Depth (ft.)	Year Constructed	Aquifer	Well Vulnerability
1	202926	S	12	220	462	1957	St. Lawrence – Eau Claire	Not Vulnerable
2	202929	S	12	226	788	1957	St. Lawrence – Mt. Simon	Not Vulnerable
4	202972	S	20 x 16	233	605	1960	Tunnel City – Mt. Simon	Not Vulnerable
5	202951	S	24 x 16	242	695	1961	Tunnel City – Mt. Simon	Not Vulnerable
6	202937	S	20	118	158	1960	Tunnel City	Vulnerable
7	202943	S	24 x 16	189	632	1964	Tunnel City – Mt. Simon	Vulnerable
8	202932	P	24 x 16	283	700	1965	Tunnel City – Mt. Simon	Not Vulnerable
9	202931	P	24 x 16	294	500	1969	Tunnel City – Eau Claire	Not Vulnerable
10	202930	P	30 x 24 x 16	272	684	1970	Tunnel City – Mt. Simon	Not Vulnerable
11	202965	P	24	157	627	1972	Tunnel City – Mt. Simon	Vulnerable
12	168721	S	24 x 16	208	604	1975	Tunnel City – Mt. Simon	Not Vulnerable
13	168720	P	24 x 16	395	693	1977	Tunnel City – Mt. Simon	Not Vulnerable
14	110460	P	30 x 20	328	613	1977	Tunnel City – Mt. Simon	Not Vulnerable
15	110461	P	30 x 20	225	615	1976	Tunnel City – Mt. Simon	Vulnerable
16	161413	S	30 x 24 x 18	395	653	1981	Wonewoc – Mt. Simon	Not Vulnerable

¹ P = Primary, S = Seasonal

Table 2

Water Supply Well Information (continued)
Coon Rapids WHPP Amendment

Local Well ID	Unique Number	Use/ Status ¹	Casing Diameter (in.)	Casing Depth (ft.)	Well Depth (ft.)	Year Constructed	Aquifer	Well Vulnerability
17	150357	P	30	81	121	1981	Confined Quaternary	Vulnerable
18	110469	S	36 x 30 x 24	575	637	1986	Mt. Simon	Not Vulnerable
19	110475	P	30 x 20	115	135	1987	Confined Quaternary	Vulnerable
20	420956	P	30 x 20	95	135	1988	Confined Quaternary	Vulnerable
21	474384	P	24 x 18	170	203	1990	Confined Quaternary	Vulnerable
22	474385	S	24	80	105	1990	Confined Quaternary	Vulnerable
23	463020	S	30 x 24	93	128	1991	Confined Quaternary	Vulnerable
24	674478	P	36 x 30 x 24	241	388	2003	Tunnel City – Wonewoc	Vulnerable
25	674479	P	36 x 24	229	388	2003	Tunnel City – Wonewoc	Vulnerable

¹ P = Primary, S = Seasonal

Table 3

Annual and Projected Pumping Rates for Coon Rapids Wells
Coon Rapids WHPP Amendment

Unique Number	Well Name	Total Annual Withdrawal (gal/yr)				
		2010	2011	2012	2013	2014
202926	1	2,474,000	2,056,000	5,603,000	11,794,000	3,625,000
202929	2	2,510,000	2,107,000	5,257,000	16,688,000	3,438,000
202972	4	454,000	237,000	328,000	4,995,000	2,330,000
202951	5	11,664,000	10,940,000	18,240,000	23,187,000	2,019,000
202937	6	11,404,000	14,692,000	18,891,000	28,209,000	2,022,000
202943	7	8,143,000	15,479,000	19,480,000	36,111,000	2,966,000
202932	8	266,464,000	146,631,000	124,262,000	87,333,000	153,358,000
202931	9	154,980,000	279,287,000	296,930,000	240,707,000	234,551,000
202930	10	289,927,000	321,549,000	329,619,000	260,648,000	48,304,000
202965	11	292,273,000	335,685,000	301,213,000	227,880,000	230,392,000
168721	12	8,107,000	13,305,000	19,113,000	26,242,000	1,961,000
168720	13	26,545,000	79,698,000	42,333,000	56,801,000	84,661,000
110460	14	82,530,000	65,386,000	104,955,000	97,452,000	89,025,000
110461	15	141,580,000	132,889,000	284,911,000	279,754,000	341,462,000
161413	16	6,637,000	268,000	1,340,000	1,462,000	859,000
150357	17	166,967,000	324,602,000	238,277,000	210,720,000	263,843,000
110469	18	1,461,000	1,264,000	1,103,000	3,664,000	2,340,000
110475	19	309,781,000	333,579,000	206,674,000	222,999,000	190,172,000
420956	20	348,896,000	275,096,000	157,449,000	146,620,000	161,888,000
474384	21	300,898,000	327,105,000	300,839,000	218,424,000	227,594,000
474385	22	2,315,000	33,171,000	34,297,000	23,168,000	45,768,000
463020	23	1,482,000	7,167,000	16,255,000	12,440,000	18,061,000
674478	24	229,680,000	20,193,000	218,647,000	220,698,000	160,699,000
674479	25	210,722,000	18,157,000	213,137,000	204,520,000	161,852,000
Totals		2,877,894,000	2,760,543,000	2,959,153,000	2,662,516,000	2,433,190,000

Source: City water use records

Table 3

Annual and Projected Pumping Rates for Coon Rapids Wells
Coon Rapids WHPP Amendment

Unique Number	Well Name	Percentage of Annual Withdrawal					Average Annual % of Withdrawal
		2010	2011	2012	2013	2014	
202926	1	0.1%	0.1%	0.2%	0.4%	0.1%	0.2%
202929	2	0.1%	0.1%	0.2%	0.6%	0.1%	0.2%
202972	4	0.0%	0.0%	0.0%	0.2%	0.1%	0.1%
202951	5	0.4%	0.4%	0.6%	0.9%	0.1%	0.5%
202937	6	0.4%	0.5%	0.6%	1.1%	0.1%	0.5%
202943	7	0.3%	0.6%	0.7%	1.4%	0.1%	0.6%
202932	8	9.3%	5.3%	4.2%	3.3%	6.3%	5.7%
202931	9	5.4%	10.1%	10.0%	9.0%	9.6%	8.8%
202930	10	10.1%	11.6%	11.1%	9.8%	2.0%	8.9%
202965	11	10.2%	12.2%	10.2%	8.6%	9.5%	10.1%
168721	12	0.3%	0.5%	0.6%	1.0%	0.1%	0.5%
168720	13	0.9%	2.9%	1.4%	2.1%	3.5%	2.2%
110460	14	2.9%	2.4%	3.5%	3.7%	3.7%	3.2%
110461	15	4.9%	4.8%	9.6%	10.5%	14.0%	8.8%
161413	16	0.2%	0.0%	0.0%	0.1%	0.0%	0.1%
150357	17	5.8%	11.8%	8.1%	7.9%	10.8%	8.9%
110469	18	0.1%	0.0%	0.0%	0.1%	0.1%	0.1%
110475	19	10.8%	12.1%	7.0%	8.4%	7.8%	9.2%
420956	20	12.1%	10.0%	5.3%	5.5%	6.7%	7.9%
474384	21	10.5%	11.8%	10.2%	8.2%	9.4%	10.0%
474385	22	0.1%	1.2%	1.2%	0.9%	1.9%	1.0%
463020	23	0.1%	0.3%	0.5%	0.5%	0.7%	0.4%
674478	24	8.0%	0.7%	7.4%	8.3%	6.6%	6.2%
674479	25	7.3%	0.7%	7.2%	7.7%	6.7%	5.9%

Table 3

Annual and Projected Pumping Rates for Coon Rapids Wells
Coon Rapids WHPP Amendment

Unique Number	Well Name	Projected Water Use (2020)			Maximum Total Pumping for Model Input ³		
		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
202926	1		0.2%	6,002,060	11,794,000	32,312	122
202929	2		0.2%	6,002,060	16,688,000	45,721	173
202972	4		0.1%	3,001,030	4,995,000	13,685	52
202951	5		0.5%	15,005,150	23,187,000	63,526	240
202937	6		0.5%	15,005,150	28,209,000	77,285	293
202943	7		0.6%	18,006,180	36,111,000	98,934	375
202932	8		5.7%	171,058,710	266,464,000	730,038	2,764
202931	9		8.8%	264,090,640	296,930,000	813,507	3,080
202930	10		8.9%	267,091,670	329,619,000	903,066	3,419
202965	11		10.1%	303,104,030	335,685,000	919,685	3,482
168721	12		0.5%	15,005,150	26,242,000	71,896	272
168720	13		2.2%	66,022,660	84,661,000	231,948	878
110460	14		3.2%	96,032,960	104,955,000	287,548	1,089
110461	15		8.8%	264,090,640	341,462,000	935,512	3,542
161413	16		0.1%	3,001,030	6,637,000	18,184	69
150357	17		8.9%	267,091,670	324,602,000	889,321	3,367
110469	18		0.1%	3,001,030	3,664,000	10,038	38
110475	19		9.2%	276,094,760	333,579,000	913,915	3,460
420956	20		7.9%	237,081,370	348,896,000	955,879	3,619
474384	21		10.0%	300,103,000	327,105,000	896,178	3,393
474385	22		1.0%	30,010,300	45,768,000	125,392	475
463020	23		0.4%	12,004,120	18,061,000	49,482	187
674478	24		6.2%	186,063,860	229,680,000	629,260	2,382
674479	25		5.9%	177,060,770	213,137,000	583,937	2,211
Totals		3,001,030,000		3,001,030,000	3,758,131,000	10,296,249	38,978

Appropriation 3,200,000,000

¹ 2020 projected average daily demand interpolated from land use-based projections in Coon Rapids Comprehensive Water System Plan (Bolton & Menk, 2014) for 2019 (8.11 MGD) and 2024 (8.67 MGD).

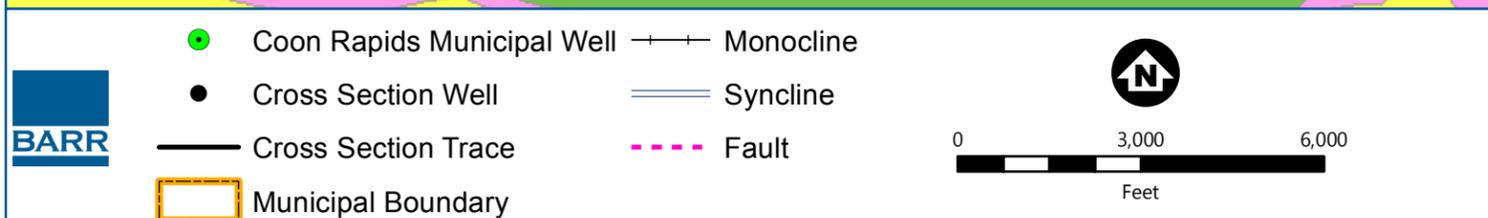
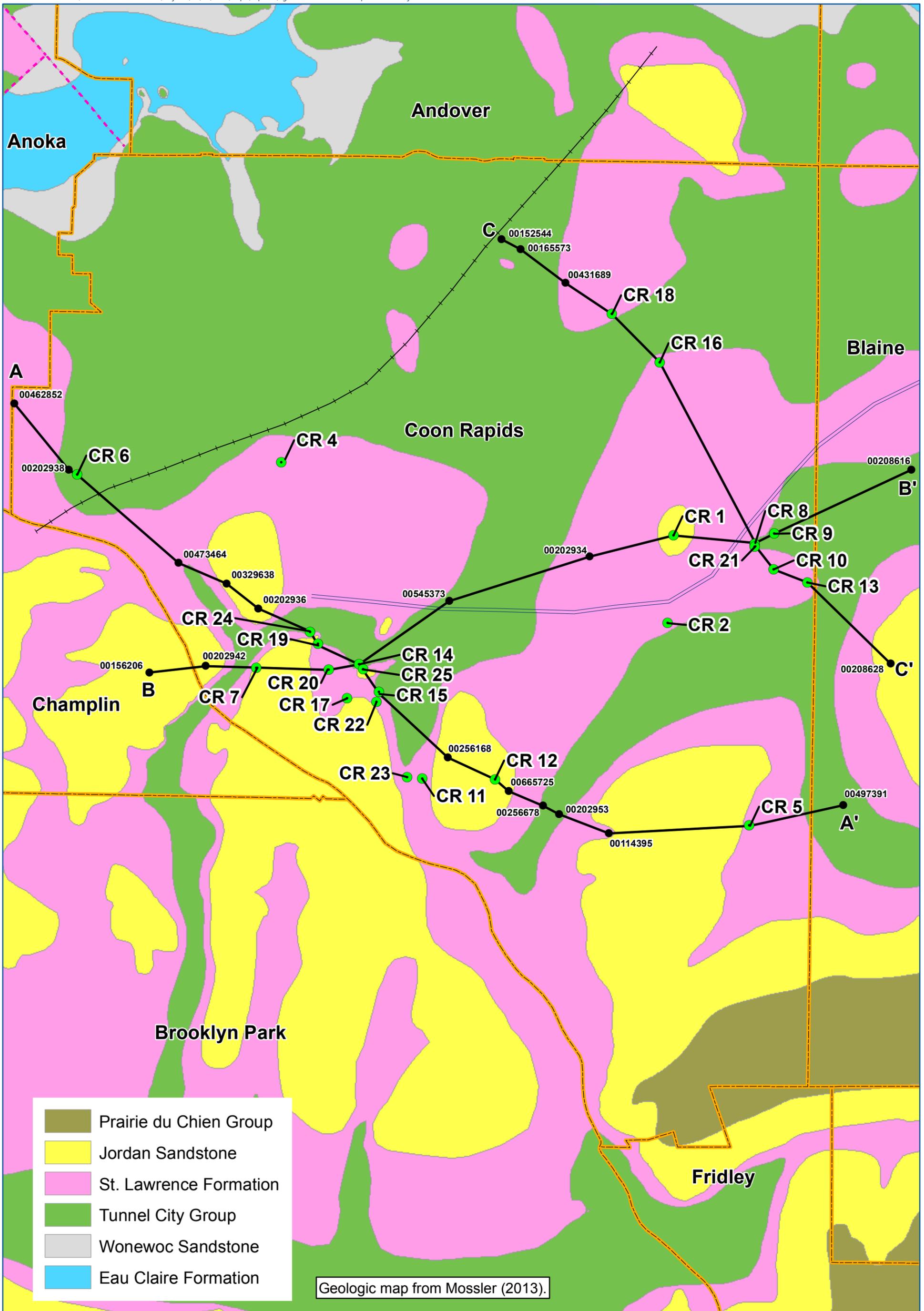
² Percentages for all wells are based the average % of annual withdrawal for the period 2010 through 2014

³ For each well, the greater of the estimated pumpage based on projected 2020 withdrawal and actual annual pumpage for 2010 - 2014.

Table 4
Tritium Sampling Results
Coon Rapids WHPP Amendment

Local Well ID	Unique Number	Aquifer	Sample Date	Tritium Concentration (NTU)
2	202929	St. Lawrence – Mt. Simon	7/9/2015	2.6
5	202951	Tunnel City – Mt. Simon	7/9/2015	<.8
6	202937	Tunnel City	7/9/2015	6.8
9	202931	Tunnel City – Eau Claire	7/9/2015	2.9
11	202965	Tunnel City – Mt. Simon	6/8/2010	2.7
14	110460	Tunnel City – Mt. Simon	7/9/2015	1.8
17	150357	Confined Quaternary	6/8/2010	2.0
18	110469	Mt. Simon	7/9/2015	<.8
20	420956	Confined Quaternary	6/8/2010	6.9
21	474384	Confined Quaternary	7/9/2015	8.6
23	463020	Confined Quaternary	6/8/2010	7.7
24	674478	Tunnel City - Wonewoc	7/15/2010	7.7

Figures

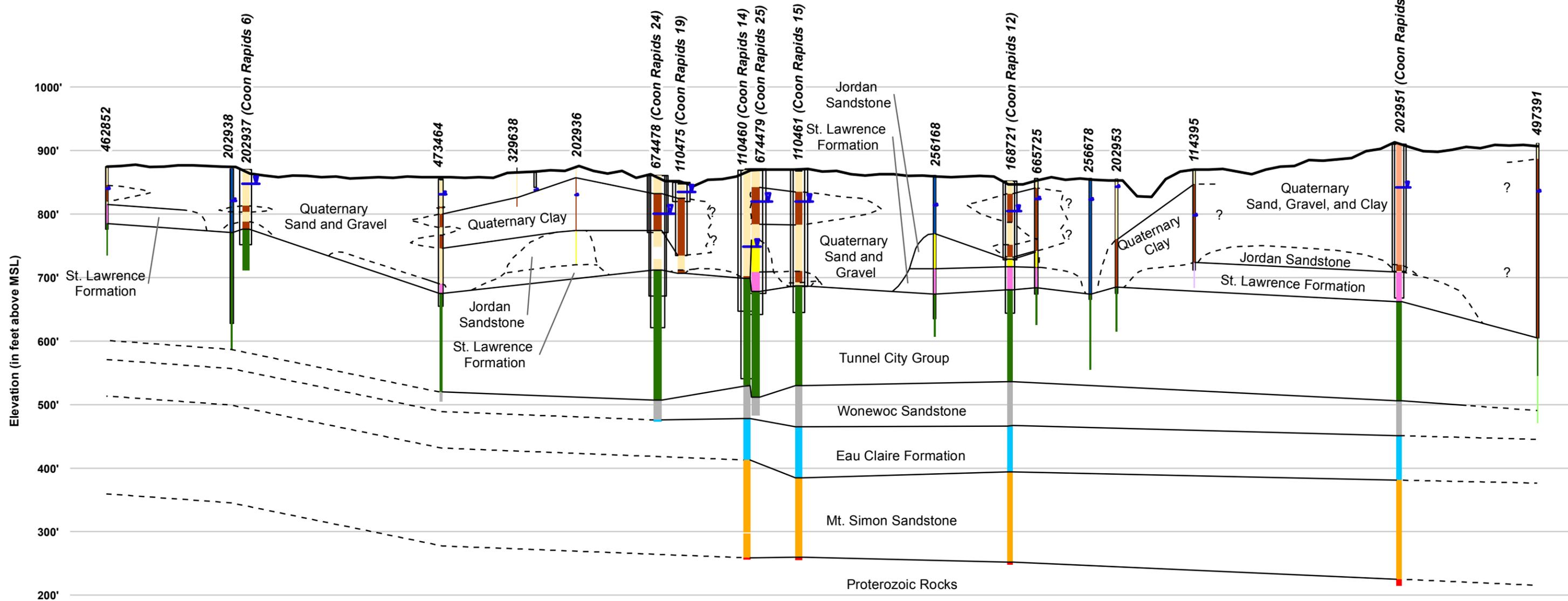


BEDROCK SUBCROP
 Coon Rapids WHPP Amendment
 City of Coon Rapids, MN

FIGURE 1

A
Northwest

A'
Southeast



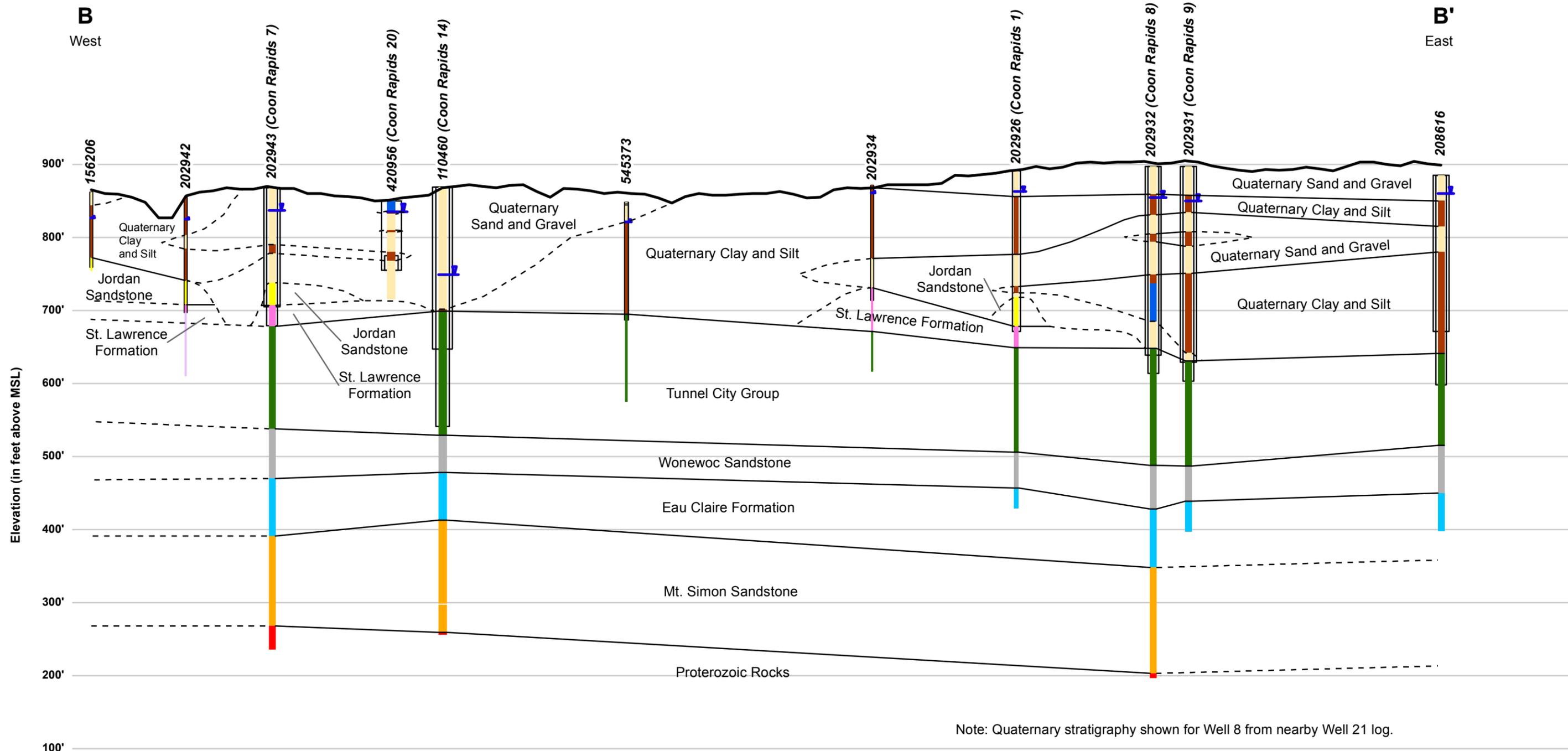
- Static Water Level
- Ground Surface
- Well Casing
- Quaternary Sand and Gravel
- Quaternary Clay
- Fill and Topsoil
- Quaternary Sand, Gravel, and Clay
- Undifferentiated Quaternary
- Jordan Sandstone
- St. Lawrence Formation
- St. Lawrence Formation - Tunnel City Group
- Tunnel City Group
- Tunnel City Group - Wonewoc Sandstone
- Wonewoc Sandstone
- Eau Claire Formation
- Mt. Simon Sandstone
- Proterozoic Rocks

Vert. Exag. = 15X

CROSS SECTION A-A'
Coon Rapids WHPP Amendment
City of Coon Rapids, MN

FIGURE 2





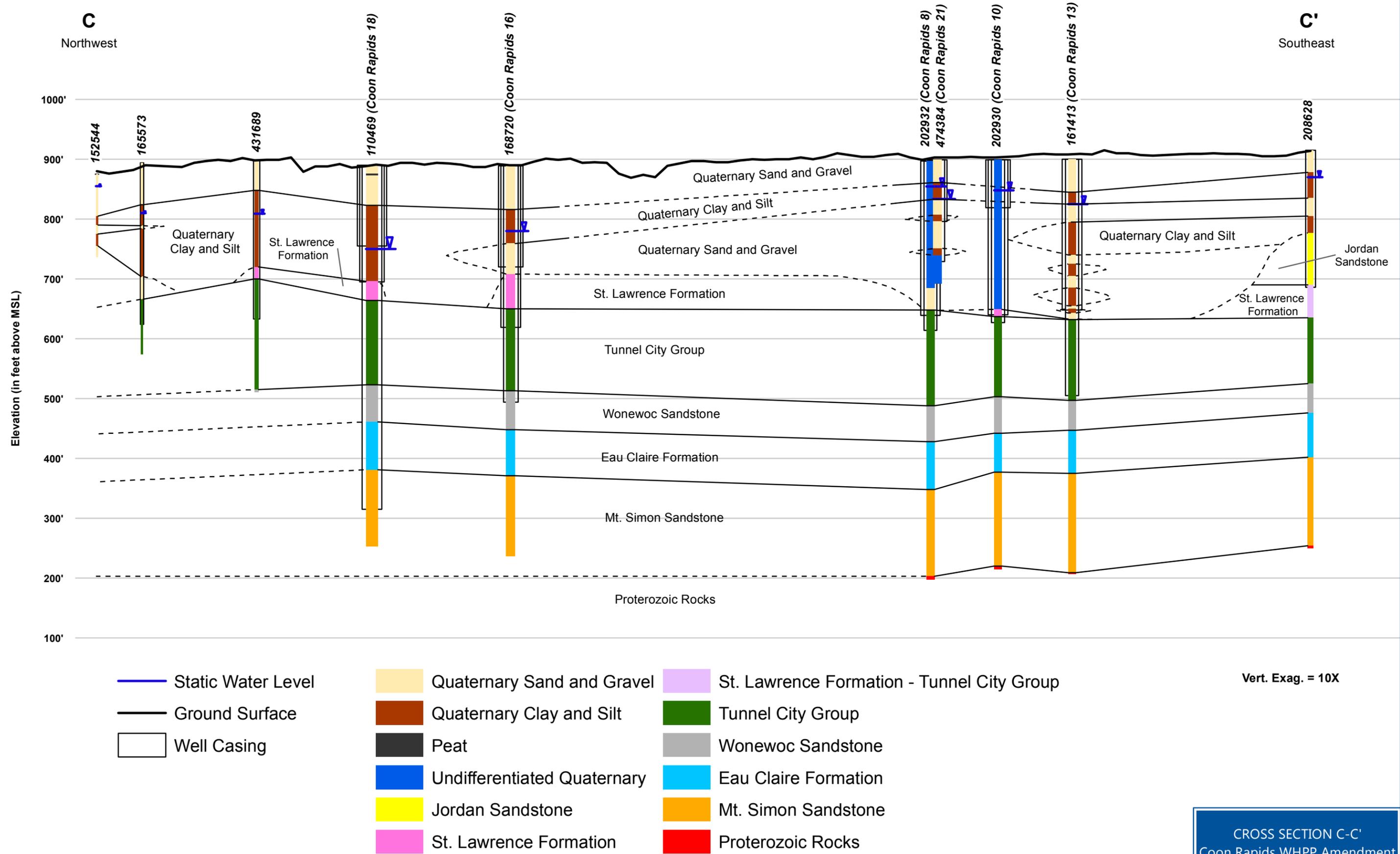
Note: Quaternary stratigraphy shown for Well 8 from nearby Well 21 log.

Vert. Exag. = 15X

- | | | |
|--------------------|-----------------------------|--|
| Static Water Level | Quaternary Sand and Gravel | St. Lawrence Formation - Tunnel City Group |
| Ground Surface | Quaternary Clay and Silt | Tunnel City Group |
| Well Casing | Peat | Wonewoc Sandstone |
| | Undifferentiated Quaternary | Eau Claire Formation |
| | Jordan Sandstone | Mt. Simon Sandstone |
| | St. Lawrence Formation | Proterozoic Rocks |

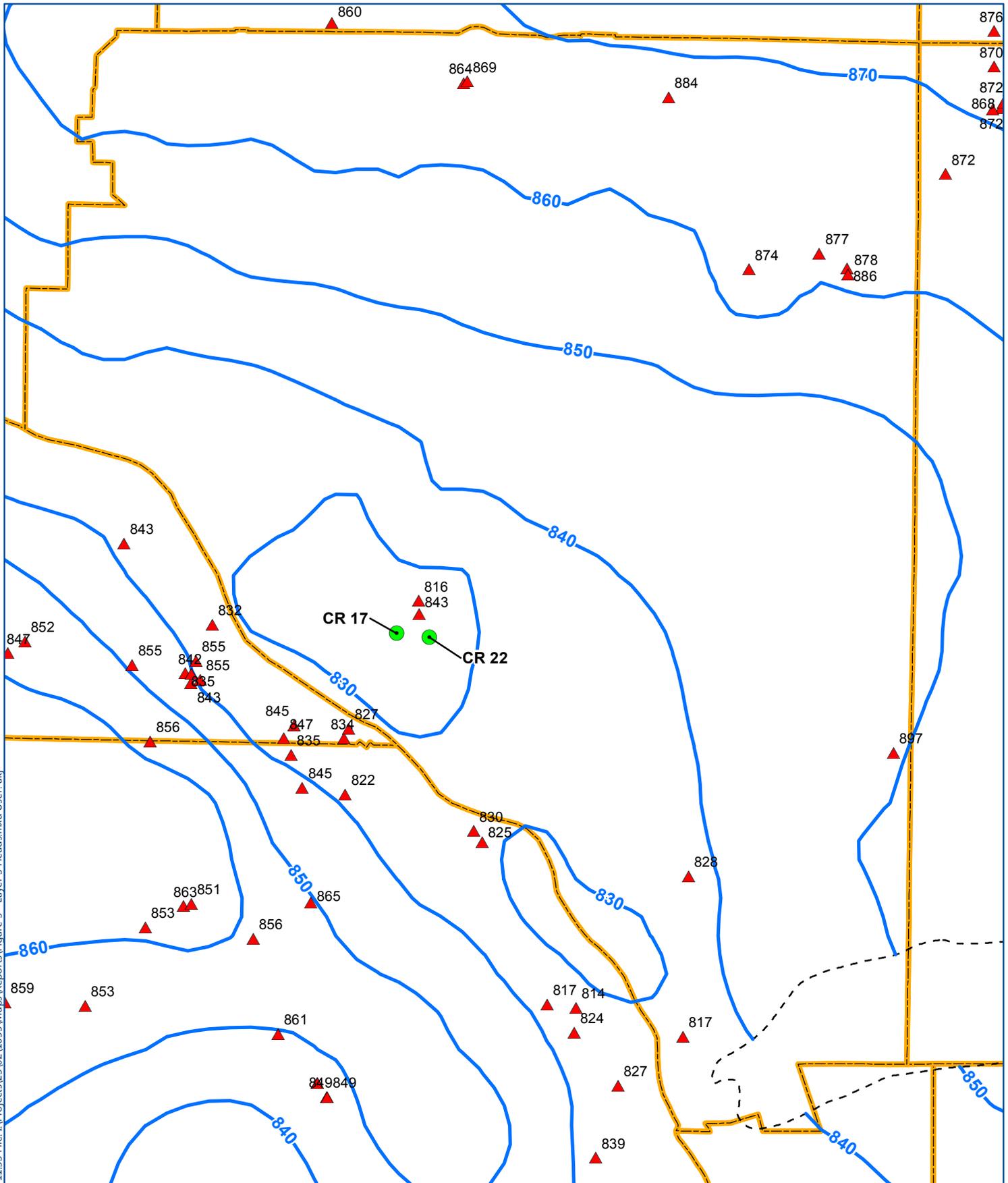
CROSS SECTION B-B'
Coon Rapids WHPP Amendment
City of Coon Rapids, MN
FIGURE 3



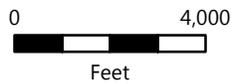


CROSS SECTION C-C'
Coon Rapids WHPP Amendment
City of Coon Rapids, MN

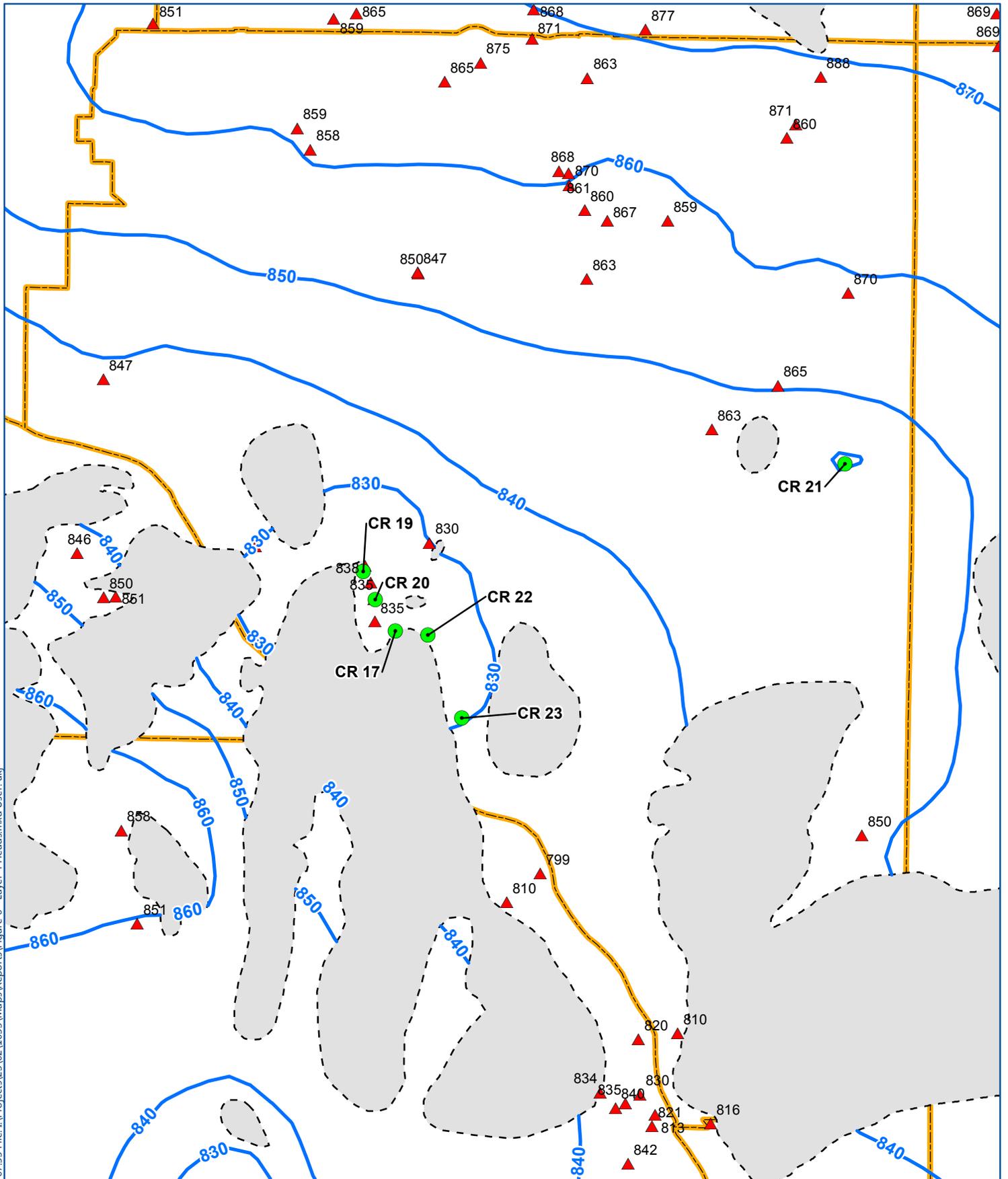
FIGURE 4



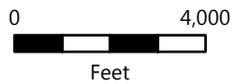
- Coon Rapids Municipal Well open to Layer 3
- Layer 3 Quaternary Target
- Modeled Head (ft MSL)
- Prairie du Chien Group Extent
- Municipal Boundary



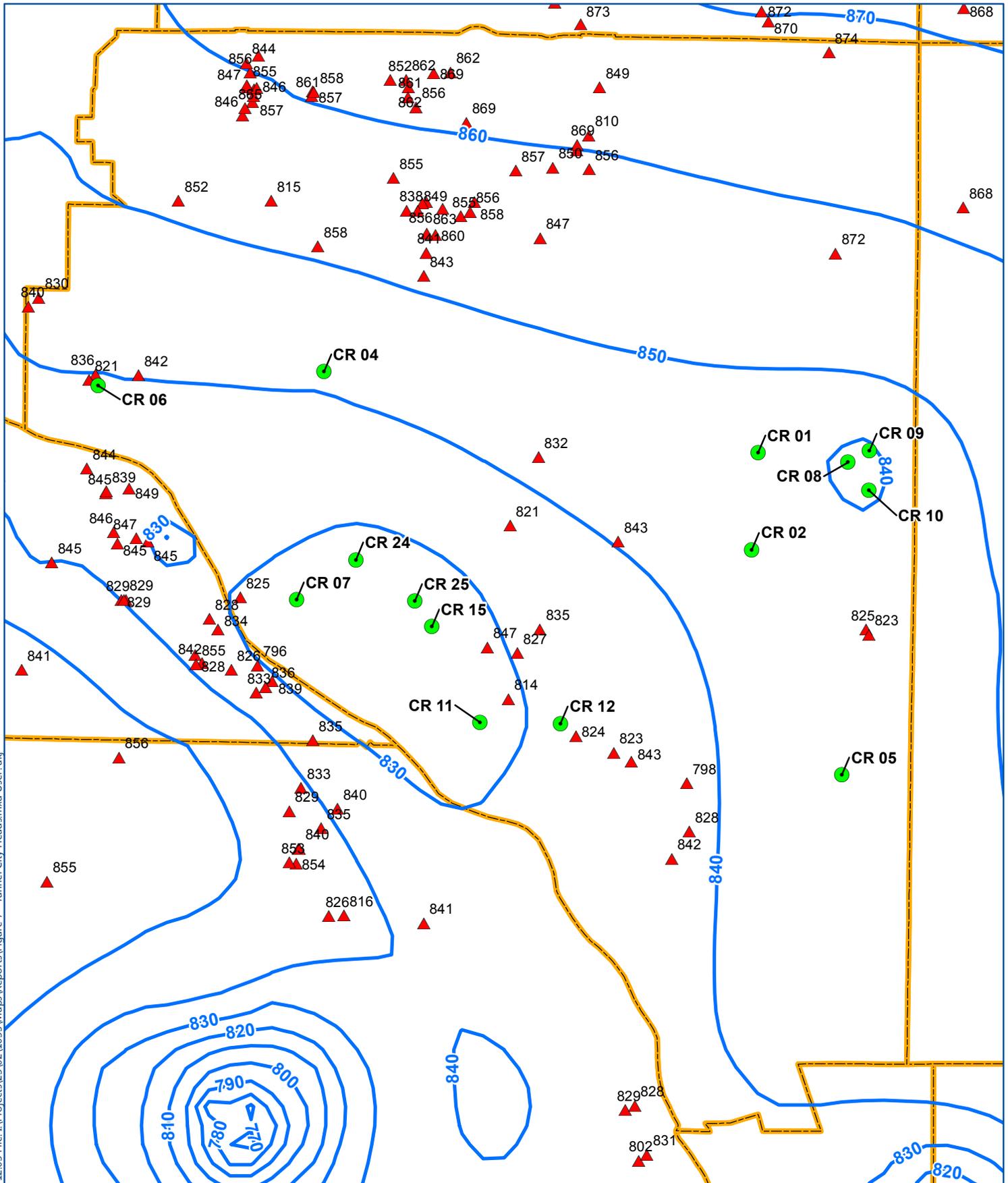
MODELED HEADS IN QUATERNARY GLACIAL DRIFT LAYER 3
Coon Rapids WHPP Amendment
City of Coon Rapids, MN
FIGURE 5



- Coon Rapids Municipal Well open to Layer 4
- Layer 4 Quaternary Target
- Modeled Head (ft MSL)
- Jordan Sandstone Extent
- Municipal Boundary



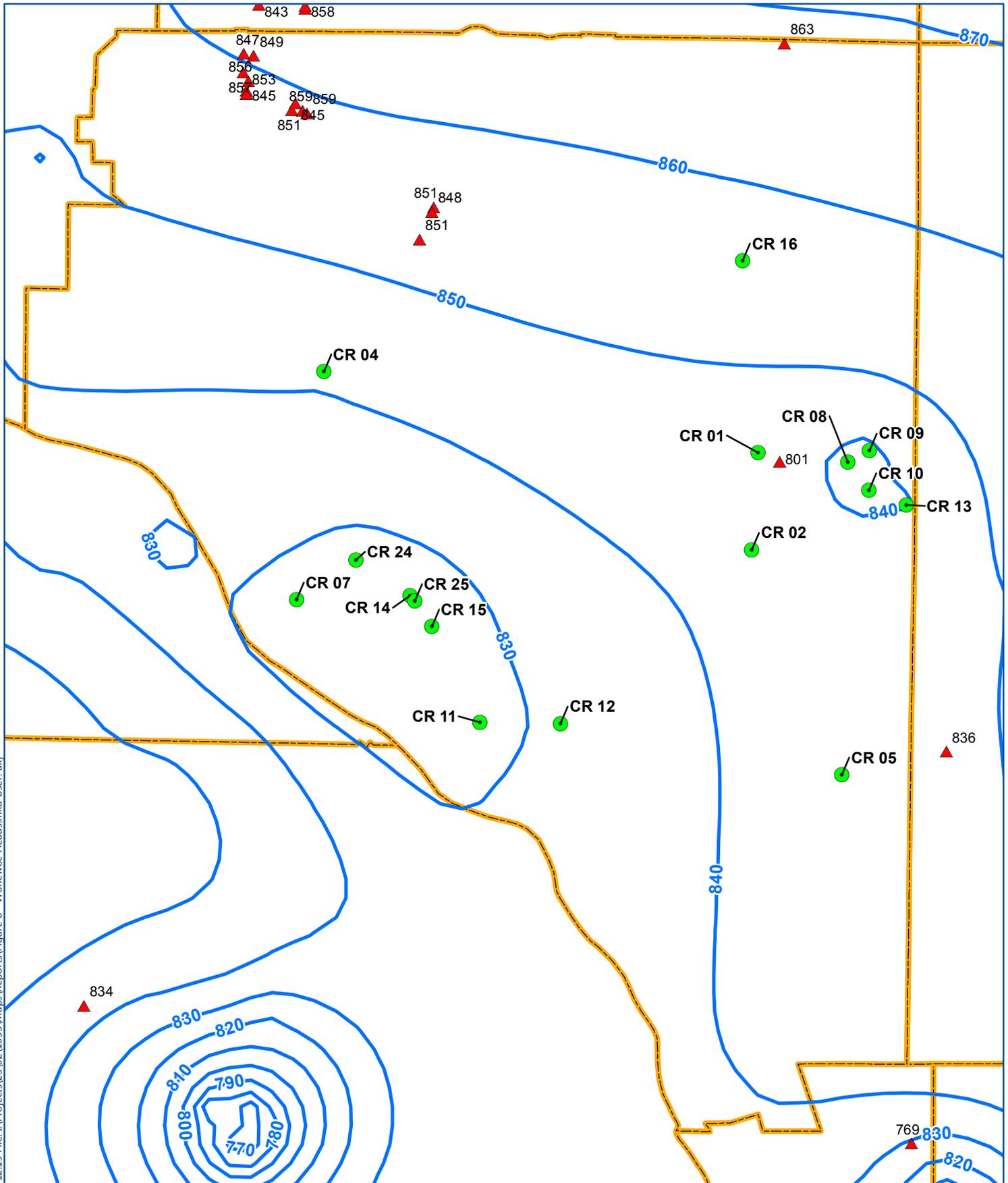
MODELED HEADS IN QUATERNARY GLACIAL DRIFT LAYER 4
Coon Rapids WHPP Amendment
City of Coon Rapids, MN
FIGURE 6



- Coon Rapids Municipal Well open to Tunnel City Group
- Layer 6 Tunnel City Target
- Modeled Head (ft MSL)
- Municipal Boundary



**MODELED HEADS IN
TUNNEL CITY GROUP
LAYER 6**
Coon Rapids WHPP Amendment
City of Coon Rapids, MN
FIGURE 7

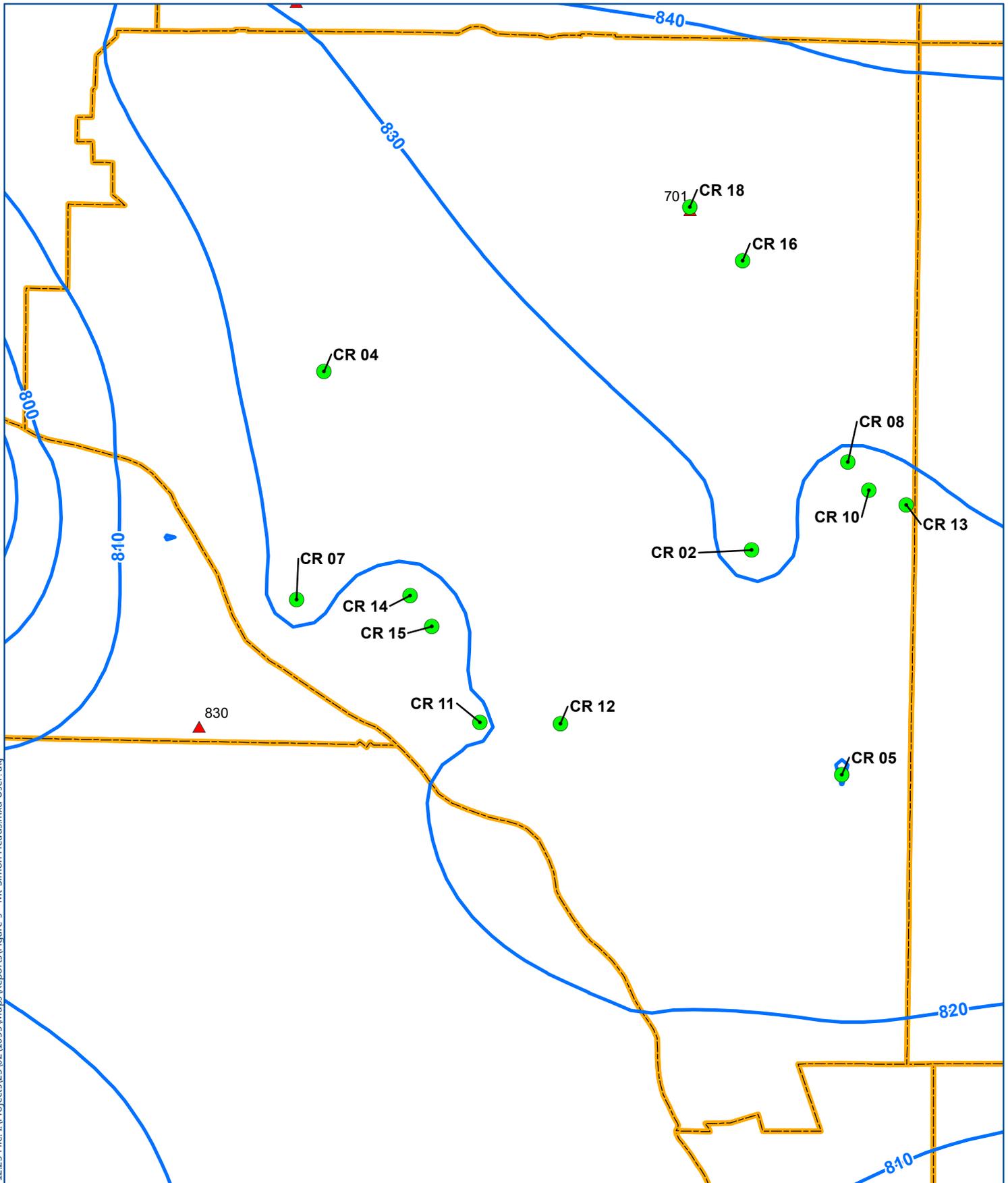


  Coon Rapids Municipal Well open to Wonewoc Sandstone
 Layer 7 Wonewoc Target
 Modeled Head (ft MSL)
 Municipal Boundary

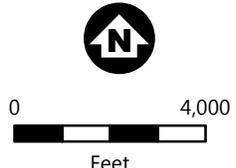


0 4,000
Feet

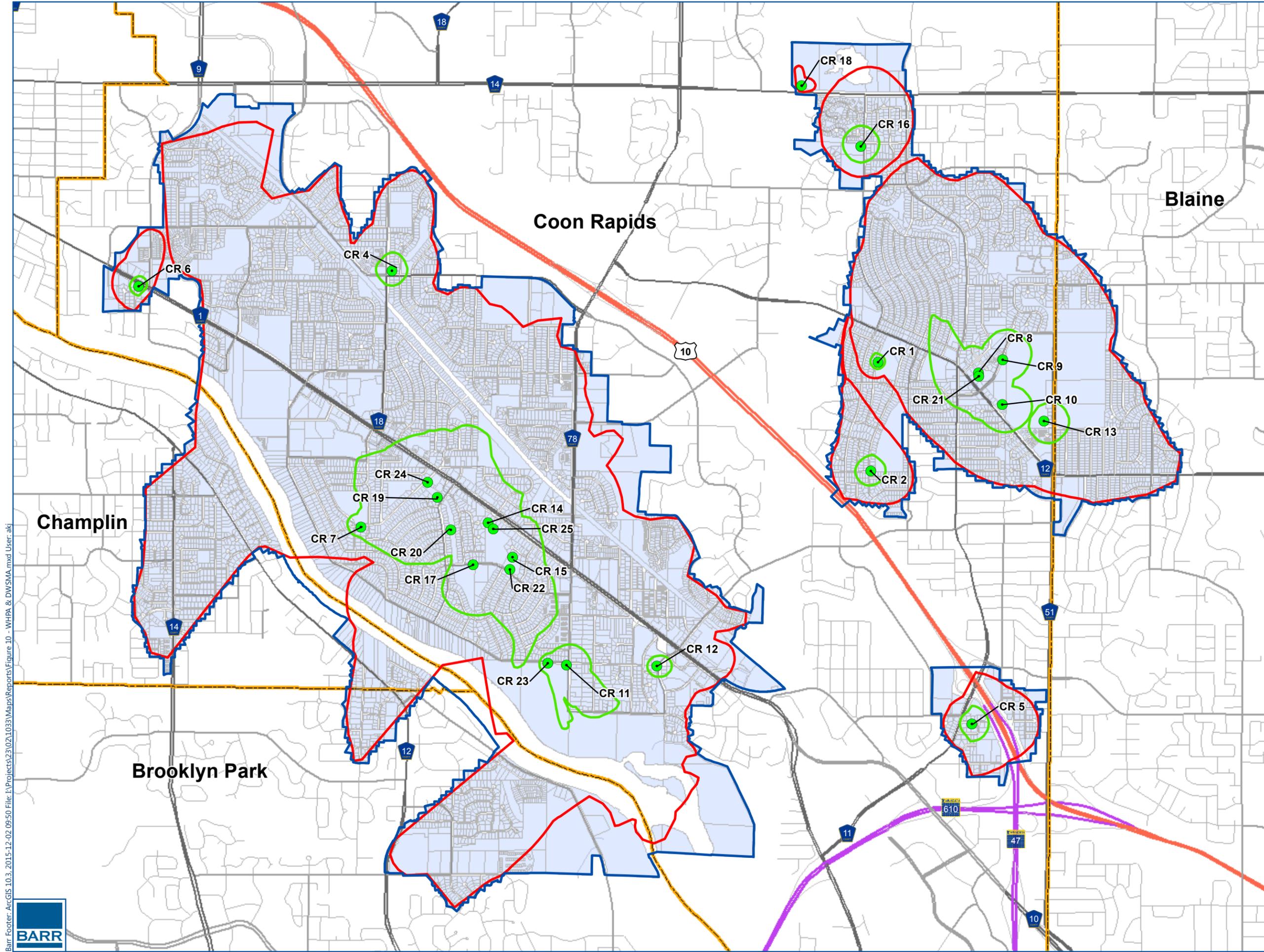
MODELED HEADS IN
WONEWOC SANDSTONE
LAYER 7
Coon Rapids WHPP Amendment
City of Coon Rapids, MN
FIGURE 8



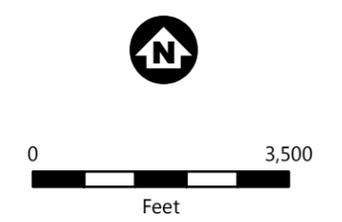
-  Coon Rapids Municipal Well open to Mt. Simon Sandstone
-  Layer 9 Mt. Simon Target
-  Modeled Head (ft MSL)
-  Municipal Boundary



**MODELED HEADS IN
MT. SIMON SANDSTONE
LAYER 9**
Coon Rapids WHPP Amendment
City of Coon Rapids, MN
FIGURE 9



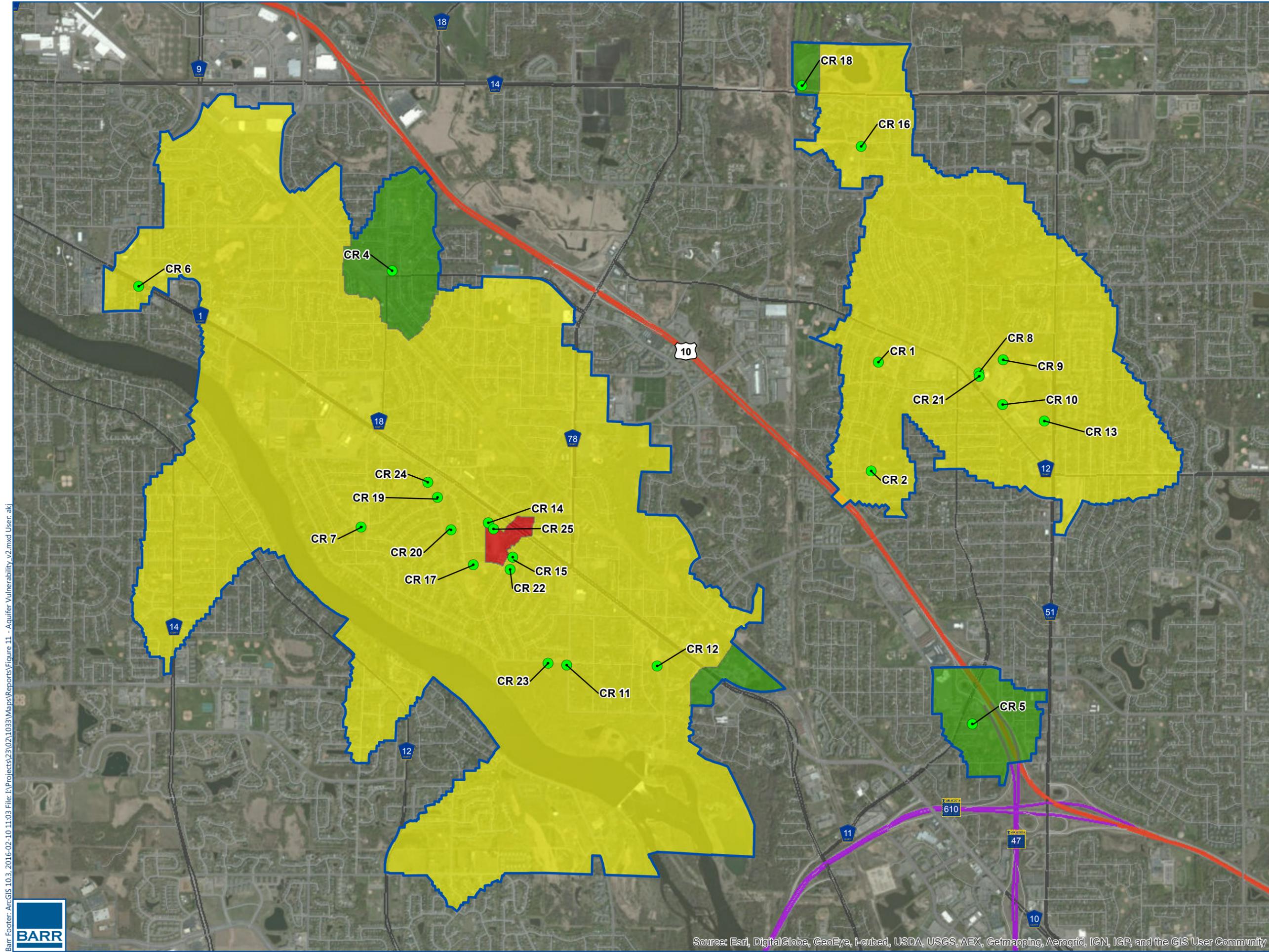
- Coon Rapids Municipal Well
- ERA
- WHPA
- DWSMA
- Parcel
- Municipal Boundary



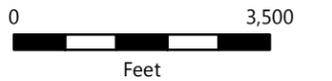
WHPA & DWSMA
Coon Rapids WHPA Amendment
City of Coon Rapids, MN

FIGURE 10





- Coon Rapids Municipal Well
- DWSSMA
- Vulnerability**
- High
- Moderate
- Low



AQUIFER VULNERABILITY
Coon Rapids WHPP Amendment
City of Coon Rapids, MN

FIGURE 11



Appendix A

Well Construction Records

Unique No. 00202926	MINNESOTA DEPARTMENT OF HEALTH WELL AND BORING RECORD <i>Minnesota Statutes Chapter 1031</i>	Update Date 2007/02/06																																																																																																									
County Name Anoka		Entry Date 1991/04/15																																																																																																									
Township Name Township Range Dir Section Subsection 31 24 W 13 BCCABD	Well Depth 462 ft. Depth Completed 462 ft. Date Well Completed 1957/09/00																																																																																																										
Well Name COON RAPIDS 1	Drilling Method Cable Tool																																																																																																										
Well Owner's Name COON RAPIDS 1 11349 NORWAY NW ST COON RAPIDS MN 55433	Drilling Fluid	Well Hydrofractured? <input type="checkbox"/> Yes <input type="checkbox"/> No From ft. to ft.																																																																																																									
Contact's Name CITY OF COON RAPIDS 11155 ROBINSON NW DR COON RAPIDS MN 55433	Use Community Supply (municipal)																																																																																																										
<table border="1" style="width:100%; border-collapse: collapse;"> <thead> <tr> <th>GEOLOGICAL MATERIAL</th> <th>COLOR</th> <th>HARDNESS</th> <th>FROM</th> <th>TO</th> </tr> </thead> <tbody> <tr><td>SAND</td><td></td><td></td><td>0</td><td>35</td></tr> <tr><td>CLAY</td><td>BLUE</td><td></td><td>35</td><td>50</td></tr> <tr><td>SANDY CLAY</td><td></td><td></td><td>50</td><td>91</td></tr> <tr><td>HARDPAN</td><td></td><td></td><td>91</td><td>114</td></tr> <tr><td>SAND</td><td></td><td></td><td>114</td><td>135</td></tr> <tr><td>SAND & CLAY</td><td></td><td></td><td>135</td><td>138</td></tr> <tr><td>SAND & GRAVEL</td><td></td><td></td><td>138</td><td>158</td></tr> <tr><td>HARDPAN</td><td></td><td></td><td>158</td><td>167</td></tr> <tr><td>SANDROCK</td><td></td><td>SOFT</td><td>167</td><td>173</td></tr> <tr><td>SANDROCK</td><td></td><td>SOFT</td><td>173</td><td>197</td></tr> <tr><td>SANDROCK & SHALE</td><td></td><td></td><td>197</td><td>213</td></tr> <tr><td>SANDROCK & SHALE</td><td></td><td></td><td>213</td><td>242</td></tr> <tr><td>SANDROCK & SHALE</td><td></td><td></td><td>242</td><td>355</td></tr> <tr><td>CLAY RED</td><td></td><td></td><td>355</td><td>360</td></tr> <tr><td>SHALE & SANDROCK</td><td></td><td></td><td>360</td><td>385</td></tr> <tr><td>SHALE & SANDROCK</td><td></td><td></td><td>385</td><td>386</td></tr> <tr><td>SANDROCK WITH SOME SH</td><td></td><td></td><td>386</td><td>398</td></tr> <tr><td>SANDROCK VERY SOFT</td><td></td><td></td><td>398</td><td>434</td></tr> <tr><td>SANDROCK WITH SOME SH</td><td></td><td></td><td>434</td><td>458</td></tr> <tr><td>SHALE</td><td></td><td></td><td>458</td><td>462</td></tr> </tbody> </table>	GEOLOGICAL MATERIAL	COLOR	HARDNESS	FROM	TO	SAND			0	35	CLAY	BLUE		35	50	SANDY CLAY			50	91	HARDPAN			91	114	SAND			114	135	SAND & CLAY			135	138	SAND & GRAVEL			138	158	HARDPAN			158	167	SANDROCK		SOFT	167	173	SANDROCK		SOFT	173	197	SANDROCK & SHALE			197	213	SANDROCK & SHALE			213	242	SANDROCK & SHALE			242	355	CLAY RED			355	360	SHALE & SANDROCK			360	385	SHALE & SANDROCK			385	386	SANDROCK WITH SOME SH			386	398	SANDROCK VERY SOFT			398	434	SANDROCK WITH SOME SH			434	458	SHALE			458	462	Casing Drive Shoe? <input type="checkbox"/> Yes <input type="checkbox"/> N	Hole Diameter 0 in. t 462 ft.
	GEOLOGICAL MATERIAL	COLOR	HARDNESS	FROM	TO																																																																																																						
SAND			0	35																																																																																																							
CLAY	BLUE		35	50																																																																																																							
SANDY CLAY			50	91																																																																																																							
HARDPAN			91	114																																																																																																							
SAND			114	135																																																																																																							
SAND & CLAY			135	138																																																																																																							
SAND & GRAVEL			138	158																																																																																																							
HARDPAN			158	167																																																																																																							
SANDROCK		SOFT	167	173																																																																																																							
SANDROCK		SOFT	173	197																																																																																																							
SANDROCK & SHALE			197	213																																																																																																							
SANDROCK & SHALE			213	242																																																																																																							
SANDROCK & SHALE			242	355																																																																																																							
CLAY RED			355	360																																																																																																							
SHALE & SANDROCK			360	385																																																																																																							
SHALE & SANDROCK			385	386																																																																																																							
SANDROCK WITH SOME SH			386	398																																																																																																							
SANDROCK VERY SOFT			398	434																																																																																																							
SANDROCK WITH SOME SH			434	458																																																																																																							
SHALE			458	462																																																																																																							
	Casing Diameter 12 in. t Weight(lbs/ft) 220 ft																																																																																																										
	Screen N	Open Hole From 220 ft. to 462 ft.																																																																																																									
	Make	Type																																																																																																									
	Static Water Level 28 ft. from Land surface	Date 1957/09/00																																																																																																									
	PUMPING LEVEL (below land surface) 78 ft. after hrs. pumping 880 g.p.m.																																																																																																										
	Well Head Completion Pitless adapter mfr Model Casing Protection <input type="checkbox"/> 12 in. above grade <input type="checkbox"/> At-grade(Environmental Wells and Borings ONLY)																																																																																																										
	Grouting Information Well grouted? <input type="checkbox"/> Yes <input type="checkbox"/> No																																																																																																										
	Nearest Known Source of Contamination ft. direction type Well disinfected upon completion? <input type="checkbox"/> Yes <input type="checkbox"/> No																																																																																																										
	Pump <input type="checkbox"/> Not Installed Date Installed Y Mfr nam FAIRBANKS MORSE Model HP 50 Volts 220 Drop Pipe Length ft. Capacity 600 g.p.m Type T																																																																																																										
	Any not in use and not sealed well(s) on property? <input type="checkbox"/> Yes <input type="checkbox"/> No																																																																																																										
	Was a variance granted from the MDH for this Well? <input type="checkbox"/> Yes <input type="checkbox"/> No																																																																																																										
	Well CONTRACTOR CERTIFICATION Lic. Or Reg. No. <u>62012</u> License Business Name Name of Driller <u>BRANDON, J.</u>																																																																																																										
REMARKS, ELEVATION, SOURCE OF DATA, etc. GAMMA LOGGED & TV 5-15-1995. LOGGED & TV BY GEOSPHERE. USGS Quad Coon Rapids Elevation 891 Aquifer: MTPL Alt Id: 80-6139																																																																																																											

Report Copy

Unique No. 00202926	MINNESOTA DEPARTMENT OF HEALTH						Update Date 2007/02/06	
County Name Anoka	WELL AND BORING RECORD						Entry Date 1991/04/15	
<i>Minnesota Statutes Chapter 1031</i>								
Township Name Township	Range 31	Dir 24	Section W 13	Subsection BCCABD	Well Depth 462 ft.		Depth Completed 462 ft.	Date Well Completed 1957/09/00
Well Name COON RAPIDS 1				Lic. Or Reg. No. 62012	Name of Driller BRANDON, J.			
USGS Quad Coon Rapi	Elevation 891			Aquifer MTPL	Alternative Id 80-6139			

GEOLOGICAL MATERIAL	COLOR	HARDNESS	FROM	TO	STRAT	LITH PRIM	LITH SEC	LITH MINOR
SAND QFUU = Sand			0	35	QFUU	SAND		
	SAND = Sand							
CLAY QCUG = Clay		BLUE	35	50	QCUG	CLAY		
	CLAY = Clay							
SANDY CLAY QLUU = Clay & sand			50	91	QLUU	CLAY	SAND	
	CLAY = Clay							SAND = Sand
HARDPAN QPUU = Pebbly sand/silt/clay			91	114	QPUU	HDPN		
	HDPN = Hardpan							
SAND QFUU = Sand			114	135	QFUU	SAND		
	SAND = Sand							
SAND & CLAY QLUU = Clay & sand			135	138	QLUU	SAND	CLAY	
	SAND = Sand							CLAY = Clay
SAND & GRAVEL QHUU = Sand & larger			138	158	QHUU	SAND	GRVL	
	SAND = Sand							GRVL = Gravel
HARDPAN QPUU = Pebbly sand/silt/clay			158	167	QPUU	HDPN		
	HDPN = Hardpan							
SANDROCK QFUU = Sand		SOFT	167	173	QFUU	SAND		
	SAND = Sand							
SANDROCK CJDN = Jordan		SOFT	173	197	CJDN	SNDS		
	SNDS = Sandstone							
SANDROCK & SHALE CJDN = Jordan			197	213	CJDN	SNDS		
	SNDS = Sandstone							
SANDROCK & SHALE CSTL = St.Lawrence			213	242	CSTL	SLSN	DLMT	
	SLSN = Siltstone							DLMT = Dolomite
SANDROCK & SHALE CFRN = Franconia			242	355	CFRN	SNDS	SHLE	DLMT
	SNDS = Sandstone							DLMT = Dolomite
							SHLE = Shale	
CLAY RED CFRN = Franconia			355	360	CFRN	SNDS	SHLE	DLMT
	SNDS = Sandstone							DLMT = Dolomite
							SHLE = Shale	

Unique No. 00202926	MINNESOTA DEPARTMENT OF HEALTH						Update Date 2007/02/06	
County Name Anoka	WELL AND BORING RECORD						Entry Date 1991/04/15	
<i>Minnesota Statutes Chapter 1031</i>								
Township Name	Township	Range	Dir	Section	Subsection	Well Depth	Depth Completed	Date Well Completed
	31	24	W	13	BCCABD	462 ft.	462 ft.	1957/09/00
Well Name	COON RAPIDS 1			Lic. Or Reg. No.	62012	Name of Driller	BRANDON, J.	
USGS Quad	Coon Rapi	Elevation	891	Aquifer	MTPL	Alternative Id	80-6139	

GEOLOGICAL MATERIAL	COLOR	HARDNESS	FROM	TO	STRAT	LITH PRIM	LITH SEC	LITH MINOR
SHALE & SANDROCK CFRN = Franconia		SNDS = Sandstone	360	385	CFRN	SNDS	SHLE	DLMT
					SHLE = Shale		DLMT = Dolomite	
SHALE & SANDROCK CIGL = Ironton-Galesville		SNDS = Sandstone	385	386	CIGL	SNDS		
SANDROCK WITH SOME SHALE CIGL = Ironton-Galesville		SNDS = Sandstone	386	398	CIGL	SNDS		
SANDROCK VERY SOFT CIGL = Ironton-Galesville		SNDS = Sandstone	398	434	CIGL	SNDS		
SANDROCK WITH SOME SHALE CECR = Eau Claire		SHLE = Shale	434	458	CECR	SHLE	SNDS	
					SNDS = Sandstone			
SHALE CECR = Eau Claire		SHLE = Shale	458	462	CECR	SHLE	SNDS	
					SNDS = Sandstone			

Unique No. 00202929	MINNESOTA DEPARTMENT OF HEALTH WELL AND BORING RECORD <i>Minnesota Statutes Chapter 1031</i>	Update Date 2007/02/06
County Name Anoka		Entry Date 1991/04/15
Township Name Township Range Dir Section Subsection 31 24 W 13 CCCCAD	Well Depth 788 ft.	Depth Completed 788 ft.
		Date Well Completed 1957/06/00
Well Name COON RAPIDS 2	Drilling Method Cable Tool	
Contact's Name CITY OF COON RAPIDS 11155 ROBINSON NW DR COON RAPIDS MN 55433	Drilling Fluid	Well Hydrofractured? <input type="checkbox"/> Yes <input type="checkbox"/> No From ft. to ft.
Well Owner's Name COON RAPIDS 2 10911 MAGNOLIA ST COON RAPIDS MN 55433	Use Community Supply (municipal)	
GEOLOGICAL MATERIAL COLOR HARDNESS FROM TO	Casing Drive Shoe? <input type="checkbox"/> Yes <input type="checkbox"/> N	Hole Diameter
	Casing Diameter Weight(lbs/ft)	in. t 704 ft
SAND	12 in. t 226 ft	in. t 788 ft
CLAY		
CLAY & GRAVEL		
HARDPAN		
CLAY & SAND		
SAND		
SAND & GRAVEL		
SHALE		
LIMEROCK & SHALE		
LIMEROCK & SHALE		
LIMEROCK & SHALE		
SANDROCK & SHALE		
SANDROCK & SHALE		
SANDROCK & SHALE		
SHALE		
SANDROCK & SHALE		
SANDROCK & SHALE		
SANDROCK		
CAVING RED SHALE		
RED ROCK & SHALE		
RED ROCK		
SHALE		
RED ROCK		
REMARKS, ELEVATION, SOURCE OF DATA, etc.		
TWO OTHER PUM TESTS AT DEPTHS OF 673 & 466 FT.		
PUMPING TEST NO. 3 RECORDED AT 685 FT.		
M.G.S. NO. 156. GAMMA LOGGED & TV 5-15-1995. OLD PA. NO. 61-0225.		
WELL WAS BACK FILLED TO 685 FT.		
LOGGED & TV BY GEOSPHERE.		
Screen N	Open Hole From 226 ft. to 788 ft.	
Make	Type	
Static Water Level 24 ft. from Land surface Date 1957/06/00		
PUMPING LEVEL (below land surface) 33.5 ft. after hrs. pumping 302 g.p.m.		
Well Head Completion		
Pitless adapter mfr	Model	
Casing Protection	<input checked="" type="checkbox"/> 12 in. above grade	
<input type="checkbox"/> At-grade(Environmental Wells and Borings ONLY)		
Grouting Information	Well grouted?	<input type="checkbox"/> Yes <input type="checkbox"/> No
Nearest Known Source of Contamination		
ft.	direction	type
Well disinfected upon completion? <input type="checkbox"/> Yes <input type="checkbox"/> No		
Pump <input type="checkbox"/> Not Installed	Date Installed Y	
Mfr nam	FAIRBANKS MORSE	
Model	HP	30 Volts 220
Drop Pipe Length	187 ft.	Capacity 500 g.p.m
Type	T	
Any not in use and not sealed well(s) on property? <input type="checkbox"/> Yes <input type="checkbox"/> No		
Was a variance granted from the MDH for this Well? <input type="checkbox"/> Yes <input type="checkbox"/> No		

USGS Quad Coon Rapids

Elevation 885

Aquifer: MTPL

Alt Id: 80-6139

Well CONTRACTOR CERTIFICATION Lic. Or Reg. No. 62012

License Business Name

Name of Driller BRANDON, J.

Report Copy

HE-01205-06 (Rev. 9/96)

Unique No. 00202929	MINNESOTA DEPARTMENT OF HEALTH WELL AND BORING RECORD						Update Date 2007/02/06	
County Name Anoka	<i>Minnesota Statutes Chapter 1031</i>						Entry Date 1991/04/15	
Township Name	Township	Range	Dir	Section	Subsection	Well Depth	Depth Completed	Date Well Completed
	31	24	W	13	CCCCAD	788 ft.	788 ft.	1957/06/00
Well Name	COON RAPIDS 2			Lic. Or Reg. No.	62012	Name of Driller	BRANDON, J.	
USGS Quad	Coon Rapi	Elevation	885	Aquifer	MTPL	Alternative Id	80-6139	

GEOLOGICAL MATERIAL	COLOR	HARDNESS	FROM	TO	STRAT	LITH PRIM	LITH SEC	LITH MINOR
SAND QFUU = Sand	SAND = Sand		0	36	QFUU	SAND		
CLAY QCUU = Clay	CLAY = Clay		36	48	QCUU	CLAY		
CLAY & GRAVEL QPUU = Pebbly sand/silt/clay	CLAY = Clay		48	136	QPUU	CLAY	GRVL	
								GRVL = Gravel
HARDPAN QPUU = Pebbly sand/silt/clay	HDPN = Hardpan		136	145	QPUU	HDPN		
CLAY & SAND QLUU = Clay & sand	CLAY = Clay		145	163	QLUU	CLAY	SAND	
								SAND = Sand
SAND QFUU = Sand	SAND = Sand		163	175	QFUU	SAND		
SAND & GRAVEL QHUU = Sand & larger	SAND = Sand		175	218	QHUU	SAND	GRVL	
								GRVL = Gravel
SHALE QCUU = Clay	CLAY = Clay		218	219	QCUU	CLAY		
LIMEROCK & SHALE QUUU = Unknown deposit type	DRFT = Drift		219	221	QUUU	DRFT		
LIMEROCK & SHALE CSTL = St.Lawrence	DLMT = Dolomite		221	243	CSTL	DLMT	SLSN	
								SLSN = Siltstone
LIMEROCK & SHALE CFRN = Franconia	SNDS = Sandstone		243	258	CFRN	SNDS	SHLE	DLMT
								SHLE = Shale
								DLMT = Dolomite
SANDROCK & SHALE CFRN = Franconia	SNDS = Sandstone		258	391	CFRN	SNDS	SHLE	DLMT
								SHLE = Shale
								DLMT = Dolomite
SANDROCK & SHALE CIGL = Iron-ton-Galesville	SNDS = Sandstone		391	439	CIGL	SNDS		
SANDROCK & SHALE CECR = Eau Claire	SHLE = Shale		439	472	CECR	SHLE	SNDS	
								SNDS = Sandstone

Unique No. 00202929	MINNESOTA DEPARTMENT OF HEALTH						Update Date 2007/02/06	
County Name Anoka	WELL AND BORING RECORD						Entry Date 1991/04/15	
<i>Minnesota Statutes Chapter 1031</i>								
Township Name	Township	Range	Dir	Section	Subsection	Well Depth	Depth Completed	Date Well Completed
	31	24	W	13	CCCCAD	788 ft.	788 ft.	1957/06/00
Well Name	COON RAPIDS 2			Lic. Or Reg. No.	62012	Name of Driller	BRANDON, J.	
USGS Quad	Coon Rapi	Elevation	885	Aquifer	MTPL	Alternative Id	80-6139	

GEOLOGICAL MATERIAL	COLOR	HARDNESS	FROM	TO	STRAT	LITH PRIM	LITH SEC	LITH MINOR
SHALE CECR = Eau Claire	SHLE = Shale		472	498	CECR	SHLE	SNDS	SNDS = Sandstone
SANDROCK & SHALE CECR = Eau Claire	SHLE = Shale		498	545	CECR	SHLE	SNDS	SNDS = Sandstone
SANDROCK & SHALE CMTS = Mt.Simon	SNDS = Sandstone		545	594	CMTS	SNDS		
SANDROCK CMTS = Mt.Simon	SNDS = Sandstone		594	670	CMTS	SNDS		
CAVING RED SHALE PMSC = Solor Church Formation	SHLE = Shale		670	704	PMSC	SHLE		
RED ROCK & SHALE PMSC = Solor Church Formation	SHLE = Shale		704	726	PMSC	SHLE		
RED ROCK PMSC = Solor Church Formation	SHLE = Shale		726	770	PMSC	SHLE		
SHALE PMSC = Solor Church Formation	SHLE = Shale		770	778	PMSC	SHLE		
RED ROCK PMSC = Solor Church Formation	SHLE = Shale		778	788	PMSC	SHLE		

Unique No. 00202972	MINNESOTA DEPARTMENT OF HEALTH WELL AND BORING RECORD <i>Minnesota Statutes Chapter 1031</i>	Update Date 2007/03/12																																																												
County Name Anoka		Entry Date 1991/04/15																																																												
Township Name Township Range Dir Section Subsection 31 24 W 9 DCCCCD	Well Depth 605 ft. Depth Completed 605 ft. Date Well Completed 1960/08/19																																																													
Well Name COON RAPIDS 4	Drilling Method Cable Tool																																																													
Well Owner's Name COON RAPIDS 4 2731 NORTHDALE BL COON RAPIDS MN 55433	Drilling Fluid _____ Well Hydrofractured? <input type="checkbox"/> Yes <input type="checkbox"/> No From _____ ft. to _____ ft.																																																													
Contact's Name CITY OF COON RAPIDS 11155 ROBINSON NW DR COON RAPIDS MN 55433	Use Community Supply (municipal)																																																													
<table border="1" style="width:100%; border-collapse: collapse;"> <thead> <tr> <th>GEOLOGICAL MATERIAL</th> <th>COLOR</th> <th>HARDNESS</th> <th>FROM</th> <th>TO</th> </tr> </thead> <tbody> <tr><td>DRIFT</td><td></td><td></td><td>0</td><td>158</td></tr> <tr><td>DOLOMITE</td><td></td><td>HARD</td><td>158</td><td>170</td></tr> <tr><td>JORDAN SANDSTONE</td><td></td><td></td><td>170</td><td>220</td></tr> <tr><td>SHALE</td><td></td><td>GREE</td><td>220</td><td>310</td></tr> <tr><td>SANDSTONE WITH THIN SH</td><td></td><td></td><td>310</td><td>369</td></tr> <tr><td>SANDY SHALE</td><td></td><td></td><td>369</td><td>425</td></tr> <tr><td>HARD SANDSTONE, SHALE</td><td></td><td></td><td>425</td><td>435</td></tr> <tr><td>HARD SANDSTONE, SHALE</td><td></td><td></td><td>435</td><td>475</td></tr> <tr><td>SHALEY SANDSTONE</td><td></td><td></td><td>475</td><td>520</td></tr> <tr><td>HARD SANDSTONE, COARS</td><td></td><td></td><td>520</td><td>587</td></tr> <tr><td>SHALE</td><td></td><td></td><td>587</td><td>605</td></tr> </tbody> </table>	GEOLOGICAL MATERIAL	COLOR	HARDNESS	FROM	TO	DRIFT			0	158	DOLOMITE		HARD	158	170	JORDAN SANDSTONE			170	220	SHALE		GREE	220	310	SANDSTONE WITH THIN SH			310	369	SANDY SHALE			369	425	HARD SANDSTONE, SHALE			425	435	HARD SANDSTONE, SHALE			435	475	SHALEY SANDSTONE			475	520	HARD SANDSTONE, COARS			520	587	SHALE			587	605	Casing _____ Drive Shoe? <input type="checkbox"/> Yes <input type="checkbox"/> N Hole Diameter _____	
	GEOLOGICAL MATERIAL	COLOR	HARDNESS	FROM	TO																																																									
	DRIFT			0	158																																																									
	DOLOMITE		HARD	158	170																																																									
	JORDAN SANDSTONE			170	220																																																									
	SHALE		GREE	220	310																																																									
	SANDSTONE WITH THIN SH			310	369																																																									
	SANDY SHALE			369	425																																																									
	HARD SANDSTONE, SHALE			425	435																																																									
	HARD SANDSTONE, SHALE			435	475																																																									
SHALEY SANDSTONE			475	520																																																										
HARD SANDSTONE, COARS			520	587																																																										
SHALE			587	605																																																										
	Casing Diameter _____ Weight(lbs/ft) _____ 20 in. t 158 ft 16 in. t 233 ft																																																													
	Screen N _____ Open Hole From 233 ft. to 605 ft. Make _____ Type _____																																																													
	Static Water Level 23 ft. from Land surface Date 1960/08/19																																																													
	PUMPING LEVEL (below land surface) 142 ft. after 24 hrs. pumping 1000 g.p.m.																																																													
	Well Head Completion Pitless adapter mfr _____ Model _____ Casing Protection <input checked="" type="checkbox"/> 12 in. above grade <input type="checkbox"/> At-grade(Environmental Wells and Borings ONLY)																																																													
	Grouting Information Well grouted? <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No Material _____ From To (ft.) Amount(yds/bags) 0 233																																																													
	Nearest Known Source of Contamination ft. direction type Well disinfected upon completion? <input type="checkbox"/> Yes <input type="checkbox"/> No																																																													
	Pump <input type="checkbox"/> Not Installed Date Installed Y _____ Mfr nam FAIRBANKS MORSE Model 6977 HP 100 Volts 240 Drop Pipe Length 180 ft. Capacity g.p.m. Type T																																																													
REMARKS, ELEVATION, SOURCE OF DATA, etc. M.G.S. NO. 168. GAMMA LOGGED 3-31-1998. LOGGED BY JIM TRAEEN. OLD PA. NO. 60-0350. USGS Quad Coon Rapids Elevation 869 Aquifer: CFMS Alt Id: 80-6139	Any not in use and not sealed well(s) on property? <input type="checkbox"/> Yes <input type="checkbox"/> No Was a variance granted from the MDH for this Well? <input type="checkbox"/> Yes <input type="checkbox"/> No																																																													
	Well CONTRACTOR CERTIFICATION Lic. Or Reg. No. <u>27118</u> License Business Name _____ Name of Driller <u>BENEKE, R.</u>																																																													

Report Copy

Unique No. 00202972	MINNESOTA DEPARTMENT OF HEALTH						Update Date 2007/03/12	
County Name Anoka	WELL AND BORING RECORD						Entry Date 1991/04/15	
<i>Minnesota Statutes Chapter 1031</i>								
Township Name	Township	Range	Dir	Section	Subsection	Well Depth	Depth Completed	Date Well Completed
	31	24	W	9	DCCCCD	605 ft.	605 ft.	1960/08/19
Well Name	COON RAPIDS 4			Lic. Or Reg. No.	27118	Name of Driller	BENEKE, R.	
USGS Quad	Coon Rapi	Elevation	869	Aquifer	CFMS	Alternative Id	80-6139	

GEOLOGICAL MATERIAL	COLOR	HARDNESS	FROM	TO	STRAT	LITH PRIM	LITH SEC	LITH MINOR
DRIFT QUUU = Unknown deposit type	DRFT = Drift		0	158	QUUU	DRFT		
DOLOMITE CSTL = St.Lawrence	DLMT = Dolomite	HARD	158	170	CSTL	DLMT	SNDS	
							SNDS = Sandstone	
JORDAN SANDSTONE CFRN = Franconia	SNDS = Sandstone		170	220	CFRN	SNDS	SHLE	
							SHLE = Shale	
SHALE CFRN = Franconia	SHLE = Shale	GREEN	220	310	CFRN	SHLE	SNDS	DLMT
							SNDS = Sandstone	DLMT = Dolomite
SANDSTONE WITH THIN SHALE LENSES CIGL = Ironton-Galesville	SNDS = Sandstone		310	369	CIGL	SNDS		
SANDY SHALE CECR = Eau Claire	SHLE = Shale		369	425	CECR	SHLE	SNDS	
							SNDS = Sandstone	
HARD SANDSTONE, SHALE LENSES CECR = Eau Claire	SHLE = Shale		425	435	CECR	SHLE	SNDS	
							SNDS = Sandstone	
HARD SANDSTONE, SHALE LENSES CMTS = Mt.Simon	SNDS = Sandstone		435	475	CMTS	SNDS		
SHALEY SANDSTONE CMTS = Mt.Simon	SNDS = Sandstone		475	520	CMTS	SNDS		
HARD SANDSTONE, COARSE CMTS = Mt.Simon	SNDS = Sandstone		520	587	CMTS	SNDS		
SHALE PMRC = Red Clastic Series	SHLE = Shale		587	605	PMRC	SHLE		

Unique No. 00202951	MINNESOTA DEPARTMENT OF HEALTH WELL AND BORING RECORD	Update Date 2007/02/07
County Name Anoka	<i>Minnesota Statutes Chapter 1031</i>	Entry Date 1991/04/15
Township Name Township Range Dir Section Subsection 31 24 W 25 ACBDD	Well Depth 695 ft.	Depth Completed 695 ft. Date Well Completed 1961/09/00
Well Name COON RAPIDS 5	Drilling Method Cable Tool	Drilling Fluid Well Hydrofractured? <input type="checkbox"/> Yes <input type="checkbox"/> No From ft. to ft.
Well Owner's Name COON RAPIDS 5 99TH NW LA COON RAPIDS MN 55433	Use Community Supply (municipal)	
Contact's Name CITY OF COON RAPIDS 11155 ROBINSON NW DR COON RAPIDS MN 55433	Casing Drive Shoe? <input type="checkbox"/> Yes <input type="checkbox"/> N	Hole Diameter 0 in. t 695 ft
GEOLOGICAL MATERIAL COLOR HARDNESS FROM TO	Casing Diameter Weight(lbs/ft)	
SAND, GRAVEL, SHALE 0 190	24 in. t 200 ft	
SHALE, SANDROCK 190 200	16 in. t 242 ft	
SANDROCK HARD 200 201		
SANDROCK HARD 201 215		
SHALE 215 225		
HARD SANDROCK & SHALE 225 248		
HARD SANDROCK & SHALE 248 255		
HARD SHALE & LIMEROCK 255 279		
SANDROCK 279 293		
LIMEROCK 293 295		
HARD GREEN SHALE & LIM 295 374		
SHALE 374 387		
LIMEROCK 387 390		
SHALE, LAYERS OF LIME GREE HARD 390 404		
SHALE, LAYERS OF LIME GREE HARD 404 410		
SANDROCK & SHALE 410 424		
SANDROCK 424 449		
HARD SANDROCK & SHALE 449 454		
HARD SHALE, LAYERS OF L 454 459		
HARD SHALE, LAYERS OF L 459 465		
STICK GREEN SHALE 465 477		
SHALE RED 477 497		
BLUE-GREEN SHALE 497 525		
HARD GRAY SHALE, SOME 525 529		
HARD GRAY SHALE, SOME 529 555		
HARD SHALE & SANDROCK 555 625		
SANDROCK 625 685		
RED CLASTICS 685 695		
GNEISS AT 695' 695 695		
REMARKS, ELEVATION, SOURCE OF DATA, etc.	Screen N Open Hole From 242 ft. to 695 ft. Make Type	
SAMPLES INDICATE BASALT AT 695 FT.	Static Water Level 68 ft. from Land surface Date 1961/07/11	
	PUMPING LEVEL (below land surface) 188 ft. after 26 hrs. pumping 1200 g.p.m.	
	Well Head Completion Pitless adapter mfr Model Casing Protection <input checked="" type="checkbox"/> 12 in. above grade <input type="checkbox"/> At-grade(Environmental Wells and Borings ONLY)	
	Grouting Information Well grouted? <input type="checkbox"/> Yes <input type="checkbox"/> No	
	Nearest Known Source of Contamination ft. direction type Well disinfected upon completion? <input type="checkbox"/> Yes <input type="checkbox"/> No	
	Pump <input type="checkbox"/> Not Installed Date Installed Mfr name Model HP Volts	
	Drop Pipe Length ft. Capacity g.p.m. Type	
	Any not in use and not sealed well(s) on property? <input type="checkbox"/> Yes <input type="checkbox"/> No	

M.G.S. NO. 199. 190-203 FT. LOOKS LIKE REWORKED
JORDAN.

Was a variance granted from the MDH for this Well? Yes No

GAMMA LOGGED 2-13-2006 TO 580 FT BY JIM TRAEN.

USGS Quad Coon Rapids Elevation 910
Aquifer: CFMS Alt Id: 80-6139

Well CONTRACTOR CERTIFICATION Lic. Or Reg. No. 27058

License Business Name

Name of Driller

Report Copy

HE-01205-06 (Rev. 9/96)

Unique No. 00202951	MINNESOTA DEPARTMENT OF HEALTH WELL AND BORING RECORD						Update Date 2007/02/07
County Name Anoka	<i>Minnesota Statutes Chapter 1031</i>						Entry Date 1991/04/15
Township Name Township	Range 31	Dir 24	Section W 25	Subsection ACBBDD	Well Depth 695	ft. 695	ft. 1961/09/00
Well Name COON RAPIDS 5				Lic. Or Reg. No. 27058	Name of Driller		
USGS Quad Coon Rapi	Elevation 910			Aquifer CFMS	Alternative Id 80-6139		

GEOLOGICAL MATERIAL	COLOR	HARDNESS	FROM	TO	STRAT	LITH PRIM	LITH SEC	LITH MINOR
SAND, GRAVEL, SHALE QPUU = Pebbly sand/silt/clay	SAND = Sand		0	190	QPUU	SAND	GRVL	CLAY
							CLAY = Clay	
SHALE, SANDROCK QLUU = Clay & sand	CLAY = Clay		190	200	QLUU	CLAY	SAND	
							SAND = Sand	
SANDROCK QFUU = Sand	SAND = Sand	HARD	200	201	QFUU	SAND		
SANDROCK CSTL = St.Lawrence	DLMT = Dolomite	HARD	201	215	CSTL	DLMT	SNDS	
							SNDS = Sandstone	
SHALE CSTL = St.Lawrence	SHLE = Shale		215	225	CSTL	SHLE	SLSN	
							SLSN = Siltstone	
HARD SANDROCK & SHALE CSTL = St.Lawrence	DLMT = Dolomite		225	248	CSTL	DLMT	SNDS	
							SNDS = Sandstone	
HARD SANDROCK & SHALE CFRN = Franconia	SNDS = Sandstone		248	255	CFRN	SNDS	SHLE	DLMT
							SHLE = Shale	DLMT = Dolomite
HARD SHALE & LIMEROCK CFRN = Franconia	SNDS = Sandstone		255	279	CFRN	SNDS	SHLE	DLMT
							SHLE = Shale	DLMT = Dolomite
SANDROCK CFRN = Franconia	SNDS = Sandstone		279	293	CFRN	SNDS		
LIMEROCK CFRN = Franconia	DLMT = Dolomite		293	295	CFRN	DLMT		
HARD GREEN SHALE & LIMEROCK CFRN = Franconia	SHLE = Shale		295	374	CFRN	SHLE	DLMT	
							DLMT = Dolomite	
SHALE CFRN = Franconia	SHLE = Shale		374	387	CFRN	SHLE		
LIMEROCK CFRN = Franconia	DLMT = Dolomite		387	390	CFRN	DLMT		
SHALE, LAYERS OF LIME CFRN = Franconia	SHLE = Shale	GREEN	390	404	CFRN	SHLE	DLMT	
		HARD					DLMT = Dolomite	

Unique No. 00202951	MINNESOTA DEPARTMENT OF HEALTH						Update Date 2007/02/07
County Name Anoka	WELL AND BORING RECORD						Entry Date 1991/04/15
<i>Minnesota Statutes Chapter 1031</i>							
Township Name Township	Range Dir	Section	Subsection	Well Depth		Depth Completed	Date Well Completed
	31 24 W	25	ACBBDD	695	ft.	695 ft.	1961/09/00
Well Name COON RAPIDS 5				Lic. Or Reg. No. 27058	Name of Driller		
USGS Quad Coon Rapi	Elevation 910	Aquifer CFMS		Alternative Id 80-6139			

GEOLOGICAL MATERIAL	COLOR	HARDNESS	FROM	TO	STRAT	LITH PRIM	LITH SEC	LITH MINOR
SHALE, LAYERS OF LIME CIGL = Ironton-Galesville	GREEN	HARD	404	410	CIGL	SNDS		
	SNDS = Sandstone							
SANDROCK & SHALE CIGL = Ironton-Galesville			410	424	CIGL	SNDS	SHLE	
	SNDS = Sandstone						SHLE = Shale	
SANDROCK CIGL = Ironton-Galesville			424	449	CIGL	SNDS		
	SNDS = Sandstone							
HARD SANDROCK & SHALE CIGL = Ironton-Galesville			449	454	CIGL	SNDS	SHLE	
	SNDS = Sandstone						SHLE = Shale	
HARD SHALE, LAYERS OF LIME CIGL = Ironton-Galesville			454	459	CIGL	SNDS		
	SNDS = Sandstone							
HARD SHALE, LAYERS OF LIME CECR = Eau Claire			459	465	CECR	SHLE	SNDS	DLMT
	SHLE = Shale						SNDS = Sandstone	DLMT = Dolomite
STICK GREEN SHALE CECR = Eau Claire			465	477	CECR	SHLE	SNDS	
	SHLE = Shale						SNDS = Sandstone	
SHALE CECR = Eau Claire	RED		477	497	CECR	SHLE	SNDS	
	SHLE = Shale						SNDS = Sandstone	
BLUE-GREEN SHALE CECR = Eau Claire			497	525	CECR	SHLE	SNDS	
	SHLE = Shale						SNDS = Sandstone	
HARD GRAY SHALE, SOME SANDROCK CECR = Eau Claire			525	529	CECR	SHLE	SNDS	
	SHLE = Shale						SNDS = Sandstone	
HARD GRAY SHALE, SOME SANDROCK CMTS = Mt.Simon			529	555	CMTS	SHLE	SNDS	
	SHLE = Shale						SNDS = Sandstone	
HARD SHALE & SANDROCK CMTS = Mt.Simon			555	625	CMTS	SHLE	SNDS	
	SHLE = Shale						SNDS = Sandstone	
SANDROCK CMTS = Mt.Simon			625	685	CMTS	SNDS		
	SNDS = Sandstone							
RED CLASTICS PMRC = Red Clastic Series			685	695	PMRC	SHLE	SNDS	
	SHLE = Shale						SNDS = Sandstone	

Unique No. 00202951	MINNESOTA DEPARTMENT OF HEALTH						Update Date 2007/02/07	
County Name Anoka	WELL AND BORING RECORD						Entry Date 1991/04/15	
<i>Minnesota Statutes Chapter 1031</i>								
Township Name	Township	Range	Dir	Section	Subsection	Well Depth	Depth Completed	Date Well Completed
	31	24	W	25	ACBBDD	695 ft.	695 ft.	1961/09/00
Well Name	COON RAPIDS 5			Lic. Or Reg. No.	27058	Name of Driller		
USGS Quad	Coon Rapi	Elevation	910	Aquifer	CFMS	Alternative Id	80-6139	

GEOLOGICAL MATERIAL	COLOR	HARDNESS	FROM	TO	STRAT	LITH PRIM	LITH SEC	LITH MINOR
GNEISS AT 695'			695	695	PAUD	BSLT		
PAUD = Archean Rocks Undivided		BSLT = Basalt						

Unique No. 00202937	MINNESOTA DEPARTMENT OF HEALTH WELL AND BORING RECORD <i>Minnesota Statutes Chapter 1031</i>	Update Date 2010/03/15
County Name Anoka		Entry Date 1991/04/15
Township Name Township Range Dir Section Subsection 31 24 W 17 BBAACC	Well Depth 158 ft.	Depth Completed 158 ft.
		Date Well Completed 1960/11/00
Well Name COON RAPIDS 6	Drilling Method Cable Tool	
Well Owner's Name COON RAPIDS 6 11611 YUCCA NW ST COON RAPIDS MN 55433	Drilling Fluid	Well Hydrofractured? <input type="checkbox"/> Yes <input type="checkbox"/> No From ft. to ft.
Contact's Name CITY OF COON RAPIDS 11155 ROBINSON NW DR COON RAPIDS MN 55433	Use Community Supply (municipal)	
	Casing Drive Shoe? <input type="checkbox"/> Yes <input type="checkbox"/> N	Hole Diameter 0 in. t 158 ft
GEOLOGICAL MATERIAL COLOR HARDNESS FROM TO	Casing Diameter Weight(lbs/ft)	
SAND & GRAVEL 0 57	20 in. t 118 ft	
CLAY 57 67		
SAND & GRAVEL 67 82		
HARDPAN 82 94		
HARDPAN 94 102		
SANDROCK 102 158		
	Screen N	Open Hole From 118 ft. to 158 ft.
	Make	Type
	Static Water Level 22 ft. from Land surface Date 1960/11/00	
	PUMPING LEVEL (below land surface) 24.5 ft. after hrs. pumping 151 g.p.m.	
	Well Head Completion Pitless adapter mfr Model Casing Protection <input checked="" type="checkbox"/> 12 in. above grade <input type="checkbox"/> At-grade(Environmental Wells and Borings ONLY)	
	Grouting Information Well grouted? <input type="checkbox"/> Yes <input type="checkbox"/> No	
	Nearest Known Source of Contamination ft. direction type Well disinfected upon completion? <input type="checkbox"/> Yes <input type="checkbox"/> No	
	Pump <input type="checkbox"/> Not Installed Date Installed Mfr name Model HP Volts Drop Pipe Length ft. Capacity g.p.m Type	
REMARKS, ELEVATION, SOURCE OF DATA, etc.		
BASED ON SAMPLES AIR LIFTED FROM WELL 5-6-1993 FRANCONIA FM. PRESENT.		
GAMMA LOGGED 12-1-1992.		
GAMMA LOGGED 5-6-1993. LOGGED BY GEOSPHERE.		
OLD P.A. 60-0743.		
USGS Quad Coon Rapids	Elevation	870
Aquifer: CFRN	Alt Id:	80-6139
Well CONTRACTOR CERTIFICATION		Lic. Or Reg. No. 62012
License Business Name		
Name of Driller		KEMPER D

Unique No. 00202937	MINNESOTA DEPARTMENT OF HEALTH						Update Date 2010/03/15
County Name Anoka	WELL AND BORING RECORD						Entry Date 1991/04/15
<i>Minnesota Statutes Chapter 1031</i>							
Township Name Township	Range Dir	Section	Subsection	Well Depth	Depth Completed	Date Well Completed	
	31 24 W	17	BBAACC	158 ft.	158 ft.	1960/11/00	
Well Name COON RAPIDS 6			Lic. Or Reg. No. 62012		Name of Driller KEMPER, R.		
USGS Quad Coon Rapi	Elevation 870		Aquifer CFRN		Alternative Id 80-6139		

GEOLOGICAL MATERIAL	COLOR	HARDNESS	FROM	TO	STRAT	LITH PRIM	LITH SEC	LITH MINOR
SAND & GRAVEL QHUU = Sand & larger	SAND = Sand		0	57	QHUU	SAND	GRVL	
							GRVL = Gravel	
CLAY QCUU = Clay	CLAY = Clay		57	67	QCUU	CLAY		
SAND & GRAVEL QHUU = Sand & larger	SAND = Sand		67	82	QHUU	SAND	GRVL	
							GRVL = Gravel	
HARDPAN QPUU = Pebbly sand/silt/clay	HDPN = Hardpan		82	94	QPUU	HDPN		
HARDPAN CFRN = Franconia	SNDS = Sandstone		94	102	CFRN	SNDS	SHLE	
							SHLE = Shale	
SANDROCK CFRN = Franconia	SNDS = Sandstone		102	158	CFRN	SNDS	SHLE	DLMT
							SHLE = Shale	DLMT = Dolomite

Unique No. 00202943	MINNESOTA DEPARTMENT OF HEALTH WELL AND BORING RECORD <i>Minnesota Statutes Chapter 1031</i>	Update Date 2008/12/30
County Name Anoka		Entry Date 1991/04/15
Township Name Township Range Dir Section Subsection 31 24 W 21 BDACBB	Well Depth 632 ft.	Depth Completed 632 ft. Date Well Completed 1964/04/00
Well Name COON RAPIDS 7	Drilling Method Cable Tool	Drilling Fluid Well Hydrofractured? <input type="checkbox"/> Yes <input type="checkbox"/> No From ft. to ft.
Well Owner's Name COON RAPIDS 7 10617 DIRECT RIVER DR COON RAPIDS MN 55433	Use Community Supply (municipal)	
Contact's Name CITY OF COON RAPIDS 11155 ROBINSON NW DR COON RAPIDS MN 55433	Casing Drive Shoe? <input type="checkbox"/> Yes <input type="checkbox"/> N	Hole Diameter
GEOLOGICAL MATERIAL COLOR HARDNESS FROM TO	Casing Diameter Weight(lbs/ft)	
SAND & CLAY 0 78	24 in. t 163 ft	
CLAY 78 90	16 in. t 189 ft	
FINE SAND 90 130		
SANDSTONE 130 161		
GREENSHALE GREE 161 165		
DOLOMITIC CLAY 165 190		
SHALE & SANDSTONE 190 295		
GRAY SHALE GRAY 295 300		
BROWN SHALE BROW 300 315		
SHALE RED 315 325		
SHALE GRAY 325 330		
SHALE GRAY 330 345		
SANDSTONE GRAY 345 380		
GRAY SHALE GRAY 380 398		
SHALE GRAY 398 400		
RED ROCK RED 400 425		
GRAY & RED SHALE GRY/R 425 440		
GRAY & BROWN ROCK GRY/B 440 475		
COARSE SAND GRAY 475 477		
COARSE SAND GRAY 477 480		
FINE SAND GRAY 480 520		
FINE SAND GRAY 520 560		
COARSE SAND WHITE 560 590		
HARD GOLD GRAINS COAR WHITE 590 600		
SHALE RED 600 610		
RED & GRAY SHALE RED/G 610 615		
SHALE RED 615 632		
REMARKS, ELEVATION, SOURCE OF DATA, etc.	Screen N Open Hole From 189 ft. to 632 ft. Make Type	
JIM TRAEN HAS TWO DATES ON LOG 1-18-04 AND 1-18-05.	Static Water Level 31 ft. from Land surface Date 1964/04/00	
GAMMA LOGGED 1-18-04 BY JIM TRAEN	PUMPING LEVEL (below land surface) 71 ft. after hrs. pumping 1600 g.p.m.	
	Well Head Completion Pitless adapter mfr Model Casing Protection <input checked="" type="checkbox"/> 12 in. above grade <input type="checkbox"/> At-grade(Environmental Wells and Borings ONLY)	
	Grouting Information Well grouted? <input type="checkbox"/> Yes <input type="checkbox"/> No	
	Nearest Known Source of Contamination ft. direction type Well disinfected upon completion? <input type="checkbox"/> Yes <input type="checkbox"/> No	
	Pump <input type="checkbox"/> Not Installed Date Installed Mfr name Model HP Volts	
	Drop Pipe Length ft. Capacity g.p.m. Type	
	Any not in use and not sealed well(s) on property? <input type="checkbox"/> Yes <input type="checkbox"/> No	
	Was a variance granted from the MDH for this Well? <input type="checkbox"/> Yes <input type="checkbox"/> No	
USGS Quad Coon Rapids Elevation 868 Aquifer: CFMS Alt Id: 80-6139	Well CONTRACTOR CERTIFICATION Lic. Or Reg. No. 96460	

Unique No. 00202943	MINNESOTA DEPARTMENT OF HEALTH						Update Date 2008/12/30
County Name Anoka	WELL AND BORING RECORD						Entry Date 1991/04/15
<i>Minnesota Statutes Chapter 1031</i>							
Township Name Township	Range Dir	Section	Subsection	Well Depth		Depth Completed	Date Well Completed
31	24 W	21	BDACBB	632	ft.	632 ft.	1964/04/00
Well Name COON RAPIDS 7	Lic. Or Reg. No. 96460		Name of Driller				
USGS Quad Coon Rapi	Elevation 868	Aquifer CFMS	Alternative Id 80-6139				

GEOLOGICAL MATERIAL	COLOR	HARDNESS	FROM	TO	STRAT	LITH PRIM	LITH SEC	LITH MINOR
SAND & CLAY QLUU = Clay & sand	SAND = Sand		0	78	QLUU	SAND	CLAY	
								CLAY = Clay
CLAY QCUU = Clay	CLAY = Clay		78	90	QCUU	CLAY		
FINE SAND QFUU = Sand	SAND = Sand		90	130	QFUU	SAND		
SANDSTONE CJDN = Jordan	SNDS = Sandstone		130	161	CJDN	SNDS		
GREENSHALE CSTL = St.Lawrence	GREEN SHLE = Shale		161	165	CSTL	SHLE	SLSN	
								SLSN = Siltstone
DOLOMITIC CLAY CSTL = St.Lawrence	DLMT = Dolomite		165	190	CSTL	DLMT	SLSN	
								SLSN = Siltstone
SHALE & SANDSTONE CFRN = Franconia	SHLE = Shale		190	295	CFRN	SHLE	SNDS	
								SNDS = Sandstone
GRAY SHALE CFRN = Franconia	GRAY SHLE = Shale		295	300	CFRN	SHLE	SNDS	DLMT
								SNDS = Sandstone DLMT = Dolomite
BROWN SHALE CFRN = Franconia	BROWN SHLE = Shale		300	315	CFRN	SHLE	SNDS	DLMT
								SNDS = Sandstone DLMT = Dolomite
SHALE CFRN = Franconia	RED SHLE = Shale		315	325	CFRN	SHLE	SNDS	DLMT
								SNDS = Sandstone DLMT = Dolomite
SHALE CFRN = Franconia	GRAY SHLE = Shale		325	330	CFRN	SHLE	SNDS	DLMT
								SNDS = Sandstone DLMT = Dolomite
SHALE CIGL = Ironton-Galesville	GRAY SNDS = Sandstone		330	345	CIGL	SNDS		
SANDSTONE CIGL = Ironton-Galesville	GRAY SNDS = Sandstone		345	380	CIGL	SNDS		
GRAY SHALE CIGL = Ironton-Galesville	GRAY SNDS = Sandstone		380	398	CIGL	SNDS		

Unique No. 00202943	MINNESOTA DEPARTMENT OF HEALTH						Update Date 2008/12/30	
County Name Anoka	WELL AND BORING RECORD						Entry Date 1991/04/15	
<i>Minnesota Statutes Chapter 1031</i>								
Township Name Township	Range 31	Dir 24	Dir W	Section 21	Subsection BDACBB	Well Depth 632 ft.	Depth Completed 632 ft.	Date Well Completed 1964/04/00
Well Name COON RAPIDS 7				Lic. Or Reg. No. 96460	Name of Driller			
USGS Quad Coon Rapi	Elevation 868			Aquifer CFMS	Alternative Id 80-6139			

GEOLOGICAL MATERIAL	COLOR	HARDNESS	FROM	TO	STRAT	LITH PRIM	LITH SEC	LITH MINOR
SHALE CECR = Eau Claire	GRAY SHLE = Shale		398	400	CECR	SHLE	SNDS	SNDS = Sandstone
RED ROCK CECR = Eau Claire	RED SHLE = Shale		400	425	CECR	SHLE	SNDS	SNDS = Sandstone
GRAY & RED SHALE CECR = Eau Claire	GRY/RED SHLE = Shale		425	440	CECR	SHLE	SNDS	SNDS = Sandstone
GRAY & BROWN ROCK CECR = Eau Claire	GRY/BRN SHLE = Shale		440	475	CECR	SHLE	SNDS	SNDS = Sandstone
COARSE SAND CECR = Eau Claire	GRAY SHLE = Shale		475	477	CECR	SHLE	SNDS	SNDS = Sandstone
COARSE SAND CMTS = Mt.Simon	GRAY SNDS = Sandstone		477	480	CMTS	SNDS		
FINE SAND CMTS = Mt.Simon	GRAY SNDS = Sandstone		480	520	CMTS	SNDS		
FINE SAND CMTS = Mt.Simon	GRAY SNDS = Sandstone		520	560	CMTS	SNDS		
COARSE SAND CMTS = Mt.Simon	WHITE SNDS = Sandstone		560	590	CMTS	SNDS		
HARD GOLD GRAINS COARSE SAND CMTS = Mt.Simon	WHITE SNDS = Sandstone		590	600	CMTS	SNDS		
SHALE PMSU = Mid.Proterozoic Sedimentary	RED SHLE = Shale		600	610	PMSU	SHLE		
RED & GRAY SHALE PMSU = Mid.Proterozoic Sedimentary	RED/GRY SHLE = Shale		610	615	PMSU	SHLE		
SHALE PMSU = Mid.Proterozoic Sedimentary	RED SHLE = Shale		615	632	PMSU	SHLE		

Unique No. 00202932	MINNESOTA DEPARTMENT OF HEALTH WELL AND BORING RECORD <i>Minnesota Statutes Chapter 1031</i>	Update Date 2007/02/06																																																																																										
County Name Anoka		Entry Date 1991/04/15																																																																																										
Township Name Township Range Dir Section Subsection 31 24 W 13 ACCDBD	Well Depth 700 ft. Depth Completed 700 ft. Date Well Completed 1965/05/07																																																																																											
Well Name COON RAPIDS 8	Drilling Method Cable Tool																																																																																											
Well Owner's Name COON RAPIDS 8 269 NORTHDAL BL COON RAPIDS MN 55433	Drilling Fluid	Well Hydrofractured? <input type="checkbox"/> Yes <input type="checkbox"/> No From ft. to ft.																																																																																										
Contact's Name CITY OF COON RAPIDS 11155 ROBINSON NW DR COON RAPIDS MN 55433	Use Community Supply (municipal)																																																																																											
<table border="1" style="width:100%; border-collapse: collapse;"> <thead> <tr> <th>GEOLOGICAL MATERIAL</th> <th>COLOR</th> <th>HARDNESS</th> <th>FROM</th> <th>TO</th> </tr> </thead> <tbody> <tr><td>DRIFT</td><td></td><td></td><td>0</td><td>212</td></tr> <tr><td>SANDROCK, SHALE, GRAV</td><td></td><td></td><td>212</td><td>243</td></tr> <tr><td>LIMEROCK, SHALE</td><td></td><td></td><td>243</td><td>249</td></tr> <tr><td>LIMEROCK, SHALE</td><td></td><td></td><td>249</td><td>263</td></tr> <tr><td>SANDROCK, SHALE</td><td></td><td></td><td>263</td><td>409</td></tr> <tr><td>SANDROCK, SHALE</td><td></td><td></td><td>409</td><td>418</td></tr> <tr><td>SANDROCK</td><td></td><td></td><td>418</td><td>445</td></tr> <tr><td>SHALEY SANDROCK</td><td></td><td></td><td>445</td><td>469</td></tr> <tr><td>SHALEY SANDROCK</td><td></td><td></td><td>469</td><td>473</td></tr> <tr><td>SHALE</td><td></td><td></td><td>473</td><td>518</td></tr> <tr><td>SHALE & SANDROCK</td><td></td><td></td><td>518</td><td>533</td></tr> <tr><td>SHALEY SANDROCK</td><td></td><td></td><td>533</td><td>545</td></tr> <tr><td>SHALE</td><td></td><td></td><td>545</td><td>549</td></tr> <tr><td>SANDROCK</td><td></td><td></td><td>549</td><td>594</td></tr> <tr><td>SHALE</td><td></td><td></td><td>594</td><td>598</td></tr> <tr><td>SANDROCK</td><td></td><td></td><td>598</td><td>694</td></tr> <tr><td>SHALE</td><td></td><td></td><td>694</td><td>700</td></tr> </tbody> </table>	GEOLOGICAL MATERIAL	COLOR	HARDNESS	FROM	TO	DRIFT			0	212	SANDROCK, SHALE, GRAV			212	243	LIMEROCK, SHALE			243	249	LIMEROCK, SHALE			249	263	SANDROCK, SHALE			263	409	SANDROCK, SHALE			409	418	SANDROCK			418	445	SHALEY SANDROCK			445	469	SHALEY SANDROCK			469	473	SHALE			473	518	SHALE & SANDROCK			518	533	SHALEY SANDROCK			533	545	SHALE			545	549	SANDROCK			549	594	SHALE			594	598	SANDROCK			598	694	SHALE			694	700	Casing Drive Shoe? <input type="checkbox"/> Yes <input type="checkbox"/> N Hole Diameter in. t 700 ft	
	GEOLOGICAL MATERIAL	COLOR	HARDNESS	FROM	TO																																																																																							
	DRIFT			0	212																																																																																							
	SANDROCK, SHALE, GRAV			212	243																																																																																							
	LIMEROCK, SHALE			243	249																																																																																							
	LIMEROCK, SHALE			249	263																																																																																							
	SANDROCK, SHALE			263	409																																																																																							
	SANDROCK, SHALE			409	418																																																																																							
	SANDROCK			418	445																																																																																							
	SHALEY SANDROCK			445	469																																																																																							
	SHALEY SANDROCK			469	473																																																																																							
	SHALE			473	518																																																																																							
	SHALE & SANDROCK			518	533																																																																																							
	SHALEY SANDROCK			533	545																																																																																							
	SHALE			545	549																																																																																							
SANDROCK			549	594																																																																																								
SHALE			594	598																																																																																								
SANDROCK			598	694																																																																																								
SHALE			694	700																																																																																								
	Casing Diameter Weight(lbs/ft)																																																																																											
	24 in. t 258 ft																																																																																											
	16 in. t 283 ft																																																																																											
	Screen N Open Hole From 283 ft. to 700 ft.																																																																																											
	Make Type																																																																																											
	Static Water Level 42 ft. from Land surface Date 1965/05/07																																																																																											
	PUMPING LEVEL (below land surface)																																																																																											
	132.3 ft. after hrs. pumping 922 g.p.m.																																																																																											
	Well Head Completion																																																																																											
	Pitless adapter mfr Model																																																																																											
	Casing Protection <input checked="" type="checkbox"/> 12 in. above grade																																																																																											
	<input type="checkbox"/> At-grade(Environmental Wells and Borings ONLY)																																																																																											
	Grouting Information Well grouted? <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No																																																																																											
	Material From To (ft.) Amount(yds/bags)																																																																																											
	G 0 283 24 Y																																																																																											
	Nearest Known Source of Contamination																																																																																											
	ft. direction type																																																																																											
	Well disinfected upon completion? <input type="checkbox"/> Yes <input type="checkbox"/> No																																																																																											
	Pump <input type="checkbox"/> Not Installed Date Installed																																																																																											
	Mfr nam																																																																																											
	Model HP Volts																																																																																											
	Drop Pipe Length ft. Capacity g.p.m																																																																																											
	Type																																																																																											
	Any not in use and not sealed well(s) on property? <input type="checkbox"/> Yes <input type="checkbox"/> No																																																																																											
	Was a variance granted from the MDH for this Well? <input type="checkbox"/> Yes <input type="checkbox"/> No																																																																																											
	Well CONTRACTOR CERTIFICATION Lic. Or Reg. No. 62012																																																																																											
	License Business Name																																																																																											
	Name of Driller O'BRIEN, F.																																																																																											

REMARKS, ELEVATION, SOURCE OF DATA, etc.

OLD PA. NO. 65-0095.

GAMMA LOGGED 2-6-2004 BY JIM TRAEN

USGS Quad Coon Rapids Elevation 897
 Aquifer: CFMS Alt Id: 80-6139

Report Copy

Unique No. 00202932	MINNESOTA DEPARTMENT OF HEALTH						Update Date 2007/02/06	
County Name Anoka	WELL AND BORING RECORD						Entry Date 1991/04/15	
<i>Minnesota Statutes Chapter 1031</i>								
Township Name	Township	Range	Dir	Section	Subsection	Well Depth	Depth Completed	Date Well Completed
	31	24	W	13	ACCDBD	700 ft.	700 ft.	1965/05/07
Well Name	COON RAPIDS 8			Lic. Or Reg. No.	62012	Name of Driller	O'BRIEN, F.	
USGS Quad	Coon Rapi	Elevation	897	Aquifer	CFMS	Alternative Id	80-6139	

GEOLOGICAL MATERIAL	COLOR	HARDNESS	FROM	TO	STRAT	LITH PRIM	LITH SEC	LITH MINOR
DRIFT QUUU = Unknown deposit type	DRFT = Drift		0	212	QUUU	DRFT		
SANDROCK, SHALE, GRAVEL QPUU = Pebbly sand/silt/clay	SAND = Sand		212	243	QPUU	SAND	CLAY	GRVL
							GRVL = Gravel	
LIMEROCK, SHALE QUUU = Unknown deposit type	COBL = Cobble		243	249	QUUU	COBL		
LIMEROCK, SHALE CFRN = Franconia	SHLE = Shale		249	263	CFRN	SHLE	DLMT	SNDS
							DLMT = Dolomite	SNDS = Sandstone
SANDROCK, SHALE CFRN = Franconia	SNDS = Sandstone		263	409	CFRN	SNDS	SHLE	DLMT
							DLMT = Dolomite	
SANDROCK, SHALE CIGL = Ironton-Galesville	SNDS = Sandstone		409	418	CIGL	SNDS		
SANDROCK CIGL = Ironton-Galesville	SNDS = Sandstone		418	445	CIGL	SNDS		
SHALEY SANDROCK CIGL = Ironton-Galesville	SNDS = Sandstone		445	469	CIGL	SNDS	SHLE	
							SHLE = Shale	
SHALEY SANDROCK CECR = Eau Claire	SNDS = Sandstone		469	473	CECR	SNDS	SHLE	
							SHLE = Shale	
SHALE CECR = Eau Claire	SHLE = Shale		473	518	CECR	SHLE		
SHALE & SANDROCK CECR = Eau Claire	SHLE = Shale		518	533	CECR	SHLE	SNDS	
							SNDS = Sandstone	
SHALEY SANDROCK CECR = Eau Claire	SNDS = Sandstone		533	545	CECR	SNDS		
SHALE CECR = Eau Claire	SHLE = Shale		545	549	CECR	SHLE	SLSN	
							SLSN = Siltstone	
SANDROCK CMTS = Mt. Simon	SNDS = Sandstone		549	594	CMTS	SNDS		

Unique No. 00202932	MINNESOTA DEPARTMENT OF HEALTH						Update Date 2007/02/06	
County Name Anoka	WELL AND BORING RECORD						Entry Date 1991/04/15	
<i>Minnesota Statutes Chapter 1031</i>								
Township Name	Township	Range	Dir	Section	Subsection	Well Depth	Depth Completed	Date Well Completed
	31	24	W	13	ACCDBD	700 ft.	700 ft.	1965/05/07
Well Name	COON RAPIDS 8			Lic. Or Reg. No.	62012	Name of Driller	O'BRIEN, F.	
USGS Quad	Coon Rapi	Elevation	897	Aquifer	CFMS	Alternative Id	80-6139	

GEOLOGICAL MATERIAL	COLOR	HARDNESS	FROM	TO	STRAT	LITH PRIM	LITH SEC	LITH MINOR
SHALE CMTS = Mt.Simon	SHLE = Shale		594	598	CMTS	SHLE	SNDS	SNDS = Sandstone
SANDROCK CMTS = Mt.Simon	SNDS = Sandstone		598	694	CMTS	SNDS		
SHALE PMRC = Red Clastic Series	SLSN = Siltstone		694	700	PMRC	SLSN	SHLE	SHLE = Shale

Unique No. 00202931	MINNESOTA DEPARTMENT OF HEALTH WELL AND BORING RECORD	Update Date 2008/12/30
County Name Anoka	<i>Minnesota Statutes Chapter 1031</i>	Entry Date 1991/04/15
Township Name Township Range Dir Section Subsection 31 24 W 13 ACDAAB	Well Depth 500 ft.	Depth Completed 500 ft.
		Date Well Completed 1969/04/07
Well Name COON RAPIDS 9	Drilling Method Cable Tool	
Well Owner's Name COON RAPIDS 9 11399 DOGWOOD NW ST COON RAPIDS MN 55433	Drilling Fluid	Well Hydrofractured? <input type="checkbox"/> Yes <input type="checkbox"/> No From ft. to ft.
Contact's Name CITY OF COON RAPIDS 11155 ROBINSON NW DR COON RAPIDS MN 55433	Use Community Supply (municipal)	
	Casing Drive Shoe? <input type="checkbox"/> Yes <input type="checkbox"/> N	Hole Diameter
GEOLOGICAL MATERIAL COLOR HARDNESS FROM TO	Casing Diameter Weight(lbs/ft)	
SAND 0 20	24 in. t 268 ft	
SAND RED 20 39	16 in. t 294 ft	
CLAY BLUE 39 63		
SAND RED 63 83		
SAND RED 83 89		
CLAY GREE 89 98		
CLAY BLUE 98 109		
GRAVEL 109 123		
GRAVEL GRAY 123 135		
GRAVEL & ROCKS 135 140		
SAND GREE 140 146		
CLAY & ROCKS 146 166		
GREEN CLAY & ROCKS 166 173		
CLAY RED 173 235		
RED CLAY & ROCK 235 245		
RED CLAY & SAND 245 250		
RED CLAY & SAND 250 252		
SHALE GREE 252 255		
LIMEROCK & SHALE 255 263		
LIMEROCK & SHALE 263 265		
LIMEROCK & SHALE 265 266		
LIMEROCK & SHALE 266 271		
SANDSTONE & SHALE 271 275		
HARD SHALE & SAND 275 302		
HARD SHALE & SAND 302 316		
SANDSTONE HARD 316 320		
SANDSTONE & SHALE 320 353		
SANDSTONE 353 356		
SHALE SOME SAND 356 371		
SHALE & SANDSTONE 371 388		
SHALE 388 396		
SHALE & SANDSTONE 396 405		
	Screen N	Open Hole From 294 ft. to 500 ft.
	Make	Type
	Static Water Level 47 ft. from Land surface	Date 1969/04/07
	PUMPING LEVEL (below land surface) ft. after hrs. pumping g.p.m.	
	Well Head Completion Pitless adapter mfr Model Casing Protection <input checked="" type="checkbox"/> 12 in. above grade <input type="checkbox"/> At-grade(Environmental Wells and Borings ONLY)	
	Grouting Information Well grouted? <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No Material From To (ft.) Amount(yds/bags) G 24 Y	
	Nearest Known Source of Contamination ft. direction type Well disinfected upon completion? <input type="checkbox"/> Yes <input type="checkbox"/> No	
	Pump <input type="checkbox"/> Not Installed Date Installed Mfr nam Model HP Volts	

SANDY SHALE	405	410
SANDY SHALE	410	415
SANDY SHALE	415	425
SANDY SHALE	425	454
SANDY SHALE	454	458
SANDY SHALE	458	462
BLUE & RED SHALE	462	475
SANDY SHALE	475	478
SANDY SHALE	478	482
SANDY SHALE	482	492
RED & GREEN SHALE	492	500

REMARKS, ELEVATION, SOURCE OF DATA, etc.

M.G.S. NO. 459.

GAMMA LOGGED 2-13-2004. LOGGED BY JIM TRAEN.

USGS Quad Coon Rapids Elevation 897
 Aquifer: CFIE Alt Id: 80-6139

Report Copy

Drop Pipe Length ft. Capacity g.p.m
 Type

Any not in use and not sealed well(s) on property? Yes No

Was a variance granted from the MDH for this Well? Yes No

Well CONTRACTOR CERTIFICATION Lic. Or Reg. No. 27010

License Business Name

Name of Driller OLZESKE, T.

Unique No. 00202931	MINNESOTA DEPARTMENT OF HEALTH						Update Date 2008/12/30	
County Name Anoka	WELL AND BORING RECORD						Entry Date 1991/04/15	
<i>Minnesota Statutes Chapter 1031</i>								
Township Name	Township	Range	Dir	Section	Subsection	Well Depth	Depth Completed	Date Well Completed
	31	24	W	13	ACDAAB	500 ft.	500 ft.	1969/04/07
Well Name	COON RAPIDS 9			Lic. Or Reg. No.	27010	Name of Driller	OLZESKE, T.	
USGS Quad	Coon Rapi	Elevation	897	Aquifer	CFIE	Alternative Id	80-6139	

GEOLOGICAL MATERIAL	COLOR	HARDNESS	FROM	TO	STRAT	LITH PRIM	LITH SEC	LITH MINOR
SAND QFUU = Sand			0	20	QFUU	SAND		
	SAND = Sand							
SAND QFUR = Sand	RED		20	39	QFUR	SAND		
	SAND = Sand							
CLAY QCUG = Clay	BLUE		39	63	QCUG	CLAY		
	CLAY = Clay							
SAND QFUR = Sand	RED		63	83	QFUR	SAND		
	SAND = Sand							
SAND QFUR = Sand	RED		83	89	QFUR	SAND		
	SAND = Sand							
CLAY QCUL = Clay	GREEN		89	98	QCUL	CLAY		
	CLAY = Clay							
CLAY QCUG = Clay	BLUE		98	109	QCUG	CLAY		
	CLAY = Clay							
GRAVEL QGUU = Gravel (+larger)			109	123	QGUU	GRVL		
	GRVL = Gravel							
GRAVEL QGUG = Gravel (+larger)	GRAY		123	135	QGUG	GRVL		
	GRVL = Gravel							
GRAVEL & ROCKS QGUU = Gravel (+larger)			135	140	QGUU	GRVL	COBL	
	GRVL = Gravel							COBL = Cobble
SAND QFUL = Sand	GREEN		140	146	QFUL	SAND		
	SAND = Sand							
CLAY & ROCKS QPUU = Pebbly sand/silt/clay			146	166	QPUU	CLAY	COBL	
	CLAY = Clay							COBL = Cobble
GREEN CLAY & ROCKS QPUL = Pebbly sand/silt/clay			166	173	QPUL	CLAY	COBL	
	CLAY = Clay							COBL = Cobble
CLAY QCUR = Clay	RED		173	235	QCUR	CLAY		
	CLAY = Clay							

Unique No. 00202931	MINNESOTA DEPARTMENT OF HEALTH						Update Date 2008/12/30
County Name Anoka	WELL AND BORING RECORD						Entry Date 1991/04/15
<i>Minnesota Statutes Chapter 1031</i>							
Township Name Township	Range Dir	Section	Subsection	Well Depth		Depth Completed	Date Well Completed
31	24 W	13	ACDAAB	500	ft.	500 ft.	1969/04/07
Well Name COON RAPIDS 9	Lic. Or Reg. No. 27010		Name of Driller OLZESKE, T.				
USGS Quad Coon Rapi	Elevation 897	Aquifer CFIE	Alternative Id 80-6139				

GEOLOGICAL MATERIAL	COLOR	HARDNESS	FROM	TO	STRAT	LITH PRIM	LITH SEC	LITH MINOR
RED CLAY & ROCK QPUR = Pebbly sand/silt/clay	RED CLAY = Clay		235	245	QPUR	CLAY	COBL	
							COBL = Cobble	
RED CLAY & SAND QLUR = Clay & sand	RED CLAY = Clay		245	250	QLUR	CLAY	SAND	
							SAND = Sand	
RED CLAY & SAND QLUR = Clay & sand	RED CLAY = Clay		250	252	QLUR	CLAY	SAND	
							SAND = Sand	
SHALE QCUL = Clay	GREEN CLAY = Clay		252	255	QCUL	CLAY		
LIMEROCK & SHALE QPUU = Pebbly sand/silt/clay			255	263	QPUU	COBL	CLAY	
							COBL = Cobble	CLAY = Clay
LIMEROCK & SHALE QPUU = Pebbly sand/silt/clay			263	265	QPUU	COBL	CLAY	
							COBL = Cobble	CLAY = Clay
LIMEROCK & SHALE QPUU = Pebbly sand/silt/clay			265	266	QPUU	COBL	CLAY	
							COBL = Cobble	CLAY = Clay
LIMEROCK & SHALE CFRN = Franconia			266	271	CFRN	DLMT	SHLE	SNDS
							DLMT = Dolomite	SHLE = Shale
								SNDS = Sandstone
SANDSTONE & SHALE CFRN = Franconia			271	275	CFRN	SNDS	SHLE	DLMT
							SNDS = Sandstone	SHLE = Shale
								DLMT = Dolomite
HARD SHALE & SAND CFRN = Franconia			275	302	CFRN	SHLE	SNDS	DLMT
							SHLE = Shale	SNDS = Sandstone
								DLMT = Dolomite
HARD SHALE & SAND CFRN = Franconia			302	316	CFRN	SHLE	SNDS	DLMT
							SHLE = Shale	SNDS = Sandstone
								DLMT = Dolomite
SANDSTONE CFRN = Franconia		HARD	316	320	CFRN	SNDS	DLMT	
							SNDS = Sandstone	DLMT = Dolomite
SANDSTONE & SHALE CFRN = Franconia			320	353	CFRN	SNDS	SHLE	DLMT
							SNDS = Sandstone	SHLE = Shale
								DLMT = Dolomite
SANDSTONE CFRN = Franconia			353	356	CFRN	SNDS	SHLE	
							SNDS = Sandstone	SHLE = Shale

Unique No. 00202931	MINNESOTA DEPARTMENT OF HEALTH						Update Date 2008/12/30
County Name Anoka	WELL AND BORING RECORD						Entry Date 1991/04/15
<i>Minnesota Statutes Chapter 1031</i>							
Township Name Township	Range Dir	Section	Subsection	Well Depth		Depth Completed	Date Well Completed
	31 24 W	13	ACDAAB	500	ft.	500 ft.	1969/04/07
Well Name COON RAPIDS 9			Lic. Or Reg. No. 27010			Name of Driller OLZESKE, T.	
USGS Quad Coon Rapi	Elevation 897		Aquifer CFIE			Alternative Id 80-6139	

GEOLOGICAL MATERIAL	COLOR	HARDNESS	FROM	TO	STRAT	LITH PRIM	LITH SEC	LITH MINOR
SHALE SOME SAND CFRN = Franconia	SHLE = Shale		356	371	CFRN	SHLE	SNDS	DLMT
							SNDS = Sandstone	DLMT = Dolomite
SHALE & SANDSTONE CFRN = Franconia	SHLE = Shale		371	388	CFRN	SHLE	SNDS	DLMT
							SNDS = Sandstone	DLMT = Dolomite
SHALE CFRN = Franconia	SHLE = Shale		388	396	CFRN	SHLE	SNDS	
							SNDS = Sandstone	
SHALE & SANDSTONE CFRN = Franconia	SHLE = Shale		396	405	CFRN	SHLE	SNDS	
							SNDS = Sandstone	
SANDY SHALE CFRN = Franconia	SNDS = Sandstone		405	410	CFRN	SNDS	SHLE	DLMT
							SHLE = Shale	DLMT = Dolomite
SANDY SHALE CIGL = Ironton-Galesville	SNDS = Sandstone		410	415	CIGL	SNDS		
							SNDS = Sandstone	
SANDY SHALE CIGL = Ironton-Galesville	SNDS = Sandstone		415	425	CIGL	SNDS		
							SNDS = Sandstone	
SANDY SHALE CIGL = Ironton-Galesville	SNDS = Sandstone		425	454	CIGL	SNDS		
							SNDS = Sandstone	
SANDY SHALE CIGL = Ironton-Galesville	SNDS = Sandstone		454	458	CIGL	SNDS		
							SNDS = Sandstone	
SANDY SHALE CECR = Eau Claire	SHLE = Shale		458	462	CECR	SHLE	SNDS	
							SNDS = Sandstone	
BLUE & RED SHALE CECR = Eau Claire	SHLE = Shale		462	475	CECR	SHLE	SNDS	
							SNDS = Sandstone	
SANDY SHALE CECR = Eau Claire	SHLE = Shale		475	478	CECR	SHLE	SNDS	
							SNDS = Sandstone	
SANDY SHALE CECR = Eau Claire	SHLE = Shale		478	482	CECR	SHLE	SNDS	
							SNDS = Sandstone	
SANDY SHALE CECR = Eau Claire	SHLE = Shale		482	492	CECR	SHLE	SNDS	
							SNDS = Sandstone	

Unique No. 00202931	MINNESOTA DEPARTMENT OF HEALTH						Update Date 2008/12/30	
County Name Anoka	WELL AND BORING RECORD						Entry Date 1991/04/15	
<i>Minnesota Statutes Chapter 1031</i>								
Township Name	Township	Range	Dir	Section	Subsection	Well Depth	Depth Completed	Date Well Completed
	31	24	W	13	ACDAAB	500 ft.	500 ft.	1969/04/07
Well Name	COON RAPIDS 9			Lic. Or Reg. No.	27010	Name of Driller	OLZESKE, T.	
USGS Quad	Coon Rapi	Elevation	897	Aquifer	CFIE	Alternative Id	80-6139	

GEOLOGICAL MATERIAL	COLOR	HARDNESS	FROM	TO	STRAT	LITH PRIM	LITH SEC	LITH MINOR
RED & GREEN SHALE			492	500	CECR	SHLE	SNDS	
CECR = Eau Claire	SHLE = Shale		SNDS = Sandstone					

Unique No. 00202930	MINNESOTA DEPARTMENT OF HEALTH WELL AND BORING RECORD <i>Minnesota Statutes Chapter 1031</i>	Update Date 2007/02/07																																																																						
County Name Anoka		Entry Date 1991/04/15																																																																						
Township Name Township Range Dir Section Subsection 31 24 W 13 DBADDC	Well Depth 684 ft.	Depth Completed 684 ft.																																																																						
		Date Well Completed 1970/05/05																																																																						
Well Name COON RAPIDS 10	Drilling Method Cable Tool																																																																							
Well Owner's Name COON RAPIDS 10 203 NORTHDAL BL COON RAPIDS MN 55433	Drilling Fluid	Well Hydrofractured? <input type="checkbox"/> Yes <input type="checkbox"/> No From ft. to ft.																																																																						
Contact's Name CITY OF COON RAPIDS 11155 ROBINSON NW DR COON RAPIDS MN 55433	Use Community Supply (municipal)																																																																							
<table border="1" style="width:100%; border-collapse: collapse;"> <thead> <tr> <th>GEOLOGICAL MATERIAL</th> <th>COLOR</th> <th>HARDNESS</th> <th>FROM</th> <th>TO</th> </tr> </thead> <tbody> <tr><td>GLACIAL DRIFT</td><td></td><td></td><td>0</td><td>250</td></tr> <tr><td>SANDY LIMESTONE</td><td></td><td></td><td>250</td><td>262</td></tr> <tr><td>SANDY LIMESTONE</td><td></td><td></td><td>262</td><td>295</td></tr> <tr><td>SANDSTONE WITH BEDS O</td><td></td><td></td><td>295</td><td>375</td></tr> <tr><td>SANDSTONE SLATE</td><td>BROW</td><td></td><td>375</td><td>396</td></tr> <tr><td>SANDSTONE SLATE</td><td>BROW</td><td></td><td>396</td><td>442</td></tr> <tr><td>SANDSTONE SLATE BROW</td><td>BROW</td><td></td><td>442</td><td>455</td></tr> <tr><td>HARD RED SHALE</td><td></td><td></td><td>455</td><td>457</td></tr> <tr><td>HARD RED SHALE</td><td></td><td></td><td>457</td><td>495</td></tr> <tr><td>SANDSTONE, SLATE</td><td>BROW</td><td></td><td>495</td><td>522</td></tr> <tr><td>SANDSTONE, SLATE</td><td>BROW</td><td></td><td>522</td><td>662</td></tr> <tr><td>SANDSTONE</td><td></td><td></td><td>662</td><td>679</td></tr> <tr><td>RED SHALE</td><td></td><td></td><td>679</td><td>684</td></tr> </tbody> </table>	GEOLOGICAL MATERIAL	COLOR	HARDNESS	FROM	TO	GLACIAL DRIFT			0	250	SANDY LIMESTONE			250	262	SANDY LIMESTONE			262	295	SANDSTONE WITH BEDS O			295	375	SANDSTONE SLATE	BROW		375	396	SANDSTONE SLATE	BROW		396	442	SANDSTONE SLATE BROW	BROW		442	455	HARD RED SHALE			455	457	HARD RED SHALE			457	495	SANDSTONE, SLATE	BROW		495	522	SANDSTONE, SLATE	BROW		522	662	SANDSTONE			662	679	RED SHALE			679	684	Casing	Drive Shoe? <input type="checkbox"/> Yes <input type="checkbox"/> N
	GEOLOGICAL MATERIAL	COLOR	HARDNESS	FROM	TO																																																																			
	GLACIAL DRIFT			0	250																																																																			
	SANDY LIMESTONE			250	262																																																																			
	SANDY LIMESTONE			262	295																																																																			
	SANDSTONE WITH BEDS O			295	375																																																																			
SANDSTONE SLATE	BROW		375	396																																																																				
SANDSTONE SLATE	BROW		396	442																																																																				
SANDSTONE SLATE BROW	BROW		442	455																																																																				
HARD RED SHALE			455	457																																																																				
HARD RED SHALE			457	495																																																																				
SANDSTONE, SLATE	BROW		495	522																																																																				
SANDSTONE, SLATE	BROW		522	662																																																																				
SANDSTONE			662	679																																																																				
RED SHALE			679	684																																																																				
	Hole Diameter																																																																							
	Casing Diameter	Weight(lbs/ft)																																																																						
	30 in. t 80 ft																																																																							
	24 in. t 259 ft																																																																							
	16 in. t 272 ft																																																																							
	Screen N	Open Hole From 272 ft. to 684 ft.																																																																						
	Make	Type																																																																						
	Static Water Level 51 ft. from Land surface	Date 1970/05/05																																																																						
	PUMPING LEVEL (below land surface) 185 ft. after 49 hrs. pumping 1875 g.p.m.																																																																							
	Well Head Completion Pitless adapter mfr Model Casing Protection <input checked="" type="checkbox"/> 12 in. above grade <input type="checkbox"/> At-grade(Environmental Wells and Borings ONLY)																																																																							
	Grouting Information Well grouted? <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No Material From To (ft.) Amount(yds/bags) G 0 272																																																																							
	Nearest Known Source of Contamination ft. direction type Well disinfected upon completion? <input type="checkbox"/> Yes <input type="checkbox"/> No																																																																							
	Pump <input type="checkbox"/> Not Installed Date Installed Y Mfr nam Model HP 100 Volts Drop Pipe Length ft. Capacity g.p.m Type T																																																																							
REMARKS, ELEVATION, SOURCE OF DATA, etc. M.G.S. NO. 558. OLD PA. NO. 71-0825. GAMMA LOGGED 5-3-2004. LOGGED BY JIM TRAEN. USGS Quad Coon Rapids Elevation 899 Aquifer: CFMS Alt Id: 80-6139	Any not in use and not sealed well(s) on property? <input type="checkbox"/> Yes <input type="checkbox"/> No Was a variance granted from the MDH for this Well? <input type="checkbox"/> Yes <input type="checkbox"/> No																																																																							
	Well CONTRACTOR CERTIFICATION Lic. Or Reg. No. 27118 License Business Name Name of Driller <u>BENEKE, R.</u>																																																																							

Report Copy

Unique No. 00202965	MINNESOTA DEPARTMENT OF HEALTH WELL AND BORING RECORD <i>Minnesota Statutes Chapter 1031</i>	Update Date 2008/12/30																																																																																					
County Name Anoka		Entry Date 1991/04/15																																																																																					
Township Name Township Range Dir Section Subsection 31 24 W 27 BAAAAA	Well Depth 627 ft. Depth Completed 627 ft. Date Well Completed 1972/05/11																																																																																						
Well Name COON RAPIDS 11	Drilling Method Non-specified Rotary																																																																																						
Well Owner's Name COON RAPIDS 11 COON RAPIDS MN 55433	Drilling Fluid _____ Well Hydrofractured? <input type="checkbox"/> Yes <input type="checkbox"/> No From _____ ft. to _____ ft.																																																																																						
Contact's Name CITY OF COON RAPIDS 11155 ROBINSON NW DR COON RAPIDS MN 55433	Use Community Supply (municipal)																																																																																						
<table border="1" style="width:100%; border-collapse: collapse;"> <thead> <tr> <th>GEOLOGICAL MATERIAL</th> <th>COLOR</th> <th>HARDNESS</th> <th>FROM</th> <th>TO</th> </tr> </thead> <tbody> <tr><td>SAND</td><td></td><td></td><td>0</td><td>18</td></tr> <tr><td>SANDY CLAY</td><td></td><td></td><td>18</td><td>58</td></tr> <tr><td>SAND, GRAVEL & BOULDE</td><td></td><td></td><td>58</td><td>142</td></tr> <tr><td>SAND, GRAVEL & BOULDE</td><td></td><td></td><td>142</td><td>146</td></tr> <tr><td>LIME, SHALE</td><td></td><td></td><td>146</td><td>199</td></tr> <tr><td>LIME, SHALE</td><td></td><td></td><td>199</td><td>305</td></tr> <tr><td>SHALEY SANDSTONE</td><td></td><td></td><td>305</td><td>318</td></tr> <tr><td>SHALEY SANDSTONE</td><td></td><td></td><td>318</td><td>352</td></tr> <tr><td>SANDSTONE</td><td></td><td>SOFT</td><td>352</td><td>362</td></tr> <tr><td>SANDSTONE</td><td></td><td>HARD</td><td>362</td><td>410</td></tr> <tr><td>SANDSTONE</td><td></td><td>HARD</td><td>410</td><td>423</td></tr> <tr><td>SHALE</td><td></td><td></td><td>423</td><td>434</td></tr> <tr><td>SANDSTONE-SOME SHALE</td><td></td><td></td><td>434</td><td>478</td></tr> <tr><td>SANDSTONE-SOME SHALE</td><td></td><td></td><td>478</td><td>530</td></tr> <tr><td>SANDSTONE</td><td></td><td></td><td>530</td><td>622</td></tr> <tr><td>SHALE</td><td></td><td></td><td>622</td><td>627</td></tr> </tbody> </table>	GEOLOGICAL MATERIAL	COLOR	HARDNESS	FROM	TO	SAND			0	18	SANDY CLAY			18	58	SAND, GRAVEL & BOULDE			58	142	SAND, GRAVEL & BOULDE			142	146	LIME, SHALE			146	199	LIME, SHALE			199	305	SHALEY SANDSTONE			305	318	SHALEY SANDSTONE			318	352	SANDSTONE		SOFT	352	362	SANDSTONE		HARD	362	410	SANDSTONE		HARD	410	423	SHALE			423	434	SANDSTONE-SOME SHALE			434	478	SANDSTONE-SOME SHALE			478	530	SANDSTONE			530	622	SHALE			622	627	Casing _____ Drive Shoe? <input type="checkbox"/> Yes <input type="checkbox"/> N Hole Diameter _____ in. t 157 ft Casing Diameter _____ Weight(lbs/ft) _____ in. t 627 ft 24 in. t 157 ft	
	GEOLOGICAL MATERIAL	COLOR	HARDNESS	FROM	TO																																																																																		
	SAND			0	18																																																																																		
	SANDY CLAY			18	58																																																																																		
	SAND, GRAVEL & BOULDE			58	142																																																																																		
	SAND, GRAVEL & BOULDE			142	146																																																																																		
	LIME, SHALE			146	199																																																																																		
	LIME, SHALE			199	305																																																																																		
	SHALEY SANDSTONE			305	318																																																																																		
	SHALEY SANDSTONE			318	352																																																																																		
SANDSTONE		SOFT	352	362																																																																																			
SANDSTONE		HARD	362	410																																																																																			
SANDSTONE		HARD	410	423																																																																																			
SHALE			423	434																																																																																			
SANDSTONE-SOME SHALE			434	478																																																																																			
SANDSTONE-SOME SHALE			478	530																																																																																			
SANDSTONE			530	622																																																																																			
SHALE			622	627																																																																																			
	Screen N Open Hole From 157 ft. to 627 ft. Make _____ Type _____																																																																																						
	Static Water Level 25 ft. from Land surface Date 1972/05/11																																																																																						
	PUMPING LEVEL (below land surface) 110 ft. after hrs. pumping 1820 g.p.m.																																																																																						
	Well Head Completion Pitless adapter mfr _____ Model _____ Casing Protection <input checked="" type="checkbox"/> 12 in. above grade <input type="checkbox"/> At-grade(Environmental Wells and Borings ONLY)																																																																																						
	Grouting Information Well grouted? <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No Material From To (ft.) Amount(yds/bags) G 0 157 20 Y																																																																																						
	Nearest Known Source of Contamination ft. direction type Well disinfected upon completion? <input type="checkbox"/> Yes <input type="checkbox"/> No																																																																																						
	Pump <input type="checkbox"/> Not Installed Date Installed _____ Mfr nam _____ Model _____ HP _____ Volts _____ Drop Pipe Length _____ ft. Capacity _____ g.p.m. Type _____																																																																																						
REMARKS, ELEVATION, SOURCE OF DATA, etc.	Any not in use and not sealed well(s) on property? <input type="checkbox"/> Yes <input type="checkbox"/> No																																																																																						
M.G.S. NO. 776	Was a variance granted from the MDH for this Well? <input type="checkbox"/> Yes <input type="checkbox"/> No																																																																																						
GAMMA LOGGED 9-12-1983 BY MGS AND 4-26-2002. LOGGED BY JIM TRAEN.	Well CONTRACTOR CERTIFICATION Lic. Or Reg. No. <u>62012</u>																																																																																						
USGS Quad Coon Rapids Elevation 860	License Business Name _____																																																																																						
Aquifer: CFMS Alt Id: 80-6139	Name of Driller <u>GIBSON, E.</u>																																																																																						

Report Copy

Unique No. 00202965	MINNESOTA DEPARTMENT OF HEALTH						Update Date 2008/12/30	
County Name Anoka	WELL AND BORING RECORD						Entry Date 1991/04/15	
<i>Minnesota Statutes Chapter 1031</i>								
Township Name	Township	Range	Dir	Section	Subsection	Well Depth	Depth Completed	Date Well Completed
	31	24	W	27	BAAAAA	627 ft.	627 ft.	1972/05/11
Well Name	COON RAPIDS 11			Lic. Or Reg. No.	62012	Name of Driller	GIBSON, E.	
USGS Quad	Coon Rapi	Elevation	860	Aquifer	CFMS	Alternative Id	80-6139	

GEOLOGICAL MATERIAL	COLOR	HARDNESS	FROM	TO	STRAT	LITH PRIM	LITH SEC	LITH MINOR
SANDSTONE			530	622	CMTS	SNDS		
CMTS = Mt.Simon		SNDS = Sandstone						
SHALE			622	627	PMRC	SHLE		
PMRC = Red Clastic Series		SHLE = Shale						

Unique No. 00168721	MINNESOTA DEPARTMENT OF HEALTH WELL AND BORING RECORD <i>Minnesota Statutes Chapter 1031</i>	Update Date 2007/02/07
County Name Anoka		Entry Date 1991/04/15
Township Name Township 31 Range 24 Dir W Section 27 Subsection AAAAAD	Well Depth 604 ft.	Depth Completed 604 ft. Date Well Completed 1975/05/14
Well Name COON RAPIDS 12	Drilling Method Cable Tool	
Well Owner's Name COON RAPIDS 12 COON RAPIDS MN 55433	Drilling Fluid	Well Hydrofractured? <input type="checkbox"/> Yes <input type="checkbox"/> No From _____ ft. to _____ ft.
Contact's Name CITY OF COON RAPIDS 11155 ROBINSON NW DR COON RAPIDS MN 55433	Use Community Supply (municipal)	
GEOLOGICAL MATERIAL	COLOR	HARDNESS
FROM	TO	
SAND FILL	YELLOW	0 9
SAND	GRAY	9 20
CLAY	GRAY	20 30
CLAY	RED/B	30 65
SANDY MUCK	BROW	65 100
SHALE	GRAY	100 120
JORDAN SANDROCK	WHITE	120 123
JORDAN SANDROCK	WHITE	123 135
ST. LAWRANCE SANDSTON	YELLOW	135 140
ST. LAWRANCE SANDSTON	WHITE	140 170
ST. LAWRENCE SANDSTON	BLU/G	170 171
ST. LAWRANCE SANDSTON	BLU/G	171 180
ST. LAWRANCE SANDSTON	BLU/G	180 185
ST. LAWRANCE SANDSTON	PINK	185 195
ST. LAWRANCE SANDSTON	VARIE	195 208
ST. LAWRANCE SANDSTON	GREE	208 264
HARD LAYER OF SHALE	GREE	264 270
SHALE ROCK	GREE	270 286
SHALE SANDROCK	GREE	286 300
SANDROCK	TAN/G	300 316
SANDROCK	TAN/G	316 385
SHALE SANDSTONE	LIGHT	385 386
SHALE SANDSTONE	LIGHT	386 407
SHALE ROCK	TAN/B	407 420
SHALE	BRN/G	420 458
SHALE	BRN/G	458 480
SHALEY SANDSTONE	WHITE	480 550
SANDSTONE	TAN	550 600
SHALE	RED	600 604
REMARKS, ELEVATION, SOURCE OF DATA, etc. M.G.S. NO.985.		
Casing	Drive Shoe? <input type="checkbox"/> Yes <input type="checkbox"/> N	Hole Diameter
Casing Diameter	Weight(lbs/ft)	
24 in. t	124 ft	94.62
16 in. t	208 ft	62.58
Screen N	Open Hole From 208 ft. to 604 ft.	
Make _____	Type _____	
Static Water Level 47 ft. from Land surface	Date 1975/05/14	
PUMPING LEVEL (below land surface) 146 ft. after 8 hrs. pumping 1800 g.p.m.		
Well Head Completion		
Pitless adapter mfr _____	Model _____	
Casing Protection _____	<input checked="" type="checkbox"/> 12 in. above grade	
<input type="checkbox"/> At-grade(Environmental Wells and Borings ONLY)		
Grouting Information Well grouted? <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No		
Material	From To (ft.)	Amount(yds/bags)
G		
Nearest Known Source of Contamination		
ft.	direction	type
Well disinfected upon completion?	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	
Pump <input type="checkbox"/> Not Installed	Date Installed _____	
Mfr name _____		
Model _____	HP _____	Volts _____
Drop Pipe Length _____ ft.	Capacity _____ g.p.m.	
Type _____		

GAMMA LOGGED 1-18-05. LOGGED BY JIM TRAEN.

Any not in use and not sealed well(s) on property? Yes No

USGS Quad Coon Rapids Elevation 852
Aquifer: CFMS Alt Id: 80-6139

Was a variance granted from the MDH for this Well? Yes No

Well CONTRACTOR CERTIFICATION Lic. Or Reg. No. 02015

License Business Name

Name of Driller SIGAFOOS, G.

Report Copy

HE-01205-06 (Rev. 9/96)

Unique No. 00168721	MINNESOTA DEPARTMENT OF HEALTH						Update Date 2007/02/07
County Name Anoka	WELL AND BORING RECORD						Entry Date 1991/04/15
<i>Minnesota Statutes Chapter 1031</i>							
Township Name Township	Range Dir	Section	Subsection	Well Depth		Depth Completed	Date Well Completed
	31 24 W	27	AAAAAD	604	ft.	604 ft.	1975/05/14
Well Name COON RAPIDS 12				Lic. Or Reg. No. 02015	Name of Driller SIGAFOOS, G.		
USGS Quad Coon Rapi	Elevation 852			Aquifer CFMS	Alternative Id 80-6139		

GEOLOGICAL MATERIAL	COLOR	HARDNESS	FROM	TO	STRAT	LITH PRIM	LITH SEC	LITH MINOR
SAND FILL RMMF = Man-made fill	YELLOW SAND = Sand		0	9	RMMF	SAND	FILL	
			FILL = Fill					
SAND QFUG = Sand	GRAY SAND = Sand		9	20	QFUG	SAND		
CLAY QCUG = Clay	GRAY CLAY = Clay		20	30	QCUG	CLAY		
CLAY QCUU = Clay	RED/BRN CLAY = Clay		30	65	QCUU	CLAY		
SANDY MUCK QNUB = Sand & silt	BROWN SAND = Sand		65	100	QNUB	SAND	MUCK	
			MUCK = Muck					
SHALE QCUG = Clay	GRAY CLAY = Clay		100	120	QCUG	CLAY		
JORDAN SANDROCK QFUU = Sand	WHITE SAND = Sand		120	123	QFUU	SAND		
JORDAN SANDROCK CJDN = Jordan	WHITE SNDS = Sandstone		123	135	CJDN	SNDS		
ST. LAWRANCE SANDSTONE CSTL = St.Lawrence	YELLOW SLSN = Siltstone		135	140	CSTL	SLSN	DLMT	SNDS
			DLMT = Dolomite				SNDS = Sandstone	
ST. LAWRANCE SANDSTONE CSTL = St.Lawrence	WHITE SLSN = Siltstone		140	170	CSTL	SLSN	DLMT	SNDS
			DLMT = Dolomite				SNDS = Sandstone	
ST. LAWRENCE SANDSTONE CSTL = St.Lawrence	BLU/GRN SLSN = Siltstone		170	171	CSTL	SLSN	DLMT	SNDS
			DLMT = Dolomite				SNDS = Sandstone	
ST. LAWRANCE SANDSTONE CFRN = Franconia	BLU/GRN SNDS = Sandstone		171	180	CFRN	SNDS	SHLE	DLMT
			SHLE = Shale				DLMT = Dolomite	
ST. LAWRANCE SANDSTONE CFRN = Franconia	BLU/GRN SNDS = Sandstone		180	185	CFRN	SNDS	SHLE	DLMT
			SHLE = Shale				DLMT = Dolomite	
ST. LAWRANCE SANDSTONE CFRN = Franconia	PINK SNDS = Sandstone		185	195	CFRN	SNDS	SHLE	DLMT
			SHLE = Shale				DLMT = Dolomite	

Unique No. 00168721	MINNESOTA DEPARTMENT OF HEALTH						Update Date 2007/02/07	
County Name Anoka	WELL AND BORING RECORD						Entry Date 1991/04/15	
<i>Minnesota Statutes Chapter 1031</i>								
Township Name	Township	Range	Dir	Section	Subsection	Well Depth	Depth Completed	Date Well Completed
	31	24	W	27	AAAAAD	604 ft.	604 ft.	1975/05/14
Well Name	COON RAPIDS 12			Lic. Or Reg. No.	02015	Name of Driller	SIGAFOOS, G.	
USGS Quad	Coon Rapi	Elevation	852	Aquifer	CFMS	Alternative Id	80-6139	

GEOLOGICAL MATERIAL	COLOR	HARDNESS	FROM	TO	STRAT	LITH PRIM	LITH SEC	LITH MINOR
SHALE	RED		600	604	PMSU	SHLE		
PMSU = Mid.Proterozoic Sedimentary		SHLE = Shale						

Unique No. 00168720	MINNESOTA DEPARTMENT OF HEALTH WELL AND BORING RECORD <i>Minnesota Statutes Chapter 1031</i>	Update Date 2007/02/07
County Name Anoka		Entry Date 1991/04/15
Township Name Township Range Dir Section Subsection 31 24 W 13 DADDBC	Well Depth 693 ft.	Depth Completed 693 ft. Date Well Completed 1977/03/25
Well Name COON RAPIDS 13	Drilling Method Cable Tool	
Well Owner's Name COON RAPIDS 13 11100 UNIVERSITY AV COON RAPIDS MN 55433	Drilling Fluid	Well Hydrofractured? <input type="checkbox"/> Yes <input type="checkbox"/> No From ft. to ft.
Contact's Name CITY OF COON RAPIDS 11155 ROBINSON NW DR COON RAPIDS MN 55433	Use Community Supply (municipal)	
	Casing Drive Shoe? <input checked="" type="checkbox"/> Yes <input type="checkbox"/> N	Hole Diameter
GEOLOGICAL MATERIAL COLOR HARDNESS FROM TO	Casing Diameter Weight(lbs/ft)	
SAND BROW 0 55	24 in. t 252 ft 94.62	
SANDY CLAY GRAY 55 75	16 in. t 395 ft 62.58	
FINE SAND GRAY HARD 75 85		
FINE SAND RED 85 105		
CLAY STICKY RED 105 135		
CLAY & STONE GRAY HARD 135 160		
FINE SAND RED 160 175		
CLAY GRAY 175 195		
SAND & STONES & CLAY GRAY 195 205		
STONES & SAND DARK 205 215		
SHALE & STONES TAN 215 220		
SHALE TAN 220 245		
SANDSTONE SHALE GRAY 245 250		
SHALE RED 250 257		
ST. LAWRANCE GREEN, RE VARIE 257 260		
HARDROCK TAN 260 267		
HARDROCK TAN 267 268		
SANDROCK LIGHT HARD 268 298		
SANDY ROCK, SHALE GREE 298 312		
SANDROCK, SHALE LIGHT 312 338		
SANDSTONE GREEN-GRAY- 338 403		
SANDSTONE GREEN-GRAY- 403 453		
SANDSTONE GREEN-GRAY- 453 525		
SANDSTONE GREEN-GRAY- 525 672		
HINCKLEY SANDSTONE RED 672 691		
HINCKLEY SANDSTONE 691 693		
REMARKS, ELEVATION, SOURCE OF DATA, etc.	Screen N Open Hole From 395 ft. to 693 ft.	
M.G.S. NO.1124.	Make Type	
GAMMA LOGGED 2-6-04. LOGGED BY JIM TRAEN.	Static Water Level 75 ft. from Land surface Date 1977/03/25	
USGS Quad Coon Rapids Elevation 900	PUMPING LEVEL (below land surface)	
Aquifer: CFMS Alt Id: 80-6139	158 ft. after 10 hrs. pumping 1000 g.p.m.	
	Well Head Completion	
	Pitless adapter mfr Model	
	Casing Protection <input checked="" type="checkbox"/> 12 in. above grade	
	<input type="checkbox"/> At-grade(Environmental Wells and Borings ONLY)	
	Grouting Information Well grouted? <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	
	Material From To (ft.) Amount(yds/bags)	
	G	
	Nearest Known Source of Contamination	
	ft. direction type	
	Well disinfected upon completion? <input type="checkbox"/> Yes <input type="checkbox"/> No	
	Pump <input type="checkbox"/> Not Installed Date Installed	
	Mfr name	
	Model HP Volts	
	Drop Pipe Length ft. Capacity g.p.m	
	Type	
	Any not in use and not sealed well(s) on property? <input type="checkbox"/> Yes <input type="checkbox"/> No	
	Was a variance granted from the MDH for this Well? <input type="checkbox"/> Yes <input type="checkbox"/> No	
	Well CONTRACTOR CERTIFICATION Lic. Or Reg. No. 02015	
	License Business Name	

Unique No. 00168720	MINNESOTA DEPARTMENT OF HEALTH						Update Date 2007/02/07
County Name Anoka	WELL AND BORING RECORD						Entry Date 1991/04/15
<i>Minnesota Statutes Chapter 1031</i>							
Township Name Township	Range Dir	Section	Subsection	Well Depth		Depth Completed	Date Well Completed
	31 24 W	13	DADDBC	693	ft.	693 ft.	1977/03/25
Well Name COON RAPIDS 13	Lic. Or Reg. No. 02015		Name of Driller SIGAFOOS, G.				
USGS Quad Coon Rapi	Elevation 900	Aquifer CFMS	Alternative Id 80-6139				

GEOLOGICAL MATERIAL	COLOR	HARDNESS	FROM	TO	STRAT	LITH PRIM	LITH SEC	LITH MINOR
SAND QFUB = Sand	BROWN SAND = Sand		0	55	QFUB	SAND		
SANDY CLAY QLUG = Clay & sand	GRAY CLAY = Clay		55	75	QLUG	CLAY	SAND	
FINE SAND QFUG = Sand	GRAY SAND = Sand	HARD	75	85	QFUG	SAND		
FINE SAND QFUR = Sand	RED SAND = Sand		85	105	QFUR	SAND		
CLAY STICKY QCUR = Clay	RED CLAY = Clay		105	135	QCUR	CLAY		
CLAY & STONE QPUG = Pebbly sand/silt/clay	GRAY CLAY = Clay	HARD	135	160	QPUG	CLAY	PEBL	
FINE SAND QFUR = Sand	RED SAND = Sand		160	175	QFUR	SAND		
CLAY QCUG = Clay	GRAY CLAY = Clay		175	195	QCUG	CLAY		
SAND & STONES & CLAY QPUG = Pebbly sand/silt/clay	GRAY SAND = Sand		195	205	QPUG	SAND	PEBL	CLAY
STONES & SAND QHUU = Sand & larger	DARK PEBL = Pebbles		205	215	QHUU	PEBL	SAND	
SHALE & STONES QPUU = Pebbly sand/silt/clay	TAN CLAY = Clay		215	220	QPUU	CLAY	PEBL	
SHALE QCUU = Clay	TAN CLAY = Clay		220	245	QCUU	CLAY		
SANDSTONE SHALE QLUG = Clay & sand	GRAY SAND = Sand		245	250	QLUG	SAND	CLAY	
SHALE QCUR = Clay	RED CLAY = Clay		250	257	QCUR	CLAY		

Unique No. 00168720	MINNESOTA DEPARTMENT OF HEALTH						Update Date 2007/02/07
County Name Anoka	WELL AND BORING RECORD						Entry Date 1991/04/15
<i>Minnesota Statutes Chapter 1031</i>							
Township Name Township	Range Dir	Section	Subsection	Well Depth		Depth Completed	Date Well Completed
	31 24 W	13	DADDBC	693	ft.	693 ft.	1977/03/25
Well Name COON RAPIDS 13	Lic. Or Reg. No. 02015		Name of Driller SIGAFOOS, G.				
USGS Quad Coon Rapi	Elevation 900	Aquifer CFMS	Alternative Id 80-6139				

GEOLOGICAL MATERIAL	COLOR	HARDNESS	FROM	TO	STRAT	LITH PRIM	LITH SEC	LITH MINOR
ST. LAWRANCE GREEN, RED, BLACK QUUU = Unknown deposit type	VARIED SAND = Sand		257	260	QUUU	SAND	CLAY	COBL
							CLAY = Clay	COBL = Cobble
HARDROCK QBUU = Boulder or boulders	TAN BLDR = Boulder		260	267	QBUU	BLDR		
HARDROCK CSTL = St.Lawrence	TAN DLMT = Dolomite		267	268	CSTL	DLMT	SLSN	
							SLSN = Siltstone	
SANDROCK CFRN = Franconia	LIGHT HARD SNDS = Sandstone		268	298	CFRN	SNDS	SHLE	DLMT
							SHLE = Shale	DLMT = Dolomite
SANDY ROCK, SHALE CFRN = Franconia	GREEN SNDS = Sandstone		298	312	CFRN	SNDS	SHLE	DLMT
							SHLE = Shale	DLMT = Dolomite
SANDROCK, SHALE CFRN = Franconia	LIGHT SNDS = Sandstone		312	338	CFRN	SNDS	SHLE	DLMT
							SHLE = Shale	DLMT = Dolomite
SANDSTONE GREEN-GRAY-RED CFRN = Franconia			338	403	CFRN	SNDS	SHLE	DLMT
							SHLE = Shale	DLMT = Dolomite
SANDSTONE GREEN-GRAY-RED CIGL = Ironton-Galesville			403	453	CIGL	SNDS		
							SNDS = Sandstone	
SANDSTONE GREEN-GRAY-RED CECR = Eau Claire			453	525	CECR	SHLE	SNDS	
							SHLE = Shale	SNDS = Sandstone
SANDSTONE GREEN-GRAY-RED CMTS = Mt.Simon			525	672	CMTS	SNDS		
							SNDS = Sandstone	
HINCKLEY SANDSTONE CMTS = Mt.Simon	RED SNDS = Sandstone		672	691	CMTS	SNDS		
							SNDS = Sandstone	
HINCKLEY SANDSTONE PMRC = Red Clastic Series			691	693	PMRC	SHLE		
							SHLE = Shale	

Unique No. 00110460	MINNESOTA DEPARTMENT OF HEALTH WELL AND BORING RECORD <i>Minnesota Statutes Chapter 1031</i>	Update Date 2007/02/07																																																																																															
County Name Anoka		Entry Date 1991/04/15																																																																																															
Township Name Township Range Dir Section Subsection 31 24 W 22 BCBDD	Well Depth 613 ft. Depth Completed 613 ft. Date Well Completed 1977/03/22																																																																																																
Well Name COON RAPIDS 14	Drilling Method Cable Tool																																																																																																
Well Owner's Name COON RAPIDS 14 2344 COON RAPIDS BL COON RAPIDS MN 55433	Drilling Fluid	Well Hydrofractured? <input type="checkbox"/> Yes <input type="checkbox"/> No From ft. to ft.																																																																																															
Contact's Name CITY OF COON RAPIDS 11155 ROBINSON NW DR COON RAPIDS MN 55433	Use Community Supply (municipal)																																																																																																
<table border="1" style="width:100%; border-collapse: collapse;"> <thead> <tr> <th>GEOLOGICAL MATERIAL</th> <th>COLOR</th> <th>HARDNESS</th> <th>FROM</th> <th>TO</th> </tr> </thead> <tbody> <tr><td>SAND & GRAVEL</td><td></td><td></td><td>0</td><td>60</td></tr> <tr><td>SAND</td><td>LT. BR</td><td></td><td>60</td><td>130</td></tr> <tr><td>SAND W/SHALE STREAKS</td><td>GREE</td><td></td><td>130</td><td>167</td></tr> <tr><td>SHALE-SANDY</td><td>GREE</td><td></td><td>167</td><td>170</td></tr> <tr><td>SHALE-SANDY</td><td>GREE</td><td></td><td>170</td><td>218</td></tr> <tr><td>SANDSTONE</td><td></td><td></td><td>218</td><td>250</td></tr> <tr><td>SANDY SHALE</td><td></td><td></td><td>250</td><td>305</td></tr> <tr><td>DOLOMITE/SHALE</td><td></td><td></td><td>305</td><td>330</td></tr> <tr><td>SHALE</td><td>RED</td><td></td><td>330</td><td>339</td></tr> <tr><td>SHALE</td><td>RED</td><td></td><td>339</td><td>340</td></tr> <tr><td>SAND</td><td>WHITE</td><td></td><td>340</td><td>385</td></tr> <tr><td>SHALE W/LIMESTONE SEA</td><td>VARIE</td><td></td><td>385</td><td>391</td></tr> <tr><td>SHALE W/LIMESTONE SEA</td><td>VARIE</td><td></td><td>391</td><td>450</td></tr> <tr><td>SANDSTONE W/SHALE</td><td>VARIE</td><td></td><td>450</td><td>456</td></tr> <tr><td>SANDSTONE W/SHALE</td><td>VARIE</td><td></td><td>456</td><td>520</td></tr> <tr><td>SHALE-STICKY</td><td></td><td></td><td>520</td><td>570</td></tr> <tr><td>SHALE W/SAND LAYERS</td><td></td><td></td><td>572</td><td>610</td></tr> <tr><td>SHALE</td><td>RED</td><td></td><td>610</td><td>613</td></tr> </tbody> </table>	GEOLOGICAL MATERIAL	COLOR	HARDNESS	FROM	TO	SAND & GRAVEL			0	60	SAND	LT. BR		60	130	SAND W/SHALE STREAKS	GREE		130	167	SHALE-SANDY	GREE		167	170	SHALE-SANDY	GREE		170	218	SANDSTONE			218	250	SANDY SHALE			250	305	DOLOMITE/SHALE			305	330	SHALE	RED		330	339	SHALE	RED		339	340	SAND	WHITE		340	385	SHALE W/LIMESTONE SEA	VARIE		385	391	SHALE W/LIMESTONE SEA	VARIE		391	450	SANDSTONE W/SHALE	VARIE		450	456	SANDSTONE W/SHALE	VARIE		456	520	SHALE-STICKY			520	570	SHALE W/SAND LAYERS			572	610	SHALE	RED		610	613	Casing Drive Shoe? <input checked="" type="checkbox"/> Yes <input type="checkbox"/> N Hole Diameter	
	GEOLOGICAL MATERIAL	COLOR	HARDNESS	FROM	TO																																																																																												
	SAND & GRAVEL			0	60																																																																																												
	SAND	LT. BR		60	130																																																																																												
	SAND W/SHALE STREAKS	GREE		130	167																																																																																												
	SHALE-SANDY	GREE		167	170																																																																																												
	SHALE-SANDY	GREE		170	218																																																																																												
	SANDSTONE			218	250																																																																																												
	SANDY SHALE			250	305																																																																																												
	DOLOMITE/SHALE			305	330																																																																																												
	SHALE	RED		330	339																																																																																												
	SHALE	RED		339	340																																																																																												
	SAND	WHITE		340	385																																																																																												
	SHALE W/LIMESTONE SEA	VARIE		385	391																																																																																												
	SHALE W/LIMESTONE SEA	VARIE		391	450																																																																																												
SANDSTONE W/SHALE	VARIE		450	456																																																																																													
SANDSTONE W/SHALE	VARIE		456	520																																																																																													
SHALE-STICKY			520	570																																																																																													
SHALE W/SAND LAYERS			572	610																																																																																													
SHALE	RED		610	613																																																																																													
	Casing Diameter Weight(lbs/ft) 30 in. t 222 ft 20 in. t 328 ft																																																																																																
	Screen N Open Hole From 328 ft. to 613 ft. Make Type																																																																																																
	Static Water Level 120 ft. from Land surface Date 1977/03/21																																																																																																
	PUMPING LEVEL (below land surface) 196 ft. after 8 hrs. pumping 1600 g.p.m.																																																																																																
	Well Head Completion Pitless adapter mfr Model Casing Protection <input checked="" type="checkbox"/> 12 in. above grade <input type="checkbox"/> At-grade(Environmental Wells and Borings ONLY)																																																																																																
	Grouting Information Well grouted? <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No Material From To (ft.) Amount(yds/bags) G 0 328 28 Y																																																																																																
	Nearest Known Source of Contamination ft. direction type Well disinfected upon completion? <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No																																																																																																
	Pump <input type="checkbox"/> Not Installed Date Installed Y Mfr nam Model HP Volts Drop Pipe Length ft. Capacity g.p.m Type T																																																																																																
REMARKS, ELEVATION, SOURCE OF DATA, etc. GAMMA LOGGED 2-6-1997 & 10-17-2001. M.G.S. NO. 1108. LOGGED BOTH TIMES BY JIM TRAEN. USGS Quad Coon Rapids Elevation 869 Aquifer: CFMS Alt Id: 80-6139	Any not in use and not sealed well(s) on property? <input type="checkbox"/> Yes <input type="checkbox"/> No Was a variance granted from the MDH for this Well? <input type="checkbox"/> Yes <input type="checkbox"/> No																																																																																																
	Well CONTRACTOR CERTIFICATION Lic. Or Reg. No. 27010 License Business Name Name of Driller LINDEKE, W.																																																																																																

Report Copy

Unique No. 00110460	MINNESOTA DEPARTMENT OF HEALTH						Update Date 2007/02/07	
County Name Anoka	WELL AND BORING RECORD						Entry Date 1991/04/15	
<i>Minnesota Statutes Chapter 1031</i>								
Township Name Township	Range 31	Dir 24	Section W 22	Subsection BCBDD	Well Depth 613 ft.		Depth Completed 613 ft.	Date Well Completed 1977/03/22
Well Name COON RAPIDS 14				Lic. Or Reg. No. 27010	Name of Driller LINDEKE, W.			
USGS Quad Coon Rapi	Elevation 869			Aquifer CFMS	Alternative Id 80-6139			

GEOLOGICAL MATERIAL	COLOR	HARDNESS	FROM	TO	STRAT	LITH PRIM	LITH SEC	LITH MINOR
SAND & GRAVEL QHUU = Sand & larger			0	60	QHUU	SAND	GRVL	
	SAND = Sand						GRVL = Gravel	
SAND QFUB = Sand	LT. BRN		60	130	QFUB	SAND		
	SAND = Sand							
SAND W/SHALE STREAKS QLUL = Clay & sand	GREEN		130	167	QLUL	SAND	CLAY	
	SAND = Sand						CLAY = Clay	
SHALE-SANDY QLUL = Clay & sand	GREEN		167	170	QLUL	CLAY	SAND	
	CLAY = Clay						SAND = Sand	
SHALE-SANDY CFRN = Franconia	GREEN		170	218	CFRN	SNDS	SHLE	DLMT
	SNDS = Sandstone						SHLE = Shale	DLMT = Dolomite
SANDSTONE CFRN = Franconia			218	250	CFRN	SNDS	SHLE	
	SNDS = Sandstone						SHLE = Shale	
SANDY SHALE CFRN = Franconia			250	305	CFRN	SNDS	SLSN	DLMT
	SNDS = Sandstone						SLSN = Siltstone	DLMT = Dolomite
DOLOMITE/SHALE CFRN = Franconia			305	330	CFRN	SNDS	DLMT	SHLE
	SNDS = Sandstone						DLMT = Dolomite	SHLE = Shale
SHALE CFRN = Franconia	RED		330	339	CFRN	SHLE	SNDS	DLMT
	SHLE = Shale						SNDS = Sandstone	DLMT = Dolomite
SHALE CIGL = Ironton-Galesville	RED		339	340	CIGL	SNDS		
	SNDS = Sandstone							
SAND CIGL = Ironton-Galesville	WHITE		340	385	CIGL	SNDS		
	SNDS = Sandstone							
SHALE W/LIMESTONE SEAMS CIGL = Ironton-Galesville	VARIED		385	391	CIGL	SNDS		
	SNDS = Sandstone							
SHALE W/LIMESTONE SEAMS CECR = Eau Claire	VARIED		391	450	CECR	SLSN	SHLE	
	SLSN = Siltstone						SHLE = Shale	
SANDSTONE W/SHALE CECR = Eau Claire	VARIED		450	456	CECR	SNDS	SLSN	
	SNDS = Sandstone						SLSN = Siltstone	

Unique No. 00110460	MINNESOTA DEPARTMENT OF HEALTH						Update Date 2007/02/07	
County Name Anoka	WELL AND BORING RECORD						Entry Date 1991/04/15	
<i>Minnesota Statutes Chapter 1031</i>								
Township Name	Township	Range	Dir	Section	Subsection	Well Depth	Depth Completed	Date Well Completed
	31	24	W	22	BCBBDD	613 ft.	613 ft.	1977/03/22
Well Name	COON RAPIDS 14			Lic. Or Reg. No.	27010	Name of Driller	LINDEKE, W.	
USGS Quad	Coon Rapi	Elevation	869	Aquifer	CFMS	Alternative Id	80-6139	

GEOLOGICAL MATERIAL	COLOR	HARDNESS	FROM	TO	STRAT	LITH PRIM	LITH SEC	LITH MINOR
SANDSTONE W/SHALE CMTS = Mt.Simon	VARIED SNDS = Sandstone		456	520	CMTS	SNDS	SLSN	SLSN = Siltstone
SHALE-STICKY CMTS = Mt.Simon	SNDS = Sandstone		520	570	CMTS	SNDS		
SHALE W/SAND LAYERS CMTS = Mt.Simon	SNDS = Sandstone		572	610	CMTS	SNDS		
SHALE PMRC = Red Clastic Series	RED SHLE = Shale		610	613	PMRC	SHLE		

Unique No. 00110461	MINNESOTA DEPARTMENT OF HEALTH WELL AND BORING RECORD <i>Minnesota Statutes Chapter 1031</i>	Update Date 2007/02/07																																																																																																																								
County Name Anoka		Entry Date 1991/04/15																																																																																																																								
Township Name Township Range Dir Section Subsection 31 24 W 22 BCDDCA	Well Depth 615 ft. Depth Completed 615 ft. Date Well Completed 1976/09/13																																																																																																																									
Well Name COON RAPIDS 15	Drilling Method Cable Tool																																																																																																																									
Well Owner's Name COON RAPIDS 15 2231 105TH AV COON RAPIDS MN 55433	Drilling Fluid	Well Hydrofractured? <input type="checkbox"/> Yes <input type="checkbox"/> No From ft. to ft.																																																																																																																								
Contact's Name CITY OF COON RAPIDS 11155 ROBINSON NW DR COON RAPIDS MN 55433	Use Community Supply (municipal)																																																																																																																									
<table border="1" style="width:100%; border-collapse: collapse;"> <thead> <tr> <th>GEOLOGICAL MATERIAL</th> <th>COLOR</th> <th>HARDNESS</th> <th>FROM</th> <th>TO</th> </tr> </thead> <tbody> <tr><td>DIRT</td><td>BLACK</td><td></td><td>0</td><td>3</td></tr> <tr><td>FINE SAND</td><td></td><td></td><td>3</td><td>25</td></tr> <tr><td>SAND & ROCKS</td><td></td><td></td><td>25</td><td>35</td></tr> <tr><td>CLAY</td><td></td><td>HARD</td><td>35</td><td>40</td></tr> <tr><td>CLAY & FINE SAND</td><td></td><td></td><td>40</td><td>87</td></tr> <tr><td>SAND, TRACE OF CLAY</td><td></td><td></td><td>87</td><td>97</td></tr> <tr><td>SAND/GRAVEL/TRACES OF</td><td></td><td></td><td>97</td><td>121</td></tr> <tr><td>FINE SAND, TRACE OF CLA</td><td></td><td></td><td>121</td><td>145</td></tr> <tr><td>SANDSTONE</td><td></td><td>SOFT</td><td>145</td><td>160</td></tr> <tr><td>SHALE</td><td>BLUE</td><td></td><td>160</td><td>170</td></tr> <tr><td>RED SHALE & SANDROCK</td><td>RED</td><td></td><td>170</td><td>178</td></tr> <tr><td>SAND/GRAVEL/TRACE OF S</td><td>GREE</td><td></td><td>178</td><td>183</td></tr> <tr><td>GREEN SHALE & ROCK</td><td>GREE</td><td></td><td>183</td><td>194</td></tr> <tr><td>FRANCONIA SANDSTONE</td><td></td><td></td><td>194</td><td>295</td></tr> <tr><td>FRANCONIA SHALE STREA</td><td></td><td></td><td>295</td><td>340</td></tr> <tr><td>FRANCONIA SHALE STREA</td><td></td><td></td><td>340</td><td>348</td></tr> <tr><td>RED & BLUE SHALE STREA</td><td></td><td></td><td>348</td><td>352</td></tr> <tr><td>IRONTON GALESVILLE SAN</td><td></td><td></td><td>352</td><td>405</td></tr> <tr><td>EAU CLAIRE SHALE</td><td></td><td></td><td>405</td><td>485</td></tr> <tr><td>MT. SIMON</td><td></td><td></td><td>485</td><td>510</td></tr> <tr><td>MT. SIMON, TRACE OF SHA</td><td></td><td></td><td>510</td><td>540</td></tr> <tr><td>MT. SIMON</td><td></td><td>HARD</td><td>540</td><td>610</td></tr> <tr><td>SHALE</td><td>RED</td><td></td><td>610</td><td>615</td></tr> </tbody> </table>	GEOLOGICAL MATERIAL	COLOR	HARDNESS	FROM	TO	DIRT	BLACK		0	3	FINE SAND			3	25	SAND & ROCKS			25	35	CLAY		HARD	35	40	CLAY & FINE SAND			40	87	SAND, TRACE OF CLAY			87	97	SAND/GRAVEL/TRACES OF			97	121	FINE SAND, TRACE OF CLA			121	145	SANDSTONE		SOFT	145	160	SHALE	BLUE		160	170	RED SHALE & SANDROCK	RED		170	178	SAND/GRAVEL/TRACE OF S	GREE		178	183	GREEN SHALE & ROCK	GREE		183	194	FRANCONIA SANDSTONE			194	295	FRANCONIA SHALE STREA			295	340	FRANCONIA SHALE STREA			340	348	RED & BLUE SHALE STREA			348	352	IRONTON GALESVILLE SAN			352	405	EAU CLAIRE SHALE			405	485	MT. SIMON			485	510	MT. SIMON, TRACE OF SHA			510	540	MT. SIMON		HARD	540	610	SHALE	RED		610	615	Casing Drive Shoe? <input checked="" type="checkbox"/> Yes <input type="checkbox"/> N Hole Diameter	
	GEOLOGICAL MATERIAL	COLOR	HARDNESS	FROM	TO																																																																																																																					
	DIRT	BLACK		0	3																																																																																																																					
	FINE SAND			3	25																																																																																																																					
	SAND & ROCKS			25	35																																																																																																																					
	CLAY		HARD	35	40																																																																																																																					
	CLAY & FINE SAND			40	87																																																																																																																					
	SAND, TRACE OF CLAY			87	97																																																																																																																					
	SAND/GRAVEL/TRACES OF			97	121																																																																																																																					
	FINE SAND, TRACE OF CLA			121	145																																																																																																																					
	SANDSTONE		SOFT	145	160																																																																																																																					
	SHALE	BLUE		160	170																																																																																																																					
	RED SHALE & SANDROCK	RED		170	178																																																																																																																					
	SAND/GRAVEL/TRACE OF S	GREE		178	183																																																																																																																					
	GREEN SHALE & ROCK	GREE		183	194																																																																																																																					
FRANCONIA SANDSTONE			194	295																																																																																																																						
FRANCONIA SHALE STREA			295	340																																																																																																																						
FRANCONIA SHALE STREA			340	348																																																																																																																						
RED & BLUE SHALE STREA			348	352																																																																																																																						
IRONTON GALESVILLE SAN			352	405																																																																																																																						
EAU CLAIRE SHALE			405	485																																																																																																																						
MT. SIMON			485	510																																																																																																																						
MT. SIMON, TRACE OF SHA			510	540																																																																																																																						
MT. SIMON		HARD	540	610																																																																																																																						
SHALE	RED		610	615																																																																																																																						
	Casing Diameter Weight(lbs/ft) 30 in. t 184 ft 20 in. t 225 ft																																																																																																																									
	Screen N Open Hole From 225 ft. to 615 ft. Make Type																																																																																																																									
	Static Water Level 50 ft. from Land surface Date 1976/09/10																																																																																																																									
	PUMPING LEVEL (below land surface) 148 ft. after 15 hrs. pumping 2400 g.p.m.																																																																																																																									
	Well Head Completion Pitless adapter mfr Model Casing Protection <input type="checkbox"/> 12 in. above grade <input type="checkbox"/> At-grade(Environmental Wells and Borings ONLY)																																																																																																																									
	Grouting Information Well grouted? <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No Material From To (ft.) Amount(yds/bags) G 15 Y																																																																																																																									
	Nearest Known Source of Contamination ft. direction type Well disinfected upon completion? <input type="checkbox"/> Yes <input type="checkbox"/> No																																																																																																																									
	Pump <input type="checkbox"/> Not Installed Date Installed Mfr nam Model HP Volts Drop Pipe Length ft. Capacity g.p.m Type																																																																																																																									
	Any not in use and not sealed well(s) on property? <input type="checkbox"/> Yes <input type="checkbox"/> No																																																																																																																									
	Was a variance granted from the MDH for this Well? <input type="checkbox"/> Yes <input type="checkbox"/> No																																																																																																																									
	Well CONTRACTOR CERTIFICATION Lic. Or Reg. No. 27010 License Business Name Name of Driller <u>HOLLEN, G.</u>																																																																																																																									
REMARKS, ELEVATION, SOURCE OF DATA, etc. GAMMA LOGGED 4-26-2002. M.G.S. NO. 1105. LOGGED BY JIM TRAEN. USGS Quad Coon Rapids Elevation 870 Aquifer: CFMS Alt Id: 80-6139																																																																																																																										

Report Copy

Unique No. 00110461	MINNESOTA DEPARTMENT OF HEALTH						Update Date 2007/02/07
County Name Anoka	WELL AND BORING RECORD						Entry Date 1991/04/15
<i>Minnesota Statutes Chapter 1031</i>							
Township Name Township	Range 31	Dir 24	Section W 22	Subsection BCDDCA	Well Depth 615	Depth Completed 615	Date Well Completed 1976/09/13
Well Name COON RAPIDS 15				Lic. Or Reg. No. 27010	Name of Driller HOLLEN, G.		
USGS Quad Coon Rapi	Elevation 870			Aquifer CFMS	Alternative Id 80-6139		

GEOLOGICAL MATERIAL	COLOR	HARDNESS	FROM	TO	STRAT	LITH PRIM	LITH SEC	LITH MINOR
DIRT RUUK = Recent Deposit	BLACK SOIL = Soil		0	3	RUUK	SOIL	ORGD	
ORGD = Organic Deposits								
FINE SAND QFUU = Sand	SAND = Sand		3	25	QFUU	SAND		
SAND & ROCKS QHUU = Sand & larger	SAND = Sand		25	35	QHUU	SAND	COBL	
COBL = Cobble								
CLAY QCUU = Clay	CLAY = Clay	HARD	35	40	QCUU	CLAY		
CLAY & FINE SAND QLUU = Clay & sand	CLAY = Clay		40	87	QLUU	CLAY	SAND	
SAND = Sand								
SAND, TRACE OF CLAY QLUU = Clay & sand	SAND = Sand		87	97	QLUU	SAND	CLAY	
CLAY = Clay								
SAND/GRAVEL/TRACES OF CLAY QPUU = Pebbly sand/silt/clay	SAND = Sand		97	121	QPUU	SAND	GRVL	CLAY
GRVL = Gravel CLAY = Clay								
FINE SAND, TRACE OF CLAY QLUU = Clay & sand	SAND = Sand		121	145	QLUU	SAND	CLAY	
CLAY = Clay								
SANDSTONE QFUU = Sand	SAND = Sand	SOFT	145	160	QFUU	SAND		
SHALE QCUG = Clay	BLUE CLAY = Clay		160	170	QCUG	CLAY		
RED SHALE & SANDROCK QLUR = Clay & sand	RED CLAY = Clay		170	178	QLUR	CLAY	SAND	
SAND = Sand								
SAND/GRAVEL/TRACE OF SHALE QHUU = Sand & larger	GREEN SAND = Sand		178	183	QHUU	SAND	GRVL	
GRVL = Gravel								
GREEN SHALE & ROCK CFRN = Franconia	GREEN SHLE = Shale		183	194	CFRN	SHLE	DLMT	
DLMT = Dolomite								
FRANCONIA SANDSTONE CFRN = Franconia	SNDS = Sandstone		194	295	CFRN	SNDS	SHLE	
SHLE = Shale								

Unique No. 00110461	MINNESOTA DEPARTMENT OF HEALTH						Update Date 2007/02/07	
County Name Anoka	WELL AND BORING RECORD						Entry Date 1991/04/15	
<i>Minnesota Statutes Chapter 1031</i>								
Township Name	Township	Range	Dir	Section	Subsection	Well Depth	Depth Completed	Date Well Completed
	31	24	W	22	BCDDCA	615 ft.	615 ft.	1976/09/13
Well Name	COON RAPIDS 15			Lic. Or Reg. No.	27010	Name of Driller	HOLLEN, G.	
USGS Quad	Coon Rapi	Elevation	870	Aquifer	CFMS	Alternative Id	80-6139	

GEOLOGICAL MATERIAL	COLOR	HARDNESS	FROM	TO	STRAT	LITH PRIM	LITH SEC	LITH MINOR
FRANCONIA SHALE STREAKS CFRN = Franconia			295	340	CFRN	SNDS	SHLE	DLMT
	SNDS = Sandstone						DLMT = Dolomite	
FRANCONIA SHALE STREAKS CIGL = Ironton-Galesville			340	348	CIGL	SNDS		
	SNDS = Sandstone							
RED & BLUE SHALE STREAKS CIGL = Ironton-Galesville			348	352	CIGL	SNDS		
	SNDS = Sandstone							
IRONTON GALESVILLE SANDSTONE CIGL = Ironton-Galesville			352	405	CIGL	SNDS		
	SNDS = Sandstone							
EAU CLAIRE SHALE CECR = Eau Claire			405	485	CECR	SHLE	SNDS	
	SHLE = Shale						SNDS = Sandstone	
MT. SIMON CMTS = Mt.Simon			485	510	CMTS	SNDS		
	SNDS = Sandstone							
MT. SIMON, TRACE OF SHALE CMTS = Mt.Simon			510	540	CMTS	SNDS		
	SNDS = Sandstone							
MT. SIMON CMTS = Mt.Simon		HARD	540	610	CMTS	SNDS		
	SNDS = Sandstone							
SHALE PMRC = Red Clastic Series	RED		610	615	PMRC	SHLE		
	SHLE = Shale							

Unique No. 00161413	MINNESOTA DEPARTMENT OF HEALTH WELL AND BORING RECORD <i>Minnesota Statutes Chapter 1031</i>	Update Date 2007/02/06																																																																																											
County Name Anoka		Entry Date 1991/04/15																																																																																											
Township Name Township Range Dir Section Subsection 31 24 W 11 ADAAAA	Well Depth 653 ft.	Depth Completed 653 ft. Date Well Completed 1981/04/10																																																																																											
Well Name COON RAPIDS 16	Drilling Method Cable Tool																																																																																												
Well Owner's Name COON RAPIDS 16 12280 OLIVE ST COON RAPIDS MN 55433	Drilling Fluid	Well Hydrofractured? <input type="checkbox"/> Yes <input type="checkbox"/> No From ft. to ft.																																																																																											
Contact's Name CITY OF COON RAPID 11155 ROBINSON NW DR COON RAPIDS MN 55433	Use Community Supply (municipal)																																																																																												
<table border="1" style="width:100%; border-collapse: collapse;"> <thead> <tr> <th>GEOLOGICAL MATERIAL</th> <th>COLOR</th> <th>HARDNESS</th> <th>FROM</th> <th>TO</th> </tr> </thead> <tbody> <tr><td>SAND</td><td></td><td></td><td>0</td><td>73</td></tr> <tr><td>CLAY SAND & GRAVEL</td><td></td><td></td><td>73</td><td>112</td></tr> <tr><td>CLAY & SAND</td><td></td><td></td><td>112</td><td>130</td></tr> <tr><td>WATER, SAND & GRAVEL</td><td></td><td></td><td>130</td><td>166</td></tr> <tr><td>BOULDERS</td><td></td><td></td><td>166</td><td>176</td></tr> <tr><td>GRAVEL W/SANDROCK</td><td></td><td></td><td>176</td><td>181</td></tr> <tr><td>GRAVEL W/SANDROCK</td><td></td><td></td><td>181</td><td>187</td></tr> <tr><td>SHALE</td><td></td><td></td><td>187</td><td>239</td></tr> <tr><td>SHALE</td><td></td><td></td><td>239</td><td>252</td></tr> <tr><td>SANDROCK</td><td></td><td>SOFT</td><td>252</td><td>270</td></tr> <tr><td>SHALE & SANDROCK</td><td></td><td></td><td>270</td><td>376</td></tr> <tr><td>SHALE & SANDROCK</td><td></td><td></td><td>376</td><td>435</td></tr> <tr><td>SANDROCK</td><td></td><td></td><td>435</td><td>441</td></tr> <tr><td>SANDROCK</td><td></td><td></td><td>441</td><td>455</td></tr> <tr><td>SHALE (EAU CLAIRE)</td><td></td><td></td><td>455</td><td>517</td></tr> <tr><td>SANDROCK</td><td></td><td></td><td>517</td><td>518</td></tr> <tr><td>SANDROCK</td><td></td><td></td><td>518</td><td>653</td></tr> </tbody> </table>	GEOLOGICAL MATERIAL	COLOR	HARDNESS	FROM	TO	SAND			0	73	CLAY SAND & GRAVEL			73	112	CLAY & SAND			112	130	WATER, SAND & GRAVEL			130	166	BOULDERS			166	176	GRAVEL W/SANDROCK			176	181	GRAVEL W/SANDROCK			181	187	SHALE			187	239	SHALE			239	252	SANDROCK		SOFT	252	270	SHALE & SANDROCK			270	376	SHALE & SANDROCK			376	435	SANDROCK			435	441	SANDROCK			441	455	SHALE (EAU CLAIRE)			455	517	SANDROCK			517	518	SANDROCK			518	653	Casing	Drive Shoe? <input checked="" type="checkbox"/> Yes <input type="checkbox"/> N	Hole Diameter
	GEOLOGICAL MATERIAL	COLOR	HARDNESS	FROM	TO																																																																																								
	SAND			0	73																																																																																								
	CLAY SAND & GRAVEL			73	112																																																																																								
	CLAY & SAND			112	130																																																																																								
	WATER, SAND & GRAVEL			130	166																																																																																								
	BOULDERS			166	176																																																																																								
	GRAVEL W/SANDROCK			176	181																																																																																								
	GRAVEL W/SANDROCK			181	187																																																																																								
	SHALE			187	239																																																																																								
SHALE			239	252																																																																																									
SANDROCK		SOFT	252	270																																																																																									
SHALE & SANDROCK			270	376																																																																																									
SHALE & SANDROCK			376	435																																																																																									
SANDROCK			435	441																																																																																									
SANDROCK			441	455																																																																																									
SHALE (EAU CLAIRE)			455	517																																																																																									
SANDROCK			517	518																																																																																									
SANDROCK			518	653																																																																																									
	Casing Diameter	Weight(lbs/ft)																																																																																											
	30 in. t	169 ft	118																																																																																										
	24 in. t	270 ft	94.62																																																																																										
	18 in. t	395 ft	70.59																																																																																										
	Screen N	Open Hole From 395 ft. to 653 ft.																																																																																											
	Make	Type																																																																																											
	Static Water Level 109 ft. from Land surface		Date 1981/04/10																																																																																										
	PUMPING LEVEL (below land surface) 190 ft. after 34 hrs. pumping 2000 g.p.m.																																																																																												
	Well Head Completion																																																																																												
	Pitless adapter mfr	Model																																																																																											
	Casing Protection	<input checked="" type="checkbox"/> 12 in. above grade																																																																																											
	<input type="checkbox"/> At-grade(Environmental Wells and Borings ONLY)																																																																																												
	Grouting Information	Well grouted? <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No																																																																																											
	Material	From To (ft.)	Amount(yds/bags)																																																																																										
	G	0 395																																																																																											
	Nearest Known Source of Contamination																																																																																												
	ft.	direction	type																																																																																										
	Well disinfected upon completion? <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No																																																																																												
	Pump <input type="checkbox"/> Not Installed	Date Installed																																																																																											
	Mfr nam																																																																																												
	Model	HP	Volts																																																																																										
	Drop Pipe Length	ft.	Capacity g.p.m																																																																																										
	Type																																																																																												
REMARKS, ELEVATION, SOURCE OF DATA, etc.																																																																																													
M.G.S. NO. 1608 & 1705. GAMMA LOGGED10-17-2001 BY SUMMIT ENVIRON.																																																																																													
USGS Quad	Coon Rapids	Elevation	889																																																																																										
Aquifer:	CIGM	Alt Id:	80-6187																																																																																										
Report Copy																																																																																													
Any not in use and not sealed well(s) on property? <input type="checkbox"/> Yes <input type="checkbox"/> No																																																																																													
Was a variance granted from the MDH for this Well? <input type="checkbox"/> Yes <input type="checkbox"/> No																																																																																													
Well CONTRACTOR CERTIFICATION Lic. Or Reg. No. <u>27058</u>																																																																																													
License Business Name																																																																																													
Name of Driller																																																																																													

Unique No. 00161413	MINNESOTA DEPARTMENT OF HEALTH						Update Date 2007/02/06
County Name Anoka	WELL AND BORING RECORD						Entry Date 1991/04/15
<i>Minnesota Statutes Chapter 1031</i>							
Township Name Township	Range 31	Dir 24	Section W 11	Subsection ADAAAA	Well Depth 653	Depth Completed ft. 653	Date Well Completed 1981/04/10
Well Name COON RAPIDS 16				Lic. Or Reg. No. 27058	Name of Driller		
USGS Quad Coon Rapi	Elevation 889			Aquifer CIGM	Alternative Id 80-6187		

GEOLOGICAL MATERIAL	COLOR	HARDNESS	FROM	TO	STRAT	LITH PRIM	LITH SEC	LITH MINOR
SAND QFUU = Sand	SAND = Sand		0	73	QFUU	SAND		
CLAY SAND & GRAVEL QPUU = Pebbly sand/silt/clay	CLAY = Clay		73	112	QPUU	CLAY	SAND	GRVL
							GRVL = Gravel	
CLAY & SAND QLUU = Clay & sand	CLAY = Clay		112	130	QLUU	CLAY	SAND	
WATER, SAND & GRAVEL QHUU = Sand & larger	SAND = Sand		130	166	QHUU	SAND	GRVL	
BOULDERS QBUU = Boulder or boulders	BLDR = Boulder		166	176	QBUU	BLDR		
GRAVEL W/SANDROCK QGUU = Gravel (+larger)	SAND = Sand		176	181	QGUU	SAND	COBL	
GRAVEL W/SANDROCK CSTL = St.Lawrence	SHLE = Shale		181	187	CSTL	SHLE	DLMT	SNDS
								SNDS = Sandstone
SHALE CSTL = St.Lawrence	SHLE = Shale		187	239	CSTL	SHLE	DLMT	SNDS
								SNDS = Sandstone
SHALE CFRN = Franconia	SNDS = Sandstone		239	252	CFRN	SNDS	SHLE	DLMT
								DLMT = Dolomite
SANDROCK CFRN = Franconia	SNDS = Sandstone	SOFT	252	270	CFRN	SNDS	SHLE	DLMT
								DLMT = Dolomite
SHALE & SANDROCK CFRN = Franconia	SNDS = Sandstone		270	376	CFRN	SNDS	SHLE	DLMT
								DLMT = Dolomite
SHALE & SANDROCK CIGL = Ironton-Galesville	SNDS = Sandstone		376	435	CIGL	SNDS		
SANDROCK CIGL = Ironton-Galesville	SNDS = Sandstone		435	441	CIGL	SNDS		
SANDROCK CECR = Eau Claire	SHLE = Shale		441	455	CECR	SHLE	SNDS	
								SNDS = Sandstone

Unique No. 00161413	MINNESOTA DEPARTMENT OF HEALTH						Update Date 2007/02/06	
County Name Anoka	WELL AND BORING RECORD						Entry Date 1991/04/15	
<i>Minnesota Statutes Chapter 1031</i>								
Township Name	Township	Range	Dir	Section	Subsection	Well Depth	Depth Completed	Date Well Completed
	31	24	W	11	ADAAAA	653 ft.	653 ft.	1981/04/10
Well Name	COON RAPIDS 16			Lic. Or Reg. No.	27058	Name of Driller		
USGS Quad	Coon Rapi	Elevation	889	Aquifer	CIGM	Alternative Id	80-6187	

GEOLOGICAL MATERIAL	COLOR	HARDNESS	FROM	TO	STRAT	LITH PRIM	LITH SEC	LITH MINOR
SHALE (EAU CLAIRE) CECR = Eau Claire	SHLE = Shale		455	517	CECR	SHLE	SNDS	SNDS = Sandstone
SANDROCK CECR = Eau Claire	SHLE = Shale		517	518	CECR	SHLE	SNDS	SNDS = Sandstone
SANDROCK CMTS = Mt.Simon	SNDS = Sandstone		518	653	CMTS	SNDS		

Unique No. 00150357	MINNESOTA DEPARTMENT OF HEALTH WELL AND BORING RECORD <i>Minnesota Statutes Chapter 1031</i>	Update Date 2007/02/07
County Name Anoka		Entry Date 1991/04/15
Township Name Township Range Dir Section Subsection 31 24 W 21 DAAAAA	Well Depth 121 ft. Depth Completed 121 ft. Date Well Completed 1981/12/18	
Well Name COON RAPIDS 17	Drilling Method Cable Tool	
Well Owner's Name COON RAPIDS 17 2400 105TH NW AV COON RAPIDS MN 55433	Drilling Fluid	Well Hydrofractured? <input type="checkbox"/> Yes <input type="checkbox"/> No From ft. to ft.
Contact's Name CITY OF COON RAPIDS 11155 ROBINSON NW DR COON RAPIDS MN 55433	Use Community Supply (municipal)	
GEOLOGICAL MATERIAL COLOR HARDNESS FROM TO	Casing Drive Shoe? <input checked="" type="checkbox"/> Yes <input type="checkbox"/> N	Hole Diameter in. t 121 ft
DIRT BLACK 0 3	Casing Diameter 30 in. t Weight(lbs/ft) 81 ft 118.6	
SAND & GRAVEL & SOME C 3 59		
SANDY CLAY SOFT 59 70		
CLEAN COARSE GRAVEL & RED 70 98		
CLEAN COARSE SAND & G 98 108		
MEDIUM GRAVEL SAND & 108 113		
COARSE SAND & GRAVEL 113 121		
	Screen Y Open Hole From ft. to ft.	
	Make JOHNSON Type L	
	Diameter Slot Length Set Fitting	
	30 20 40 81 ft. to 121 ft	
	Static Water Level 15 ft. from Land surface Date 1981/12/18	
	PUMPING LEVEL (below land surface) 72 ft. after 4 hrs. pumping 2000 g.p.m.	
	Well Head Completion Pitless adapter mfr Model Casing Protection <input checked="" type="checkbox"/> 12 in. above grade <input type="checkbox"/> At-grade(Environmental Wells and Borings ONLY)	
	Grouting Information Well grouted? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	
	Nearest Known Source of Contamination ft. direction type Well disinfected upon completion? <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	
	Pump <input checked="" type="checkbox"/> Not Installed Date Installed N Mfr nam Model HP Volts Drop Pipe Length ft. Capacity g.p.m Type	
REMARKS, ELEVATION, SOURCE OF DATA, etc.	Any not in use and not sealed well(s) on property? <input type="checkbox"/> Yes <input type="checkbox"/> No	
GAMMA LOGGED 10-23-2001 BY SUMMIT ENVIR.	Was a variance granted from the MDH for this Well? <input type="checkbox"/> Yes <input type="checkbox"/> No	
USGS Quad Coon Rapids Elevation 855 Aquifer: QBAA Alt Id: 80-6139	Well CONTRACTOR CERTIFICATION Lic. Or Reg. No. <u>27010</u> License Business Name Name of Driller <u>KAUITSON, K.</u>	

Report Copy

Unique No. 00150357	MINNESOTA DEPARTMENT OF HEALTH						Update Date 2007/02/07	
County Name Anoka	WELL AND BORING RECORD						Entry Date 1991/04/15	
<i>Minnesota Statutes Chapter 1031</i>								
Township Name	Township	Range	Dir	Section	Subsection	Well Depth	Depth Completed	Date Well Completed
	31	24	W	21	DAAAAA	121 ft.	121 ft.	1981/12/18
Well Name	COON RAPIDS 17			Lic. Or Reg. No.	27010	Name of Driller	KAUITSON, K.	
USGS Quad	Coon Rapi	Elevation	855	Aquifer	QBAA	Alternative Id	80-6139	

GEOLOGICAL MATERIAL	COLOR	HARDNESS	FROM	TO	STRAT	LITH PRIM	LITH SEC	LITH MINOR
DIRT RUUK = Recent Deposit	BLACK SOIL = Soil		0	3	RUUK	SOIL	ORGD	
							ORGD = Organic Deposits	
SAND & GRAVEL & SOME CLAY QPUU = Pebbly sand/silt/clay	SAND = Sand		3	59	QPUU	SAND	GRVL CLAY = Clay	CLAY
							GRVL = Gravel	
SANDY CLAY QLUU = Clay & sand	CLAY = Clay	SOFT	59	70	QLUU	CLAY	SAND	
							SAND = Sand	
CLEAN COARSE GRAVEL & SAND QHUR = Sand & larger	RED GRVL = Gravel		70	98	QHUR	GRVL	SAND	
							SAND = Sand	
CLEAN COARSE SAND & GRAVEL QHUU = Sand & larger	SAND = Sand		98	108	QHUU	SAND	GRVL	
							GRVL = Gravel	
MEDIUM GRAVEL SAND & GRAVEL QHUU = Sand & larger	GRVL = Gravel		108	113	QHUU	GRVL	SAND	
							SAND = Sand	
COARSE SAND & GRAVEL QHUU = Sand & larger	SAND = Sand		113	121	QHUU	SAND	GRVL	
							GRVL = Gravel	

Unique No. 00110469	MINNESOTA DEPARTMENT OF HEALTH WELL AND BORING RECORD <i>Minnesota Statutes Chapter 1031</i>	Update Date 2008/12/29																																																																																															
County Name Anoka		Entry Date 1991/04/15																																																																																															
Township Name Township Range Dir Section Subsection 31 24 W 2 DCDCDB	Well Depth 637 ft. Depth Completed 637 ft. Date Well Completed 1986/05/00																																																																																																
Well Name COON RAPIDS 18	Drilling Method Cable Tool																																																																																																
Well Owner's Name COON RAPIDS COON RAPIDS MN 55448	Drilling Fluid	Well Hydrofractured? <input type="checkbox"/> Yes <input type="checkbox"/> No From ft. to ft.																																																																																															
Contact's Name CITY OF COON RAPIDS 11155 ROBINSON NW DR COON RAPIDS MN 55433	Use Community Supply (municipal)																																																																																																
<table border="1" style="width:100%; border-collapse: collapse;"> <thead> <tr> <th>GEOLOGICAL MATERIAL</th> <th>COLOR</th> <th>HARDNESS</th> <th>FROM</th> <th>TO</th> </tr> </thead> <tbody> <tr><td>SAND</td><td>BROW</td><td></td><td>0</td><td>14</td></tr> <tr><td>PEAT</td><td>BLK/B</td><td></td><td>14</td><td>17</td></tr> <tr><td>SAND MEDIUM</td><td>BROW</td><td></td><td>17</td><td>67</td></tr> <tr><td>CLAY</td><td></td><td></td><td>67</td><td>120</td></tr> <tr><td>CLAY-SHALE</td><td>RED</td><td></td><td>120</td><td>142</td></tr> <tr><td>CLAY & SAND</td><td>RED</td><td></td><td>142</td><td>194</td></tr> <tr><td>CLAY & SAND</td><td>RED</td><td></td><td>194</td><td>198</td></tr> <tr><td>SHALE & SAND</td><td>GRN/G</td><td></td><td>198</td><td>226</td></tr> <tr><td>SHALE & SAND</td><td></td><td></td><td>226</td><td>228</td></tr> <tr><td>FRANCONIA</td><td>GREE</td><td></td><td>228</td><td>367</td></tr> <tr><td>GALESVILLE</td><td></td><td></td><td>367</td><td>429</td></tr> <tr><td>GALESVILLE</td><td></td><td></td><td>429</td><td>432</td></tr> <tr><td>SHALE</td><td></td><td></td><td>432</td><td>486</td></tr> <tr><td>MT. SIMON</td><td></td><td></td><td>486</td><td>509</td></tr> <tr><td>MT. SIMON</td><td></td><td></td><td>509</td><td>593</td></tr> <tr><td>SHALEY SANDSTON</td><td></td><td></td><td>593</td><td>616</td></tr> <tr><td>MIXED SHALE & SANDSTO</td><td></td><td></td><td>616</td><td>631</td></tr> <tr><td>SANDSTONE</td><td>RED</td><td></td><td>631</td><td>637</td></tr> </tbody> </table>	GEOLOGICAL MATERIAL	COLOR	HARDNESS	FROM	TO	SAND	BROW		0	14	PEAT	BLK/B		14	17	SAND MEDIUM	BROW		17	67	CLAY			67	120	CLAY-SHALE	RED		120	142	CLAY & SAND	RED		142	194	CLAY & SAND	RED		194	198	SHALE & SAND	GRN/G		198	226	SHALE & SAND			226	228	FRANCONIA	GREE		228	367	GALESVILLE			367	429	GALESVILLE			429	432	SHALE			432	486	MT. SIMON			486	509	MT. SIMON			509	593	SHALEY SANDSTON			593	616	MIXED SHALE & SANDSTO			616	631	SANDSTONE	RED		631	637	Casing Drive Shoe? <input checked="" type="checkbox"/> Yes <input type="checkbox"/> N Hole Diameter	
	GEOLOGICAL MATERIAL	COLOR	HARDNESS	FROM	TO																																																																																												
	SAND	BROW		0	14																																																																																												
	PEAT	BLK/B		14	17																																																																																												
	SAND MEDIUM	BROW		17	67																																																																																												
	CLAY			67	120																																																																																												
	CLAY-SHALE	RED		120	142																																																																																												
	CLAY & SAND	RED		142	194																																																																																												
	CLAY & SAND	RED		194	198																																																																																												
	SHALE & SAND	GRN/G		198	226																																																																																												
	SHALE & SAND			226	228																																																																																												
	FRANCONIA	GREE		228	367																																																																																												
	GALESVILLE			367	429																																																																																												
	GALESVILLE			429	432																																																																																												
	SHALE			432	486																																																																																												
MT. SIMON			486	509																																																																																													
MT. SIMON			509	593																																																																																													
SHALEY SANDSTON			593	616																																																																																													
MIXED SHALE & SANDSTO			616	631																																																																																													
SANDSTONE	RED		631	637																																																																																													
	Casing Diameter Weight(lbs/ft)																																																																																																
	36 in. t 135 ft																																																																																																
	30 in. t 195 ft																																																																																																
	24 in. t 575 ft																																																																																																
	Screen N Open Hole From 575 ft. to 637 ft.																																																																																																
	Make Type																																																																																																
	Static Water Level 140 ft. from Land surface Date 1986/05/00																																																																																																
	PUMPING LEVEL (below land surface) 248 ft. after 36 hrs. pumping 1400 g.p.m.																																																																																																
	Well Head Completion Pitless adapter mfr Model Casing Protection <input checked="" type="checkbox"/> 12 in. above grade <input type="checkbox"/> At-grade(Environmental Wells and Borings ONLY)																																																																																																
	Grouting Information Well grouted? <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No Material From To (ft.) Amount(yds/bags) G 0 575 67.5 Y																																																																																																
	Nearest Known Source of Contamination ft. direction type Well disinfected upon completion? <input type="checkbox"/> Yes <input type="checkbox"/> No																																																																																																
	Pump <input checked="" type="checkbox"/> Not Installed Date Installed N Mfr nam Model HP Volts Drop Pipe Length ft. Capacity g.p.m Type																																																																																																
	Any not in use and not sealed well(s) on property? <input type="checkbox"/> Yes <input type="checkbox"/> No																																																																																																
	Was a variance granted from the MDH for this Well? <input type="checkbox"/> Yes <input type="checkbox"/> No																																																																																																
	Well CONTRACTOR CERTIFICATION Lic. Or Reg. No. 27010 License Business Name Name of Driller HOLLEN, G.																																																																																																
REMARKS, ELEVATION, SOURCE OF DATA, etc. M.G.S. NO.2048. GAMMA LOGGED 8-28-1985. GAMMA LOGGED 1-11-2005 BY JIM TRAEN. USGS Quad Coon Rapids Elevation 890 Aquifer: CMTS Alt Id: 80-6139																																																																																																	

Report Copy

Unique No. 00110469	MINNESOTA DEPARTMENT OF HEALTH						Update Date 2008/12/29
County Name Anoka	WELL AND BORING RECORD						Entry Date 1991/04/15
<i>Minnesota Statutes Chapter 1031</i>							
Township Name Township	Range 31	Dir 24	Section W 2	Subsection DCDCDB	Well Depth 637	Depth Completed 637	Date Well Completed 1986/05/00
Well Name COON RAPIDS 18				Lic. Or Reg. No. 27010	Name of Driller HOLLEN, G.		
USGS Quad Coon Rapi	Elevation 890			Aquifer CMTS	Alternative Id 80-6139		

GEOLOGICAL MATERIAL	COLOR	HARDNESS	FROM	TO	STRAT	LITH PRIM	LITH SEC	LITH MINOR
SAND QFUB = Sand	BROWN SAND = Sand		0	14	QFUB	SAND		
PEAT QSUU = Peat	BLK/BRN PEAT = Peat		14	17	QSUU	PEAT		
SAND MEDIUM QFUB = Sand	BROWN SAND = Sand		17	67	QFUB	SAND		
CLAY QCUU = Clay			67	120	QCUU	CLAY		
CLAY-SHALE QCUR = Clay	RED CLAY = Clay		120	142	QCUR	CLAY		
CLAY & SAND QLUR = Clay & sand	RED CLAY = Clay		142	194	QLUR	CLAY	SAND	
CLAY & SAND CSTL = St.Lawrence	RED DLMT = Dolomite		194	198	CSTL	DLMT	SLSN	SHLE
							SLSN = Siltstone	SHLE = Shale
SHALE & SAND CSTL = St.Lawrence	GRN/GRY DLMT = Dolomite		198	226	CSTL	DLMT	SLSN	SHLE
							SLSN = Siltstone	SHLE = Shale
SHALE & SAND CFRN = Franconia			226	228	CFRN	SHLE	DLMT	SNDS
	SHLE = Shale						DLMT = Dolomite	SNDS = Sandstone
FRANCONIA CFRN = Franconia	GREEN SHLE = Shale		228	367	CFRN	SHLE	DLMT	SNDS
							DLMT = Dolomite	SNDS = Sandstone
GALESVILLE CIGL = Ironton-Galesville			367	429	CIGL	SNDS		
	SNDS = Sandstone							
GALESVILLE CECR = Eau Claire			429	432	CECR	SHLE	SNDS	
	SHLE = Shale						SNDS = Sandstone	
SHALE CECR = Eau Claire	SHLE = Shale		432	486	CECR	SHLE	SNDS	DLMT
							SNDS = Sandstone	DLMT = Dolomite
MT. SIMON CECR = Eau Claire	SHLE = Shale		486	509	CECR	SHLE	SNDS	DLMT
							SNDS = Sandstone	DLMT = Dolomite

Unique No. 00110469	MINNESOTA DEPARTMENT OF HEALTH						Update Date 2008/12/29	
County Name Anoka	WELL AND BORING RECORD						Entry Date 1991/04/15	
<i>Minnesota Statutes Chapter 1031</i>								
Township Name	Township	Range	Dir	Section	Subsection	Well Depth	Depth Completed	Date Well Completed
	31	24	W	2	DCDCDB	637 ft.	637 ft.	1986/05/00
Well Name	COON RAPIDS 18			Lic. Or Reg. No.	27010	Name of Driller	HOLLEN, G.	
USGS Quad	Coon Rapi	Elevation	890	Aquifer	CMTS	Alternative Id	80-6139	

GEOLOGICAL MATERIAL	COLOR	HARDNESS	FROM	TO	STRAT	LITH PRIM	LITH SEC	LITH MINOR
MT. SIMON CMTS = Mt.Simon			509	593	CMTS	SNDS		
	SNDS = Sandstone							
SHALEY SANDSTON CMTS = Mt.Simon			593	616	CMTS	SNDS	SHLE	
	SNDS = Sandstone				SHLE = Shale			
MIXED SHALE & SANDSTONE CMTS = Mt.Simon			616	631	CMTS	SNDS	SHLE	
	SNDS = Sandstone				SHLE = Shale			
SANDSTONE CMTS = Mt.Simon	RED		631	637	CMTS	SNDS		
	SNDS = Sandstone							

Unique No. 00110475	MINNESOTA DEPARTMENT OF HEALTH WELL AND BORING RECORD <i>Minnesota Statutes Chapter 1031</i>	Update Date 2009/07/16
County Name Anoka		Entry Date 1991/04/15
Township Name Township Range Dir Section Subsection 31 24 W 21 AACBDB	Well Depth 143 ft. Depth Completed 135 ft. Date Well Completed 1987/10/14	
Well Name COON RAPIDS 19	Drilling Method Cable Tool	
Well Owner's Name COON RAPIDS 19 COON RAPIDS MN 55433	Drilling Fluid _____ Well Hydrofractured? <input type="checkbox"/> Yes <input type="checkbox"/> No From _____ ft. to _____ ft.	
Contact's Name CITY OF COON RAPIDS 11155 ROBINSON NW DR COON RAPIDS MN 55433	Use Community Supply (municipal)	
GEOLOGICAL MATERIAL COLOR HARDNESS FROM TO	Casing Drive Shoe? <input checked="" type="checkbox"/> Yes <input type="checkbox"/> N Hole Diameter _____	
TOPSOIL BLACK 0 3	Casing Diameter Weight(lbs/ft) 30 in. t 30 ft	
FINE SAND BROW 3 25	20 in. t 115 ft	
CLAY & SAND MIX BROW 25 35		
CLAY WITH GRAVEL BROW 35 83	Screen Y Open Hole From _____ ft. to _____ ft.	
STICKY CLAY BLUE 83 105	Make JOHNSON Type L	
STICKY CLAY RED HARD 105 115	Diameter Slot Length Set Fitting 20 70 20 115 ft. to 135 ft	
COARSE SAND/GRAVEL 115 138	Static Water Level 15 ft. from Land surface Date 1987/10/14	
CLAY HARD 138 143	PUMPING LEVEL (below land surface) 84 ft. after 24 hrs. pumping 1200 g.p.m.	
	Well Head Completion Pitless adapter mfr _____ Model _____ Casing Protection <input checked="" type="checkbox"/> 12 in. above grade <input type="checkbox"/> At-grade(Environmental Wells and Borings ONLY)	
	Grouting Information Well grouted? <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No Material From To (ft.) Amount(yds/bags) G 6 25 0	
	Nearest Known Source of Contamination ft. direction type Well disinfected upon completion? <input type="checkbox"/> Yes <input type="checkbox"/> No	
	Pump <input checked="" type="checkbox"/> Not Installed Date Installed N Mfr nam _____ Model _____ HP _____ Volts _____ Drop Pipe Length ft. Capacity g.p.m. Type _____	
REMARKS, ELEVATION, SOURCE OF DATA, etc.	Any not in use and not sealed well(s) on property? <input type="checkbox"/> Yes <input type="checkbox"/> No	
M.G.S. NO.2878.	Was a variance granted from the MDH for this Well? <input type="checkbox"/> Yes <input type="checkbox"/> No	
USGS Quad Coon Rapids Elevation 850	Well CONTRACTOR CERTIFICATION Lic. Or Reg. No. <u>27010</u>	
Aquifer: QBAA Alt Id: 80-6139	License Business Name _____ Name of Driller <u>HOLLEN, G.</u>	

Report Copy

Unique No. 00110475	MINNESOTA DEPARTMENT OF HEALTH						Update Date 2009/07/16	
County Name Anoka	WELL AND BORING RECORD						Entry Date 1991/04/15	
<i>Minnesota Statutes Chapter 1031</i>								
Township Name Township	Range 31	Dir 24	W	Section 21	Subsection AACBDB	Well Depth 143 ft.	Depth Completed 135 ft.	Date Well Completed 1987/10/14
Well Name COON RAPIDS 19				Lic. Or Reg. No. 27010	Name of Driller HOLLEN, G.			
USGS Quad Coon Rapi	Elevation 850				Aquifer QBAA	Alternative Id 80-6139		

GEOLOGICAL MATERIAL	COLOR	HARDNESS	FROM	TO	STRAT	LITH PRIM	LITH SEC	LITH MINOR
TOPSOIL RUUK = Recent Deposit	BLACK SOIL = Soil		0	3	RUUK	SOIL	ORGD	ORGD = Organic Deposits
FINE SAND QFUB = Sand	BROWN SAND = Sand		3	25	QFUB	SAND		
CLAY & SAND MIX QLUB = Clay & sand	BROWN CLAY = Clay		25	35	QLUB	CLAY	SAND	SAND = Sand
CLAY WITH GRAVEL QPUB = Pebbly sand/silt/clay	BROWN CLAY = Clay		35	83	QPUB	CLAY	GRVL	GRVL = Gravel
STICKY CLAY QCUG = Clay	BLUE CLAY = Clay		83	105	QCUG	CLAY		
STICKY CLAY QCUR = Clay	RED CLAY = Clay	HARD	105	115	QCUR	CLAY		
COARSE SAND/GRAVEL QHUU = Sand & larger	SAND = Sand		115	138	QHUU	SAND	GRVL	GRVL = Gravel
CLAY QCUU = Clay	CLAY = Clay	HARD	138	143	QCUU	CLAY		

Unique No. 00420956	MINNESOTA DEPARTMENT OF HEALTH WELL AND BORING RECORD <i>Minnesota Statutes Chapter 1031</i>	Update Date 2008/12/30																																													
County Name Anoka		Entry Date 1991/04/15																																													
Township Name Township Range Dir Section Subsection 31 24 W 21 ADBDAB	Well Depth 135 ft. Depth Completed 135 ft. Date Well Completed 1988/04/26																																														
Well Name COON RAPIDS 20	Drilling Method Cable Tool																																														
Well Owner's Name COON RAPIDS 20 XAVIS NW ST COON RAPIDS MN 55433	Drilling Fluid	Well Hydrofractured? <input type="checkbox"/> Yes <input type="checkbox"/> No From ft. to ft.																																													
Contact's Name CITY OF COON RAPIDS 11155 ROBINSON NW DR COON RAPIDS MN 55433	Use Community Supply (municipal)																																														
<table border="1" style="width:100%; border-collapse: collapse;"> <thead> <tr> <th>GEOLOGICAL MATERIAL</th> <th>COLOR</th> <th>HARDNESS</th> <th>FROM</th> <th>TO</th> </tr> </thead> <tbody> <tr> <td>TOPSOIL-SAND</td> <td>BROW</td> <td></td> <td>0</td> <td>14</td> </tr> <tr> <td>CLAY WITH GRAVEL</td> <td>RED</td> <td></td> <td>14</td> <td>18</td> </tr> <tr> <td>MIXED LAYERS SAND & CL</td> <td>BROW</td> <td></td> <td>18</td> <td>40</td> </tr> <tr> <td>CLAY</td> <td>GRAY</td> <td></td> <td>40</td> <td>43</td> </tr> <tr> <td>LAYERED SAND & CLAY</td> <td>GRAY</td> <td></td> <td>43</td> <td>70</td> </tr> <tr> <td>STICKY CLAY</td> <td>BLUE</td> <td></td> <td>70</td> <td>82</td> </tr> <tr> <td>COARSE SAND</td> <td>YELLO</td> <td></td> <td>82</td> <td>93</td> </tr> <tr> <td>SAND/GRAVEL</td> <td>YELLO</td> <td></td> <td>93</td> <td>135</td> </tr> </tbody> </table>	GEOLOGICAL MATERIAL	COLOR	HARDNESS	FROM	TO	TOPSOIL-SAND	BROW		0	14	CLAY WITH GRAVEL	RED		14	18	MIXED LAYERS SAND & CL	BROW		18	40	CLAY	GRAY		40	43	LAYERED SAND & CLAY	GRAY		43	70	STICKY CLAY	BLUE		70	82	COARSE SAND	YELLO		82	93	SAND/GRAVEL	YELLO		93	135	Casing Drive Shoe? <input checked="" type="checkbox"/> Yes <input type="checkbox"/> N	Hole Diameter 0 in. t 135 ft.
	GEOLOGICAL MATERIAL	COLOR	HARDNESS	FROM	TO																																										
	TOPSOIL-SAND	BROW		0	14																																										
	CLAY WITH GRAVEL	RED		14	18																																										
	MIXED LAYERS SAND & CL	BROW		18	40																																										
	CLAY	GRAY		40	43																																										
	LAYERED SAND & CLAY	GRAY		43	70																																										
STICKY CLAY	BLUE		70	82																																											
COARSE SAND	YELLO		82	93																																											
SAND/GRAVEL	YELLO		93	135																																											
	Casing Diameter Weight(lbs/ft) 30 in. t 95 ft 20 in. t 95 ft																																														
	Screen Y	Open Hole From ft. to ft.																																													
	Make JOHNSON	Type L																																													
	Diameter Slot Length Set Fitting 20 40.8 95 ft. to 135 ft																																														
	Static Water Level 15 ft. from Land surface	Date 1988/04/26																																													
	PUMPING LEVEL (below land surface) 90 ft. after 8 hrs. pumping 1560 g.p.m.																																														
	Well Head Completion Pitless adapter mfr Model Casing Protection <input checked="" type="checkbox"/> 12 in. above grade <input type="checkbox"/> At-grade(Environmental Wells and Borings ONLY)																																														
	Grouting Information Well grouted? <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No Material From To (ft.) Amount(yds/bags) G 0 40 6 Y																																														
	Nearest Known Source of Contamination ft. direction type Well disinfected upon completion? <input type="checkbox"/> Yes <input type="checkbox"/> No																																														
	Pump <input checked="" type="checkbox"/> Not Installed Date Installed N Mfr nam Model HP Volts Drop Pipe Length ft. Capacity g.p.m Type																																														
REMARKS, ELEVATION, SOURCE OF DATA, etc. SAME AS NO.420957. 420957 PAPERS ARE LOST. GAMMA LOGGED 11-14-2002. LOGGED BY JIM TRAEN. USGS Quad Coon Rapids Elevation 850 Aquifer: QBAA Alt Id: 80-6139	Any not in use and not sealed well(s) on property? <input type="checkbox"/> Yes <input type="checkbox"/> No																																														
	Was a variance granted from the MDH for this Well? <input type="checkbox"/> Yes <input type="checkbox"/> No																																														
	Well CONTRACTOR CERTIFICATION Lic. Or Reg. No. <u>27010</u>																																														
	License Business Name Name of Driller <u>HOLLEN, G.</u>																																														

Report Copy

Unique No. 00420956	MINNESOTA DEPARTMENT OF HEALTH						Update Date 2008/12/30
County Name Anoka	WELL AND BORING RECORD						Entry Date 1991/04/15
<i>Minnesota Statutes Chapter 1031</i>							
Township Name Township	Range 31	Dir 24	Section W 21	Subsection ADBDAB	Well Depth 135	Depth Completed 135	Date Well Completed 1988/04/26
Well Name COON RAPIDS 20				Lic. Or Reg. No. 27010	Name of Driller HOLLEN, G.		
USGS Quad Coon Rapi	Elevation 850			Aquifer QBAA	Alternative Id 80-6139		

GEOLOGICAL MATERIAL	COLOR	HARDNESS	FROM	TO	STRAT	LITH PRIM	LITH SEC	LITH MINOR
TOPSOIL-SAND RUUB = Recent Deposit-brown	BROWN SOIL = Soil		0	14	RUUB	SOIL	ORGD	SAND
							ORGD = Organic Deposits	SAND = Sand
CLAY WITH GRAVEL QPUR = Pebbly sand/silt/clay	RED CLAY = Clay		14	18	QPUR	CLAY	GRVL	
							GRVL = Gravel	
MIXED LAYERS SAND & CLAY QLUB = Clay & sand	BROWN SAND = Sand		18	40	QLUB	SAND	CLAY	
							CLAY = Clay	
CLAY QCUG = Clay	GRAY CLAY = Clay		40	43	QCUG	CLAY		
LAYERED SAND & CLAY QLUG = Clay & sand	GRAY SAND = Sand		43	70	QLUG	SAND	CLAY	
							CLAY = Clay	
STICKY CLAY QCUG = Clay	BLUE CLAY = Clay		70	82	QCUG	CLAY		
COARSE SAND QFUY = Sand	YELLOW SAND = Sand		82	93	QFUY	SAND		
SAND/GRAVEL QHUY = Sand & larger	YELLOW SAND = Sand		93	135	QHUY	SAND	GRVL	
							GRVL = Gravel	

Unique No. 00474384	MINNESOTA DEPARTMENT OF HEALTH WELL AND BORING RECORD <i>Minnesota Statutes Chapter 1031</i>	Update Date 2007/02/06																																																																																																				
County Name Anoka		Entry Date 1992/06/22																																																																																																				
Township Name Township Range Dir Section Subsection 31 24 W 13 ACCDDD	Well Depth 207 ft. Depth Completed 203 ft. Date Well Completed 1990/01/26																																																																																																					
Well Name COON RAPIDS 21	Drilling Method Cable Tool																																																																																																					
Well Owner's Name COON RAPIDS 21 269 NORTHDAL BL COON RAPIDS MN 55433	Drilling Fluid	Well Hydrofractured? <input type="checkbox"/> Yes <input type="checkbox"/> No From ft. to ft.																																																																																																				
Contact's Name CITY OF COON RAPIDS 11155 ROBINSON NW DR COON RAPIDS MN 55433	Use Community Supply (municipal)																																																																																																					
<table border="1" style="width:100%; border-collapse: collapse;"> <thead> <tr> <th>GEOLOGICAL MATERIAL</th> <th>COLOR</th> <th>HARDNESS</th> <th>FROM</th> <th>TO</th> </tr> </thead> <tbody> <tr><td>FINE SAND</td><td>BROW</td><td>SOFT</td><td>0</td><td>25</td></tr> <tr><td>FINE SAND</td><td>GRAY</td><td>SOFT</td><td>25</td><td>30</td></tr> <tr><td>SAND & CLAY</td><td>GRAY</td><td>SOFT</td><td>30</td><td>32</td></tr> <tr><td>FINE SAND</td><td>BROW</td><td>SOFT</td><td>32</td><td>35</td></tr> <tr><td>FINE SAND</td><td>GRAY</td><td>SOFT</td><td>35</td><td>38</td></tr> <tr><td>SANDY CLAY</td><td>GRAY</td><td>SOFT</td><td>38</td><td>50</td></tr> <tr><td>CLAY</td><td>GRY/B</td><td>MEDIUM</td><td>50</td><td>66</td></tr> <tr><td>ROCKS & GRAVEL</td><td>GRAY</td><td>HARD</td><td>66</td><td>69</td></tr> <tr><td>FINE SAND & CLAY</td><td>BROW</td><td>MEDIUM</td><td>69</td><td>92</td></tr> <tr><td>CLAY/TRACES OF GRAVEL</td><td>BROW</td><td>SOFT</td><td>92</td><td>103</td></tr> <tr><td>FINE SAND</td><td>BROW</td><td>SOFT</td><td>103</td><td>105</td></tr> <tr><td>COARSE GRAVEL & CLAY</td><td>BRN/R</td><td>MEDIUM</td><td>105</td><td>110</td></tr> <tr><td>MEDIUM GRAVEL & CLAY</td><td>BROW</td><td>MEDIUM</td><td>110</td><td>127</td></tr> <tr><td>MEDIUM TO FINE SAND</td><td>BROW</td><td>SOFT</td><td>127</td><td>136</td></tr> <tr><td>GRAVEL & CLAY</td><td>GRAY</td><td>SOFT</td><td>136</td><td>148</td></tr> <tr><td>CLAY AND ROCKS</td><td>LT. YE</td><td>SFT-MED</td><td>148</td><td>150</td></tr> <tr><td>CLAY/GRAVEL & ROCKS</td><td>BLUE</td><td>SOFT</td><td>150</td><td>160</td></tr> <tr><td>NO RECORD</td><td></td><td></td><td>160</td><td>207</td></tr> <tr><td>CLAY</td><td></td><td></td><td>207</td><td>207</td></tr> </tbody> </table>	GEOLOGICAL MATERIAL	COLOR	HARDNESS	FROM	TO	FINE SAND	BROW	SOFT	0	25	FINE SAND	GRAY	SOFT	25	30	SAND & CLAY	GRAY	SOFT	30	32	FINE SAND	BROW	SOFT	32	35	FINE SAND	GRAY	SOFT	35	38	SANDY CLAY	GRAY	SOFT	38	50	CLAY	GRY/B	MEDIUM	50	66	ROCKS & GRAVEL	GRAY	HARD	66	69	FINE SAND & CLAY	BROW	MEDIUM	69	92	CLAY/TRACES OF GRAVEL	BROW	SOFT	92	103	FINE SAND	BROW	SOFT	103	105	COARSE GRAVEL & CLAY	BRN/R	MEDIUM	105	110	MEDIUM GRAVEL & CLAY	BROW	MEDIUM	110	127	MEDIUM TO FINE SAND	BROW	SOFT	127	136	GRAVEL & CLAY	GRAY	SOFT	136	148	CLAY AND ROCKS	LT. YE	SFT-MED	148	150	CLAY/GRAVEL & ROCKS	BLUE	SOFT	150	160	NO RECORD			160	207	CLAY			207	207	Casing Drive Shoe? <input type="checkbox"/> Yes <input type="checkbox"/> N Hole Diameter	
	GEOLOGICAL MATERIAL	COLOR	HARDNESS	FROM	TO																																																																																																	
	FINE SAND	BROW	SOFT	0	25																																																																																																	
	FINE SAND	GRAY	SOFT	25	30																																																																																																	
	SAND & CLAY	GRAY	SOFT	30	32																																																																																																	
	FINE SAND	BROW	SOFT	32	35																																																																																																	
	FINE SAND	GRAY	SOFT	35	38																																																																																																	
	SANDY CLAY	GRAY	SOFT	38	50																																																																																																	
	CLAY	GRY/B	MEDIUM	50	66																																																																																																	
	ROCKS & GRAVEL	GRAY	HARD	66	69																																																																																																	
	FINE SAND & CLAY	BROW	MEDIUM	69	92																																																																																																	
	CLAY/TRACES OF GRAVEL	BROW	SOFT	92	103																																																																																																	
	FINE SAND	BROW	SOFT	103	105																																																																																																	
	COARSE GRAVEL & CLAY	BRN/R	MEDIUM	105	110																																																																																																	
	MEDIUM GRAVEL & CLAY	BROW	MEDIUM	110	127																																																																																																	
MEDIUM TO FINE SAND	BROW	SOFT	127	136																																																																																																		
GRAVEL & CLAY	GRAY	SOFT	136	148																																																																																																		
CLAY AND ROCKS	LT. YE	SFT-MED	148	150																																																																																																		
CLAY/GRAVEL & ROCKS	BLUE	SOFT	150	160																																																																																																		
NO RECORD			160	207																																																																																																		
CLAY			207	207																																																																																																		
	Casing Diameter Weight(lbs/ft) 24 in. t 103 ft 18 in. t 170 ft																																																																																																					
	Screen Y Open Hole From ft. to ft. Make JOHNSON Type L Diameter Slot Length Set Fitting 12 70 33 170 ft. to 203 ft																																																																																																					
	Static Water Level 66 ft. from Land surface Date 1990/01/26																																																																																																					
	PUMPING LEVEL (below land surface) 126 ft. after hrs. pumping 1300 g.p.m.																																																																																																					
	Well Head Completion Pitless adapter mfr Model Casing Protection <input checked="" type="checkbox"/> 12 in. above grade <input type="checkbox"/> At-grade(Environmental Wells and Borings ONLY)																																																																																																					
	Grouting Information Well grouted? <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No Material From To (ft.) Amount(yds/bags) G 0 103																																																																																																					
	Nearest Known Source of Contamination ft. direction type Well disinfected upon completion? <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No																																																																																																					
	Pump <input type="checkbox"/> Not Installed Date Installed Mfr nam Model HP Volts Drop Pipe Length ft. Capacity g.p.m Type																																																																																																					
REMARKS, ELEVATION, SOURCE OF DATA, etc. GAMMA LOGGED 1-11-04. LOGGED BY JIM TRAEN	Any not in use and not sealed well(s) on property? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No																																																																																																					
USGS Quad Coon Rapids Elevation 899 Aquifer: QBAA Alt Id: 80-6139	Was a variance granted from the MDH for this Well? <input type="checkbox"/> Yes <input type="checkbox"/> No																																																																																																					
	Well CONTRACTOR CERTIFICATION Lic. Or Reg. No. 71536 License Business Name Name of Driller TOM/ROGER																																																																																																					

Report Copy

Unique No. 00474384	MINNESOTA DEPARTMENT OF HEALTH						Update Date 2007/02/06	
County Name Anoka	WELL AND BORING RECORD						Entry Date 1992/06/22	
<i>Minnesota Statutes Chapter 1031</i>								
Township Name Township	Range 31	Dir 24	Section W 13	Subsection ACCDDD	Well Depth 207 ft.		Depth Completed 203 ft.	Date Well Completed 1990/01/26
Well Name COON RAPIDS 21				Lic. Or Reg. No. 71536	Name of Driller TOM/ROGER			
USGS Quad Coon Rapi	Elevation 899			Aquifer QBAA	Alternative Id 80-6139			

GEOLOGICAL MATERIAL	COLOR	HARDNESS	FROM	TO	STRAT	LITH PRIM	LITH SEC	LITH MINOR
FINE SAND QFUB = Sand	BROWN SAND = Sand	SOFT	0	25	QFUB	SAND		
FINE SAND QFUG = Sand	GRAY SAND = Sand	SOFT	25	30	QFUG	SAND		
SAND & CLAY QLUG = Clay & sand	GRAY SAND = Sand	SOFT	30	32	QLUG	SAND	CLAY	
FINE SAND QFUB = Sand	BROWN SAND = Sand	SOFT	32	35	QFUB	SAND		
FINE SAND QFUG = Sand	GRAY SAND = Sand	SOFT	35	38	QFUG	SAND		
SANDY CLAY QLUG = Clay & sand	GRAY CLAY = Clay	SOFT	38	50	QLUG	CLAY	SAND	
CLAY QCUG = Clay	GRY/BLU CLAY = Clay	MEDIUM	50	66	QCUG	CLAY		
ROCKS & GRAVEL QGUG = Gravel (+larger)	GRAY GRVL = Gravel	HARD	66	69	QGUG	GRVL	COBL	
FINE SAND & CLAY QLUB = Clay & sand	BROWN SAND = Sand	MEDIUM	69	92	QLUB	SAND	CLAY	
CLAY/TRACES OF GRAVEL QPUB = Pebbly sand/silt/clay	BROWN CLAY = Clay	SOFT	92	103	QPUB	CLAY	GRVL	
FINE SAND QFUB = Sand	BROWN SAND = Sand	SOFT	103	105	QFUB	SAND		
COARSE GRAVEL & CLAY QPUU = Pebbly sand/silt/clay	BRN/RED GRVL = Gravel	MEDIUM	105	110	QPUU	GRVL	CLAY	
MEDIUM GRAVEL & CLAY QPUB = Pebbly sand/silt/clay	BROWN GRVL = Gravel	MEDIUM	110	127	QPUB	GRVL	CLAY	
MEDIUM TO FINE SAND QFUB = Sand	BROWN SAND = Sand	SOFT	127	136	QFUB	SAND		

Unique No. 00474385	MINNESOTA DEPARTMENT OF HEALTH WELL AND BORING RECORD <i>Minnesota Statutes Chapter 1031</i>	Update Date 2008/12/30																																																												
County Name Anoka		Entry Date 1992/06/22																																																												
Township Name Township Range Dir Section Subsection 31 24 W 22 CBABAD	Well Depth 108 ft. Depth Completed 105 ft. Date Well Completed 1990/03/15																																																													
Well Name COON RAPIDS 22	Drilling Method Cable Tool																																																													
Well Owner's Name COON RAPIDS 22 2220 105TH NW AV COON RAPIDS MN 55433	Drilling Fluid _____ Well Hydrofractured? <input type="checkbox"/> Yes <input type="checkbox"/> No From _____ ft. to _____ ft.																																																													
Contact's Name CITY OF COON RAPIDS 11155 ROBINSON NW DR COON RAPIDS MN 55433	Use Community Supply (municipal)																																																													
<table border="1" style="width:100%; border-collapse: collapse;"> <thead> <tr> <th>GEOLOGICAL MATERIAL</th> <th>COLOR</th> <th>HARDNESS</th> <th>FROM</th> <th>TO</th> </tr> </thead> <tbody> <tr><td>SAND</td><td>BROW</td><td>SOFT</td><td>0</td><td>19</td></tr> <tr><td>ROCKS & BOULDERS</td><td>BROW</td><td>HARD</td><td>19</td><td>21</td></tr> <tr><td>SANDY CLAY</td><td>BROW</td><td>MEDIUM</td><td>21</td><td>28</td></tr> <tr><td>SANDY CLAY/GRAVEL</td><td>GRAY</td><td>SOFT</td><td>28</td><td>57</td></tr> <tr><td>GRAVEL & CLAY</td><td>BROW</td><td>SOFT</td><td>57</td><td>70</td></tr> <tr><td>SANDY CLAY</td><td>BROW</td><td>SOFT</td><td>70</td><td>73</td></tr> <tr><td>FINE SAND</td><td>BROW</td><td>SOFT</td><td>73</td><td>83</td></tr> <tr><td>COARSE SAND</td><td>BROW</td><td>SOFT</td><td>83</td><td>93</td></tr> <tr><td>SAND & GRAVEL</td><td>BROW</td><td>SOFT</td><td>93</td><td>98</td></tr> <tr><td>GRAVEL</td><td>BROW</td><td>SOFT</td><td>98</td><td>105</td></tr> <tr><td>CLAY</td><td>BROW</td><td>SOFT</td><td>105</td><td>108</td></tr> </tbody> </table>	GEOLOGICAL MATERIAL	COLOR	HARDNESS	FROM	TO	SAND	BROW	SOFT	0	19	ROCKS & BOULDERS	BROW	HARD	19	21	SANDY CLAY	BROW	MEDIUM	21	28	SANDY CLAY/GRAVEL	GRAY	SOFT	28	57	GRAVEL & CLAY	BROW	SOFT	57	70	SANDY CLAY	BROW	SOFT	70	73	FINE SAND	BROW	SOFT	73	83	COARSE SAND	BROW	SOFT	83	93	SAND & GRAVEL	BROW	SOFT	93	98	GRAVEL	BROW	SOFT	98	105	CLAY	BROW	SOFT	105	108	Casing _____ Drive Shoe? <input type="checkbox"/> Yes <input type="checkbox"/> N Hole Diameter _____	
	GEOLOGICAL MATERIAL	COLOR	HARDNESS	FROM	TO																																																									
	SAND	BROW	SOFT	0	19																																																									
	ROCKS & BOULDERS	BROW	HARD	19	21																																																									
	SANDY CLAY	BROW	MEDIUM	21	28																																																									
	SANDY CLAY/GRAVEL	GRAY	SOFT	28	57																																																									
	GRAVEL & CLAY	BROW	SOFT	57	70																																																									
	SANDY CLAY	BROW	SOFT	70	73																																																									
	FINE SAND	BROW	SOFT	73	83																																																									
	COARSE SAND	BROW	SOFT	83	93																																																									
SAND & GRAVEL	BROW	SOFT	93	98																																																										
GRAVEL	BROW	SOFT	98	105																																																										
CLAY	BROW	SOFT	105	108																																																										
	Casing Diameter _____ Weight(lbs/ft) _____ 24 in. t 80 ft																																																													
	Screen Y _____ Open Hole From _____ ft. to _____ ft. Make JOHNSON _____ Type L																																																													
	Diameter Slot Length Set Fitting 18 120 25 80 ft. to 105 ft																																																													
	Static Water Level 32 ft. from Land surface Date 1990/03/15																																																													
	PUMPING LEVEL (below land surface) 105 ft. after 1 hrs. pumping 250 g.p.m.																																																													
	Well Head Completion Pitless adapter mfr _____ Model _____ Casing Protection <input checked="" type="checkbox"/> 12 in. above grade <input type="checkbox"/> At-grade(Environmental Wells and Borings ONLY)																																																													
	Grouting Information Well grouted? <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No Material From To (ft.) Amount(yds/bags) G 0 20 1.5 Y																																																													
	Nearest Known Source of Contamination ft. direction type Well disinfected upon completion? <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No																																																													
	Pump <input checked="" type="checkbox"/> Not Installed Date Installed N Mfr nam _____ Model _____ HP _____ Volts _____ Drop Pipe Length _____ ft. Capacity _____ g.p.m. Type _____																																																													
REMARKS, ELEVATION, SOURCE OF DATA, etc.	Any not in use and not sealed well(s) on property? <input type="checkbox"/> Yes <input type="checkbox"/> No																																																													
GAMMA LOGGED 11-14-2002. LOGGED BY JIM TRAEN.	Was a variance granted from the MDH for this Well? <input type="checkbox"/> Yes <input type="checkbox"/> No																																																													
USGS Quad Coon Rapids Elevation 869 Aquifer: QBAA Alt Id: 80-6139	Well CONTRACTOR CERTIFICATION Lic. Or Reg. No. <u>71536</u> License Business Name _____ Name of Driller <u>TOM/ROGER</u>																																																													

Report Copy

Unique No. 00474385	MINNESOTA DEPARTMENT OF HEALTH						Update Date 2008/12/30
County Name Anoka	WELL AND BORING RECORD						Entry Date 1992/06/22
<i>Minnesota Statutes Chapter 1031</i>							
Township Name Township	Range 31	Dir 24	Section W 22	Subsection CBABAD	Well Depth 108	Depth Completed 105	Date Well Completed 1990/03/15
Well Name COON RAPIDS 22				Lic. Or Reg. No. 71536	Name of Driller TOM/ROGER		
USGS Quad Coon Rapi	Elevation 869			Aquifer QBAA	Alternative Id 80-6139		

GEOLOGICAL MATERIAL	COLOR	HARDNESS	FROM	TO	STRAT	LITH PRIM	LITH SEC	LITH MINOR
SAND QFUB = Sand	BROWN SAND = Sand	SOFT	0	19	QFUB	SAND		
ROCKS & BOULDERS QBUB = Boulder or boulders	BROWN COBL = Cobble	HARD	19	21	QBUB	COBL	BLDR	
SANDY CLAY QLUB = Clay & sand	BROWN CLAY = Clay	MEDIUM	21	28	QLUB	CLAY	SAND	
SANDY CLAY/GRAVEL QPUG = Pebbly sand/silt/clay	GRAY CLAY = Clay	SOFT	28	57	QPUG	CLAY	SAND	GRVL
GRAVEL & CLAY QPUB = Pebbly sand/silt/clay	BROWN GRVL = Gravel	SOFT	57	70	QPUB	GRVL	CLAY	
SANDY CLAY QLUB = Clay & sand	BROWN CLAY = Clay	SOFT	70	73	QLUB	CLAY	SAND	
FINE SAND QFUB = Sand	BROWN SAND = Sand	SOFT	73	83	QFUB	SAND		
COARSE SAND QFUB = Sand	BROWN SAND = Sand	SOFT	83	93	QFUB	SAND		
SAND & GRAVEL QHUB = Sand & larger	BROWN SAND = Sand	SOFT	93	98	QHUB	SAND	GRVL	
GRAVEL QGUB = Gravel (+larger)	BROWN GRVL = Gravel	SOFT	98	105	QGUB	GRVL		
CLAY QCUB = Clay	BROWN CLAY = Clay	SOFT	105	108	QCUB	CLAY		

Unique No. 00463020	MINNESOTA DEPARTMENT OF HEALTH WELL AND BORING RECORD <i>Minnesota Statutes Chapter 1031</i>	Update Date 2007/02/07																																																							
County Name Anoka		Entry Date 1992/06/22																																																							
Township Name Township Range Dir Section Subsection 31 24 W 27 BAABBB	Well Depth 151 ft. Depth Completed 128 ft. Date Well Completed 1991/12/16																																																								
Well Name COON RAPIDS 23	Drilling Method Cable Tool																																																								
Well Owner's Name COON RAPIDS, CITY OF 2100 COON RAPIDS NW BL COON RAPIDS MN 55433	Drilling Fluid Water	Well Hydrofractured? <input type="checkbox"/> Yes <input type="checkbox"/> No From ft. to ft.																																																							
Contact's Name CITY OF COON RAPIDS 11155 ROBINSON DR COON RAPIDS MN 55433	Use Community Supply (municipal)																																																								
<table border="1" style="width:100%; border-collapse: collapse;"> <thead> <tr> <th>GEOLOGICAL MATERIAL</th> <th>COLOR</th> <th>HARDNESS</th> <th>FROM</th> <th>TO</th> </tr> </thead> <tbody> <tr><td>SAND</td><td>BROW</td><td></td><td>0</td><td>10</td></tr> <tr><td>CLAY/SAND</td><td>BROW</td><td></td><td>10</td><td>34</td></tr> <tr><td>SAND/GRAVEL</td><td>GRAY</td><td></td><td>34</td><td>38</td></tr> <tr><td>SANDY CLAY</td><td>GRAY</td><td></td><td>38</td><td>67</td></tr> <tr><td>SAND</td><td>BROW</td><td></td><td>67</td><td>95</td></tr> <tr><td>GRAVEL</td><td>BROW</td><td></td><td>95</td><td>122</td></tr> <tr><td>CLAY</td><td>GRAY</td><td></td><td>122</td><td>123</td></tr> <tr><td>GRAVEL</td><td>BROW</td><td></td><td>123</td><td>126</td></tr> <tr><td>SAND</td><td>BROW</td><td></td><td>126</td><td>151</td></tr> <tr><td>CLAY</td><td>BROW</td><td></td><td>151</td><td>151</td></tr> </tbody> </table>	GEOLOGICAL MATERIAL	COLOR	HARDNESS	FROM	TO	SAND	BROW		0	10	CLAY/SAND	BROW		10	34	SAND/GRAVEL	GRAY		34	38	SANDY CLAY	GRAY		38	67	SAND	BROW		67	95	GRAVEL	BROW		95	122	CLAY	GRAY		122	123	GRAVEL	BROW		123	126	SAND	BROW		126	151	CLAY	BROW		151	151	Casing Drive Shoe? <input checked="" type="checkbox"/> Yes <input type="checkbox"/> N	Hole Diameter
	GEOLOGICAL MATERIAL	COLOR	HARDNESS	FROM	TO																																																				
	SAND	BROW		0	10																																																				
	CLAY/SAND	BROW		10	34																																																				
	SAND/GRAVEL	GRAY		34	38																																																				
	SANDY CLAY	GRAY		38	67																																																				
	SAND	BROW		67	95																																																				
	GRAVEL	BROW		95	122																																																				
	CLAY	GRAY		122	123																																																				
	GRAVEL	BROW		123	126																																																				
SAND	BROW		126	151																																																					
CLAY	BROW		151	151																																																					
	Casing Diameter 30 in. t 92 ft Weight(lbs/ft) 118.6 24 in. t 93 ft 94.6																																																								
	Screen Y	Open Hole From ft. to ft.																																																							
	Make JOHNSON Type L																																																								
	Diameter Slot Length Set Fitting																																																								
	24 50 94 ft. to ft																																																								
	16 70 ft. to 123 ft																																																								
	Static Water Level 24 ft. from Land surface Date 1991/12/16																																																								
	PUMPING LEVEL (below land surface) 70 ft. after 8 hrs. pumping 500 g.p.m.																																																								
	Well Head Completion Pitless adapter mfr Model Casing Protection <input checked="" type="checkbox"/> 12 in. above grade <input type="checkbox"/> At-grade(Environmental Wells and Borings ONLY)																																																								
	Grouting Information Well grouted? <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No																																																								
	Material From To (ft.) Amount(yds/bags) G 91 114 S																																																								
	Nearest Known Source of Contamination ft. direction type Well disinfected upon completion? <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No																																																								
	Pump <input checked="" type="checkbox"/> Not Installed Date Installed N Mfr nam Model HP Volts Drop Pipe Length ft. Capacity g.p.m Type																																																								
REMARKS, ELEVATION, SOURCE OF DATA, etc. GAMMA LOGGED 11-14-2002 BY DOWNHOLE WELL SERVICES.	Any not in use and not sealed well(s) on property? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No																																																								
	Was a variance granted from the MDH for this Well? <input type="checkbox"/> Yes <input type="checkbox"/> No																																																								
USGS Quad Coon Rapids Elevation 855 Aquifer: QBAA Alt Id: 1020017S24	Well CONTRACTOR CERTIFICATION Lic. Or Reg. No. 71015 License Business Name Name of Driller FULTON, W.																																																								

Report Copy

Unique No. 00463020	MINNESOTA DEPARTMENT OF HEALTH						Update Date 2007/02/07
County Name Anoka	WELL AND BORING RECORD						Entry Date 1992/06/22
<i>Minnesota Statutes Chapter 1031</i>							
Township Name Township	Range Dir	Section	Subsection	Well Depth		Depth Completed	Date Well Completed
	31 24 W	27	BAABBB	151	ft.	128 ft.	1991/12/16
Well Name COON RAPIDS 23				Lic. Or Reg. No. 71015	Name of Driller FULTON, W.		
USGS Quad Coon Rapi	Elevation 855	Aquifer QBAA		Alternative Id 1020017S24			

GEOLOGICAL MATERIAL	COLOR	HARDNESS	FROM	TO	STRAT	LITH PRIM	LITH SEC	LITH MINOR
SAND QFUB = Sand	BROWN SAND = Sand		0	10	QFUB	SAND		
CLAY/SAND QLUB = Clay & sand	BROWN SAND = Sand		10	34	QLUB	SAND	CLAY	
					CLAY = Clay			
SAND/GRAVEL QHUG = Sand & larger	GRAY SAND = Sand		34	38	QHUG	SAND	GRVL	
					GRVL = Gravel			
SANDY CLAY QLUG = Clay & sand	GRAY CLAY = Clay		38	67	QLUG	CLAY	SAND	
					SAND = Sand			
SAND QFUB = Sand	BROWN SAND = Sand		67	95	QFUB	SAND		
GRAVEL QGUB = Gravel (+larger)	BROWN GRVL = Gravel		95	122	QGUB	GRVL		
CLAY QCUG = Clay	GRAY CLAY = Clay		122	123	QCUG	CLAY		
GRAVEL QGUB = Gravel (+larger)	BROWN GRVL = Gravel		123	126	QGUB	GRVL		
SAND QFUB = Sand	BROWN SAND = Sand		126	151	QFUB	SAND		
CLAY QCUB = Clay	BROWN CLAY = Clay		151	151	QCUB	CLAY		

Unique No. 00674478	MINNESOTA DEPARTMENT OF HEALTH WELL AND BORING RECORD <i>Minnesota Statutes Chapter 1031</i>	Update Date 2007/05/18																																																									
County Name Anoka		Entry Date / / 0																																																									
Township Name Township Range Dir Section Subsection 31 24 W 21 ABADAB	Well Depth 388 ft. Depth Completed 388 ft. Date Well Completed 2003/12/19																																																										
Well Name COON RAPIDS 24	Drilling Method Cable Tool																																																										
Well Owner's Name COON RAPIDS 24 10845 DIRECT RIVER DR COON RAPIDS MN 55433	Drilling Fluid Bentonite	Well Hydrofractured? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No From ft. to ft.																																																									
Contact's Name CITY OF COON RAPIDS 11155 ROBINSON DR COON RAPIDS MN 55433	Use Community Supply (municipal)																																																										
<table border="1" style="width:100%; border-collapse: collapse;"> <thead> <tr> <th>GEOLOGICAL MATERIAL</th> <th>COLOR</th> <th>HARDNESS</th> <th>FROM</th> <th>TO</th> </tr> </thead> <tbody> <tr> <td>SAND & GRAVEL</td> <td>BROW</td> <td>SOFT</td> <td>0</td> <td>29</td> </tr> <tr> <td>CLAY & GRAVEL</td> <td>BROW</td> <td>HARD</td> <td>29</td> <td>82</td> </tr> <tr> <td>SANDY CLAY</td> <td>BROW</td> <td>SOFT</td> <td>82</td> <td>87</td> </tr> <tr> <td>SAND</td> <td>BROW</td> <td>SOFT</td> <td>87</td> <td>112</td> </tr> <tr> <td>JORDAN S.S.</td> <td>TAN</td> <td>MEDIUM</td> <td>132</td> <td>149</td> </tr> <tr> <td>FRANCONIA S.S.</td> <td>GRN/B</td> <td>MED-HRD</td> <td>149</td> <td>354</td> </tr> <tr> <td>IRONTON/GALESVILLE</td> <td>GRAY</td> <td>MEDIUM</td> <td>354</td> <td>385</td> </tr> <tr> <td>EAU CLAIRE SHALE</td> <td>GRY/G</td> <td>HARD</td> <td>385</td> <td>388</td> </tr> </tbody> </table>	GEOLOGICAL MATERIAL	COLOR	HARDNESS	FROM	TO	SAND & GRAVEL	BROW	SOFT	0	29	CLAY & GRAVEL	BROW	HARD	29	82	SANDY CLAY	BROW	SOFT	82	87	SAND	BROW	SOFT	87	112	JORDAN S.S.	TAN	MEDIUM	132	149	FRANCONIA S.S.	GRN/B	MED-HRD	149	354	IRONTON/GALESVILLE	GRAY	MEDIUM	354	385	EAU CLAIRE SHALE	GRY/G	HARD	385	388	<table border="1" style="width:100%; border-collapse: collapse;"> <thead> <tr> <th>Casing Diameter</th> <th>Weight(lbs/ft)</th> </tr> </thead> <tbody> <tr> <td>30 in. t 191 ft</td> <td>118.65</td> </tr> <tr> <td>24 in. t 241 ft</td> <td>94.62</td> </tr> <tr> <td>36 in. t 90 ft</td> <td>142.68</td> </tr> </tbody> </table>	Casing Diameter	Weight(lbs/ft)	30 in. t 191 ft	118.65	24 in. t 241 ft	94.62	36 in. t 90 ft	142.68	<table border="1" style="width:100%; border-collapse: collapse;"> <thead> <tr> <th>Hole Diameter</th> </tr> </thead> <tbody> <tr> <td>in. t 85 ft</td> </tr> <tr> <td>in. t 388 ft</td> </tr> <tr> <td>in. t 323 ft</td> </tr> </tbody> </table>	Hole Diameter	in. t 85 ft	in. t 388 ft	in. t 323 ft
	GEOLOGICAL MATERIAL	COLOR	HARDNESS	FROM	TO																																																						
	SAND & GRAVEL	BROW	SOFT	0	29																																																						
	CLAY & GRAVEL	BROW	HARD	29	82																																																						
	SANDY CLAY	BROW	SOFT	82	87																																																						
	SAND	BROW	SOFT	87	112																																																						
	JORDAN S.S.	TAN	MEDIUM	132	149																																																						
FRANCONIA S.S.	GRN/B	MED-HRD	149	354																																																							
IRONTON/GALESVILLE	GRAY	MEDIUM	354	385																																																							
EAU CLAIRE SHALE	GRY/G	HARD	385	388																																																							
Casing Diameter	Weight(lbs/ft)																																																										
30 in. t 191 ft	118.65																																																										
24 in. t 241 ft	94.62																																																										
36 in. t 90 ft	142.68																																																										
Hole Diameter																																																											
in. t 85 ft																																																											
in. t 388 ft																																																											
in. t 323 ft																																																											
	Casing Drive Shoe? <input checked="" type="checkbox"/> Yes <input type="checkbox"/> N	Screen N																																																									
		Open Hole From 232 ft. to 388 ft.																																																									
	Make	Type																																																									
	Static Water Level 60 ft. from Land surface	Date 2003/09/18																																																									
	PUMPING LEVEL (below land surface)																																																										
	112 ft. after 8 hrs. pumping 1560 g.p.m.																																																										
	Well Head Completion																																																										
	Pitless adapter mfr BAKER	Model 12.5PS2426																																																									
	Casing Protection	<input checked="" type="checkbox"/> 12 in. above grade																																																									
	<input type="checkbox"/> At-grade(Environmental Wells and Borings ONLY)																																																										
	Grouting Information	Well grouted? <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No																																																									
	Material	From To (ft.) Amount(yds/bags)																																																									
	G	85 10 Y																																																									
	G	232.5 10 Y																																																									
	Nearest Known Source of Contamination																																																										
	200 ft. direction N	type SDF																																																									
	Well disinfected upon completion? <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No																																																										
	Pump <input type="checkbox"/> Not Installed	Date Installed																																																									
	Mfr nam GOULD																																																										
	Model 14RLJC-7	HP 75 Volts 480																																																									
	Drop Pipe Length 165 ft.	Capacity E+03 g.p.m																																																									
	Type S																																																										
REMARKS, ELEVATION, SOURCE OF DATA, etc.	Any not in use and not sealed well(s) on property? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No																																																										
	Was a variance granted from the MDH for this Well? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No																																																										
	Well CONTRACTOR CERTIFICATION Lic. Or Reg. No. <u>71015</u>																																																										
	License Business Name																																																										
	Name of Driller <u>COX, A.</u>																																																										
<p style="text-align:center;">Report Copy</p>																																																											

Unique No. 00674478	MINNESOTA DEPARTMENT OF HEALTH						Update Date 2007/05/18	
County Name Anoka	WELL AND BORING RECORD						Entry Date / / 0	
<i>Minnesota Statutes Chapter 1031</i>								
Township Name	Township	Range	Dir	Section	Subsection	Well Depth	Depth Completed	Date Well Completed
	31	24	W	21	ABADAB	388 ft.	388 ft.	2003/12/19
Well Name	COON RAPIDS 24			Lic. Or Reg. No.	71015	Name of Driller	COX, A.	
USGS Quad	Coon Rapi	Elevation	861	Aquifer	CFIG	Alternative Id	4242	

GEOLOGICAL MATERIAL	COLOR	HARDNESS	FROM	TO	STRAT	LITH PRIM	LITH SEC	LITH MINOR
SAND & GRAVEL QHUB = Sand & larger	BROWN SAND = Sand	SOFT	0	29	QHUB	SAND	GRVL	
							GRVL = Gravel	
CLAY & GRAVEL QPUB = Pebbly sand/silt/clay	BROWN CLAY = Clay	HARD	29	82	QPUB	CLAY	GRVL	
							GRVL = Gravel	
SANDY CLAY QLUB = Clay & sand	BROWN CLAY = Clay	SOFT	82	87	QLUB	CLAY	SAND	
							SAND = Sand	
SAND QFUB = Sand	BROWN SAND = Sand	SOFT	87	112	QFUB	SAND		
JORDAN S.S. QFUB = Sand	TAN SAND = Sand	MEDIUM	132	149	QFUB	SAND		
FRANCONIA S.S. CFRN = Franconia	GRN/BRN SNDS = Sandstone	MED-HRD	149	354	CFRN	SNDS	SHLE	DLMT
							SHLE = Shale	DLMT = Dolomite
IRONTON/GALESVILLE CIGL = Ironton-Galesville	GRAY SNDS = Sandstone	MEDIUM	354	385	CIGL	SNDS		
EAU CLAIRE SHALE CECR = Eau Claire	GRY/GRN SHLE = Shale	HARD	385	388	CECR	SHLE	SNDS	
							SNDS = Sandstone	

Unique No. 00674479	MINNESOTA DEPARTMENT OF HEALTH WELL AND BORING RECORD <i>Minnesota Statutes Chapter 1031</i>	Update Date 2007/01/09																																													
County Name Anoka		Entry Date 2004/10/11																																													
Township Name Township Range Dir Section Subsection 31 24 W 22 BCBDBA	Well Depth 388 ft. Depth Completed 388 ft. Date Well Completed 2003/12/19																																														
Well Name COON RAPIDS 25	Drilling Method Cable Tool																																														
Well Owner's Name COON RAPIDS 25 2324 COON RAPIDS NW BL COON RAPIDS MN 55433	Drilling Fluid Bentonite	Well Hydrofractured? <input type="checkbox"/> Yes <input type="checkbox"/> No From ft. to ft.																																													
Contact's Name CITY OF COON RAPIDS 11155 ROBINSON DR COON RAPIDS MN 55433	Use Community Supply (municipal)																																														
<table border="1" style="width:100%; border-collapse: collapse;"> <thead> <tr> <th>GEOLOGICAL MATERIAL</th> <th>COLOR</th> <th>HARDNESS</th> <th>FROM</th> <th>TO</th> </tr> </thead> <tbody> <tr> <td>SAND & GRAVEL</td> <td>BROW</td> <td>SOFT</td> <td>0</td> <td>29</td> </tr> <tr> <td>CLAY & GRAVEL</td> <td>BROW</td> <td>HARD</td> <td>29</td> <td>82</td> </tr> <tr> <td>SANDY CLAY</td> <td>BROW</td> <td>SOFT</td> <td>82</td> <td>87</td> </tr> <tr> <td>SAND</td> <td>BROW</td> <td>SOFT</td> <td>87</td> <td>112</td> </tr> <tr> <td>JORDAN S.S.</td> <td>TAN</td> <td>MEDIUM</td> <td>112</td> <td>162</td> </tr> <tr> <td>ST. LAWRENCE</td> <td>BRN/G</td> <td>MEDIUM</td> <td>162</td> <td>193</td> </tr> <tr> <td>FRANCONIA S.S.</td> <td>GRN/B</td> <td>MED-HRD</td> <td>193</td> <td>359</td> </tr> <tr> <td>IRONTON/GALESVILLE</td> <td>GRAY</td> <td>MEDIUM</td> <td>359</td> <td>388</td> </tr> </tbody> </table>	GEOLOGICAL MATERIAL	COLOR	HARDNESS	FROM	TO	SAND & GRAVEL	BROW	SOFT	0	29	CLAY & GRAVEL	BROW	HARD	29	82	SANDY CLAY	BROW	SOFT	82	87	SAND	BROW	SOFT	87	112	JORDAN S.S.	TAN	MEDIUM	112	162	ST. LAWRENCE	BRN/G	MEDIUM	162	193	FRANCONIA S.S.	GRN/B	MED-HRD	193	359	IRONTON/GALESVILLE	GRAY	MEDIUM	359	388	Casing Drive Shoe? <input checked="" type="checkbox"/> Yes <input type="checkbox"/> N	Hole Diameter in. t 388 ft in. t 227 ft
	GEOLOGICAL MATERIAL	COLOR	HARDNESS	FROM	TO																																										
	SAND & GRAVEL	BROW	SOFT	0	29																																										
	CLAY & GRAVEL	BROW	HARD	29	82																																										
SANDY CLAY	BROW	SOFT	82	87																																											
SAND	BROW	SOFT	87	112																																											
JORDAN S.S.	TAN	MEDIUM	112	162																																											
ST. LAWRENCE	BRN/G	MEDIUM	162	193																																											
FRANCONIA S.S.	GRN/B	MED-HRD	193	359																																											
IRONTON/GALESVILLE	GRAY	MEDIUM	359	388																																											
	Casing Diameter Weight(lbs/ft) 36 in. t 196 ft 142.68 24 in. t 229 ft 94.62																																														
	Screen N	Open Hole From 225 ft. to 388 ft.																																													
	Make	Type																																													
	Static Water Level 51 ft. from Land surface	Date 2003/12/01																																													
	PUMPING LEVEL (below land surface) 121.37 ft. after 48 hrs. pumping 1560 g.p.m.																																														
	Well Head Completion Pitless adapter mfr BAKER Model 9.5PS2426 Casing Protection <input checked="" type="checkbox"/> 12 in. above grade <input type="checkbox"/> At-grade(Environmental Wells and Borings ONLY)																																														
	Grouting Information Well grouted? <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No Material From To (ft.) Amount(yds/bags) G 225 45 Y																																														
	Nearest Known Source of Contamination 200 ft. direction N type SDF Well disinfected upon completion? <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No																																														
	Pump <input type="checkbox"/> Not Installed Date Installed Mfr nam GOULDS Model 14RLJC-7 HP 75 Volts 480 Drop Pipe Length 165 ft. Capacity E+03 g.p.m Type S																																														
REMARKS, ELEVATION, SOURCE OF DATA, etc. GAMMA LOGGED 8-29-2003. M.G.S. NO. 4280. LOGGED BY JIM TRAEN.																																															
USGS Quad Coon Rapids Elevation 871																																															
Aquifer: CFG Alt Id: 80-6137																																															
Report Copy																																															
Any not in use and not sealed well(s) on property? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No																																															
Was a variance granted from the MDH for this Well? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No																																															
Well CONTRACTOR CERTIFICATION Lic. Or Reg. No. 71015																																															
License Business Name																																															
Name of Driller COX, A.																																															

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:	1020017	PWS Name:	Coon Rapids
--------------------------------	---------	------------------	-------------

Contact Information for Person Completing this Form	
Name:	John Greer
Address:	Barr Engineering Company
	4700 West 77th Street, Suite 200
City, State, Zip:	Edina, MN 55435
Phone, Fax, e-mail:	(952) 832-2691

Aquifer Properties Determination Methods

- 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) 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). A test plan must be approved before conducting the test.
- 4) 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). A test plan must be approved before conducting the test.
- 5) 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.
- 6) 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.
- 7) An existing published transmissivity value.
 - Include all test data and analysis documentation with the estimated transmissivity, ft²/day, when the aquifer properties determination method is; 1, 2, 5, 6, or 7, listed above.
 - Attach detailed aquifer test plan for methods 3 or 4.

Submitted by: <i>John Greer</i>	Prof. License: 30347	Date: 7/31/2015
--	-----------------------------	------------------------

To request this document in another format, please call our Section Receptionist (651/201-4700) or Division TTY (651/201-5797).



Rationale for: 1) Aquifer Properties Determination or 2) Proposed New Test

Briefly describe the rationale for: 1) selected method to determine aquifer properties from existing data, or 2) a new aquifer test to be conducted on the pumped well referenced below. Include unique well numbers of all wells that were (or will be) monitored during data collection. How does the existing or proposed test deviate from the ideal. (e.g. rate, duration, no. of obwells, interfering wells, etc.) Attach documentation as necessary.

Aquifer Name: Confined Unconfined Fractured Rock

The MDH conducted a 24.3-hour pumping test at Coon Rapids Well 20 (Unique Number 420956) on March 11-12, 1999. The pumping rate was 1,150 gallons per minute (gpm). Coon Rapids Well 17 (Unique Number 150357) was used as an observation well. Analysis of the pumping and recovery data from the observation well using the Theis and Jacob methods produced a range of transmissivities from 31,800 ft²/day to 66,700 ft²/day (see attached).

The MDH conducted pumping tests at Wells 19 (Unique Number 110475) and Well 20 on August 29 - September 2, 2002. Wells 673418 and 673420 were used as observation wells. Well 19 was pumped for approximately 24 hours at 1,220 gpm followed by an approximately 24-hour recovery period, and then Well 20 was pumped at 1,000 gpm for approximately 24 hours followed by a second 24-hour recovery period. Data were analyzed using the Theis and Hantush-Jacob methods. The analysis concluded that the Quaternary aquifer is less transmissive near Well 19 and observation well 673418 (T range 8,120 ft²/day to 9,420 ft²/day) than near Well 20 and 673420 (T range 27,000 ft²/day to 55,000 ft²/day) (see attached).

T values for groundwater model:

Region including Well 19 (2002 test data for 673418):
 Geometric mean T = 8,700 ft²/day
 Sensitivity analysis range = 8,120 - 9,420 ft²/day

Region including Well 20 (1999 data from 150357 and 2002 data from 673418 and 673420):
 Geometric mean T = 45,210 ft²/day
 Sensitivity analysis range = 27,000 - 66,700 ft²/day



Proposed New Test Information Summary

Pumped Well Name (Unique Number):	420956, 110475	Test Duration (Hours):	24
Location: X, Y (meters) UTM-Z15N or Lat-Lon (decimal degrees) datum: NAD83	473997, 5001192 (420956) 473885, 5001449 (110475)	Pump Type:	unknown
		Discharge Rate:	1150, 1220, 1000 gpm
Number of Observation Wells:	3	Flow Rate Measuring Device Type:	flowmeter

▪ A map showing the location of the pumping well and observation well(s) must be included.

List the unique number of each public water supply well to which this DAP-ATP Form applies

150357					
110475					
420956					
474384					
474385					
463020					

Reviewed by: Amal Djerrari

Approved: Yes No

Approval Date: 8/3/2015

**Analysis of the Coon Rapids #20 (420956) Aquifer Test
March 11, 1999
Confined Drift Aquifer**

Introduction

The MDH is assisting in the delineation of wellhead protection areas by the City of Coon Rapids, 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.

The pumping test at the Coon Rapids Well #20 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, field data sheets in Appendix 2, well logs in Appendix 3, and test results are summarized on Table 1. The analysis shows that the aquifer responds as generally expected from the geologic setting.

Description of the Test

A pressure transducer was placed in the pumping well on March 10, 1999 at about 15:30 to collect background readings prior to the test. The well was pumping at the time the transducer was installed and was turned off at about 22:00 providing an eighteen hour resting period before the start of the test. There were no other nearby wells to cause interference for this test. A transducer was installed in a nearby public water supply well, #17 (150357), to serve as an observation well.

The test started at 11:49:53 on March 11, 1999. Well #20 was pumped at an average rate of 1150 gallons per minute. The flowmeter on the well was used to monitor the discharge. The pumping rate remained fairly constant through out the test. However, there were three short periods of time, possibly one minute or so in length, that the pump discharge decreased or even stopped during the test. This caused small variations in water level that did not cause the data to be unusable.

The pump was turned off at 12:09:00.2 on March 12, 1999 to start the recovery period. The recovery period was carried out 1450 minutes and the wells recovered above static levels caused by recharge from snow melt. There also was an anomalous flattening of the water levels during very early recovery possibly the result of pressure surge prevention equipment.

Summary of Results

A transmissivity value of 38,300 ft²/day and a storativity value of 0.00094 are chosen as being representative of aquifer properties in the area of these two wells for the capture zone analysis. The aquifer is semi-confined but the leakiness is not large and was obscured by recharge during late recovery.

The test results are fairly consistent between the pumping and observation wells, particularly during the late-time pumping period. The results are also consistent with the conceptual model of a leaky confined drift aquifer.

Problems with the Analysis

Problems notwithstanding, the data acquired for this test are of high quality and the results are consistent and representative of the aquifer in the area of the well.

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.

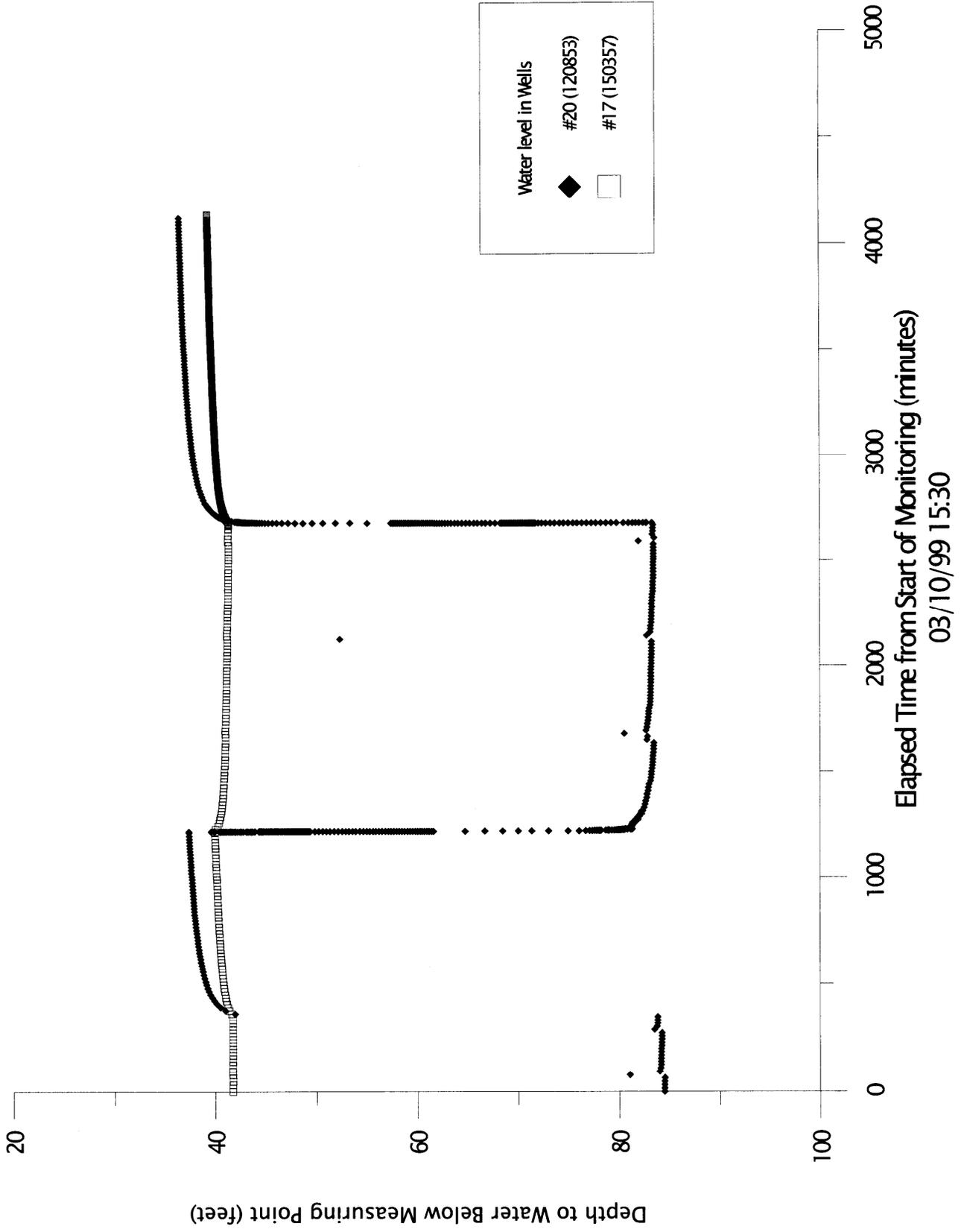
**Coon Rapids #20 Aquifer Test
March 11, 1999**

	Transmissivity T (ft ² /day) -----	Storage Coefficient S ----	Time Period Emphasized -----	Analysis Method -----
Pumping Well #20 (420956)	1,470	NA	Early Pumping	Theis
	60,700	NA	Late Pumping	Jacob
	1,470	NA	Early Recovery	Theis
	15,400	NA	Late Recovery	Jacob t/t'
Observation Well #17 (150357)	47,600	1.08e-3	Early Pumping	Theis
	66,700	6.32e-4	Late Pumping	Jacob
	38,300	9.4e-4	Early Recovery	Theis
	31,800	1.5e-4	Late Recovery	Jacob t/t'

Representative aquifer values are best shown by the early-time recovery values for the observation well, giving an average T of 38,300 and S of 0.00094.

Appendix 1.
Graphical Analysis

Test of Coon Rapids Well #20 (120853)
03/11/99
at Well #17 (150357)



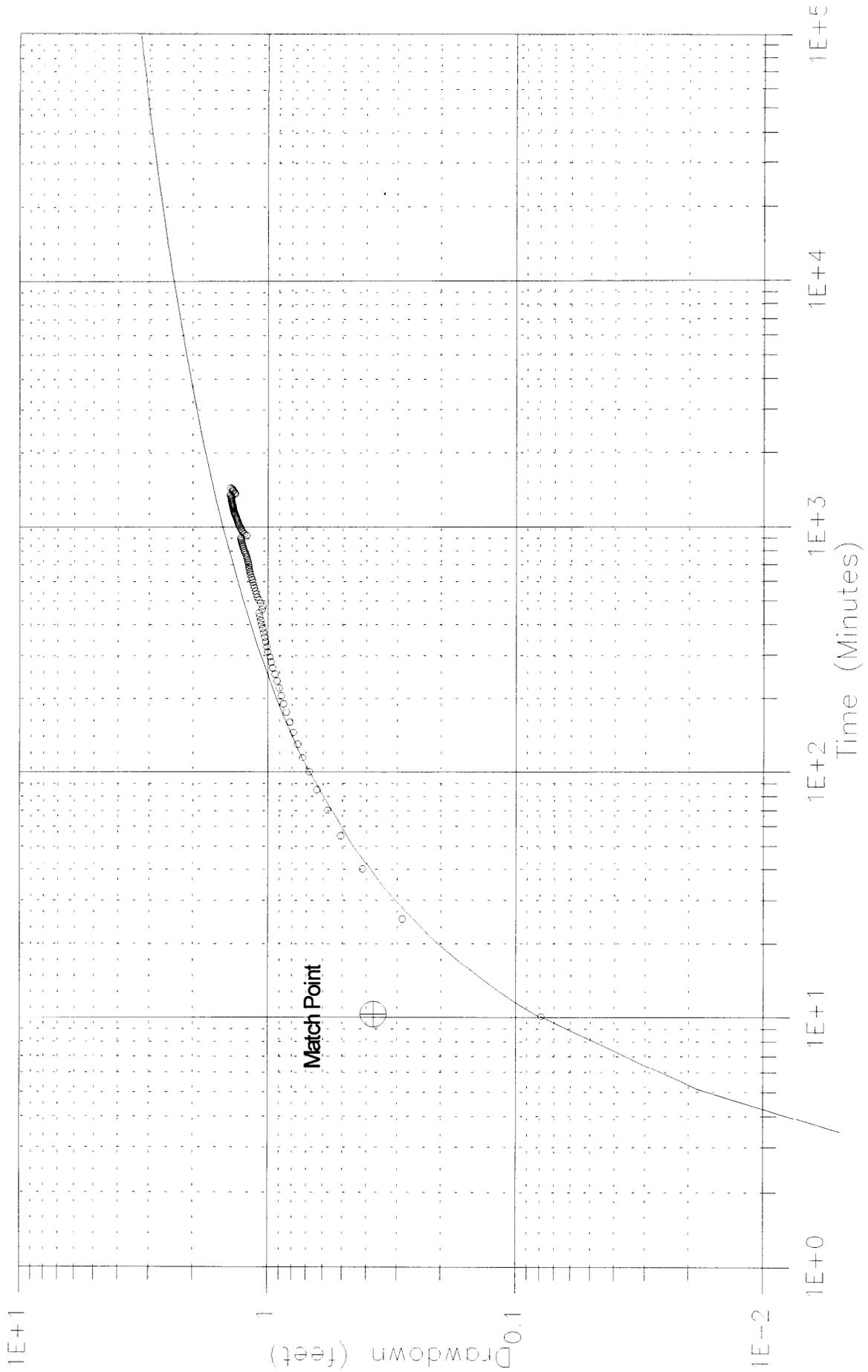
Test of Coon Rapids Well #20 (120853)

03/11/99

at Well #17 (150357)

Pumping

$T = 15.3 \frac{1152}{1163} / 0.37 = 47,600 \text{ ft}^2/\text{day}$
 $S = 47,600 \frac{11}{1163} \times 2.360 = 1.08e-3$

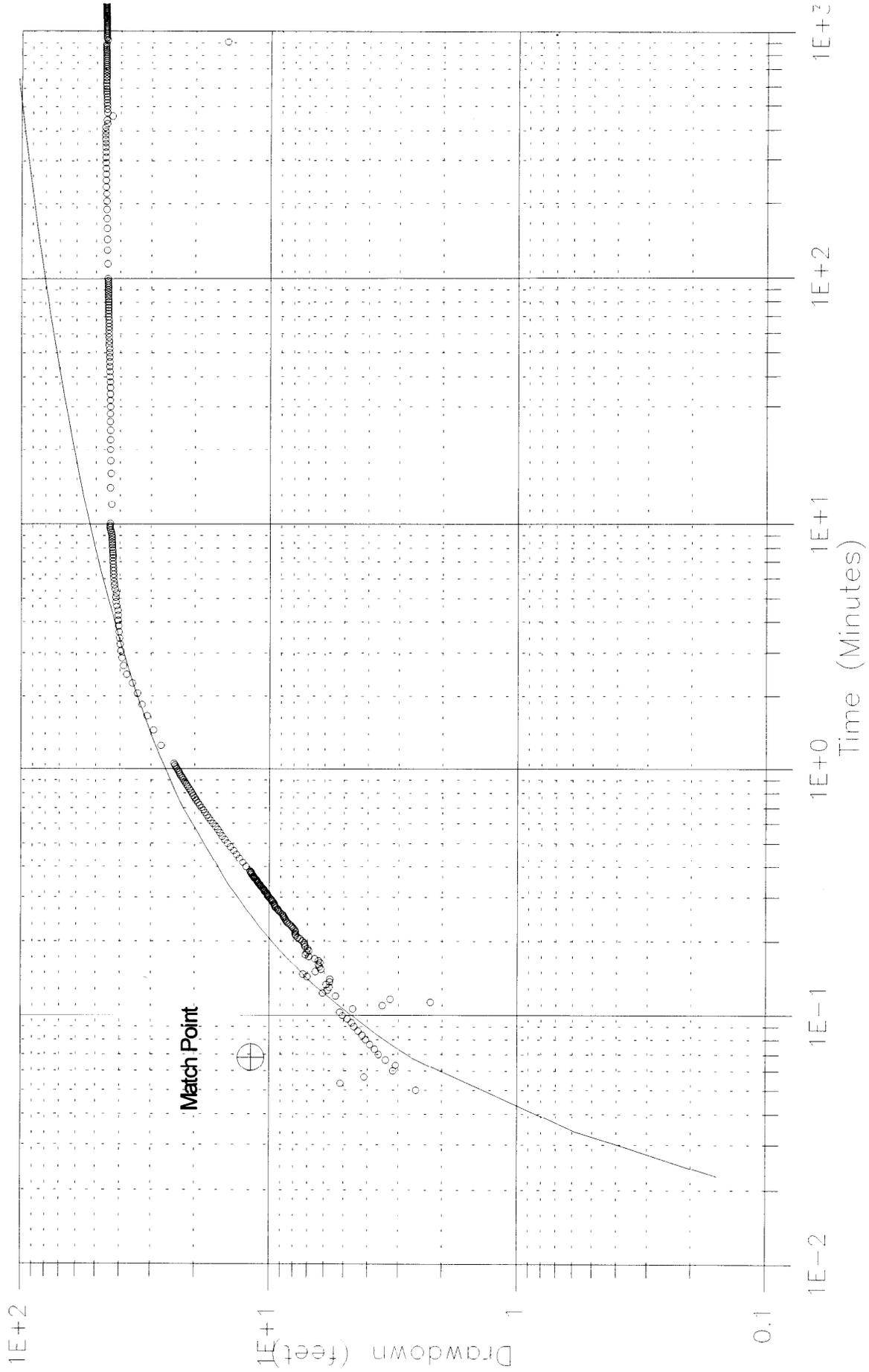


Test of Coon Rapids Well #20 (120853)

03/11/99

Pumping

$T = 15.3 \cdot 1152 / 12 = 1,470 \text{ ft}^2/\text{day}$

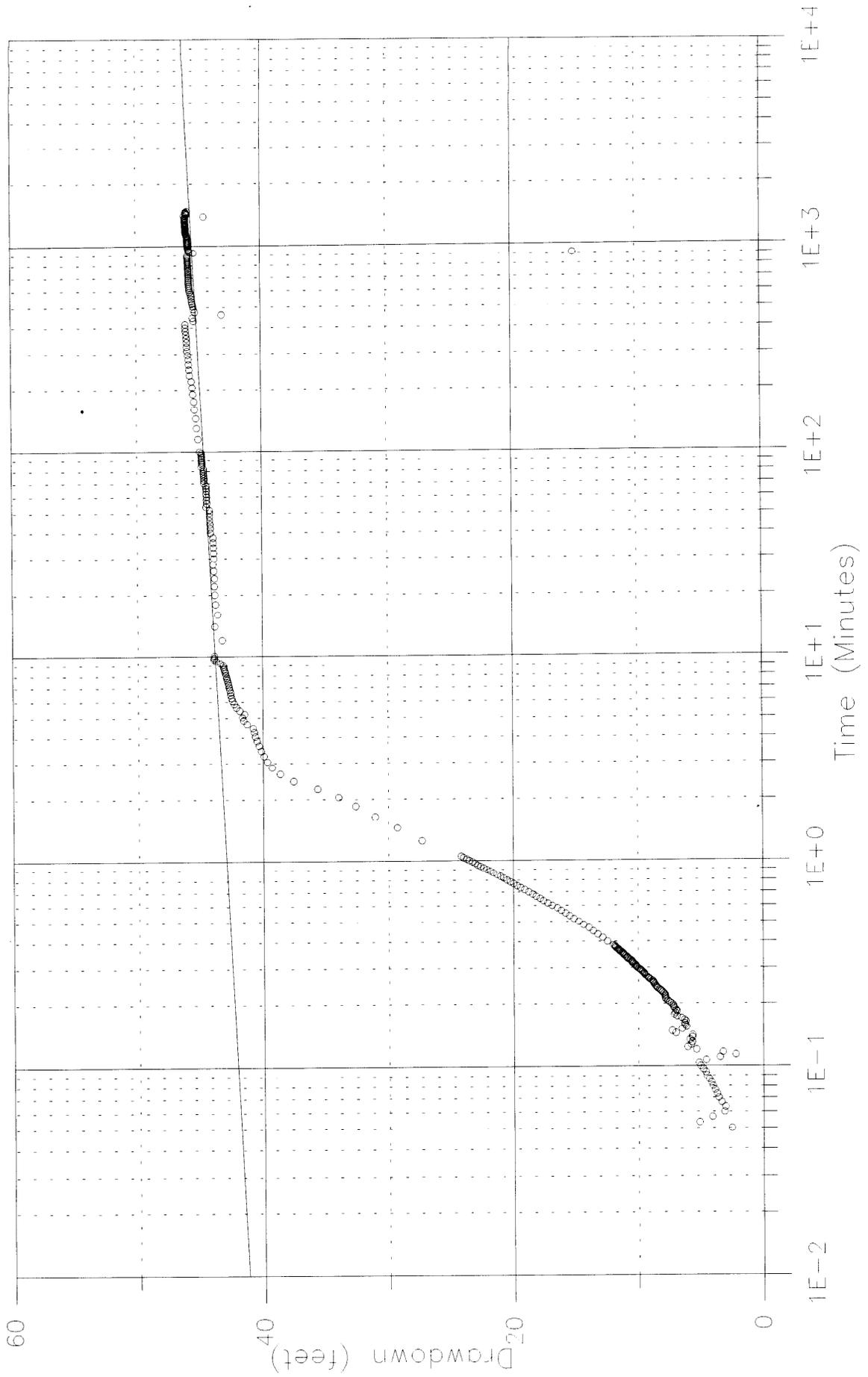


Test of Coon Rapids Well #20 (120853)

03/11/99

Pumping

T = 35.3 1152 / 0.67 = 60,700 ft²/day

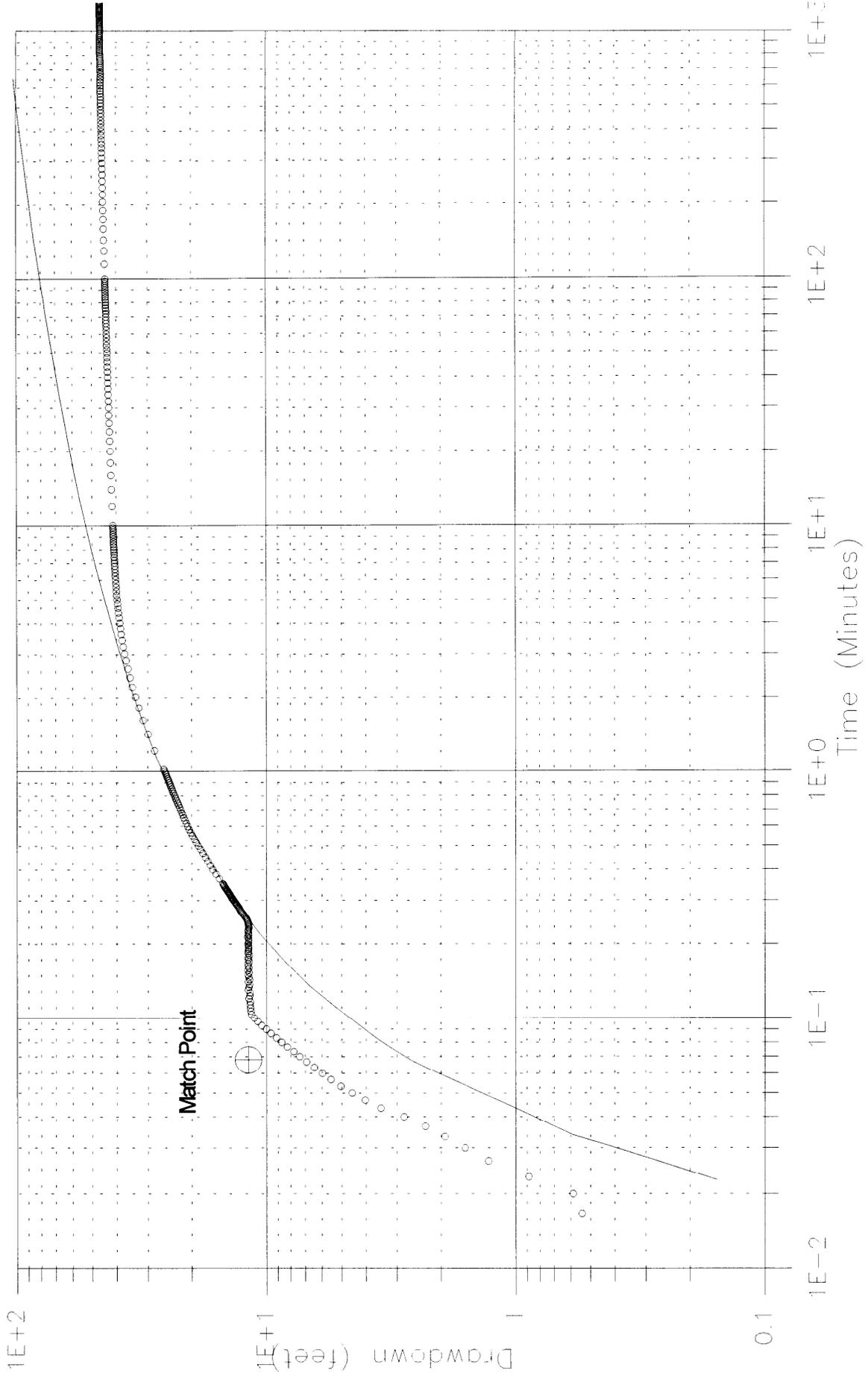


Test of Coon Rapids Well #20 (120853)

03/11/99

Recovery

$T = 15.3 \cdot 1152 / 12 = 1,470 \text{ ft}^2/\text{day}$

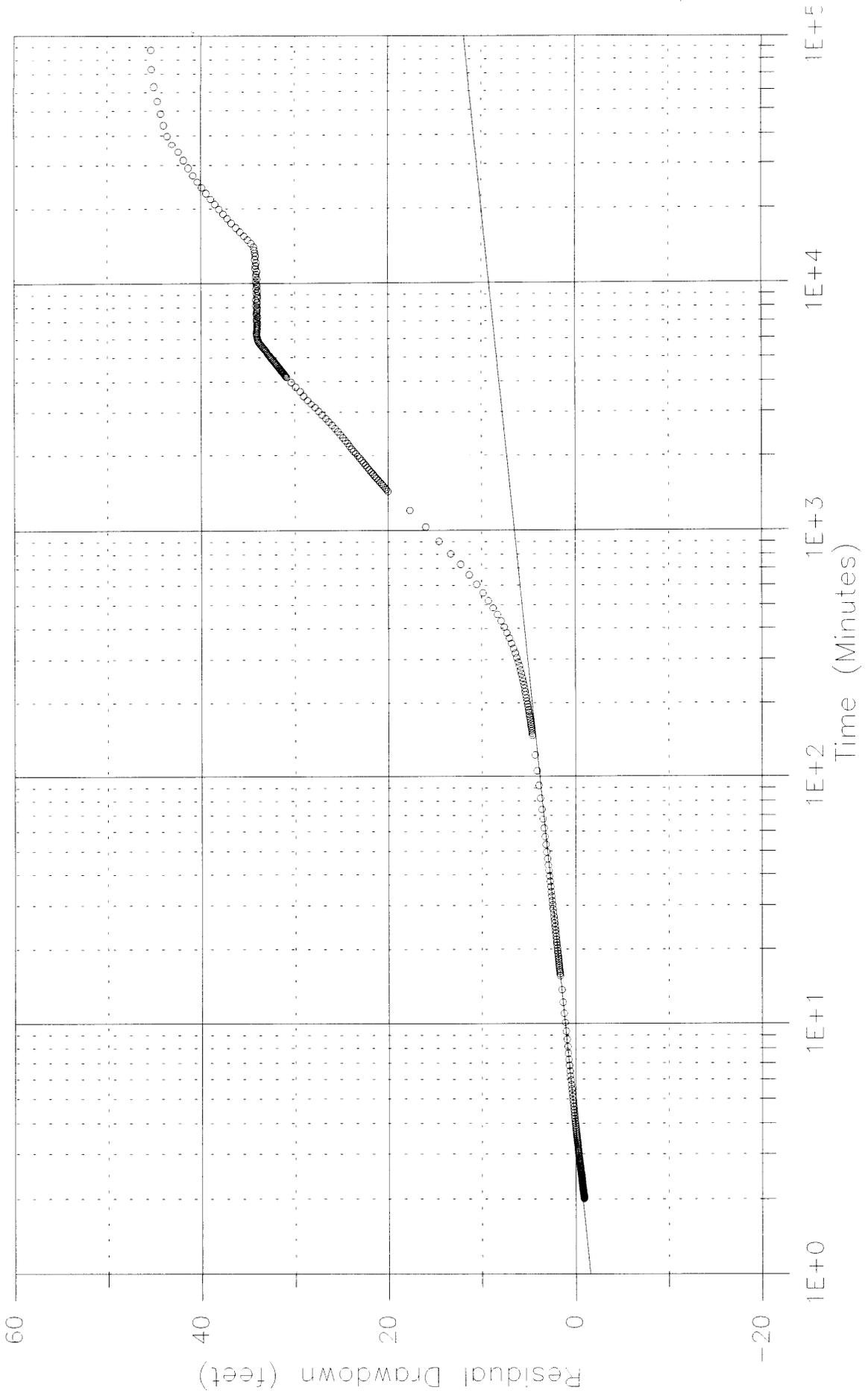


Test of Coon Rapids Well #20 (120853)

03/11/99

Recovery

$T = 35.3 \cdot 1152 / 2.64 = 15,400 \text{ ft}^2/\text{day}$



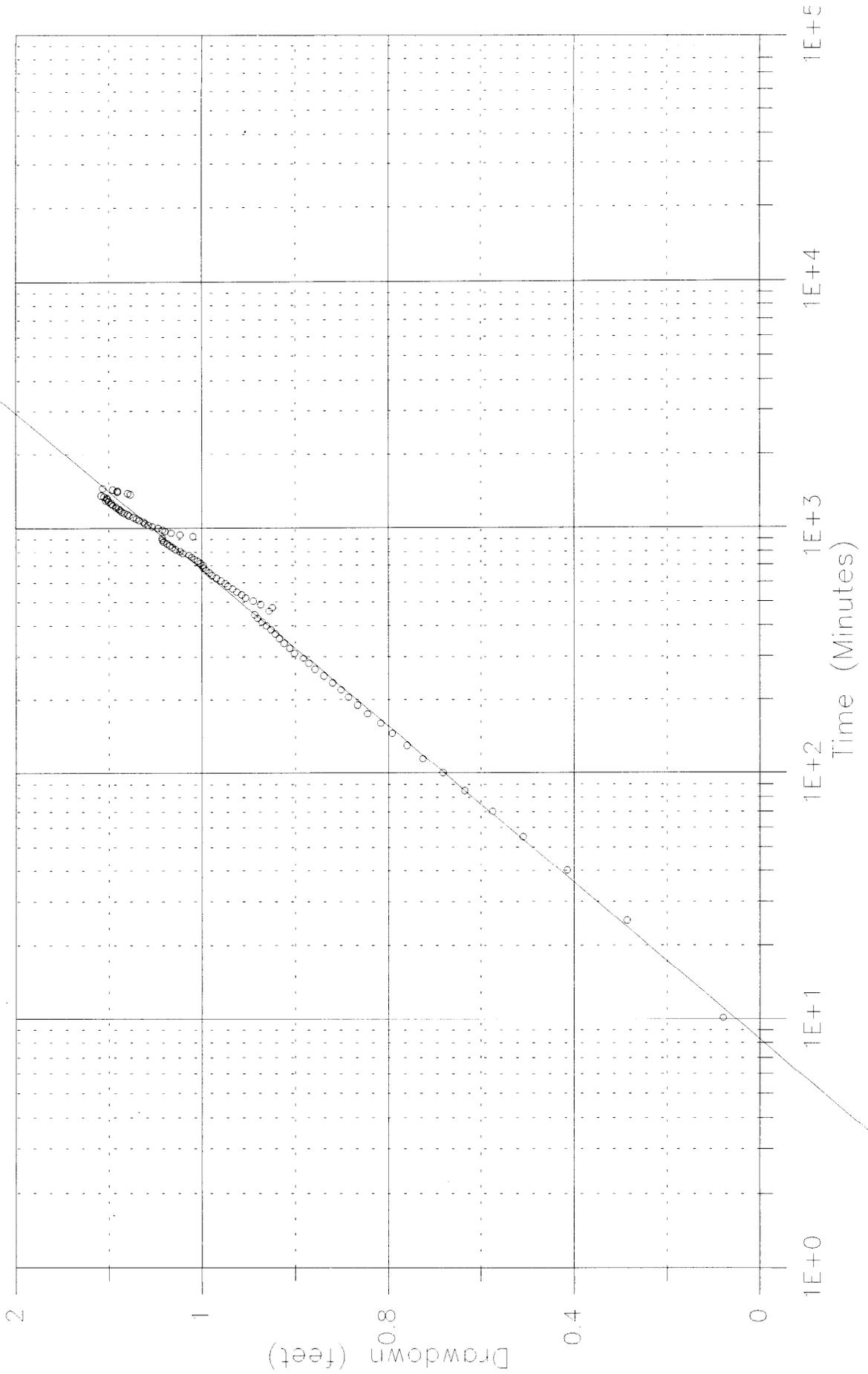
Test of Coon Rapids Well #20 (120853)

03/11/99

at Well #17 (150357)

Pumping

$T = 35.3 \frac{1152}{8.2} / 0.61 = 66,700 \text{ ft}^2/\text{day}$
 $S = 66,700 \frac{8.2}{1163^2} \cdot 640 = 6.32e-4$



Test of Coon Rapids Well #20 (120853)

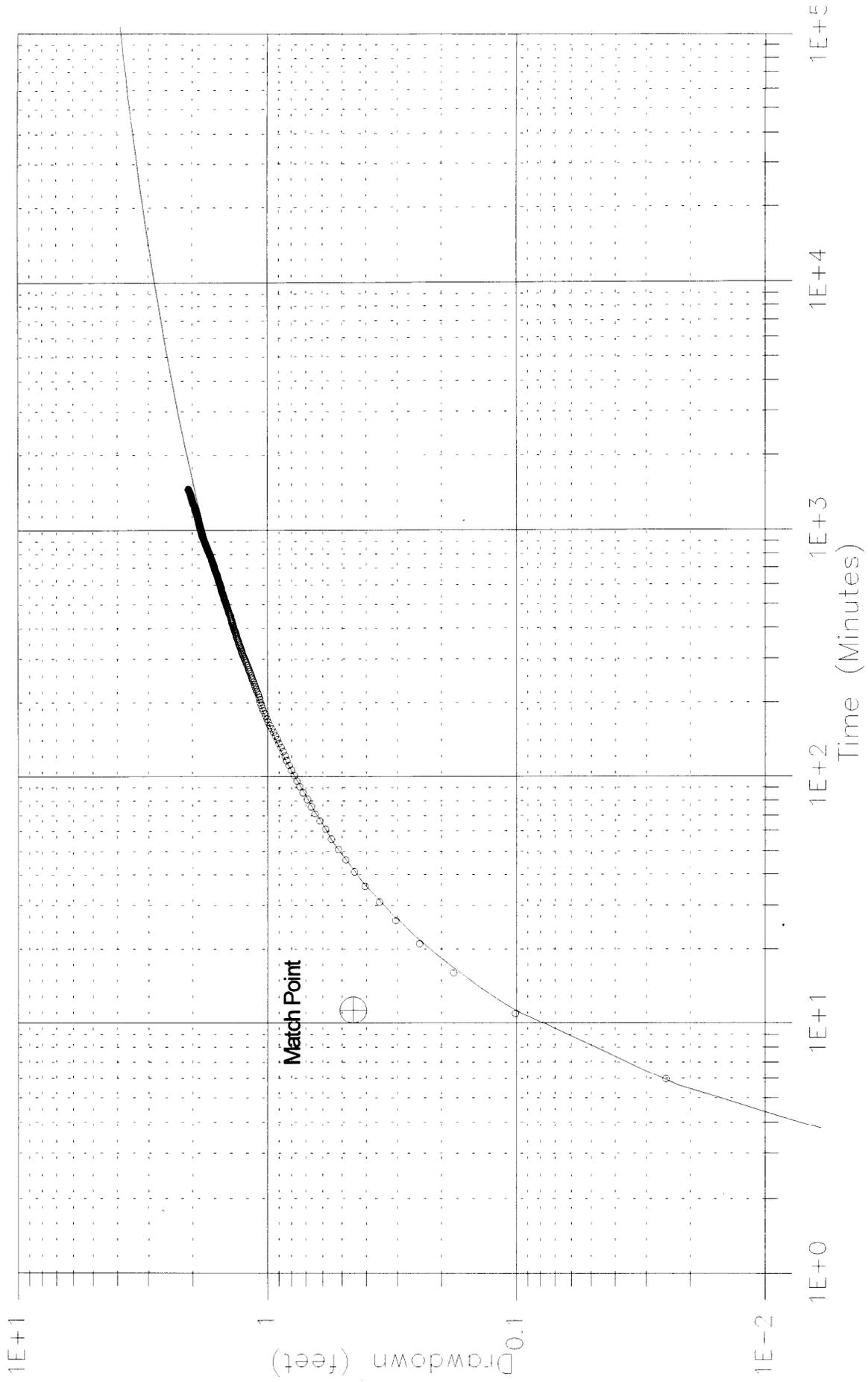
03/11/99

at Well #17 (150357)

Recovery

$T = 15.3 \cdot 1152 / 0.46 = 38,300 \text{ ft}^2/\text{day}$

$S = 38,300 \cdot 12 / 1163^2 \cdot 360 = 9.44e-4$



Test of Coon Rapids Well #20 (120853)

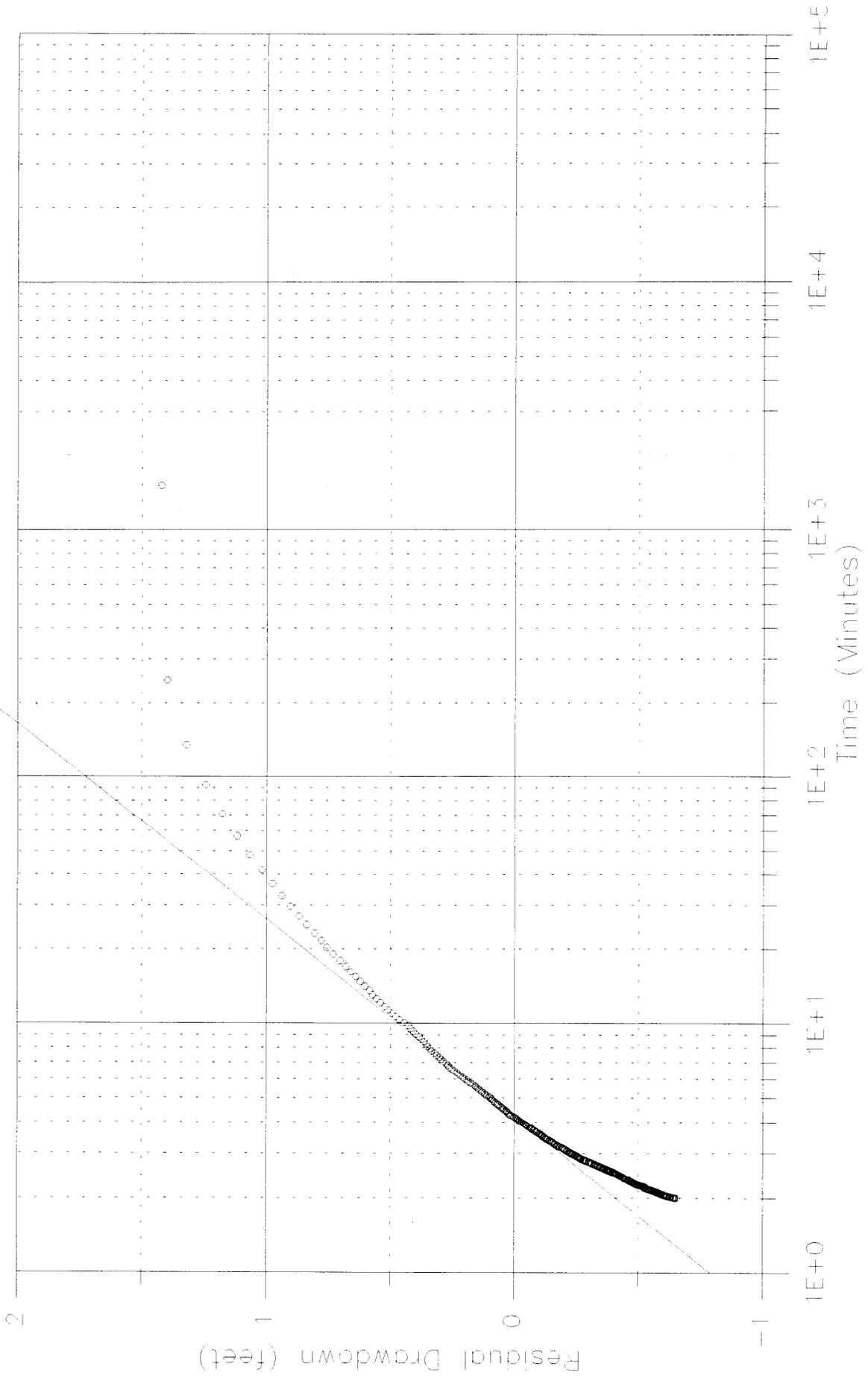
03/11/99

at Well #17 (150357)

Recovery

$T = 35.3 \text{ 1152} / 1.28 = 31,800 \text{ ft}^2/\text{day}$

$S = 31,800 \text{ 4.1} / 1163^2 \text{ 640} = 1.5e-4$



Appendix 2.
Field Data Sheets



Test No.

Aquifer Test Information

Test Location <i>Coon Rapids # 20</i>	Well Owner <i>City of Coon Rapids</i>	Test Conducted By <i>J. Blum</i>
Date/Time Test Start <i>3/11/99 11:49:53.0</i>	Flow Rate (Units) <i>1152 gpm</i>	Pump Type <i>Turbine</i>
Date/Time Recovery Start <i>3/12/99 12:09:02</i>	Flow Rate Measuring Device <i>Flowmeter</i>	Pump Intake Depth
Date/Time Test Finish <i>3/13/99 12:35</i>	Totalizer: End <i>711442.4 X 1000</i>	Pumped Well Inner Casing Diameter
Notes <i>pre lube ~ 90 sec.</i>	Totalizer: Start <i>709762</i>	Confined/Unconfined <i>Semi confined</i>
	Total Pumped (Units) <i>1690,400 gallons</i>	Quad Sheet Name/Number <i>120A Coon Rapids</i>

Unique Well Numbers	Location T, R, S, Quarters	Location N, E	Radial Distance	Open Depth	Transducer Setting	Measuring Point Location	Elevation, Datum
Pumped Well <i>#20 (120853)</i>		N E			<i>~ 91 ft XD 4.23</i>	<i>vent pipe</i>	
Observation <i>#17 (150357)</i>		N E	<i>1163'</i>		<i>51.85 XD 10.12</i>		
		N E					
		N E					
		N E					
		N E					

Sketch Map of Well Locations



● Coon Rapids #7

● Coon Rapids #14

● Coon Rapids #15

● Coon Rapids #22

● Coon Rapids #17

● Coon Rapids #19

● Coon Rapids #20

DEPARTMENT :Health

STATE OF MINNESOTA

Office Memorandum

DATE : October 8, 2002

TO : City of Coon Rapids WHP File

FROM : Steve Robertson, Source Water Protection Unit, MDH

PHONE : 651-215-1322

SUBJECT : Aquifer Tests at Coon Rapids Well Nos. 19 (110475) and 20 (420956): August 29 -
September 3, 2002

INTRODUCTION

The Minnesota Department of Health (MDH) assisted the City of Coon Rapids, Minnesota, by helping to conduct aquifer tests to determine aquifer properties near proposed new well sites. The results of these aquifer tests can be used for many purposes, including providing some of the aquifer characterization information required by MDH for wellhead protection planning.

The pumping test at Coon Rapids Well Nos. 19 and 20 were conducted by the City of Coon Rapids with assistance from H.R. Green and MDH as described below. The results were analyzed using standard nonequilibrium methods, cited in the references. Data plots and associated quantitative analyses are included in Appendix A, field data sheets in Appendix B, well logs in Appendix C. Table 1 summarizes the pumping schedule during the monitoring period and analysis results are summarized on Table 2.

The analysis shows that the aquifer responds in a manner consistent with the geologic setting.

DESCRIPTION OF THE TEST

Water level readings were monitored using pressure transducers in Wells 673418 and 673420 (monitoring wells installed during summer of 2002 for the City). Municipal Well Nos. 17, 19, and 20 are completed in deep buried Quaternary materials, as are the two monitoring wells.

Scheduling prevented gathering pre-test monitoring data over a long period. Collection of monitoring data began on August 29, 2002 and ended September 3, 2002. The test pumping program was conducted using a constant pumping rate, allowing MDH to use the collected data for quantitative aquifer analysis. Figure 1 shows the effects of the pumping on water levels in Well Nos. 673418 and 673420 over the duration of the monitoring period.

Monitoring Wells 673418 and 673420 are located about 551 and 1860 feet, respectively, from Well No. 19. Likewise, Well No. 673418 is 1493 feet and Well No. 673420 is 1289 feet from Coon Rapids Well No. 20. Locations of all wells were established using GPS technology.

The test started at 11:00:32 on August 29, 2002. Well No. 19 was pumped at an average rate of 1218.8 gallons per minute. A flowmeter on the discharge line was used to monitor the discharge. City staff maintained the pumping rate at a relatively constant rate for the duration of the test. Well discharge was pumped into the municipal distribution system.

The pump in Well No. 19 was turned off at 11:04:25 on August 30, 2002, to start the recovery period. After initiating recovery, water levels had mostly recovered after 52 minutes. After a recovery period of approximately 24 hours, pumping commenced in Coon Rapids Well No. 20, which was pumped for 24 hours starting at about 11 a.m. on August 31, 2002. Well No. 20 was also pumped for approximately 24 hours, ending at about 11 a.m. on September 1, 2002. A 24-hour recovery period followed this pumping, after which Well Nos. 17, 19, 20, and 22 were pumped simultaneously. Table 1 presents the pumping chronology.

SUMMARY OF RESULTS

The principal tests of the series were conducted for a period of 24 hours. The available geologic record and static water level information from Well No. 19, Well No. 20, and the test wells indicate the aquifer in the area of these wells is likely confined (Appendix C), although there may be nearby areas in which the deep Quaternary Aquifer is unconfined (i.e., near Coon Rapids Well No. 14 *cf.* 110460; H.R. Green Company, August, 2002).

Pumping Test of Coon Rapids Well No. 19 (110475)

Coon Rapids Well No. 19: No water levels were recorded in the pumping well.

Test Well No. 673418: The water levels in test Well No. 673418 dropped by more than 8 feet during the pumping portion of the Coon Rapids Well No. 19 test. A log-log plot of the response from this well during pumping is shown in Appendix A. The Theis drawdown analysis method was applied to the drawdown data from this well. Data emphasized in the analysis are those collected early in the pumping phase of the test because the late time data appear to be affected by leakage. The Hantush-Jacob method (Hantush, 1956), which accounts for leakage, was also applied to the drawdown data collected in the test well. The results of these analyses are presented in Table 2.

Recovery data from test Well No. 673418 also provide estimates of transmissivity. Water levels during recovery rebounded above the levels observed prior to pumping, probably because antecedent hydraulic conditions in the aquifer probably had not equilibrated prior to the start of the test. Portions of the response curve that were subjected to the Theis recovery analysis are the portions of the curve with T/T' values in the range of 2 to 20. The recovery data analysis is shown on the figures in Appendix A. Table 2 summarizes the quantitative analysis of the results from Well No. 673418.

Test Well No. 473420: The water level data from this well show virtually no response to pumping at Well No. 19 (Figure 1, Appendix A). This could be a result of antecedent pumping conditions, but will be difficult to establish given that background monitoring data are lacking. Data from this well do, however, show a measurable recovery response. Portions of the response curve that were subjected to the Theis recovery analysis are the portions of the curve with T/T' values of 2.5 to 6. Attempts to quantify the recovery data yield results that do not agree with those obtained from the other test well (Table 2), not surprising given the greater radial distance to the pumping well and the leaky conditions in the aquifer. The recovery analysis method does not account for leaky conditions, the presence of which can give rise to overestimates of T at large radial distances. The recovery data analysis are shown on the figure presented in Appendix A. Table 2 summarizes the quantitative analysis of the results from Well No. 673420.

Pumping Test of Coon Rapids Well No. 20 (420956)

Coon Rapids Well No. 20: No water levels were recorded in the pumping well.

Test Well No. 673418: The water levels in test Well No. 673418 dropped by a little less than 1 foot during the pumping portion of the Coon Rapids Well No. 20 test. A log-log plot of the response from this well during pumping is shown in Appendix A. The Theis drawdown analysis method was applied to the drawdown data from this well. Data emphasized in the analysis are those collected early in the pumping phase of the test (i.e., minutes 10 to 200) because the late time data appear to be affected by leakage. The Hantush-Jacob method (Hantush, 1956), which accounts for leakage, was also applied to the drawdown data collected in the test well. The results of these analyses are presented in Table 2.

Recovery data from test Well No. 673418 also provide estimates of transmissivity. Water levels during recovery rebounded above the levels observed prior to pumping, as observed in the test of Coon Rapids Well No. 19. Antecedent hydraulic conditions in the aquifer probably had not equilibrated prior to the start of the test, although it is also possible that the recovery data could reflect external influences that changed during the pumping. Portions of the response curve that were subjected to the Theis recovery analysis are the portions of the curve with T/T' values in the range of 4.2 to 18. The recovery data analysis are shown on the figure in Appendix A. Table 2 summarizes the quantitative analysis of the results from Well No. 673418.

Test Well No. 673420: Unlike during the test of Well No. 19, this test well showed a definite response to pumping of Well No. 20 (Figure 1, Appendix A). A log-log plot of the response from this well during pumping is shown in Appendix A. The Theis drawdown analysis method was applied to the drawdown data from this well. Data emphasized in the analysis are those collected early in the pumping phase of the test (i.e., minutes 40 to 250) because the late time data appear to be affected by leakage. The Hantush-Jacob method (Hantush, 1956), which accounts for leakage, was also applied to the drawdown data collected in the test well. The results of these analyses are presented in Table 2.

Recovery data from test Well No. 673420 also provide estimates of transmissivity. Water levels during recovery rebounded above the levels observed prior to pumping, as observed in Well No. 673418 during both tests. Portions of the response curve that were subjected to the Theis recovery analysis are the portions of the curve with T/T' values of 5.5 to 10. Attempts to quantify the recovery data yield results that do not agree with those obtained from the other test well (Table 2), not surprising given the greater radial distance to the pumping well and the leaky conditions in the aquifer. The recovery data analysis are shown on the figure in Appendix A. Table 2 summarizes the quantitative analysis of the results from Well No. 673420.

Discussion

The principal reason for collecting water level data from the wells was to assess qualitatively the aquifer response to various pumping conditions. That the data could be subjected to quantitative analysis to estimate aquifer hydraulic properties is an incidental benefit. While the results of these analyses are generally fair to good, they suffer from a few problems. First, it is likely that equilibrium hydraulic conditions did not exist prior to the onset of pumping at Coon Rapids Well Nos. 19 and 20. The lack of background data do not allow this to be established conclusively, but the recovery data infer it. Second, the water level data, especially those collected in Well No. 673420, are noisy, suggesting other aquifer

influences nearby. Each of these problems may contribute uncertainty to the analysis results, but the drawdown and recovery responses from the municipal pumping are generally large in comparison to the other influences. Improved results could be obtained by instrumenting the pumping wells and arranging for stable antecedent hydraulic conditions in the aquifer. Moreover, should other monitoring wells exist in the area, it may be worthwhile to measure water level responses during future pumping tests to get a good sense of variations over the scale of the well field and the likely capture zone of the wells.

H.R. Green (2002) and earlier reports prepared for the city of Coon Rapids (i.e., Hickok and Associates, 1986, 1989; Donahue and Associates, 1991) discuss the complex stratigraphic relationships within the unconsolidated materials above bedrock in the Coon Rapids area. The general relationship is of shallow sands, below which there is a fine-grained till which, in turn, covers deep sand and gravel materials. The deep sand and gravel comprise the deep Quaternary materials in which many of the Coon Rapids Quaternary wells are completed. It is clear from the information presented in Hickok (1986, 1989), Donahue (1991) and H.R. Green (2002) that the composition, distribution and geometry of the deep Quaternary Aquifer system is quite variable. From the data presented in those reports, it appears that Well No. 20 (420956), and Well No. 14 (110460) are in the area in which the deep Quaternary Aquifer is at its thickest, but that Well No. 19 (110475) and test Well No. 673418 are in areas where the aquifer begins to thin. This variability likely affected the results obtained in the pumping tests.

The analysis results (Table 2) show that the estimated T values for the aquifer vary from about 8000 to 110,000 ft²/day. Previous MDH tests on Coon Rapids Well No. 20 (MDH, 1999) concluded the aquifer transmissivity is on the order of 38,300 ft²/day (and S=0.00094), while Hickok (1989) reports results of 5080 ft²/day in an area further north in Coon Rapids. For the current tests, the Hantush-Jacob method, which accounts for leaky conditions in the pumped aquifer, gives transmissivity estimates that are on the low end of the range of the results using other techniques but that are likely the most reliable. The lower T values obtained from Well No. 673418 relative to those estimated from the data collected in Well No. 473420 suggest that the hydraulic properties of the aquifer vary, becoming less transmissive to the northwest. Storage values range from 0.00025 to 0.001. Leakage values from the Hantush-Jacob analyses suggest leakage factors of 725 to 900 feet.

The monitoring period also captured over 10 and nearly 20 feet of drawdown in Well Nos. 673418 and 673420, respectively, during concurrent pumping of Coon Rapids Well Nos. 17, 19, 20 and 22. No recovery from this pumping was recorded.

CONCLUSION

Transmissivity values of the aquifer likely vary over the study area. Evidence suggests the area to the northwest near Well No. 673418 is less transmissive than areas to the east and south. Accordingly, transmissivity values in the range of 8120 ft²/day to 9420 ft²/day are probably appropriate for the aquifer in the northwest near Coon Rapids Well No. 19 and testwell 673418, while values of 27,000 ft²/day to 55,000 ft²/day may be appropriate near Coon Rapids Well No. 20 and test Well No. 673420. These results compare well with the pumping test results obtained in 1999 from Coon Rapids Well No. 20. Storativity values are about 0.00025 to 0.0007.

Memorandum
Pumping Tests in Coon Rapids
October 8, 2002

References:

Donahue and Associates, 1991, letter to Scott Erickson, P.E., from Stephen D. Pettit, March 4, 1991.

Hantush, M.S., 1956, "Analysis of Data from Pumping Tests in Leaky Aquifers," American Geophysical Union Trans., v. 37, pp. 702-714.

Hickok and Associates, 1986, "Background Hydrogeological Report for the City of Coon Rapids," technical memorandum prepared for the city of Coon Rapids.

Hickok and Associates, 1989, "Coon Rapids Community Water Supply," letter to Tom Marthison, P.E., from Stephen D. Pettit, April 5, 1989.

H.R. Green Company, 2002, (Draft) "Well Siting Report Proposal for the City of Coon Rapids."

Kruseman, G.P. and N.A. de Ridder, 1991, *Analysis and Evaluation of Pumping Test Data*, International Institute for Land Reclamation and Improvement, Wageningen, The Netherlands, p. 377.

Minnesota Department of Health, 1999, "Analysis of the Coon Rapids No. 20 (420956) Aquifer Test."

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.

Figure 1. Groundwater Fluctuations, August 29 - Sept. 3, 2002
Coon Rapids Test Wells 673418, 673420

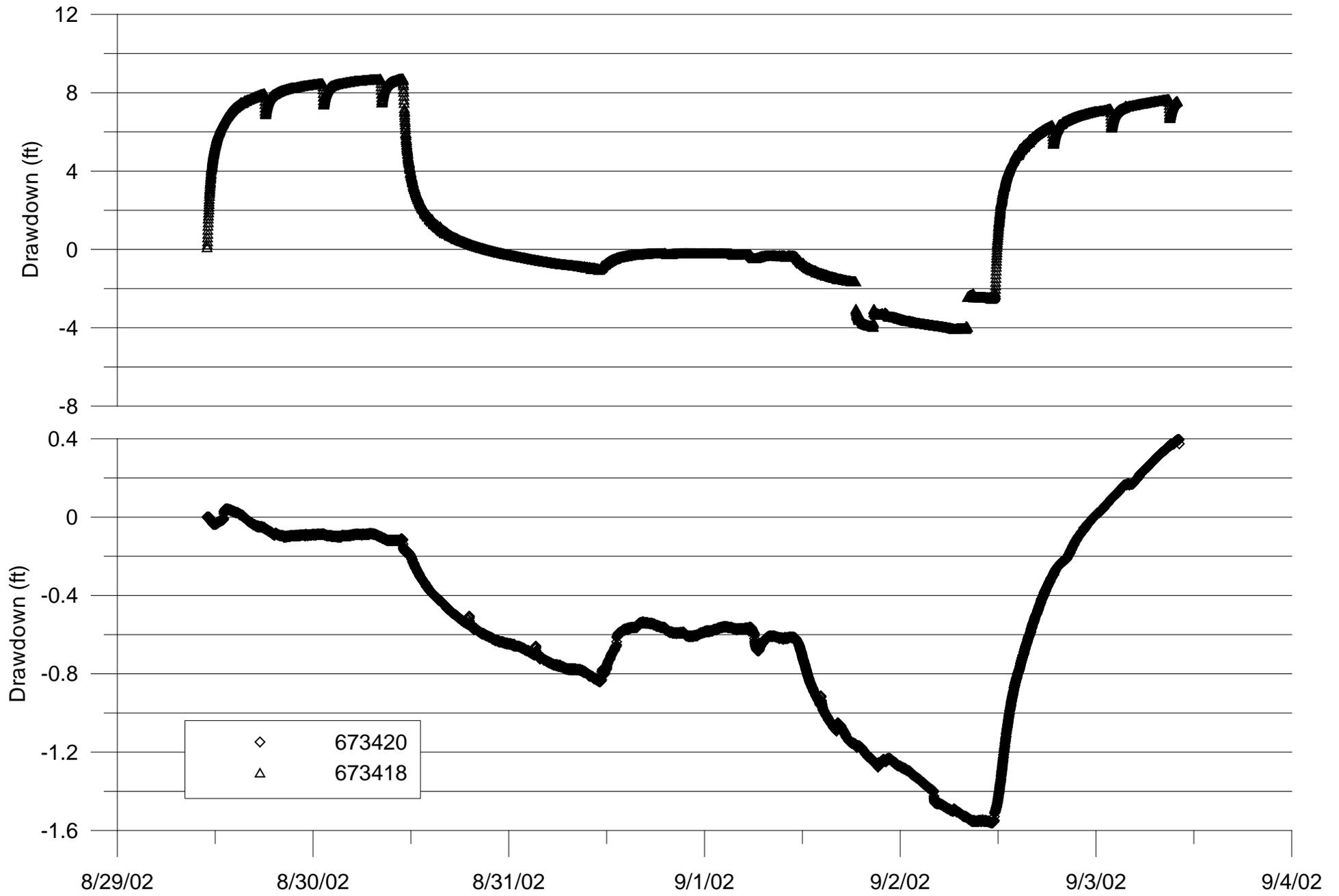


Table 1. Pumping Chronology
(Times approximate)

Date	Time	Action
August 29, 2002	11 am	Coon Rapids Well No 19 (110475) started. Beginning meter reading 201,963,000.
August 30, 2002	11 am	Coon Rapids Well No 19 (110475) stopped. Ending meter reading 203,718,000.
August 31, 2002	11 am	Coon Rapids Well No 20 (420956) started. Beginning meter reading 184,074,000.
September 1, 2002	11 am	Coon Rapids Well No 20 (420956) stopped. Ending meter reading 185,520,000.
September 2, 2002	11 am	Coon Rapids Well Nos. 17 (150357), 19 (110475), 20 (420956), and 22 (474385) started. Beginning meter readings of 90,970,000, 203,728,000, and 185,834,000 in Well Nos. 17, 19, and 20, respectively. No readings for Well No. 22.
September 3, 2002	11 am	Coon Rapids Well Nos. 17 (150357), 19 (110475), 20 (420956), and 22 (474385) stopped. Ending meter readings of 92,745,000, 205,437,000, and 187,521,000 in wells 17, 19, and 20, respectively. No readings for Well No. 22. Well No. 22 reportedly pumps at about 300 gpm.

Note: Information per Dick Dwyer, City of Coon Rapids.

Table 2. Pumping Test Results

Coon Rapids No. 19 (110475) Aquifer Test
August 29-31, 2002

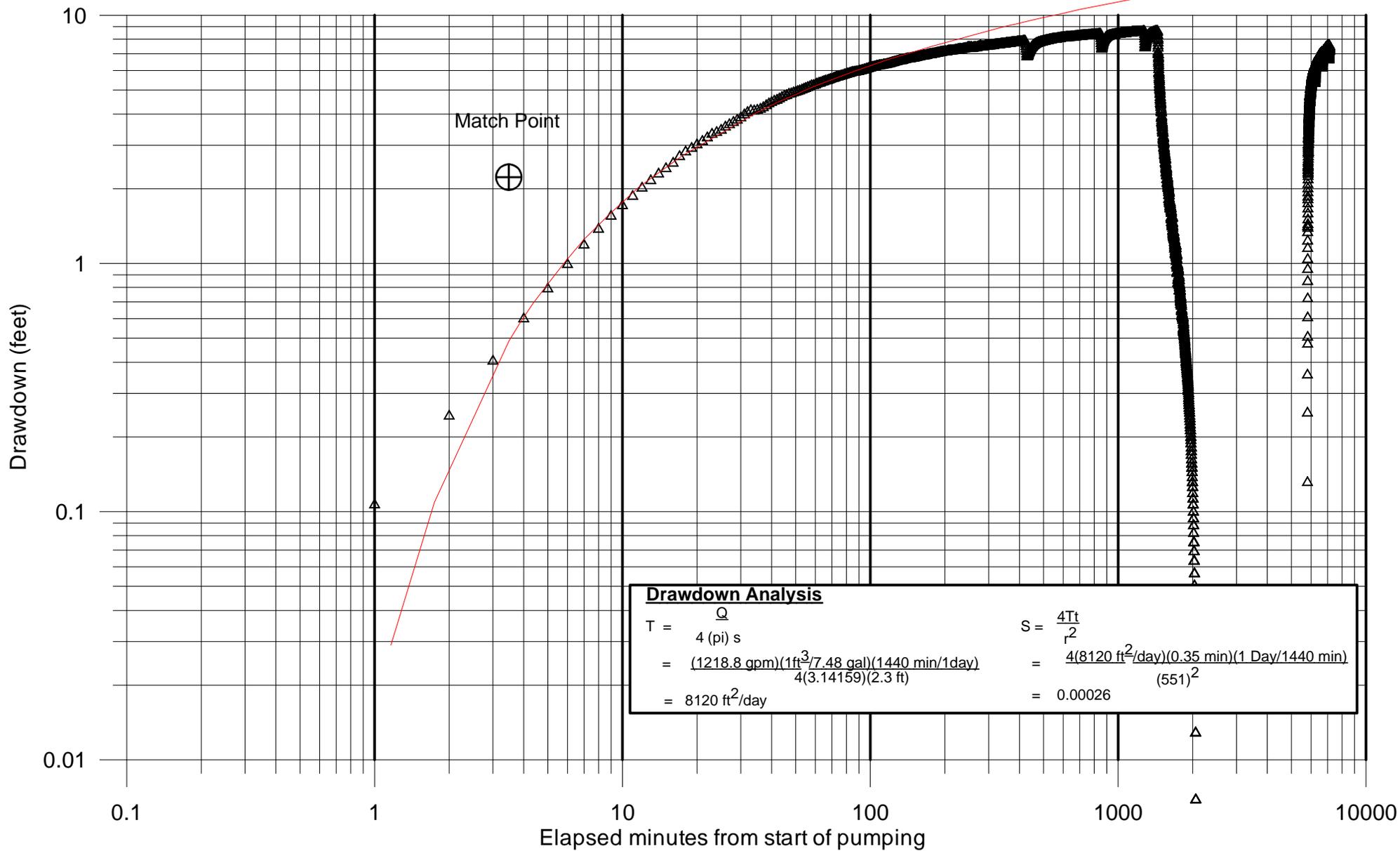
	Transmissivity T (ft ² /day)	Storage Coefficient S	Time Period Emphasized	Analysis Method
	-----	-----	-----	-----
Test Well No. 673418	8,120	0.00026	Minutes 4 - 140	Theis
	9,420	NA	T/T' 2-10	Theis Recovery
	8,610	0.00025	Late pumping	Hantush-Jacob
Test Well No. 673420	66,000	NA	Minutes 1.5-6	Theis Recovery

Coon Rapids No. 20 (420956) Aquifer Test
August 31- September 1, 2002

	Transmissivity T (ft ² /day)	Storage Coefficient S	Time Period Emphasized	Analysis Method
	-----	-----	-----	-----
Test Well No. 673418	40,500	0.00067	Minutes 10-200	Theis
	27,330	NA	T/T' 4.2-18	Theis Recovery
	26,900	0.0007	Late pumping	Hantush-Jacob
Test Well No. 673420	110,000	0.00078	Minutes 40-250	Theis
	51,350	NA	T/T' 5.5- 10	Theis Recovery
	54,900	0.001	Late Pumping	Hantush-Jacob

Aquifer Test Report Appendix A
Data Analysis

Observed Drawdown in 673418
 Pumped Well: Coon Rapids Well No. 19 (110475)



UNSTEADY FLOW TO A WELL IN A SEMI-CONFINED AQUIFER WITH NO STORAGE IN OVERLYING AQUITARDS (HANTUSH-JACOB)

This document reads a set of time-drawdown data from disk, calculates a theoretical time-drawdown curve using user-specified parameters, and plots them both in a way that the user can interactively adjust the theoretical curve to obtain a match with the field data. Applied to Monitoring Well 673418 during pumping of Coon Rapids Well No. 19 (110475). Results presented below.

Read the field data and perform the data initialization:

```

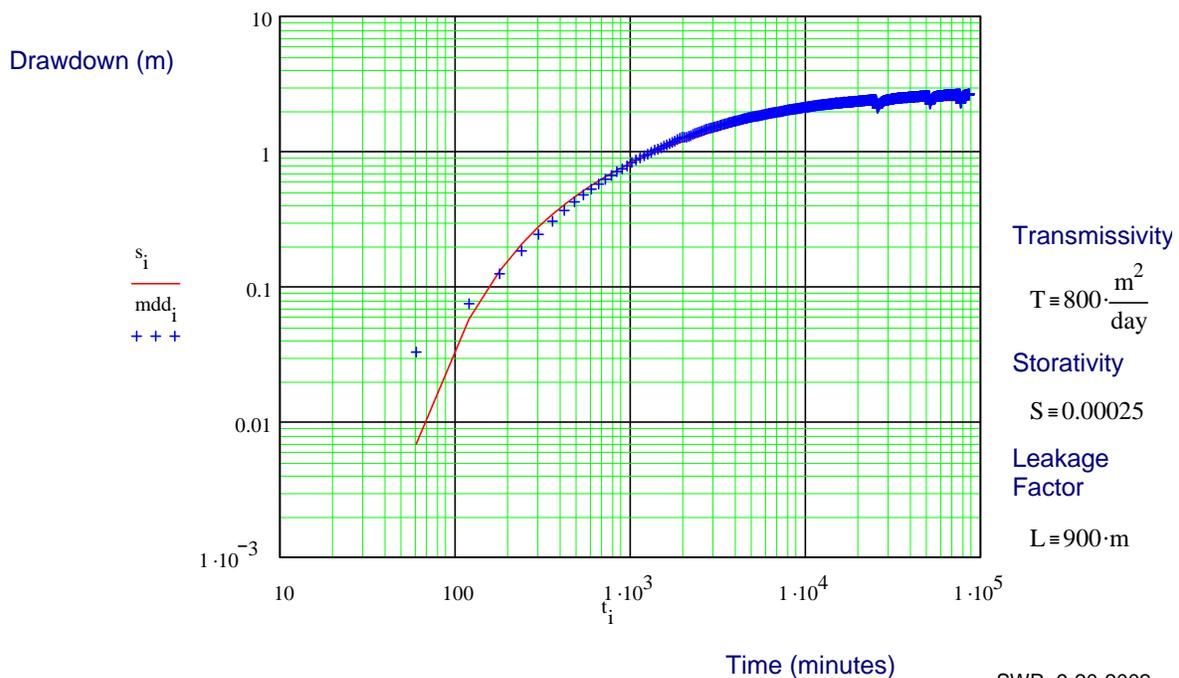
Read data from disk:      A := READPRN("673418.prn")
Data initializations:    nrows := rows(A)
                          nrows = 1.442·103
                          i := 0, 1 .. nrows - 1
                          t := A<0>·min
                          mdd := A<1>·m
    
```

Enter test parameters:

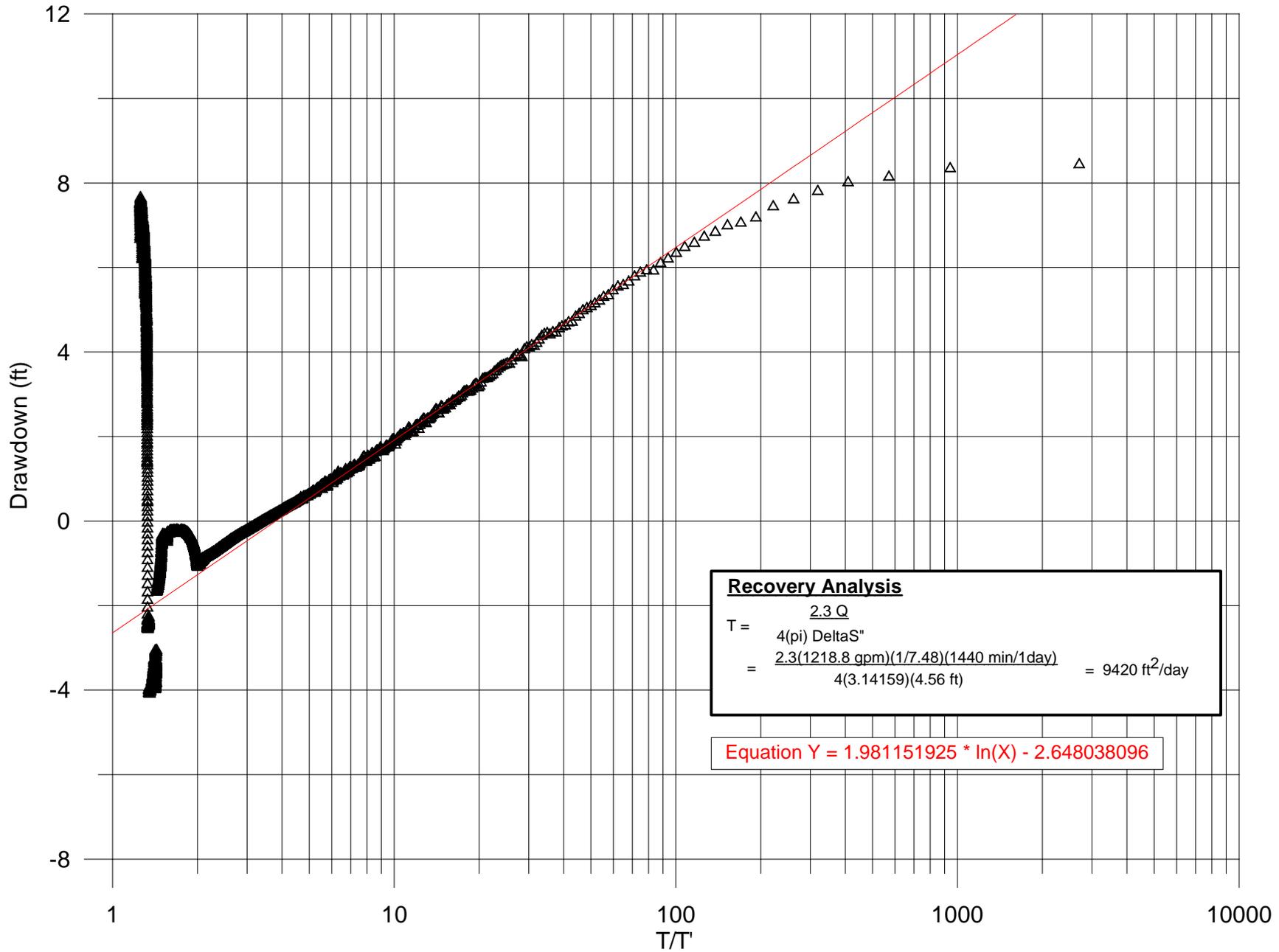
```

Well discharge (L3/T):    Q := 6644.1· $\frac{\text{m}^3}{\text{day}}$ 
Radial distance from pumping
to observation well (L)    r := 168·m
    
```

Comparison of Observed and Theoretical Drawdowns (Hantush-Jacob Method)



Observed Recovery in Well 673418
 Pumped Well: Coon Rapids Well No. 19 (110475)



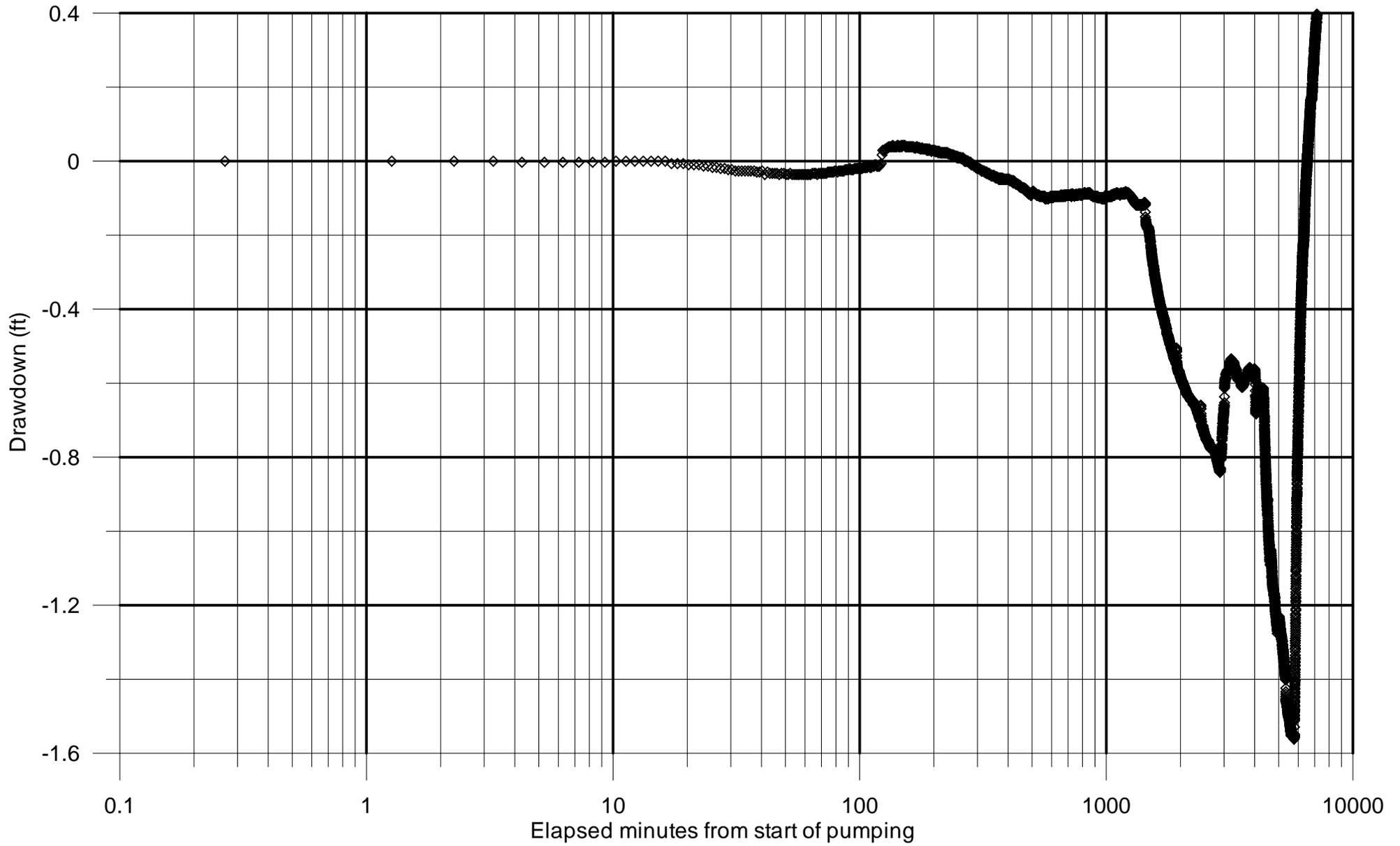
Recovery Analysis

$$T = \frac{2.3 Q}{4(\pi) \Delta s''}$$

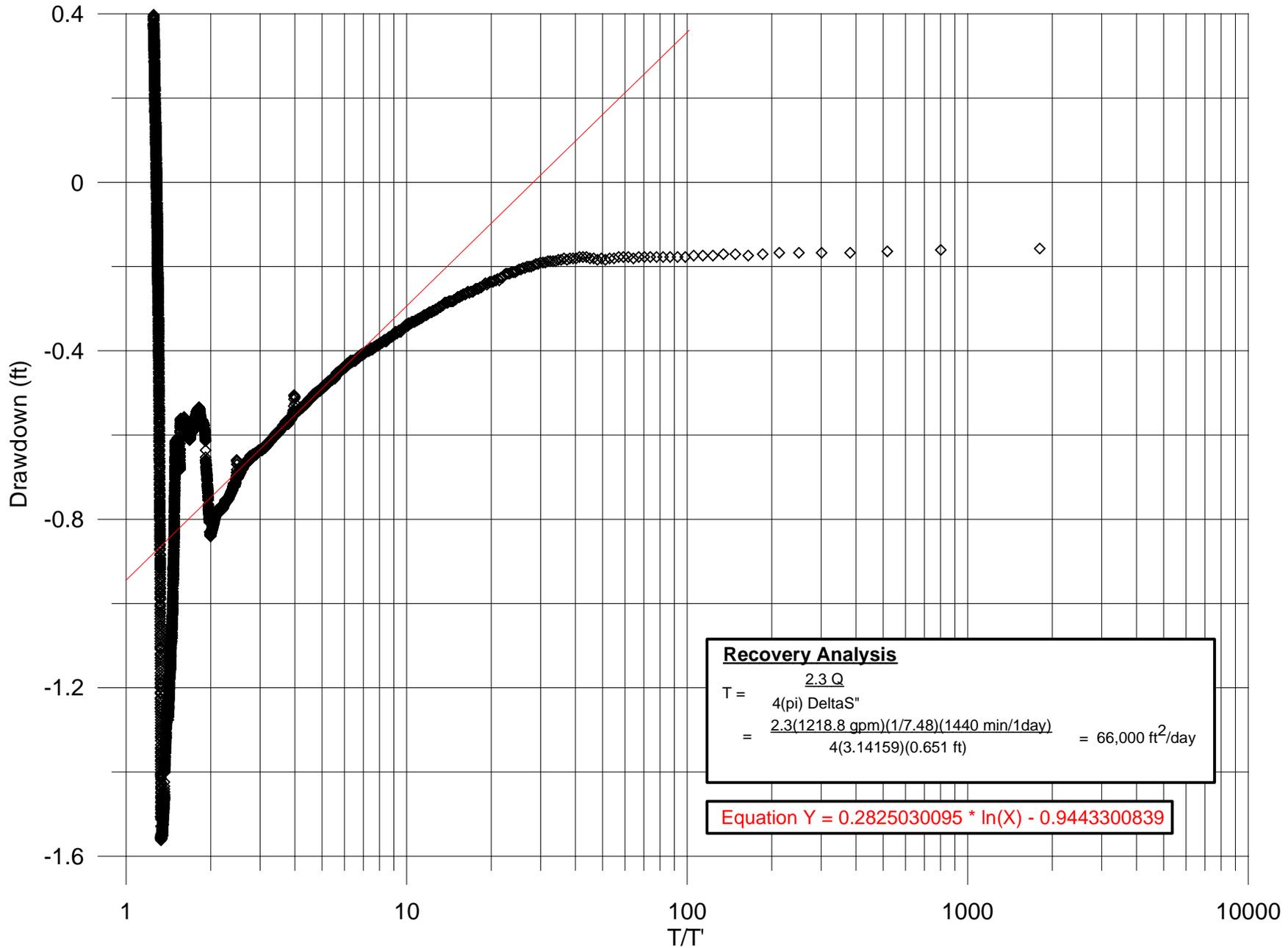
$$= \frac{2.3(1218.8 \text{ gpm})(1/7.48)(1440 \text{ min/day})}{4(3.14159)(4.56 \text{ ft})} = 9420 \text{ ft}^2/\text{day}$$

Equation $Y = 1.981151925 * \ln(X) - 2.648038096$

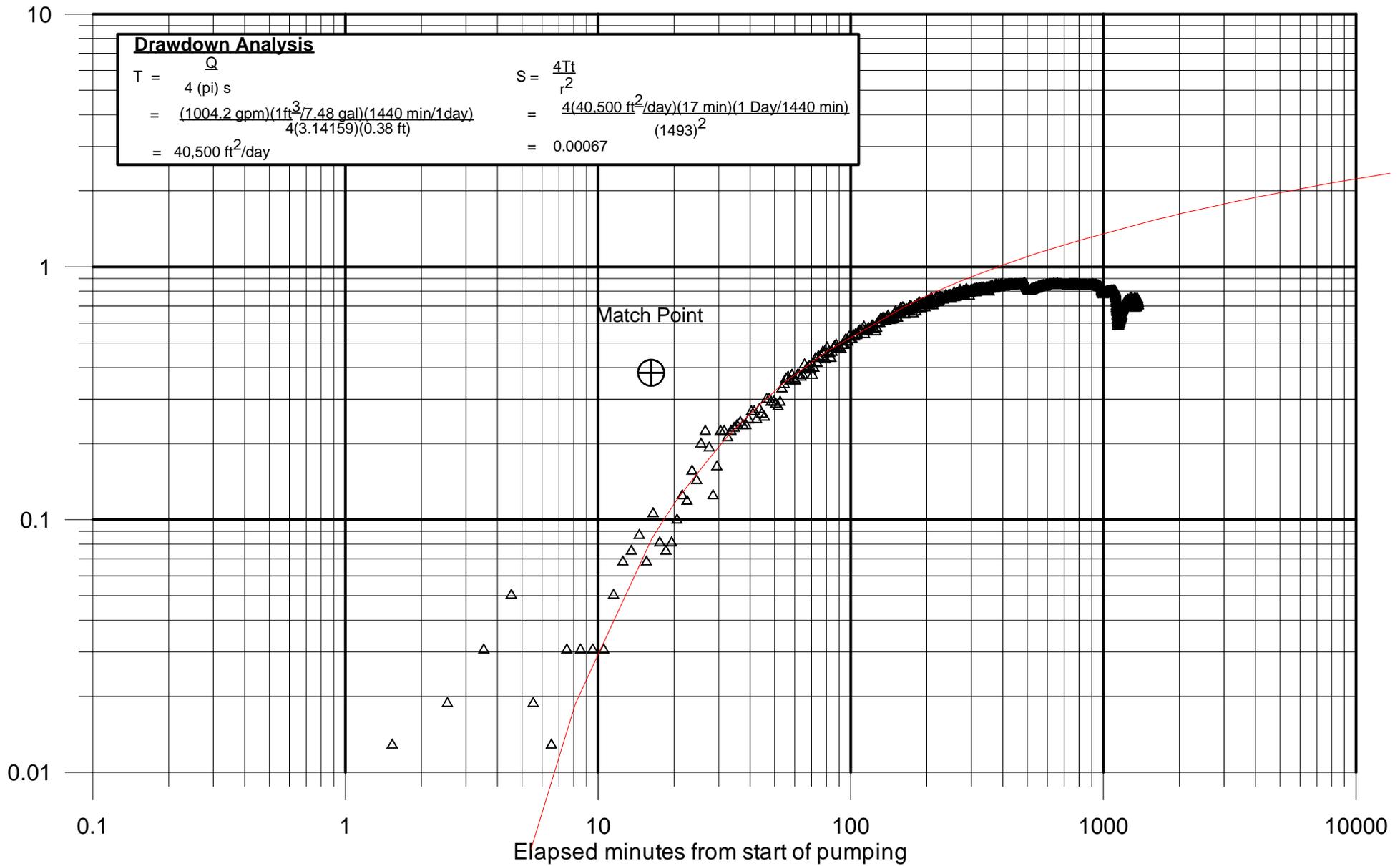
Observed Drawdown in well 673420
Pumped Well: Coon Rapids Well No. 19 (110475)



Observed Recovery in 673420
 Pumped Well: Coon Rapids Well No. 19 (110475)



Observed Drawdown in Test Well 673418
 Pumped Well: Coon Rapids No. 20 (420956)
 Test Date: August 31 - September 1, 2002



UNSTEADY FLOW TO A WELL IN A SEMI-CONFINED AQUIFER WITH NO STORAGE IN OVERLYING AQUITARDS (HANTUSH-JACOB)

This document reads a set of time-drawdown data from disk, calculates a theoretical time-drawdown curve using user-specified parameters, and plots them both in a way that the user can interactively adjust the theoretical curve to obtain a match with the field data. Applied to Monitoring Well 673418 during pumping of Coon Rapids Well No. 20 (420956). Results presented below.

Read the field data and perform the data initialization:

```

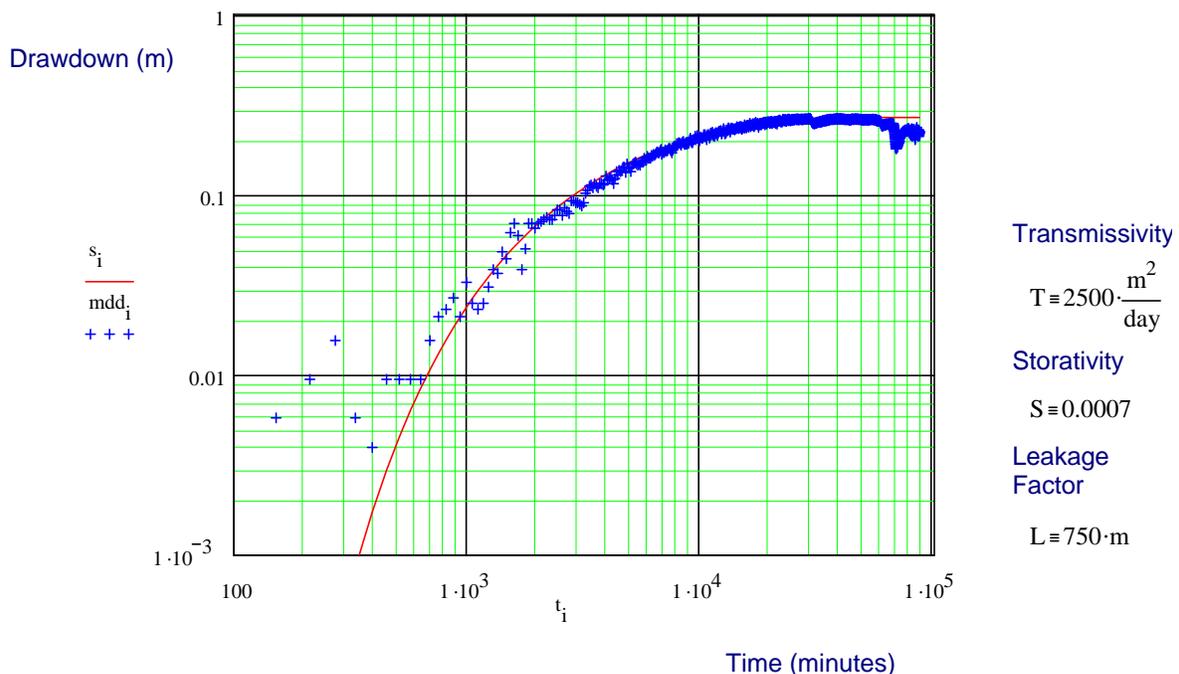
Read data from disk:      A := READPRN("673418_cr20dd.txt")
Data initializations:    nrows := rows(A)
                          nrows = 1.441·103
                          i := 0, 1 .. nrows - 1
                          t := A<0>·min
                          mdd := A<1>·m
    
```

Enter test parameters:

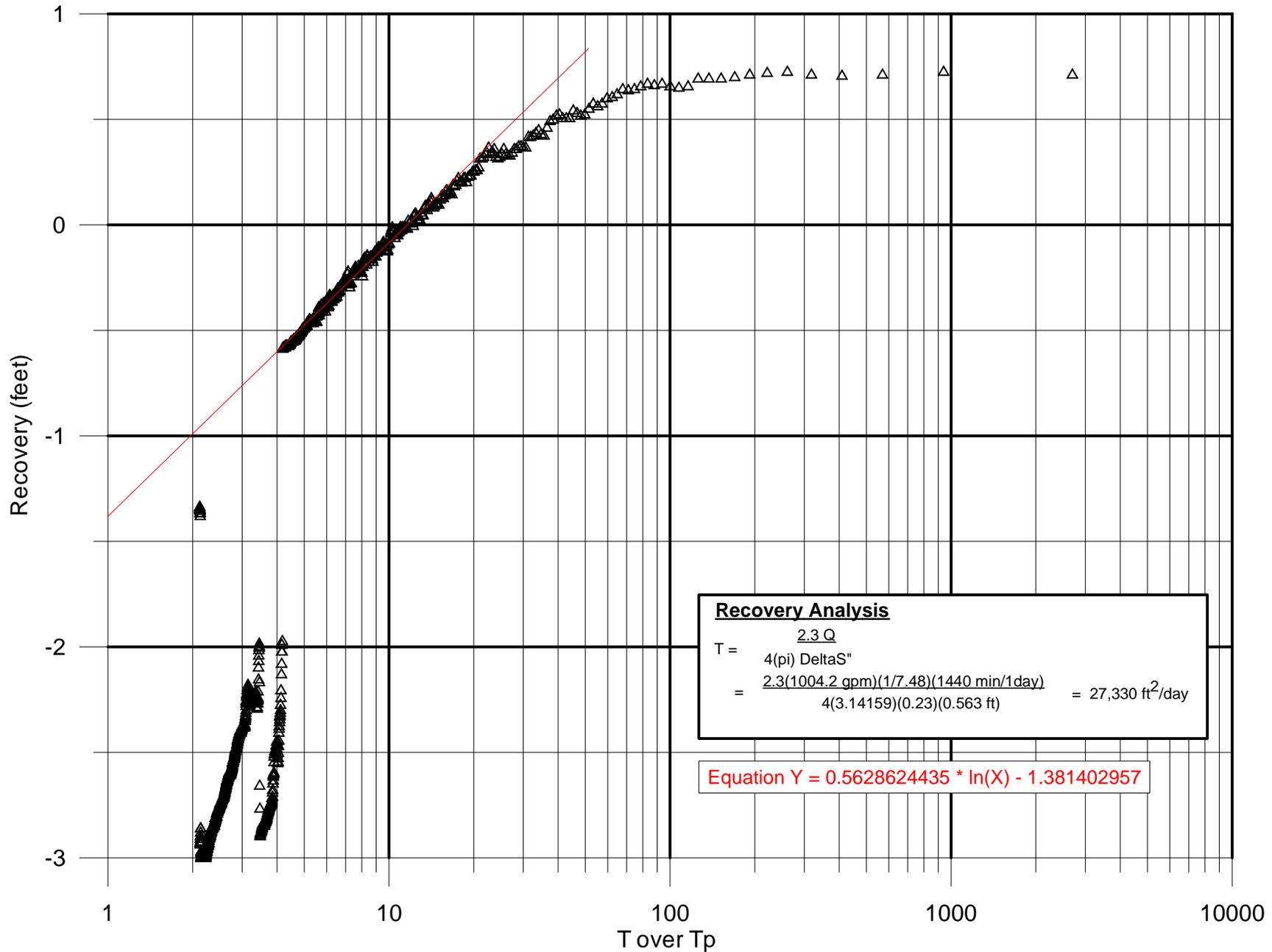
```

Well discharge (L3/T):    Q := 5474.1· $\frac{\text{m}^3}{\text{day}}$ 
Radial distance from pumping
to observation well (L)    r := 455·m
    
```

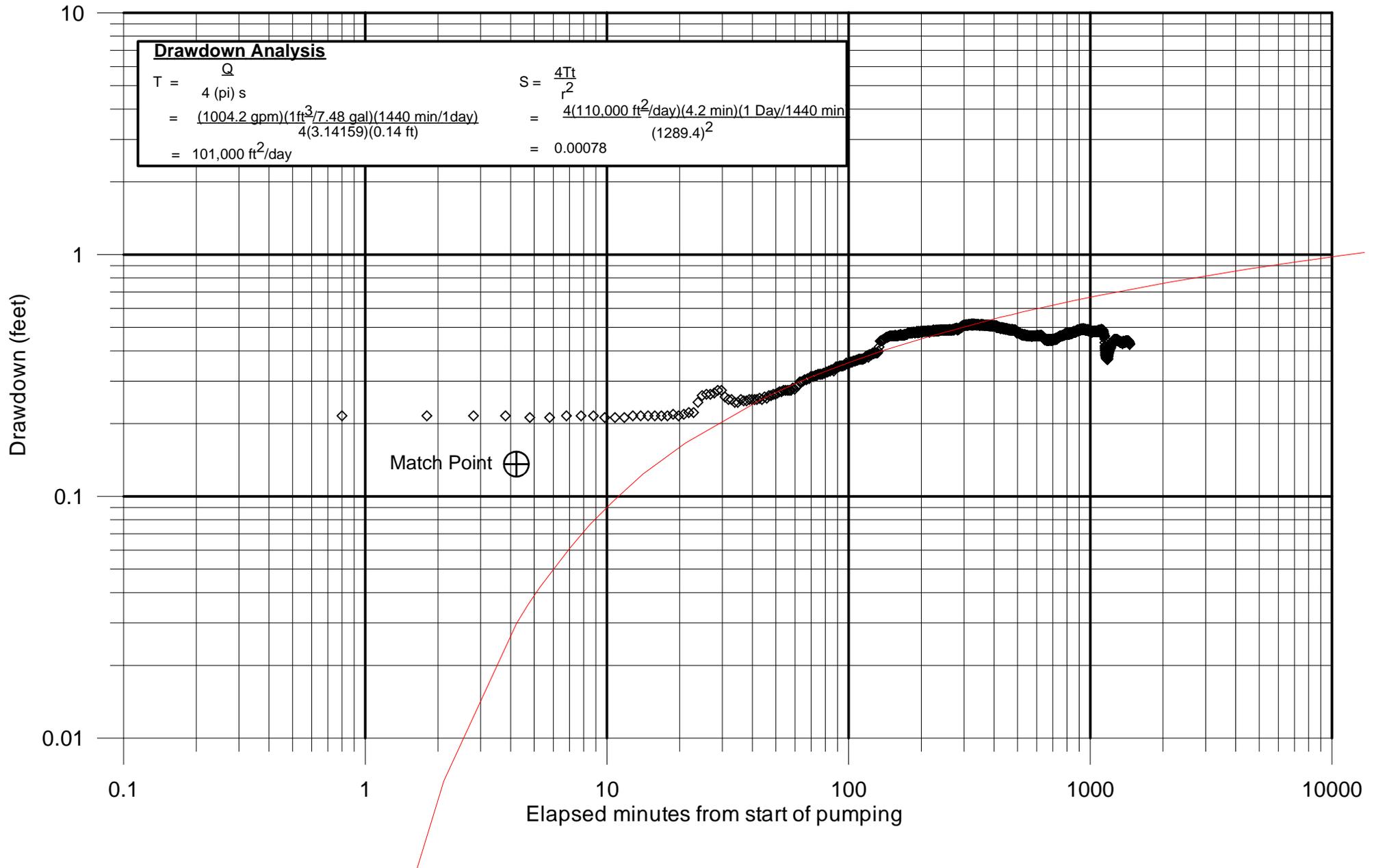
Comparison of Observed and Theoretical Drawdowns (Hantush-Jacob Method)



Observed Recovery in Test Well 673418
 Pumped Well: Coon Rapids Well No. 20 (420956)
 Test Date: August 31 - September 1, 2002



Observed Drawdown in Test Well 673420
 Pumped Well: Coon Rapids No. 20 (420956)
 Test Date: August 31 - September 1, 2002



UNSTEADY FLOW TO A WELL IN A SEMI-CONFINED AQUIFER WITH NO STORAGE IN OVERLYING AQUITARDS (HANTUSH-JACOB)

This document reads a set of time-drawdown data from disk, calculates a theoretical time-drawdown curve using user-specified parameters, and plots them both in a way that the user can interactively adjust the theoretical curve to obtain a match with the field data. Applied to Monitoring Well 673420 during pumping of Coon Rapids Well No. 20 (420956). Results presented below.

Read the field data and perform the data initialization:

```

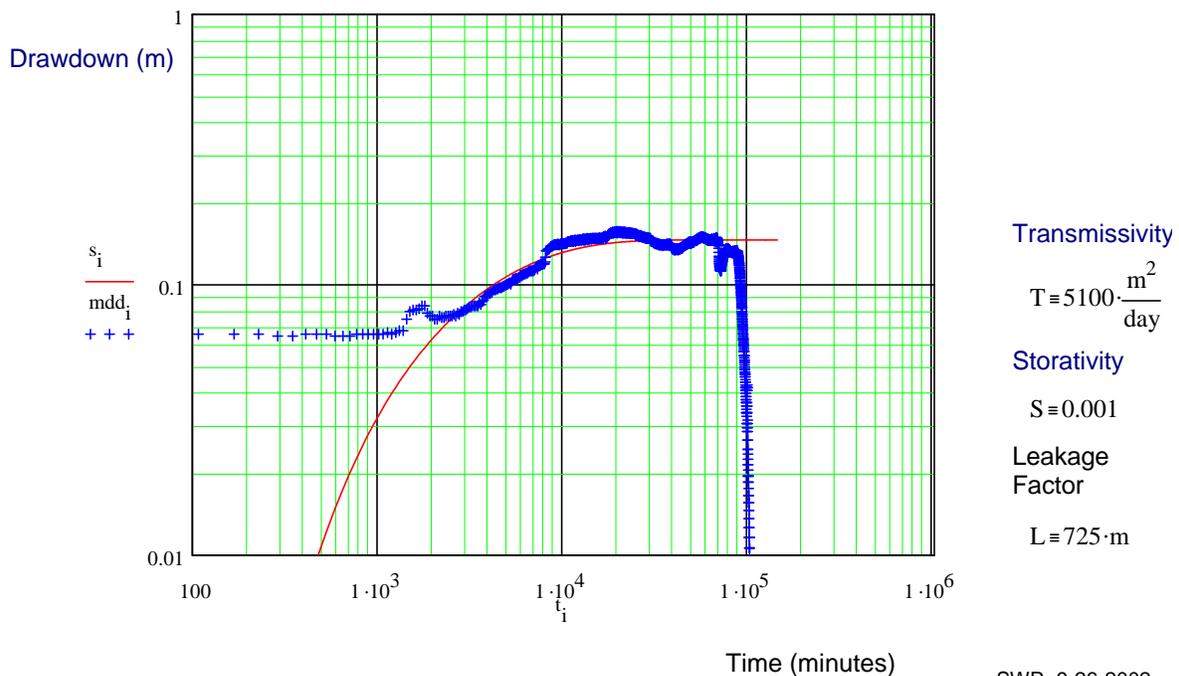
Read data from disk:      A := READPRN("673420_dd_cr20_.prn")
Data initializations:    nrows := rows(A)
                        nrows = 2.371·103
                        i := 0, 1 .. nrows - 1
                        t := A<0>.min
                        mdd := A<1>.m
    
```

Enter test parameters:

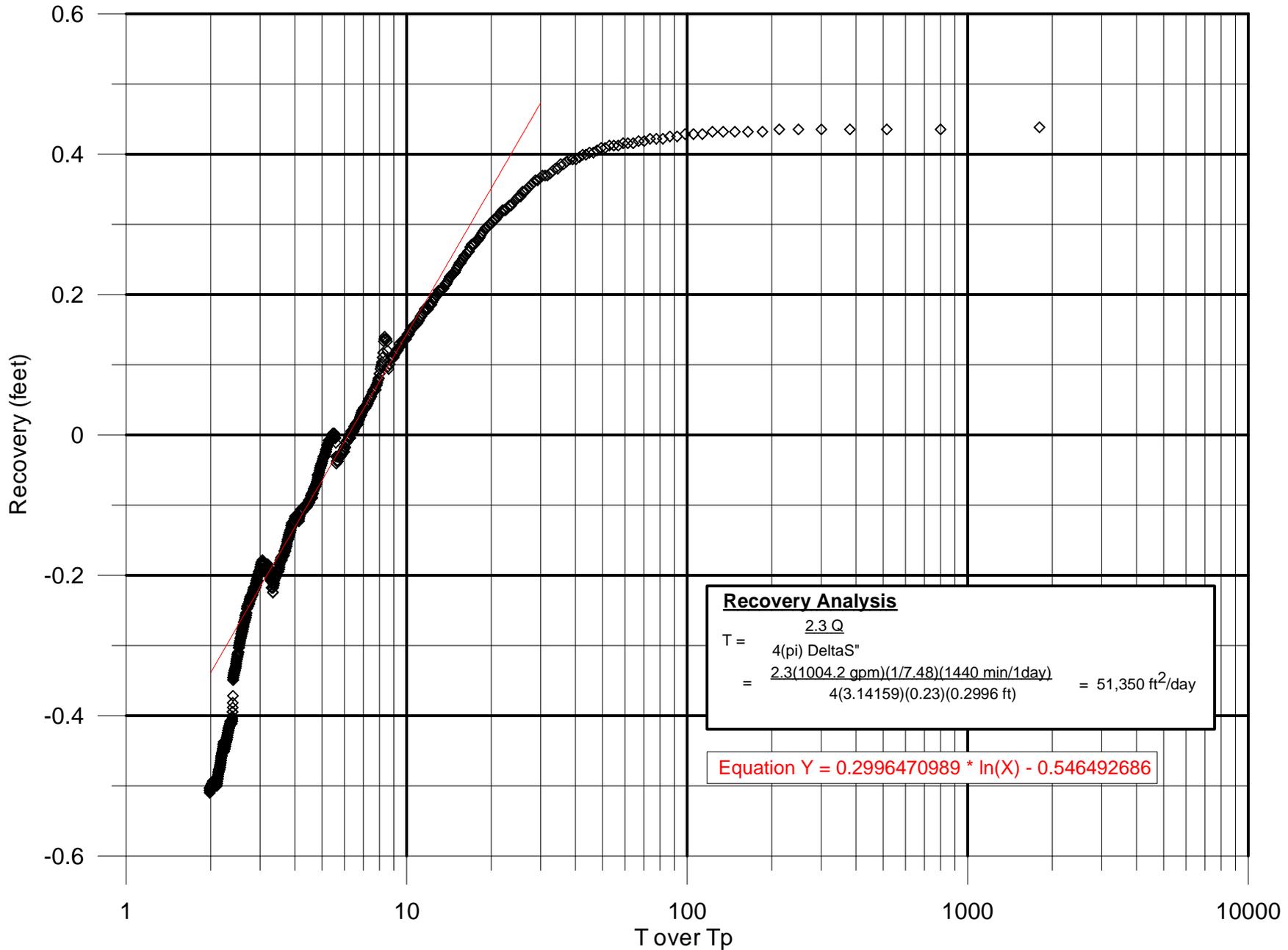
```

Well discharge (L3/T):    Q := 5474· $\frac{\text{m}^3}{\text{day}}$ 
Radial distance from pumping
to observation well (L)    r := 393·m
    
```

Comparison of Observed and Theoretical Drawdowns (Hantush-Jacob Method)



Observed Recovery in Test Well 673420
 Pumped Well: Coon Rapids Well No. 20 (420956)
 Test Date: August 31-September 1, 2002



Aquifer Test Report Appendix B
Field Data Sheets



Test No.

Aquifer Test Information

Test Location CR #19	Well Owner COON RAPIDS	Test Conducted By SCAR/HR GREEN/CITY CLK
Date/Time Test Start 8/29/02 11 am	Flow Rate (Units) VARIABLE	Pump Type
Date/Time Recovery Start 8/30/02 11 am	Flow Rate Measuring Device Flow meter	Pump Intake Depth
Date/Time Test Finish 9/3/02	Totalizer: End 203,718,000	Pumped Well Inner Casing Diameter
Notes	Totalizer: Start 201,963,000	Confined/Unconfined CONF
	Total Pumped (Units) 1755,000 gals	Quad Sheet Name/Number 1218.89A

Unique Well Numbers	Location T, R, S, Quarters	Location N, E	Radial Distance	Open Depth	Transducer Setting	Measuring Point Location	Elevation, Datum
Pumped Well CR #19 VARIABLE	110475	N E					
Observation Wells		N E					
03 well # 673418		N well 19 E 0208291	168m 551.2 ft	BTW	52.24 59.92		8-27-02 9:37 9-3-02 10:06
673420		N well 19 E 0208291	566.8m 1860 ft well 14		61.96 62.34		10:31 8-29 9-3-02 10:06
		N E	94m				
		N E					

Sketch Map of Well Locations

0209032.fxt



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:	1020017	PWS Name:	Coon Rapids
--------------------------------	---------	------------------	-------------

Contact Information for Person Completing this Form

Name:	John Greer
Address:	Barr Engineering Company 4700 West 77th Street, Suite 200
City, State, Zip:	Edina, MN 55435
Phone, Fax, e-mail:	(952) 832-2691

Aquifer Properties Determination Methods

- 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) 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). A test plan must be approved before conducting the test.
- 4) 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). A test plan must be approved before conducting the test.
- 5) 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.
- 6) 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.
- 7) An existing published transmissivity value.
 - Include all test data and analysis documentation with the estimated transmissivity, ft²/day, when the aquifer properties determination method is; 1, 2, 5, 6, or 7, listed above.
 - Attach detailed aquifer test plan for methods 3 or 4.

Submitted by: <i>John Greer</i>	Prof. License: 30347	Date: 7/31/2015
--	-----------------------------	------------------------

To request this document in another format, please call our Section Receptionist (651/201-4700) or Division TTY (651/201-5797).



Rationale for: 1) Aquifer Properties Determination or 2) Proposed New Test

Briefly describe the rationale for: 1) selected method to determine aquifer properties from existing data, or 2) a new aquifer test to be conducted on the pumped well referenced below. Include unique well numbers of all wells that were (or will be) monitored during data collection. How does the existing or proposed test deviate from the ideal. (e.g. rate, duration, no. of obwells, interfering wells, etc.) Attach documentation as necessary.

Aquifer Name: Tunnel City Group - Wonewoc Sandstone Confined Unconfined Fractured Rock

Specific capacity data on the CWI logs for Coon Rapids Wells 24 (Unique Number 674478) and 25 (Unique Number 674479) were analyzed using the TGuess Method (Bradbury and Rothschild, 1985) to obtain a geometric mean transmissivity of 7,700 ft²/day for the combined Tunnel City-Wonewoc aquifer (see attached).

The Tunnel City Group (CTCG) and Wonewoc Sandstone (CWOC) are represented as separate layers in the groundwater model, so this combined transmissivity must be apportioned between the two units. A search of the CWI within 5 km of Coon Rapids found 418 wells with sufficient data completed only in the CTCG and 42 wells with sufficient data completed only the CWOC. Average formation thicknesses of 149 feet for the CTCG and 57 feet for the CWOC were determined from the logs for the City of Coon Rapids wells that completely penetrate both units. The CTCG and CWOC data were analyzed using the TGuess method to obtain geometric mean T values of 1,300 ft²/day for the CTCG and 530 ft²/day for the CWOC. From these results, a ratio of 2.45:1 was used to apportion the combined Tunnel City-Wonewoc T of 7,700 ft²/day to the CTCG and CWOC; the base case CTCG for the groundwater model was 5,470 ft²/day and the base case CWOC T was 2,230 ft²/day.

For the sensitivity analysis, the minimum T of 6,400 ft²/day from Well 25 and the maximum T of 9,400 ft²/day from Well 24 will be used as the lower and upper bounds, respectively, on Tunnel City-Wonewoc transmissivity. These values will be apportioned between layers using the 2.45:1 ratio as detailed above for the base model.

Proposed New Test Information Summary

Pumped Well Name (Unique Number):	674478, 674479	Test Duration (Hours):	varies
Location: X, Y (meters) UTM-Z15N or Lat-Lon (decimal degrees) datum: NAD83	473799, 5001596 (674478)	Pump Type:	unknown
	474351, 5001197 (674479)	Discharge Rate:	1560 gpm
Number of Observation Wells:	0	Flow Rate Measuring Device Type:	unknown

▪ A map showing the location of the pumping well and observation well(s) must be included.

List the unique number of each public water supply well to which this DAP-ATP Form applies

202926	202932	110460			
202929	202931	110461			
202972	202930	168720			
202951	202965	674478			
202937	168721	674479			
202943	161413				

Reviewed by: Amal Djerrari

Approved: Yes No

Approval Date: 8/3/2015

Tunnel City - Wonewoc
Worksheet for Estimating Transmissivity and Hydraulic Conductivity from Specific Capacity Test Data

Explanation and notes attached.

Maximum iterations	100
Error tolerance (as drawdown)	0.001 feet

Location	Field Data				Estimated Parameters			Calculated Results					Diagnostics											
	Well Diam.	Depth to Water		Test Duration	Mean Pumping Rate	Screened Interval		Storage Coeff. (S)	Well loss Coeff. (C)	Aquifer Thickness (b)	Measured Drawdown (s _w)	Saturated Screen Length (L)	Well loss (s _w)	Partial Penetration Parameter (s _p)	Specific Capacity	Transmissivity (T)	T (ft ² /day)	Conductivity (K)	Solution Integrity		Sensitivity of T:			
		Initial	Final			Depth to Top	Depth to Bottom												Calculated Drawdown	Error as Drawdown	Well Bore Storage Test	to S at ± 1 factor of 10	to s _w at 10% of s _w	to b at ± 25%
inches	feet	feet	hours	gpm	feet	feet	-	sec ² /ft ² S	feet	feet	feet	feet	-	gpm/ft	sq ft/sec	ft ² /day	ft/day	feet	feet	pass	sq ft/sec	sq ft/sec	sq ft/sec	
00674478 (Coon Rapids 24)	24	60.2	112	8	1560	240.5	388.0	0.001	0	236.0	51.80	147.5	0.0E+00	2.27	30.12	1.1E-01	9.4E+03	39.7	51.80	0.00%	pass	1.3E-02	1.3E-02	4.0E-02
00674479 (Coon Rapids 25)	24	51.4	121.4	48	1560	229.0	388.0	0.001	0	195.0	70.00	159.0	0.0E+00	0.74	22.29	7.4E-02	6.4E+03	32.6	70.00	0.00%	pass	9.6E-03	8.7E-03	1.9E-02

Geometric Mean 7.7E+03

References:

Bradbury, K.B., and E.R. Rothschild, 1985. A computerized technique for estimating the hydraulic conductivity of aquifer from specific capacity data: Ground Water vol. 23, No. 2, pp. 240-246.

ASTM International, 2004. Standard Test Method for Determining Specific Capacity and Estimating Transmissivity at the Control Well, Standard D 5472-93, in Annual Book of ASTM Standards, Vol. 04.08 pp. 1279-1282.

Tunnel City Group
Worksheet for Estimating Transmissivity and Hydraulic Conductivity from Specific Capacity Test Data
Explanation and notes attached.

Maximum iterations	100
Error tolerance (as drawdown)	0.001 feet

Location	Field Data				Estimated Parameters				Calculated Results				Diagnostics											
	Well Diam. inches	Depth to Water		Test Duration hours	Mean Pumping Rate gpm	Screened Interval		Storage Coeff. (S)	Well loss Coeff. (C)	Aquifer Thickness (b) feet	Measured Drawdown (s _m) feet	Saturated Screen Length (L) feet	Well loss (s _w) feet	Partial Penetration Parameter (s _p)	Specific Capacity gpm/ft	Transmissivity (T) sq ft/sec	T (ft ² /day)	Conductivity (K) ft/day	Solution Integrity			Sensitivity of T:		
		Initial feet	Final feet			Depth to Top feet	Depth to Bottom feet												Calculated Drawdown feet	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%
00104713	4	40	55	4	60	173.0	187.0	0.001	0	149.0	15.00	14.0	0.0E+00	42.84	4.00	7.4E-02	6.4E+03	42.7	15.00	0.00%	pass	1.6E-03	8.3E-03	3.7E-02
00104723	4	30	40	3	30	150.0	188.0	0.001	0	149.0	10.00	38.0	0.0E+00	14.78	3.00	2.5E-02	2.1E+03	14.3	10.00	0.00%	pass	1.3E-03	2.8E-03	1.1E-02
00104753	4	20	30	3	60	161.0	188.0	0.001	0	149.0	10.00	27.0	0.0E+00	21.84	6.00	6.5E-02	5.7E+03	38.0	10.00	0.00%	pass	2.5E-03	7.4E-03	3.1E-02
00104788	4	12	30	4	45	171.0	188.0	0.001	0	149.0	18.00	17.0	0.0E+00	35.30	2.50	3.9E-02	3.4E+03	22.7	18.00	0.00%	pass	1.0E-03	4.4E-03	1.9E-02
00104846	4	25	60	3	90	152.0	167.0	0.001	0	149.0	35.00	15.0	0.0E+00	40.00	2.57	4.4E-02	3.8E+03	25.8	35.00	0.00%	pass	1.1E-03	5.0E-03	2.2E-02
00104866	4	20	50	4	60	149.0	172.0	0.001	0	149.0	30.00	23.0	0.0E+00	25.91	2.00	2.4E-02	2.1E+03	14.2	30.00	0.00%	pass	8.3E-04	2.8E-03	1.2E-02
00104898	4	20	50	6	60	150.0	200.0	0.001	0	149.0	30.00	50.0	0.0E+00	10.31	2.00	1.3E-02	1.2E+03	7.7	30.00	0.00%	pass	8.4E-04	1.5E-03	6.1E-03
00104899	4	40	65	3	30	213.0	223.0	0.001	0	149.0	25.00	10.0	0.0E+00	58.65	1.20	2.9E-02	2.5E+03	16.8	25.00	0.00%	pass	4.9E-04	3.2E-03	1.5E-02
00105116	4	50	60	3	40	141.0	156.0	0.001	0	149.0	10.00	15.0	0.0E+00	40.00	4.00	6.9E-02	6.0E+03	40.3	10.00	0.00%	pass	1.6E-03	7.8E-03	3.5E-02
00105327	4	30	40	3	20	158.0	201.0	0.001	0	149.0	10.00	43.0	0.0E+00	12.65	2.00	1.5E-02	1.3E+03	8.6	10.00	0.00%	pass	8.4E-04	1.7E-03	6.9E-03
00105384	4	30	40	3	30	197.0	214.0	0.001	0	149.0	10.00	17.0	0.0E+00	35.30	3.00	4.7E-02	4.1E+03	27.2	10.00	0.01%	pass	1.2E-03	5.3E-03	2.3E-02
00107147	4	60	80	2	20	311.0	335.0	0.001	0	149.0	20.00	24.0	0.0E+00	24.77	1.00	1.2E-02	1.0E+03	6.7	20.00	0.00%	pass	4.1E-04	1.3E-03	5.7E-03
00111261	4	22	50	4	40	105.0	156.0	0.001	0	149.0	28.00	51.0	0.0E+00	10.02	1.43	9.2E-03	7.9E+02	5.3	28.00	0.00%	pass	6.0E-04	1.0E-03	4.8E-03
00111269	4	23	54	4	50	108.0	160.0	0.001	0	149.0	31.00	52.0	0.0E+00	9.74	1.61	1.0E-02	8.8E+02	5.9	31.00	0.00%	pass	6.8E-04	1.2E-03	4.8E-03
00114342	4	35	37	3	20	137.0	175.0	0.001	0	149.0	2.00	38.0	0.0E+00	14.78	10.00	8.5E-02	7.3E+03	49.0	2.00	0.01%	pass	4.2E-03	9.6E-03	3.8E-02
00114417	10	89	120	10	300	240.0	383.0	0.001	0	149.0	31.00	143.0	0.0E+00	0.15	9.68	2.9E-02	2.5E+03	16.6	31.00	0.00%	pass	4.2E-03	3.4E-03	7.2E-03
00121670	4	12	30	3	30	144.0	200.0	0.001	0	149.0	18.00	56.0	0.0E+00	8.71	1.67	9.9E-03	8.5E+02	5.7	18.00	0.00%	pass	7.0E-04	1.1E-03	4.6E-03
00122176	4	17	40	2	30	119.0	129.0	0.001	0	149.0	23.00	10.0	0.0E+00	58.65	1.30	3.1E-02	2.7E+03	18.2	23.00	0.00%	pass	5.4E-04	3.5E-03	1.7E-02
00122201	4	22	45	6	20	188.0	201.0	0.001	0	149.0	23.00	13.0	0.0E+00	46.09	0.87	1.7E-02	1.5E+03	9.8	23.00	0.00%	pass	3.6E-04	1.9E-03	8.7E-03
00122215	6	18	42	4	100	127.0	181.0	0.001	0	149.0	24.00	54.0	0.0E+00	8.50	4.17	2.5E-02	2.1E+03	14.3	24.00	0.00%	pass	1.8E-03	2.8E-03	1.1E-02
00122231	6	22	48	5	100	141.0	241.0	0.001	0	149.0	26.00	100.0	0.0E+00	2.27	3.85	1.4E-02	1.2E+03	8.1	26.00	0.00%	pass	1.7E-03	1.6E-03	5.6E-03
00122451	4	28	40	2	30	148.0	172.0	0.001	0	149.0	12.00	24.0	0.0E+00	24.77	2.50	2.9E-02	2.5E+03	17.0	12.00	0.00%	pass	1.0E-03	3.3E-03	1.4E-02
00122464	4	38	45	2	25	159.0	230.0	0.001	0	149.0	7.00	71.0	0.0E+00	5.78	3.57	1.8E-02	1.5E+03	10.2	7.00	0.01%	pass	1.5E-03	2.0E-03	8.1E-03
00122534	4	27	40	2	25	163.0	215.0	0.001	0	149.0	13.00	52.0	0.0E+00	9.74	1.92	1.2E-02	1.0E+03	7.0	13.00	0.00%	pass	8.1E-04	1.4E-03	5.7E-03
00122886	4	15	32	4	12	155.0	200.0	0.001	0	149.0	17.00	45.0	0.0E+00	11.92	0.71	4.9E-03	4.3E+02	2.9	17.00	0.00%	pass	3.0E-04	5.6E-04	2.3E-03
00124102	4	13	20	5	30	108.0	117.0	0.001	0	149.0	7.00	9.0	0.0E+00	66.14	4.29	1.1E-01	9.9E+03	66.6	7.00	0.00%	pass	1.8E-03	1.3E-02	6.1E-02
00124136	4	35	50	4	50	180.0	197.0	0.001	0	149.0	15.00	17.0	0.0E+00	35.30	3.33	5.2E-02	4.5E+03	30.3	15.00	0.00%	pass	1.4E-03	5.9E-03	2.6E-02
00124136	4	35	50	2	50	180.0	197.0	0.001	0	149.0	15.00	17.0	0.0E+00	35.30	3.33	5.2E-02	4.5E+03	30.1	15.00	0.00%	pass	1.4E-03	5.8E-03	2.6E-02
00124971	4	35	55	4	30	127.0	132.0	0.001	0	149.0	20.00	5.0	0.0E+00	117.56	1.50	6.7E-02	5.8E+03	39.1	20.00	0.00%	pass	6.1E-04	7.5E-03	3.8E-02
00124988	4	16	30	4	100	172.0	204.0	0.001	0	149.0	14.00	32.0	0.0E+00	18.09	7.14	6.9E-02	6.0E+03	39.9	14.00	0.00%	pass	3.0E-03	7.8E-03	3.1E-02
00126388	4	50	60	3	30	216.0	246.0	0.001	0	149.0	10.00	30.0	0.0E+00	19.45	3.00	3.0E-02	2.6E+03	17.3	10.00	0.00%	pass	1.2E-03	3.4E-03	1.4E-02
00126472	4	50	60	3	40	151.0	186.0	0.001	0	149.0	10.00	35.0	0.0E+00	16.31	4.00	3.5E-02	3.1E+03	20.5	10.00	0.00%	pass	1.7E-03	4.0E-03	1.6E-02
00126500	4	30	40	3	30	136.0	170.0	0.001	0	149.0	10.00	34.0	0.0E+00	16.87	3.00	2.7E-02	2.3E+03	15.6	10.00	0.00%	pass	1.2E-03	3.1E-03	1.3E-02
00126601	4	40	63	3	12	132.0	200.0	0.001	0	149.0	23.00	68.0	0.0E+00	6.28	0.52	2.5E-03	2.2E+02	1.5	23.00	0.00%	pass	2.2E-04	2.9E-04	1.2E-03
00126606	4	22	42	3	12	110.0	145.0	0.001	0	149.0	20.00	35.0	0.0E+00	16.31	0.60	5.1E-03	4.4E+02	3.0	20.00	0.00%	pass	2.5E-04	5.8E-04	2.4E-03
00126611	4	40	63	3	12	156.0	215.0	0.001	0	149.0	23.00	59.0	0.0E+00	8.02	0.52	2.8E-03	2.5E+02	1.7	23.00	0.00%	pass	2.2E-04	3.3E-04	1.4E-03
00126695	4	20	50	1	60	179.0	235.0	0.001	0	149.0	30.00	56.0	0.0E+00	8.71	2.00	1.2E-02	9.9E+02	6.7	30.00	0.00%	pass	8.4E-04	1.3E-03	5.6E-03
00126782	4	20	42	3	12	132.0	185.0	0.001	0	149.0	22.00	53.0	0.0E+00	9.47	0.55	3.3E-03	2.8E+02	1.9	22.00	0.00%	pass	2.3E-04	3.7E-04	1.6E-03
00126814	4	20	30	3	30	125.0	185.0	0.001	0	149.0	10.00	60.0	0.0E+00	7.80	3.00	1.7E-02	1.5E+03	9.9	10.00	0.01%	pass	1.3E-03	2.0E-03	7.9E-03
00127218	4	22	32	3	30	132.0	172.0	0.001	0	149.0	10.00	40.0	0.0E+00	13.87	3.00	2.4E-02	2.0E+03	13.8	10.00	0.00%	pass	1.3E-03	2.7E-03	1.1E-02
00127250	4	50	60	3	40	108.0	141.0	0.001	0	149.0	10.00	33.0	0.0E+00	17.46	4.00	3.7E-02	3.2E+03	21.5	10.00	0.00%	pass	1.7E-03	4.2E-03	1.7E-02
00128107	4	19	22	3	50	134.0	155.0	0.001	0	149.0	3.00	21.0	0.0E+00	28.47	16.67	2.2E-01	1.9E+04	130.3	3.00	0.01%	pass	6.9E-03	2.5E-02	1.1E-01
00128150	4	24	26	3	20	197.0	201.0	0.001	0	149.0	2.00	4.0	0.0E+00	146.35	10.00	5.5E-01	4.8E+04	321.5	2.00	0.00%	pass	4.1E-03	6.2E-02	3.2E-01
00131212	4	20	40	2	40	112.0	180.0	0.001	0	149.0	20.00	68.0	0.0E+00	6.28	2.00	1.0E-02	8.6E+02	5.8	20.00	0.00%	pass	8.5E-04	1.2E-03	4.7E-03
00131265	4	28	45	2	30	125.0	130.0	0.001	0	149.0	17.00	5.0	0.0E+00	117.56	1.76	7.9E-02	6.8E+03	45.9	17.00	0.00%	pass	7.2E-04	8.8E-03	4.5E-02
00131278	4	16	35	2	30	151.0	180.0	0.001	0	149.0	19.00	29.0	0.0E+00	20.20	1.58	1.6E-02	1.4E+03	9.2	19.00	0.00%	pass	6.6E-04	1.8E-03	7.6E-03
00132007	4	43	55	3	50	191.0	236.0	0.001	0	149.0	12.00	45.0	0.0E+00	11.92	4.17	3.0E-02	2.6E+03	17.5	12.00	0.00%	pass	1.7E-03	3.4E-03	1.4E-02
00132021	4	27	33	3	50	209.0	280.0	0.001	0	149.0	6.00	71.0	0.0E+00	5.78	8.33	4.3E-02	3.7E+03	24.8	6.00	0.00%	pass	3.5E-03	4.9E-03	1.9E-02
00135310	4	40	84	2	20	169.0	209.0	0.001	0	149.0	44.00</													

00147116	4	19	63	4	100	107.0	136.0	0.001	0	149.0	44.00	29.0	0.0E+00	20.20	2.27	2.3E-02	2.0E+03	13.4	44.00	0.00%	pass	9.4E-04	2.6E-03	1.1E-02
00147142	4	20	50	3	20	80.0	120.0	0.001	0	149.0	30.00	40.0	0.0E+00	13.87	0.67	5.1E-03	4.4E+02	3.0	30.00	0.00%	pass	2.8E-04	5.8E-04	2.4E-03
00147143	4	31	63	8	80	190.0	261.0	0.001	0	149.0	32.00	71.0	0.0E+00	5.78	2.50	1.3E-02	1.1E+03	7.4	32.00	0.00%	pass	1.1E-03	1.5E-03	5.6E-03
00147155	4	15	50	3	65	168.0	210.0	0.001	0	149.0	35.00	42.0	0.0E+00	13.04	1.86	1.4E-02	1.2E+03	8.1	35.00	0.00%	pass	7.8E-04	1.6E-03	6.5E-03
00149422	4	10	20	3	40	150.0	171.0	0.001	0	149.0	10.00	21.0	0.0E+00	28.47	4.00	5.3E-02	4.6E+03	30.7	10.00	0.00%	pass	1.7E-03	6.0E-03	2.6E-02
00155121	4	17	32	3	50	166.0	216.0	0.001	0	149.0	15.00	50.0	0.0E+00	10.31	3.33	2.2E-02	1.9E+03	12.8	15.00	0.00%	pass	1.4E-03	2.5E-03	1.0E-02
00155266	4	25	35	3	35	126.0	173.0	0.001	0	149.0	10.00	47.0	0.0E+00	11.24	3.50	2.4E-02	2.1E+03	14.2	10.00	0.00%	pass	1.5E-03	2.8E-03	1.1E-02
00155907	4	25	35	3	20	150.0	171.0	0.001	0	149.0	10.00	21.0	0.0E+00	28.47	2.00	2.6E-02	2.3E+03	15.2	10.00	0.00%	pass	8.3E-04	3.0E-03	1.3E-02
00156559	4	10	30	2	30	119.0	138.0	0.001	0	149.0	20.00	19.0	0.0E+00	31.54	1.50	2.1E-02	1.8E+03	12.2	20.00	0.00%	pass	6.2E-04	2.4E-03	1.0E-02
00156561	4	20	40	2	30	144.0	201.0	0.001	0	149.0	20.00	57.0	0.0E+00	8.48	1.50	8.6E-03	7.4E+02	5.0	20.00	0.00%	pass	6.3E-04	9.9E-04	4.1E-03
00156570	4	30	70	2	50	155.0	195.0	0.001	0	149.0	40.00	40.0	0.0E+00	13.87	1.25	9.6E-03	8.3E+02	5.6	40.00	0.00%	pass	5.2E-04	1.1E-03	4.6E-03
00158324	4	15	50	4	50	178.0	200.0	0.001	0	149.0	35.00	22.0	0.0E+00	27.13	1.43	1.8E-02	1.6E+03	10.4	35.00	0.00%	pass	5.9E-04	2.0E-03	8.7E-03
00158324	4	15	50	2	50	178.0	200.0	0.001	0	149.0	35.00	22.0	0.0E+00	27.13	1.43	1.8E-02	1.5E+03	10.3	35.00	0.00%	pass	5.9E-04	2.0E-03	8.7E-03
00158330	4	20	40	3	40	134.0	156.0	0.001	0	149.0	20.00	22.0	0.0E+00	27.13	2.00	2.5E-02	2.2E+03	14.6	20.00	0.00%	pass	8.3E-04	2.8E-03	1.2E-02
00158330	4	20	40	2	40	134.0	156.0	0.001	0	149.0	20.00	22.0	0.0E+00	27.13	2.00	2.5E-02	2.2E+03	14.6	20.00	0.00%	pass	8.3E-04	2.8E-03	1.2E-02
00158334	4	20	40	4	40	135.0	188.0	0.001	0	149.0	20.00	53.0	0.0E+00	9.47	2.00	1.3E-02	1.1E+03	7.3	20.00	0.00%	pass	8.4E-04	1.4E-03	5.8E-03
00158334	4	20	40	2	40	135.0	188.0	0.001	0	149.0	20.00	53.0	0.0E+00	9.47	2.00	1.2E-02	1.1E+03	7.1	20.00	0.00%	pass	8.4E-04	1.4E-03	5.8E-03
00159327	4	12	95	4	65	197.0	231.0	0.001	0	149.0	83.00	34.0	0.0E+00	16.87	0.78	6.9E-03	6.0E+02	4.0	83.00	0.00%	pass	3.3E-04	7.8E-04	3.3E-03
00159563	4	15	25	4	30	144.0	187.0	0.001	0	149.0	10.00	43.0	0.0E+00	12.65	3.00	2.3E-02	1.9E+03	13.1	10.00	0.00%	pass	1.3E-03	2.6E-03	1.0E-02
00159631	4	30	33	4	45	138.0	171.0	0.001	0	149.0	3.00	33.0	0.0E+00	17.46	15.00	1.4E-01	1.2E+04	83.0	3.00	0.01%	pass	6.2E-03	1.6E-02	6.4E-02
00161441	14	9.5	24	24	500	243.0	323.0	0.001	0	149.0	14.50	80.0	0.0E+00	3.43	34.48	1.5E-01	1.3E+04	89.1	14.50	0.00%	pass	1.5E-02	1.8E-02	5.5E-02
00161813	4	32	50	2	30	209.0	260.0	0.001	0	149.0	18.00	51.0	0.0E+00	10.02	1.67	1.1E-02	9.1E+02	6.1	18.00	0.00%	pass	7.0E-04	1.2E-03	5.0E-03
00165893	4	25	40	4.5	30	150.0	197.0	0.001	0	149.0	15.00	47.0	0.0E+00	11.24	2.00	1.4E-02	1.2E+03	8.1	15.00	0.00%	pass	8.4E-04	1.6E-03	6.4E-03
00166870	4	27	75	3	30	112.0	160.0	0.001	0	149.0	48.00	48.0	0.0E+00	10.92	0.63	4.1E-03	3.5E+02	2.4	48.00	0.00%	pass	2.6E-04	4.7E-04	2.0E-03
00166889	4	32	60	3	40	98.0	150.0	0.001	0	149.0	28.00	52.0	0.0E+00	9.74	1.43	9.0E-03	7.7E+02	5.2	28.00	0.00%	pass	6.0E-04	1.0E-03	4.2E-03
00169239	4	15	25	3.5	35	181.0	185.0	0.001	0	149.0	10.00	4.0	0.0E+00	146.35	3.50	1.9E-01	1.7E+04	112.2	10.00	0.00%	pass	1.4E-03	2.2E-02	1.1E-01
00169240	4	20	30	3.5	25	169.0	173.0	0.001	0	149.0	10.00	4.0	0.0E+00	146.35	2.50	1.4E-01	1.2E+04	80.1	10.00	0.00%	pass	1.0E-03	1.5E-02	8.0E-02
00170412	4	35	60	3	40	150.0	201.0	0.001	0	149.0	25.00	51.0	0.0E+00	10.02	1.60	1.0E-02	8.8E+02	5.9	25.00	0.00%	pass	6.7E-04	1.2E-03	4.8E-03
00170412	4	35	60	2	40	150.0	201.0	0.001	0	149.0	25.00	51.0	0.0E+00	10.02	1.60	1.0E-02	8.7E+02	5.9	25.00	0.00%	pass	6.7E-04	1.2E-03	4.8E-03
00170415	4	25	60	3	50	118.0	152.0	0.001	0	149.0	35.00	34.0	0.0E+00	16.87	1.43	1.3E-02	1.1E+03	7.3	35.00	0.00%	pass	6.0E-04	1.4E-03	6.0E-03
00170415	4	25	60	2	50	118.0	152.0	0.001	0	149.0	35.00	34.0	0.0E+00	16.87	1.43	1.3E-02	1.1E+03	7.3	35.00	0.00%	pass	6.0E-04	1.4E-03	6.0E-03
00170429	4	15	40	4	40	138.0	156.0	0.001	0	149.0	25.00	18.0	0.0E+00	33.32	1.60	2.4E-02	2.1E+03	13.8	25.00	0.00%	pass	6.6E-04	2.7E-03	1.2E-02
00170429	4	15	40	2	40	138.0	156.0	0.001	0	149.0	25.00	18.0	0.0E+00	33.32	1.60	2.4E-02	2.0E+03	13.7	25.00	0.00%	pass	6.6E-04	2.7E-03	1.2E-02
00170445	4	25	60	3	30	190.0	246.0	0.001	0	149.0	35.00	56.0	0.0E+00	8.71	0.86	5.0E-03	4.3E+02	2.9	35.00	0.00%	pass	3.6E-04	5.7E-04	2.4E-03
00170445	4	25	60	2	30	190.0	246.0	0.001	0	149.0	35.00	56.0	0.0E+00	8.71	0.86	4.9E-03	4.2E+02	2.8	35.00	0.00%	pass	3.6E-04	5.6E-04	2.4E-03
00174572	4	20	30	4	40	60.0	112.0	0.001	0	149.0	10.00	52.0	0.0E+00	9.74	4.00	2.6E-02	2.2E+03	15.1	10.00	0.00%	pass	1.7E-03	3.0E-03	1.2E-02
00174862	4	18	100	3	65	138.0	153.0	0.001	0	149.0	82.00	15.0	0.0E+00	40.00	0.79	1.4E-02	1.2E+03	7.8	82.00	0.00%	pass	3.3E-04	1.5E-03	6.9E-03
00175606	4	12	30	2	30	114.0	127.0	0.001	0	149.0	18.00	13.0	0.0E+00	46.09	1.67	3.2E-02	2.8E+03	18.7	18.00	0.00%	pass	6.9E-04	3.6E-03	1.7E-02
00175608	4	20	40	2	30	175.0	246.0	0.001	0	149.0	20.00	71.0	0.0E+00	5.78	1.50	7.1E-03	6.2E+02	4.1	20.00	0.00%	pass	6.4E-04	8.2E-04	3.4E-03
00178931	4	25	50	3	30	152.0	175.0	0.001	0	149.0	25.00	23.0	0.0E+00	25.91	1.20	1.5E-02	1.3E+03	8.4	25.00	0.00%	pass	5.0E-04	1.6E-03	7.0E-03
00179360	4	7	20	3	50	191.0	245.0	0.001	0	149.0	13.00	54.0	0.0E+00	9.21	3.85	2.4E-02	2.1E+03	14.0	13.00	0.00%	pass	1.6E-03	2.8E-03	1.1E-02
00183172	4	35	45	2	30	185.0	211.0	0.001	0	149.0	10.00	26.0	0.0E+00	22.75	3.00	3.3E-02	2.9E+03	19.2	10.00	0.00%	pass	1.2E-03	3.7E-03	1.6E-02
00183178	4	23	40	2	30	142.0	178.0	0.001	0	149.0	17.00	36.0	0.0E+00	15.77	1.76	1.5E-02	1.3E+03	8.6	17.00	0.00%	pass	7.4E-04	1.7E-03	7.0E-03
00183460	4	13	25	3	60	192.0	218.0	0.001	0	149.0	12.00	26.0	0.0E+00	22.75	5.00	5.6E-02	4.8E+03	32.5	12.00	0.00%	pass	2.1E-03	6.3E-03	2.6E-02
00183465	4	13	25	3	60	174.0	198.0	0.001	0	149.0	12.00	24.0	0.0E+00	24.77	5.00	6.0E-02	5.2E+03	34.6	12.00	0.00%	pass	2.1E-03	6.7E-03	2.8E-02
00184772	4	20	40	1	50	175.0	220.0	0.001	0	149.0	20.00	45.0	0.0E+00	11.92	2.50	1.7E-02	1.5E+03	10.1	20.00	0.00%	pass	1.0E-03	2.0E-03	8.3E-03
00190449	4	50	100	3	30	225.0	298.0	0.001	0	149.0	50.00	73.0	0.0E+00	5.47	0.60	2.7E-03	2.4E+02	1.6	50.00	0.00%	pass	2.5E-04	3.2E-04	1.3E-03
00193457	4	40	45	2	35	142.0	192.0	0.001	0	149.0	5.00	50.0	0.0E+00	10.31	7.00	4.7E-02	4.0E+03	27.2	5.00	0.00%	pass	2.9E-03	5.4E-03	2.1E-02
00193762	4	30	60	4	40	214.0	261.0	0.001	0	149.0	30.00	47.0	0.0E+00	11.24	1.33	9.1E-03	7.9E+02	5.3	30.00	0.00%	pass	5.6E-04	1.0E-03	4.3E-03
00193762	4	30	60	2	40	214.0	261.0	0.001	0	149.0	30.00	47.0	0.0E+00	11.24	1.33	9.0E-03	7.8E+02	5.2	30.00	0.00%	pass	5.6E-04	1.0E-03	4.3E-03
00193769	4	10	60	4	40	203.0	261.0	0.001	0	149.0	50.00	58.0	0.0E+00	8.25	0.80	4.5E-03	3.9E+02	2.6	50.00	0.00%	pass	3.4E-04	5.2E-04	2.2E-03
00193769	4	10	60	2	40	203.0	261.0	0.001	0															

00406298	4	10	100	1	50	147.0	219.0	0.001	0	149.0	90.00	72.0	0.0E+00	5.63	0.56	2.4E-03	2.1E+02	1.4	90.00	0.00%	pass	2.4E-04	2.8E-04	1.2E-03
00406323	4	25	100	2	50	190.0	220.0	0.001	0	149.0	75.00	30.0	0.0E+00	19.45	0.67	6.4E-03	5.5E+02	3.7	75.00	0.00%	pass	2.8E-04	7.2E-04	3.1E-03
00406327	4	20	80	2.5	50	109.0	160.0	0.001	0	149.0	60.00	51.0	0.0E+00	10.02	0.83	5.2E-03	4.5E+02	3.0	60.00	0.00%	pass	3.5E-04	6.0E-04	2.5E-03
00406332	4	25	100	2	60	147.0	223.0	0.001	0	149.0	75.00	76.0	0.0E+00	5.04	0.80	3.5E-03	3.0E+02	2.0	75.00	0.00%	pass	3.4E-04	4.1E-04	1.7E-03
00406341	4	30	100	1	50	131.0	203.0	0.001	0	149.0	70.00	72.0	0.0E+00	5.63	0.71	3.2E-03	2.7E+02	1.8	70.00	0.00%	pass	3.0E-04	3.7E-04	1.6E-03
00406342	4	18	100	1	50	155.0	183.0	0.001	0	149.0	82.00	28.0	0.0E+00	20.99	0.61	6.1E-03	5.3E+02	3.5	82.00	0.00%	pass	2.5E-04	6.9E-04	3.0E-03
00406344	4	20	80	3	50	105.0	168.0	0.001	0	149.0	60.00	63.0	0.0E+00	7.19	0.83	4.4E-03	3.8E+02	2.5	60.00	0.00%	pass	3.5E-04	5.0E-04	2.1E-03
00406347	4	50	80	4	40	210.0	283.0	0.001	0	149.0	30.00	73.0	0.0E+00	5.47	1.33	6.3E-03	5.5E+02	3.7	30.00	0.00%	pass	5.7E-04	7.3E-04	2.9E-03
00408566	4	25	30	2	40	110.0	180.0	0.001	0	149.0	5.00	70.0	0.0E+00	5.94	8.00	4.1E-02	3.5E+03	23.7	5.00	0.00%	pass	3.4E-03	4.7E-03	1.8E-02
00408570	4	20	25	2	40	126.0	176.0	0.001	0	149.0	5.00	50.0	0.0E+00	10.31	8.00	5.4E-02	4.6E+03	31.2	5.00	0.00%	pass	3.4E-03	6.1E-03	2.4E-02
00408573	4	7	50	3	20	240.0	260.0	0.001	0	149.0	43.00	20.0	0.0E+00	29.94	0.47	6.2E-03	5.4E+02	3.6	43.00	0.00%	pass	1.9E-04	7.0E-04	3.1E-03
00408596	4	15	100	2	20	153.0	220.0	0.001	0	149.0	85.00	67.0	0.0E+00	6.45	0.24	1.1E-03	9.5E+01	0.6	85.00	0.00%	pass	1.0E-04	1.3E-04	5.6E-04
00408954	4	25	60	3	20	162.0	167.0	0.001	0	149.0	35.00	5.0	0.0E+00	117.56	0.57	2.6E-02	2.2E+03	14.8	35.00	0.00%	pass	2.3E-04	2.8E-03	1.5E-02
00408954	4	25	60	2	20	162.0	167.0	0.001	0	149.0	35.00	5.0	0.0E+00	117.56	0.57	2.5E-02	2.2E+03	14.8	35.00	0.00%	pass	2.3E-04	2.8E-03	1.5E-02
00409450	4	30	75	1	100	217.0	250.0	0.001	0	149.0	45.00	33.0	0.0E+00	17.46	2.22	2.0E-02	1.7E+03	11.5	45.00	0.00%	pass	9.3E-04	2.3E-03	9.5E-03
00409450	4	30	45	1	15	217.0	250.0	0.001	0	149.0	15.00	33.0	0.0E+00	17.46	1.00	8.8E-03	7.6E+02	5.1	15.00	0.00%	pass	4.2E-04	1.0E-03	4.3E-03
00409517	4	13	26	3	20	126.0	175.0	0.001	0	149.0	13.00	49.0	0.0E+00	10.61	1.54	1.0E-02	8.8E+02	5.9	13.00	0.00%	pass	6.5E-04	1.2E-03	4.8E-03
00410627	4	14	25	4	50	185.0	232.0	0.001	0	149.0	11.00	47.0	0.0E+00	11.24	4.55	3.2E-02	2.8E+03	18.7	11.00	0.00%	pass	1.9E-03	3.7E-03	1.5E-02
00410646	4	23	30	4	35	137.0	168.0	0.001	0	149.0	7.00	31.0	0.0E+00	18.75	5.00	4.9E-02	4.2E+03	28.5	7.00	0.00%	pass	2.1E-03	5.6E-03	2.3E-02
00410958	4	22	26	2	40	130.0	160.0	0.001	0	149.0	4.00	30.0	0.0E+00	19.45	10.00	1.0E-01	8.7E+03	58.4	4.00	0.01%	pass	4.2E-03	1.1E-02	4.6E-02
00411515	4	20	40	3	30	125.0	130.0	0.001	0	149.0	20.00	5.0	0.0E+00	117.56	1.50	6.7E-02	5.8E+03	39.0	20.00	0.00%	pass	6.1E-04	7.5E-03	3.8E-02
00415857	4	17	25	3	60	123.0	165.0	0.001	0	149.0	8.00	42.0	0.0E+00	13.04	7.50	5.8E-02	5.0E+03	33.8	8.00	0.00%	pass	3.1E-03	6.6E-03	2.6E-02
00415885	4	22	28	3	80	138.0	180.0	0.001	0	149.0	6.00	42.0	0.0E+00	13.04	13.33	1.0E-01	9.1E+03	60.9	6.00	0.00%	pass	5.6E-03	1.2E-02	4.7E-02
00415951	4	20	35	3	40	178.0	255.0	0.001	0	149.0	15.00	77.0	0.0E+00	4.90	2.67	1.2E-02	1.1E+03	7.1	15.00	0.00%	pass	1.1E-03	1.4E-03	5.6E-03
00415960	4	15	29	3	60	110.0	160.0	0.001	0	149.0	14.00	50.0	0.0E+00	10.31	4.29	2.9E-02	2.5E+03	16.6	14.00	0.00%	pass	1.8E-03	3.3E-03	1.3E-02
00415968	4	20	41	3	50	126.0	160.0	0.001	0	149.0	21.00	34.0	0.0E+00	16.87	2.38	2.1E-02	1.8E+03	12.4	21.00	0.00%	pass	9.9E-04	2.4E-03	9.9E-03
00416097	4	10	23	5	45	172.0	223.0	0.001	0	149.0	13.00	51.0	0.0E+00	10.02	3.46	2.3E-02	2.0E+03	13.3	13.00	0.00%	pass	1.5E-03	2.6E-03	1.0E-02
00416167	4	35	55	3	60	130.0	180.0	0.001	0	149.0	20.00	50.0	0.0E+00	10.31	3.00	2.0E-02	1.7E+03	11.5	20.00	0.00%	pass	1.3E-03	2.3E-03	9.1E-03
00416420	4	35	60	3	30	143.0	245.0	0.001	0	149.0	25.00	102.0	0.0E+00	2.31	1.20	4.2E-03	3.6E+02	2.4	25.00	0.00%	pass	5.2E-04	4.9E-04	1.8E-03
00416448	4	9	25	2	30	145.0	155.0	0.001	0	149.0	16.00	10.0	0.0E+00	59.65	1.88	4.5E-02	3.9E+03	26.3	16.00	0.00%	pass	7.7E-04	5.1E-03	2.4E-02
00417466	4	25	100	2	55	168.0	239.0	0.001	0	149.0	75.00	71.0	0.0E+00	5.78	0.73	3.4E-03	2.9E+02	2.0	75.00	0.00%	pass	3.1E-04	3.9E-04	1.7E-03
00417474	4	20	100	1	50	168.0	243.0	0.001	0	149.0	80.00	75.0	0.0E+00	5.18	0.63	2.7E-03	2.3E+02	1.5	80.00	0.00%	pass	2.7E-04	3.1E-04	1.4E-03
00417483	4	20	80	2	60	242.0	283.0	0.001	0	149.0	60.00	41.0	0.0E+00	13.45	1.00	7.5E-03	6.5E+02	4.3	60.00	0.00%	pass	4.2E-04	8.5E-04	3.6E-03
00417497	4	20	100	4	60	115.0	203.0	0.001	0	149.0	80.00	88.0	0.0E+00	3.58	0.75	3.0E-03	2.6E+02	1.7	80.00	0.00%	pass	3.2E-04	3.4E-04	1.4E-03
00418362	4	25	100	3	40	175.0	203.0	0.001	0	149.0	75.00	28.0	0.0E+00	20.99	0.53	5.4E-03	4.7E+02	3.1	75.00	0.00%	pass	2.2E-04	6.1E-04	2.6E-03
00418365	4	25	100	3	35	129.0	134.0	0.001	0	149.0	75.00	5.0	0.0E+00	117.56	0.47	2.1E-02	1.8E+03	12.1	75.00	0.00%	pass	1.9E-04	2.3E-03	1.2E-02
00418391	4	25	100	4	55	189.0	283.0	0.001	0	149.0	75.00	94.0	0.0E+00	2.99	0.73	2.7E-03	2.4E+02	1.6	75.00	0.00%	pass	3.1E-04	3.2E-04	1.2E-03
00418393	4	32	100	2.5	40	189.0	243.0	0.001	0	149.0	68.00	54.0	0.0E+00	9.21	0.59	3.5E-03	3.0E+02	2.0	68.00	0.00%	pass	2.5E-04	4.0E-04	1.7E-03
00418432	4	10	25	4	40	154.0	216.0	0.001	0	149.0	15.00	62.0	0.0E+00	7.39	2.67	1.5E-02	1.3E+03	8.6	15.00	0.01%	pass	1.1E-03	1.7E-03	6.8E-03
00418451	4	25	100	6	75	210.0	263.0	0.001	0	149.0	75.00	53.0	0.0E+00	9.47	1.00	6.2E-03	5.4E+02	3.6	75.00	0.00%	pass	4.2E-04	7.1E-04	2.9E-03
00419515	4	9	20	3	45	143.0	168.0	0.001	0	149.0	11.00	25.0	0.0E+00	23.72	4.09	4.7E-02	4.1E+03	27.3	11.00	0.00%	pass	1.7E-03	5.3E-03	2.2E-02
00419531	4	15	25	3	60	245.0	288.0	0.001	0	149.0	10.00	43.0	0.0E+00	12.65	6.00	4.6E-02	3.9E+03	26.4	10.00	0.00%	pass	2.5E-03	5.2E-03	2.1E-02
00419532	4	28	45	3	40	152.0	185.0	0.001	0	149.0	17.00	33.0	0.0E+00	17.46	2.35	2.2E-02	1.9E+03	12.5	17.00	0.00%	pass	9.8E-04	2.4E-03	1.0E-02
00421010	4	10	147	2	75	147.0	157.0	0.001	0	149.0	137.00	10.0	0.0E+00	59.65	0.55	1.3E-02	1.1E+03	7.6	137.00	0.00%	pass	2.3E-04	1.5E-03	7.1E-03
00425078	4	23	40	3.5	30	157.0	161.0	0.001	0	149.0	17.00	4.0	0.0E+00	146.35	1.76	9.7E-02	8.4E+03	56.4	17.00	0.00%	pass	7.2E-04	1.1E-02	5.6E-02
00425090	4	17	30	4	30	148.0	153.0	0.001	0	149.0	13.00	5.0	0.0E+00	117.56	2.31	1.0E-01	9.0E+03	60.2	13.00	0.00%	pass	9.5E-04	1.2E-02	5.9E-02
00425350	4	30	50	3	40	176.0	245.0	0.001	0	149.0	20.00	69.0	0.0E+00	6.11	2.00	1.0E-02	8.6E+02	5.8	20.00	0.00%	pass	8.5E-04	1.2E-03	4.6E-03
00425350	4	30	50	2	40	176.0	245.0	0.001	0	149.0	20.00	69.0	0.0E+00	6.11	2.00	9.8E-03	8.5E+02	5.7	20.00	0.00%	pass	8.5E-04	1.1E-03	4.6E-03
00425716	4	8	100	3	100	105.0	141.0	0.001	0	149.0	92.00	36.0	0.0E+00	15.77	1.09	9.1E-03	7.9E+02	5.3	92.00	0.00%	pass	4.5E-04	1.0E-03	4.3E-03
00425719	4	30	100	6	80	175.0	223.0	0.001	0	149.0	70.00	48.0	0.0E+00	10.92	1.14	7.8E-03	6.7E+02	4.5	70.00	0.00%	pass	4.8E-04	8.9E-04	3.6E-03
00425730	4	25	100	3	60	168.0	223.0	0.001	0	149.0	75.00	55.0	0.0E+00	8.96	0.80	4.7E-03	4.1E+02	2.7	75.00	0.00%	pass	3.4E-04	5.4E-04	2.3E-03
00425748	4	20	56	1	30	69.0	75.0	0.001	0	149.														

00435725	4	16	35	3	30	203.0	238.0	0.001	0	149.0	19.00	35.0	0.0E+00	16.31	1.58	1.4E-02	1.2E+03	7.9	19.00	0.00%	pass	6.6E-04	1.6E-03	6.4E-03
00435808	4	16	25	3.5	40	217.0	230.0	0.001	0	149.0	9.00	13.0	0.0E+00	46.09	4.44	8.7E-02	7.5E+03	50.5	9.00	0.00%	pass	1.8E-03	9.8E-03	4.4E-02
00437679	4	24	29	3	30	225.0	260.0	0.001	0	149.0	5.00	35.0	0.0E+00	16.31	6.00	5.3E-02	4.6E+03	31.0	5.00	0.00%	pass	2.5E-03	6.1E-03	2.4E-02
00439015	4	28	120	1	60	168.0	203.0	0.001	0	149.0	92.00	35.0	0.0E+00	16.31	0.65	5.4E-03	4.7E-02	3.1	92.00	0.00%	pass	2.7E-04	6.2E-04	2.7E-03
00439015	4	28	100	3	50	168.0	203.0	0.001	0	149.0	72.00	35.0	0.0E+00	16.31	0.69	5.9E-03	5.1E+02	3.4	72.00	0.00%	pass	2.9E-04	6.7E-04	2.8E-03
00439885	4	26	60	3	80	167.0	197.0	0.001	0	149.0	34.00	30.0	0.0E+00	19.45	2.35	2.3E-02	2.0E+03	13.5	34.00	0.00%	pass	9.8E-04	2.6E-03	1.1E-02
00439933	4	40	50	3	50	143.0	175.0	0.001	0	149.0	10.00	32.0	0.0E+00	18.09	5.00	4.8E-02	4.1E+03	27.6	10.00	0.00%	pass	2.1E-03	5.4E-03	2.2E-02
00439961	4	22	32	3	70	143.0	170.0	0.001	0	149.0	10.00	27.0	0.0E+00	21.84	7.00	7.7E-02	6.6E+03	44.4	10.00	0.01%	pass	2.9E-03	8.7E-03	3.6E-02
00439965	4	30	40	3	40	154.0	215.0	0.001	0	149.0	10.00	61.0	0.0E+00	7.59	4.00	2.3E-02	2.0E+03	13.2	10.00	0.00%	pass	1.7E-03	2.6E-03	1.0E-02
00440811	4	30	50	2	30	149.0	154.0	0.001	0	149.0	20.00	5.0	0.0E+00	117.56	1.50	6.7E-02	5.8E+03	39.0	20.00	0.00%	pass	6.1E-04	7.5E-03	3.8E-02
00440839	4	25	45	2	40	228.0	245.0	0.001	0	149.0	20.00	17.0	0.0E+00	35.30	2.00	3.1E-02	2.7E+03	18.0	20.00	0.00%	pass	8.3E-04	3.5E-03	1.6E-02
00446002	4	30	40	3	40	197.0	265.0	0.001	0	149.0	10.00	68.0	0.0E+00	6.28	4.00	2.1E-02	1.8E+03	12.0	10.00	0.01%	pass	1.7E-03	2.4E-03	9.4E-03
00448052	4	12	25	3	60	166.0	190.0	0.001	0	149.0	13.00	24.0	0.0E+00	24.77	4.62	5.5E-02	4.8E+03	31.9	13.00	0.00%	pass	1.9E-03	6.2E-03	2.6E-02
00448069	4	35	43	3	60	135.0	166.0	0.001	0	149.0	8.00	31.0	0.0E+00	18.75	7.50	7.4E-02	6.4E+03	42.8	8.00	0.01%	pass	3.1E-03	8.4E-03	3.4E-02
00448237	4	20	150	2	40	261.0	306.0	0.001	0	149.0	130.00	45.0	0.0E+00	11.92	0.31	2.1E-03	1.8E+02	1.2	130.00	0.00%	pass	1.3E-04	2.4E-04	1.0E-03
00448838	4	56	63	3	30	200.0	260.0	0.001	0	149.0	7.00	60.0	0.0E+00	7.80	4.29	2.5E-02	2.1E+03	14.3	7.00	0.00%	pass	1.8E-03	2.8E-03	1.1E-02
00448864	4	16	25	3	35	110.0	180.0	0.001	0	149.0	9.00	70.0	0.0E+00	5.94	3.89	2.0E-02	1.7E+03	11.4	9.00	0.01%	pass	1.6E-03	2.3E-03	8.9E-03
00449100	4	30	50	3	80	124.0	170.0	0.001	0	149.0	20.00	46.0	0.0E+00	11.57	4.00	2.8E-02	2.5E+03	16.5	20.00	0.00%	pass	1.7E-03	3.3E-03	1.3E-02
00453431	4	17	25	3	75	142.0	184.0	0.001	0	149.0	8.00	42.0	0.0E+00	13.04	9.38	7.3E-02	6.3E+03	42.5	8.00	0.00%	pass	3.9E-03	8.3E-03	3.3E-02
00453436	4	35	45	3	60	131.0	144.0	0.001	0	149.0	10.00	13.0	0.0E+00	46.09	6.00	1.2E-01	1.0E+04	68.2	10.00	0.00%	pass	2.5E-03	1.3E-02	6.0E-02
00456501	4	18	40	3	30	223.0	255.0	0.001	0	149.0	22.00	32.0	0.0E+00	18.09	1.36	1.3E-02	1.1E+03	7.3	22.00	0.00%	pass	5.7E-04	1.4E-03	6.0E-03
00456968	4	15	63	1	100	131.0	159.0	0.001	0	149.0	48.00	28.0	0.0E+00	20.99	2.08	2.1E-02	1.8E+03	12.3	48.00	0.00%	pass	8.7E-04	2.4E-03	1.0E-02
00457058	4	30	120	4	50	147.0	206.0	0.001	0	149.0	90.00	59.0	0.0E+00	8.02	0.56	3.1E-03	2.6E+02	1.8	90.00	0.00%	pass	2.3E-04	3.5E-04	1.5E-03
00457058	4	30	100	3.5	45	147.0	206.0	0.001	0	149.0	70.00	59.0	0.0E+00	8.02	0.64	3.6E-03	3.1E+02	2.1	70.00	0.00%	pass	2.7E-04	4.1E-04	1.7E-03
00457910	4	45	75	4	50	151.0	190.0	0.001	0	149.0	30.00	39.0	0.0E+00	14.31	1.67	1.3E-02	1.2E+03	7.7	30.00	0.00%	pass	7.0E-04	1.5E-03	6.2E-03
00457910	4	45	75	2	50	151.0	190.0	0.001	0	149.0	30.00	39.0	0.0E+00	14.31	1.67	1.3E-02	1.1E+03	7.6	30.00	0.00%	pass	7.0E-04	1.5E-03	6.2E-03
00458906	4	20	140	3	50	158.0	203.0	0.001	0	149.0	120.00	45.0	0.0E+00	11.92	0.42	2.8E-03	2.5E+02	1.7	120.00	0.00%	pass	1.7E-04	3.3E-04	1.4E-03
00458906	4	20	80	1	40	158.0	203.0	0.001	0	149.0	60.00	45.0	0.0E+00	11.92	0.67	4.5E-03	3.9E+02	2.6	60.00	0.00%	pass	2.8E-04	5.1E-04	2.2E-03
00460905	4	30	55	2	30	198.0	245.0	0.001	0	149.0	25.00	47.0	0.0E+00	11.24	1.20	8.1E-03	7.0E+02	4.7	25.00	0.00%	pass	5.0E-04	9.2E-04	3.8E-03
00460917	4	12	35	2	30	197.0	245.0	0.001	0	149.0	23.00	48.0	0.0E+00	10.92	1.30	8.6E-03	7.4E+02	5.0	23.00	0.00%	pass	5.5E-04	9.9E-04	4.1E-03
00461866	4	25	45	3	25	200.0	245.0	0.001	0	149.0	20.00	45.0	0.0E+00	11.92	1.25	8.8E-03	7.6E+02	5.1	20.00	0.00%	pass	5.2E-04	1.0E-03	4.1E-03
00462852	4	35	55	3	30	99.0	140.0	0.001	0	149.0	20.00	41.0	0.0E+00	13.45	1.50	1.1E-02	9.9E+02	6.6	20.00	0.00%	pass	6.3E-04	1.3E-03	5.4E-03
00463713	4	22	40	3	35	198.0	201.0	0.001	0	149.0	18.00	3.0	0.0E+00	194.25	1.94	1.4E-01	1.2E+04	81.4	18.00	0.00%	pass	8.0E-04	1.6E-02	8.3E-02
00464187	4	25	42	3	30	203.0	261.0	0.001	0	149.0	17.00	58.0	0.0E+00	8.25	1.76	1.0E-02	8.8E+02	5.9	17.00	0.00%	pass	7.4E-04	1.2E-03	4.8E-03
00467605	4	30	40	3	40	195.0	260.0	0.001	0	149.0	10.00	65.0	0.0E+00	6.81	4.00	2.2E-02	1.9E+03	12.5	10.00	0.01%	pass	1.7E-03	2.5E-03	9.8E-03
00470381	4	18	28	3	50	180.0	214.0	0.001	0	149.0	10.00	34.0	0.0E+00	16.87	5.00	4.5E-02	3.9E+03	26.3	10.00	0.00%	pass	2.1E-03	5.2E-03	2.1E-02
00471042	4	20	60	1	40	158.0	201.0	0.001	0	149.0	40.00	43.0	0.0E+00	12.65	1.00	7.1E-03	6.1E+02	4.1	40.00	0.00%	pass	4.2E-04	8.1E-04	3.4E-03
00472736	4	22	30	3	49	145.0	173.0	0.001	0	149.0	8.00	28.0	0.0E+00	20.99	6.13	6.5E-02	5.6E+03	37.7	8.00	0.01%	pass	2.5E-03	7.3E-03	3.0E-02
00472741	4	14	23	3	49	145.0	172.0	0.001	0	149.0	9.00	27.0	0.0E+00	21.84	5.44	5.9E-02	5.1E+03	34.4	9.00	0.00%	pass	2.3E-03	6.7E-03	2.8E-02
00473106	4	15	27	2	18	195.0	205.0	0.001	0	149.0	12.00	10.0	0.0E+00	59.65	1.50	3.6E-02	3.1E+03	21.0	12.00	0.01%	pass	6.2E-04	4.1E-03	1.9E-02
00473144	4	32	38	2	20	135.0	145.0	0.001	0	149.0	6.00	10.0	0.0E+00	59.65	3.33	8.1E-02	7.0E+03	46.9	6.00	0.00%	pass	1.4E-04	9.1E-03	4.3E-02
00474088	4	20	30	3	60	79.0	140.0	0.001	0	149.0	10.00	61.0	0.0E+00	7.59	6.00	3.4E-02	3.0E+03	20.0	10.00	0.00%	pass	2.5E-03	4.0E-03	1.5E-02
00475371	4	15	47	3	20	160.0	172.0	0.001	0	149.0	32.00	12.0	0.0E+00	49.88	0.63	1.3E-02	1.1E+03	7.5	32.00	0.00%	pass	2.6E-04	1.4E-03	6.8E-03
00475396	4	20	80	3	60	211.0	240.0	0.001	0	149.0	60.00	29.0	0.0E+00	20.20	1.00	1.0E-02	8.6E+02	5.8	60.00	0.00%	pass	4.2E-04	1.1E-03	4.8E-03
00477331	4	10	20	3	30	123.0	133.0	0.001	0	149.0	10.00	10.0	0.0E+00	59.65	3.00	7.3E-02	6.3E+03	42.3	10.00	0.00%	pass	1.2E-03	8.2E-03	3.9E-02
00478543	3	18	36	2	30	250.0	280.0	0.001	0	149.0	18.00	30.0	0.0E+00	20.59	1.67	1.7E-02	1.5E+03	9.9	18.00	0.00%	pass	6.9E-04	1.9E-03	8.2E-03
00478544	3	6	18	2	30	250.0	270.0	0.001	0	149.0	12.00	20.0	0.0E+00	31.79	2.50	3.6E-02	3.1E+03	20.8	12.00	0.00%	pass	1.0E-03	4.0E-03	1.8E-02
00479448	4	30	130	4	50	155.0	160.0	0.001	0	149.0	100.00	5.0	0.0E+00	117.56	0.50	2.2E-02	1.9E+03	13.0	100.00	0.00%	pass	2.0E-04	2.5E-03	1.3E-02
00479933	4	29	40	2	30	187.0	247.0	0.001	0	149.0	11.00	60.0	0.0E+00	7.80	2.73	1.5E-02	1.3E+03	8.9	11.00	0.01%	pass	1.1E-03	1.8E-03	7.1E-03
00479938	4	55	80	4	35	275.0	336.0	0.001	0	149.0	25.00	61.0	0.0E+00	7.59	1.40	7.7E-03	6.7E+02	4.5	25.00	0.00%	pass	5.9E-04	8.9E-04	3.6E-03
00487507	4	14	50	3	80	240.0	255.0	0.001	0	149.0	36.00	15.0	0.0E+00	40.00	2.22	3.8E-02	3.3E+03	22.2	36.00	0.00%	pass	9.2E-04	4.3E-03	1.9E-02
00487802	4	20	140	1	70	168.0	220.0	0.001	0	149.														

00518967	4	22	32	3	49	102.0	139.0	0.001	0	149.0	10.00	37.0	0.0E+00	15.26	4.90	4.2E-02	3.6E+03	24.1	10.00	0.00%	pass	2.0E-03	4.7E-03	1.9E-02
00521348	4	50	293	1	100	278.0	293.0	0.001	0	149.0	243.00	15.0	0.0E+00	40.00	0.41	6.9E-03	6.0E+02	4.0	243.00	0.00%	pass	1.7E-04	7.7E-04	3.6E-03
00521868	4	20	80	3	40	189.0	215.0	0.001	0	149.0	60.00	26.0	0.0E+00	22.75	0.67	7.2E-03	6.2E+02	4.2	60.00	0.00%	pass	2.8E-04	8.2E-04	3.5E-03
00523638	4	27	39	2	20	140.0	150.0	0.001	0	149.0	12.00	10.0	0.0E+00	59.65	1.67	4.0E-02	3.5E+03	23.4	12.00	0.00%	pass	6.9E-04	1.6E-03	2.2E-02
00523961	4	26	41	3	50	112.0	202.0	0.001	0	149.0	15.00	90.0	0.0E+00	3.38	3.33	1.4E-02	1.2E+03	7.9	15.00	0.00%	pass	1.4E-03	4.5E-03	5.9E-03
00523970	4	15	35	3	40	147.0	187.0	0.001	0	149.0	20.00	40.0	0.0E+00	13.87	2.00	1.6E-02	1.4E+03	9.1	20.00	0.00%	pass	8.4E-04	1.8E-03	7.3E-03
00524214	4	30	80	3	30	244.0	254.0	0.001	0	149.0	50.00	10.0	0.0E+00	59.65	0.60	1.4E-02	1.2E+03	8.4	50.00	0.00%	pass	2.5E-04	1.6E-03	7.7E-03
00524565	4	20	22	1	40	128.0	138.0	0.001	0	149.0	2.00	10.0	0.0E+00	59.65	20.00	4.9E-01	4.2E+04	283.9	2.00	0.01%	pass	8.2E-03	5.5E-02	2.6E-01
00524571	4	20	22	1	12	97.0	140.0	0.001	0	149.0	2.00	43.0	0.0E+00	12.65	6.00	4.4E-02	3.8E+03	25.7	2.00	0.05%	pass	2.5E-03	5.1E-03	2.1E-02
00525523	4	23	33	3	49	141.0	184.0	0.001	0	149.0	10.00	43.0	0.0E+00	12.65	4.90	3.7E-02	3.2E+03	21.5	10.00	0.00%	pass	2.0E-03	4.2E-03	1.7E-02
00525533	4	40	50	3	49	91.0	152.0	0.001	0	149.0	10.00	61.0	0.0E+00	7.59	4.90	2.8E-02	2.4E+03	16.2	10.00	0.00%	pass	2.1E-03	3.2E-03	1.3E-02
00527970	4	45	80	3	30	113.0	155.0	0.001	0	149.0	35.00	42.0	0.0E+00	13.04	0.86	6.3E-03	5.5E+02	3.7	35.00	0.00%	pass	3.6E-04	7.2E-04	3.0E-03
00531399	4	15	60	3	30	194.0	266.0	0.001	0	149.0	45.00	72.0	0.0E+00	5.63	0.67	3.1E-03	2.7E+02	1.8	45.00	0.00%	pass	2.8E-04	3.6E-04	1.5E-03
00531833	4	18	40	2	25	263.0	281.0	0.001	0	149.0	22.00	18.0	0.0E+00	33.32	1.14	1.7E-02	1.4E+03	9.7	22.00	0.00%	pass	4.7E-04	1.9E-03	8.4E-03
00533014	4	10	15	4	50	156.0	201.0	0.001	0	149.0	5.00	45.0	0.0E+00	11.92	10.00	7.5E-02	6.5E+03	43.3	5.00	0.02%	pass	4.2E-03	8.5E-03	3.3E-02
00533492	4	21	41	3	40	197.0	231.0	0.001	0	149.0	20.00	34.0	0.0E+00	16.87	2.00	1.8E-02	1.5E+03	10.3	20.00	0.00%	pass	8.3E-04	2.0E-03	8.4E-03
00533519	4	30	50	3	30	165.0	225.0	0.001	0	149.0	20.00	60.0	0.0E+00	7.80	1.50	8.4E-03	7.2E+02	4.8	20.00	0.00%	pass	6.3E-04	9.6E-04	3.9E-03
00536770	4	20	30	2	18	194.0	198.0	0.001	0	149.0	10.00	4.0	0.0E+00	146.35	1.80	9.9E-02	8.6E+03	57.5	10.00	0.00%	pass	7.3E-04	1.1E-02	5.8E-02
00538061	4	20	40	3	40	208.0	250.0	0.001	0	149.0	20.00	42.0	0.0E+00	13.04	2.00	1.5E-02	1.3E+03	8.7	20.00	0.00%	pass	8.4E-04	1.7E-03	7.0E-03
00538080	4	20	40	3	40	103.0	150.0	0.001	0	149.0	20.00	47.0	0.0E+00	11.24	2.00	1.4E-02	1.2E+03	8.0	20.00	0.00%	pass	8.4E-04	1.6E-03	6.4E-03
00538127	4	35	55	3	40	154.0	225.0	0.001	0	149.0	20.00	71.0	0.0E+00	5.78	2.00	9.8E-03	8.4E+02	5.7	20.00	0.00%	pass	8.5E-04	1.1E-03	4.5E-03
00540065	4	12	20	3	40	112.0	142.0	0.001	0	149.0	8.00	30.0	0.0E+00	19.45	5.00	5.0E-02	4.3E+03	29.0	8.00	0.00%	pass	2.1E-03	5.7E-03	2.3E-02
00540437	4	15	40	3	50	144.0	185.0	0.001	0	149.0	25.00	41.0	0.0E+00	13.45	2.00	1.5E-02	1.3E+03	8.9	25.00	0.00%	pass	8.4E-04	1.7E-03	7.2E-03
00541761	4	30	55	3	30	141.0	171.0	0.001	0	149.0	25.00	30.0	0.0E+00	19.45	1.20	1.2E-02	1.0E+03	6.8	25.00	0.00%	pass	5.0E-04	1.3E-03	5.6E-03
00546162	4	25	90	6	80	105.0	175.0	0.001	0	149.0	65.00	70.0	0.0E+00	5.94	1.23	6.1E-03	5.3E+02	3.6	65.00	0.00%	pass	5.2E-04	7.1E-04	2.8E-03
00547598	4	12	25	3	35	196.0	245.0	0.001	0	149.0	13.00	49.0	0.0E+00	10.61	2.69	1.8E-02	1.6E+03	10.5	13.00	0.00%	pass	1.1E-03	2.1E-03	8.3E-03
00547605	4	10	60	3	40	193.0	246.0	0.001	0	149.0	50.00	53.0	0.0E+00	9.47	0.80	4.9E-03	4.2E+02	2.8	50.00	0.00%	pass	3.4E-04	5.6E-04	2.3E-03
00551256	4	15	60	3	45	126.0	146.0	0.001	0	149.0	45.00	20.0	0.0E+00	29.94	1.00	1.4E-02	1.2E+03	7.8	45.00	0.00%	pass	4.1E-04	1.5E-03	6.7E-03
00554759	4	40	70	4	30	166.0	200.0	0.001	0	149.0	30.00	34.0	0.0E+00	16.87	1.00	8.8E-03	7.6E+02	5.1	30.00	0.00%	pass	4.2E-04	1.0E-03	4.2E-03
00554780	4	12	30	3	50	187.0	240.0	0.001	0	149.0	18.00	53.0	0.0E+00	9.47	2.78	1.7E-02	1.5E+03	10.1	18.00	0.00%	pass	1.2E-03	2.0E-03	8.1E-03
00556695	4	12	45	3	30	169.0	212.0	0.001	0	149.0	33.00	43.0	0.0E+00	12.65	0.91	6.6E-03	5.7E+02	3.8	33.00	0.00%	pass	3.8E-04	7.5E-04	3.1E-03
00556715	4	20	60	3	40	182.0	232.0	0.001	0	149.0	40.00	50.0	0.0E+00	10.31	1.00	6.4E-03	5.5E+02	3.7	40.00	0.00%	pass	4.2E-04	7.3E-04	3.0E-03
00557440	4	10	30	2	20	163.0	180.0	0.001	0	149.0	20.00	17.0	0.0E+00	35.30	1.00	1.5E-02	1.3E+03	8.9	20.00	0.00%	pass	4.1E-04	1.7E-03	7.8E-03
00559043	4	30	60	5	50	244.0	305.0	0.001	0	149.0	30.00	61.0	0.0E+00	7.59	1.67	9.3E-03	8.1E+02	5.4	30.00	0.00%	pass	7.0E-04	1.1E-03	4.3E-03
00559384	4	25	55	30	40	154.0	225.0	0.001	0	149.0	30.00	71.0	0.0E+00	5.78	1.33	7.0E-03	6.0E+02	4.0	30.00	0.00%	pass	5.6E-04	8.0E-04	3.0E-03
00559391	4	20	40	3	40	168.0	205.0	0.001	0	149.0	20.00	37.0	0.0E+00	15.26	2.00	1.7E-02	1.4E+03	9.7	20.00	0.00%	pass	8.3E-04	1.9E-03	7.8E-03
00559397	4	35	55	3	40	225.0	262.0	0.001	0	149.0	20.00	37.0	0.0E+00	15.26	2.00	1.7E-02	1.4E+03	9.7	20.00	0.00%	pass	8.3E-04	1.9E-03	7.8E-03
00559406	4	10	20	3	40	90.0	150.0	0.001	0	149.0	10.00	60.0	0.0E+00	7.80	4.00	2.3E-02	2.0E+03	13.3	10.00	0.00%	pass	1.7E-03	2.6E-03	1.0E-02
00559410	4	48	68	3	40	167.0	220.0	0.001	0	149.0	20.00	53.0	0.0E+00	9.47	2.00	1.2E-02	1.1E+03	7.2	20.00	0.00%	pass	8.4E-04	1.4E-03	5.8E-03
00559424	4	22	42	3	40	210.0	250.0	0.001	0	149.0	20.00	40.0	0.0E+00	13.87	2.00	1.6E-02	1.4E+03	9.1	20.00	0.00%	pass	8.4E-04	1.8E-03	7.3E-03
00559446	4	20	30	2	10	170.0	200.0	0.001	0	149.0	10.00	30.0	0.0E+00	19.45	1.00	9.7E-03	8.3E+02	5.6	10.00	0.00%	pass	4.2E-04	1.1E-03	4.6E-03
00559498	4	22	50	2	50	210.0	276.0	0.001	0	149.0	28.00	66.0	0.0E+00	6.63	1.79	9.1E-03	7.9E+02	5.3	28.00	0.00%	pass	7.6E-04	1.0E-03	4.3E-03
00562970	4	28	48	3	40	207.0	250.0	0.001	0	149.0	20.00	43.0	0.0E+00	12.65	2.00	1.5E-02	1.3E+03	8.6	20.00	0.00%	pass	8.4E-04	1.7E-03	6.9E-03
00563498	4	20	40	3	30	186.0	196.0	0.001	0	149.0	20.00	10.0	0.0E+00	59.65	1.50	3.6E-02	3.1E+03	21.1	20.00	0.00%	pass	6.2E-04	4.1E-03	1.9E-02
00564172	4	30	42	3	25	265.0	292.0	0.001	0	149.0	12.00	27.0	0.0E+00	21.84	2.08	2.2E-02	1.9E+03	13.0	12.00	0.00%	pass	8.6E-04	2.5E-03	1.1E-02
00566171	4	10	25	3	50	191.0	240.0	0.001	0	149.0	15.00	49.0	0.0E+00	10.61	3.33	2.2E-02	1.9E+03	13.0	15.00	0.00%	pass	1.4E-03	2.6E-03	1.0E-02
00572022	4	15	40	3	50	180.0	220.0	0.001	0	149.0	25.00	40.0	0.0E+00	13.87	2.00	1.6E-02	1.4E+03	9.1	25.00	0.00%	pass	8.4E-04	1.8E-03	7.3E-03
00576749	4	30	50	3	30	196.0	231.0	0.001	0	149.0	20.00	35.0	0.0E+00	16.31	1.50	1.3E-02	1.1E+03	7.5	20.00	0.00%	pass	6.3E-04	1.5E-03	6.1E-03
00577032	4	60	100	1	30	136.0	200.0	0.001	0	149.0	40.00	64.0	0.0E+00	7.00	0.75	3.7E-03	3.2E+02	2.2	40.00	0.00%	pass	3.2E-04	4.3E-04	1.9E-03
00580587	4	20	60	6	25	155.0	185.0	0.001	0	149.0	40.00	30.0	0.0E+00	19.45	0.63	6.1E-03	5.3E+02	3.5	40.00	0.00%	pass	2.6E-04	6.9E-04	2.9E-03
00580648	4	26	150	2.5	40	190.0	215.0	0.001	0	149.0	124.00	25.0	0.0E+00	23.72	0.32	3.6E-03	3.1E+02	2.1	124.00	0.00%	pass	1.3E-04	4.0E-04	1.8E-03
00582672	4	35	80	2	30	272.0	316.0	0.001	0	149.0	45.00													

00641250	4	38	140	1	80	205.0	240.0	0.001	0	149.0	102.00	35.0	0.0E+00	16.31	0.78	6.5E-03	5.7E+02	3.8	102.00	0.00%	pass	3.3E-04	7.4E-04	3.2E-03
00642607	4	40	70	1	20	210.0	232.0	0.001	0	149.0	30.00	22.0	0.0E+00	27.13	0.67	8.1E-03	7.0E+02	4.7	30.00	0.00%	pass	2.8E-04	9.2E-04	4.1E-03
00642640	4	40	60	1	20	210.0	235.0	0.001	0	149.0	20.00	25.0	0.0E+00	23.72	1.00	1.1E-02	9.6E+02	6.4	20.00	0.00%	pass	4.1E-04	1.3E-03	5.5E-03
00643796	4	18	60	2	30	215.0	272.0	0.001	0	149.0	42.00	57.0	0.0E+00	8.48	0.71	4.0E-03	3.5E+02	2.3	42.00	0.00%	pass	3.0E-04	4.6E-04	2.0E-03
00644640	4	30	60	5	50	160.0	260.0	0.001	0	149.0	30.00	100.0	0.0E+00	2.47	1.67	6.2E-03	5.4E+02	3.6	30.00	0.00%	pass	7.1E-04	7.2E-04	2.6E-03
00645655	4	21	30	3	60	179.0	211.0	0.001	0	149.0	9.00	32.0	0.0E+00	18.09	6.67	6.4E-02	5.5E+03	37.0	9.00	0.00%	pass	2.8E-03	7.2E-03	2.9E-02
00645658	4	24	32	3	60	172.0	210.0	0.001	0	149.0	8.00	38.0	0.0E+00	14.78	7.50	6.3E-02	5.4E+03	36.5	8.00	0.00%	pass	3.1E-03	7.2E-03	2.9E-02
00648511	4	19	60	3	30	152.0	202.0	0.001	0	149.0	41.00	50.0	0.0E+00	10.31	0.73	4.6E-03	4.0E+02	2.7	41.00	0.00%	pass	3.1E-04	5.3E-04	2.2E-03
00648828	4	45	255	1	70	234.0	255.0	0.001	0	149.0	210.00	21.0	0.0E+00	28.47	0.33	4.2E-03	3.6E+02	2.4	210.00	0.00%	pass	1.4E-04	4.7E-04	2.1E-03
00649217	4	10	30	4	30	93.0	110.0	0.001	0	149.0	20.00	17.0	0.0E+00	35.30	0.00%	pass	2.0E+03	13.5	20.00	0.00%	pass	6.2E-04	2.6E-03	1.2E-02
00650703	4	37	80	1	30	154.0	200.0	0.001	0	149.0	43.00	46.0	0.0E+00	11.57	0.70	4.6E-03	4.0E+02	2.7	43.00	0.00%	pass	2.9E-04	5.3E-04	2.3E-03
00659787	4	35	55	1	20	210.0	231.0	0.001	0	149.0	20.00	21.0	0.0E+00	28.47	1.00	1.3E-02	1.1E+03	7.4	20.00	0.00%	pass	4.1E-04	1.4E-03	6.4E-03
00661125	4	20	50	8	40	191.0	340.0	0.001	0	149.0	30.00	149.0	0.0E+00	0.00	1.33	3.8E-03	3.3E+02	2.2	30.00	0.00%	pass	5.8E-04	4.5E-04	1.2E-03
00669166	4	22	60	2	30	137.0	198.0	0.001	0	149.0	38.00	61.0	0.0E+00	7.59	0.79	4.2E-03	3.6E+02	2.4	38.00	0.00%	pass	3.3E-04	4.8E-04	2.0E-03
00670224	4	15	50	8	50	160.0	190.0	0.001	0	149.0	35.00	30.0	0.0E+00	19.45	1.43	1.4E-02	1.2E+03	8.3	35.00	0.00%	pass	5.9E-04	1.6E-03	6.6E-03
00681481	4	45	80	1	20	136.0	156.0	0.001	0	149.0	35.00	20.0	0.0E+00	29.94	0.57	7.5E-03	6.5E+02	4.4	35.00	0.00%	pass	2.4E-04	8.5E-04	3.8E-03
00693255	4	30	120	1	60	209.0	240.0	0.001	0	149.0	90.00	31.0	0.0E+00	18.75	0.67	6.1E-03	5.3E+02	3.6	90.00	0.00%	pass	2.8E-04	7.0E-04	3.0E-03
00693865	4	25	50	8	50	218.0	240.0	0.001	0	149.0	25.00	22.0	0.0E+00	27.13	2.00	2.6E-02	2.2E+03	14.8	25.00	0.00%	pass	8.3E-04	2.9E-03	1.2E-02
00706703	4	20	60	2	25	211.0	246.0	0.001	0	149.0	40.00	35.0	0.0E+00	16.31	0.63	5.3E-03	4.6E+02	3.1	40.00	0.00%	pass	2.6E-04	6.0E-04	2.5E-03
00707655	4	15	50	8	70	240.0	300.0	0.001	0	149.0	35.00	60.0	0.0E+00	7.80	2.00	1.2E-02	1.0E+03	6.7	35.00	0.00%	pass	8.4E-04	1.3E-03	5.2E-03
00707857	4	29	50	8	70	169.0	300.0	0.001	0	149.0	21.00	131.0	0.0E+00	0.64	3.33	1.1E-02	9.4E+02	6.3	21.00	0.00%	pass	1.4E-03	1.3E-03	3.5E-03
00707875	4	25	50	8	60	217.0	260.0	0.001	0	149.0	25.00	43.0	0.0E+00	12.65	2.40	1.8E-02	1.6E+03	10.6	25.00	0.00%	pass	1.0E-03	2.1E-03	8.2E-03
00707896	4	20	50	8	60	175.0	296.0	0.001	0	149.0	30.00	121.0	0.0E+00	1.11	2.00	6.7E-03	5.8E+02	3.9	30.00	0.00%	pass	8.6E-04	7.8E-04	2.4E-03
00707897	4	26	60	8	60	183.0	320.0	0.001	0	149.0	34.00	137.0	0.0E+00	0.40	1.76	5.4E-03	4.6E+02	3.1	34.00	0.00%	pass	7.7E-04	6.3E-04	1.7E-03
00716797	4	25	260	1	30	232.0	260.0	0.001	0	149.0	235.00	28.0	0.0E+00	20.99	0.13	1.2E-03	1.1E+02	0.7	235.00	0.00%	pass	5.3E-05	1.4E-04	6.3E-04
00716799	4	22	220	1	100	216.0	220.0	0.001	0	149.0	198.00	4.0	0.0E+00	146.35	0.51	2.8E-02	2.4E+03	16.0	198.00	0.00%	pass	2.1E-04	3.1E-03	1.6E-02
00735706	4	18	165	1	60	168.0	186.0	0.001	0	149.0	147.00	18.0	0.0E+00	33.32	0.41	5.9E-03	5.1E+02	3.4	147.00	0.00%	pass	1.7E-04	6.6E-04	3.0E-03
00735706	4	18	75	2	40	168.0	186.0	0.001	0	149.0	57.00	18.0	0.0E+00	33.32	0.70	1.0E-02	8.8E+02	5.9	57.00	0.00%	pass	2.9E-04	1.2E-03	5.2E-03
00739556	4	15	50	8	80	163.0	188.0	0.001	0	149.0	35.00	25.0	0.0E+00	23.72	2.29	2.6E-02	2.3E+03	15.4	35.00	0.00%	pass	9.5E-04	3.0E-03	1.2E-02
00742803	4	70	240	1	30	263.0	300.0	0.001	0	149.0	170.00	37.0	0.0E+00	15.26	0.18	1.4E-03	1.2E+02	0.8	170.00	0.00%	pass	7.4E-05	1.5E-04	6.9E-04
00748035	4	27	80	2	100	167.0	196.0	0.001	0	149.0	53.00	29.0	0.0E+00	20.20	1.89	1.9E-02	1.6E+03	11.0	53.00	0.00%	pass	7.8E-04	2.1E-03	9.0E-03
00756072	4	15	35	45	55	160.0	190.0	0.001	0	149.0	20.00	30.0	0.0E+00	19.45	2.75	2.9E-02	2.5E+03	16.6	20.00	0.00%	pass	1.1E-03	3.2E-03	1.3E-02
00761478	4	30	90	2	75	173.0	220.0	0.001	0	149.0	60.00	47.0	0.0E+00	11.24	1.25	8.4E-03	7.3E+02	4.9	60.00	0.00%	pass	5.2E-04	9.6E-04	4.0E-03
00765325	4	20	60	3	30	80.0	175.0	0.001	0	149.0	40.00	95.0	0.0E+00	2.90	0.75	2.7E-03	2.4E+02	1.6	40.00	0.00%	pass	3.2E-04	3.2E-04	1.3E-03
00776889	4	24	220	1.5	25	219.0	245.0	0.001	0	149.0	196.00	26.0	0.0E+00	22.75	0.13	1.3E-03	1.1E+02	0.8	196.00	0.00%	pass	5.3E-05	1.5E-04	6.7E-04
00778026	4	24	100	6	50	199.0	245.0	0.001	0	149.0	76.00	46.0	0.0E+00	11.57	0.66	4.6E-03	3.9E+02	2.6	76.00	0.00%	pass	2.8E-04	5.2E-04	2.1E-03
00778031	6	20	27.75	2.5	100	161.0	260.0	0.001	0	149.0	7.75	99.0	0.0E+00	2.35	12.90	4.9E-02	4.2E+03	28.2	7.75	0.01%	pass	5.5E-03	5.7E-03	1.9E-02
00778073	4	22	44	1	20	126.0	171.0	0.001	0	149.0	22.00	45.0	0.0E+00	11.92	0.91	6.2E-03	5.3E+02	3.6	22.00	0.00%	pass	3.8E-04	7.0E-04	3.0E-03
00779162	4	13	50	5	70	194.0	235.0	0.001	0	149.0	37.00	41.0	0.0E+00	13.45	1.89	1.5E-02	1.3E+03	8.5	37.00	0.00%	pass	7.9E-04	1.7E-03	6.8E-03
00779305	4	25	50	3	75	168.0	218.0	0.001	0	149.0	25.00	50.0	0.0E+00	10.31	3.00	2.0E-02	1.7E+03	11.5	25.00	0.00%	pass	1.3E-03	2.3E-03	9.1E-03
00784102	8	34	250	3	400	168.0	250.0	0.001	0	149.0	216.00	82.0	0.0E+00	3.69	1.85	7.1E-03	6.1E+02	4.1	216.00	0.00%	pass	7.9E-04	8.3E-04	3.2E-03

Max 4.8E+04 3.2E+02
Min 9.5E+01 6.4E-01
Geomean 1.3E+03 8.9E+00

References:

Bradbury, K.B., and E.R. Rothschild, 1985. A computerized technique for estimating the hydraulic conductivity of aquifer from specific capacity data: Ground Water vol. 23, No. 2, pp. 240-246.

ASTM International, 2004. Standard Test Method for Determining Specific Capacity and Estimating Transmissivity at the Control Well, Standard D 5472-93, in Annual Book of ASTM Standards, Vol. 04.08 pp. 1279-1282.

Wonewoc

Worksheet for Estimating Transmissivity and Hydraulic Conductivity from Specific Capacity Test Data

Explanation and notes attached.

Maximum iterations	100
Error tolerance (as drawdown)	0.001 feet

Location	Field Data				Estimated Parameters							Calculated Results				Diagnostics								
	Well Diam.	Depth to Water		Test Duration	Mean Pumping Rate	Screened Interval		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)	T (ft ² /day)	Conductivity (K)	Solution Integrity			Sensitivity of T:		
		Initial	Final			Depth to Top	Depth to Bottom												Calculated Drawdown	Error as Drawdown	Well Bore Storage Test	to S at ± 1 factor of 10	to S _m at 10% of S _m	to b at ± 25%
inches	feet	feet	feet	hours	gpm	feet	feet	-	sec ² /ft ⁵	feet	feet	feet	-	gpm/ft	sq ft/sec	ft/day	ft/day	feet	%	pass	sq ft/sec	sq ft/sec	sq ft/sec	
00104703	3	24	40	4	25	216.0	229.0	0.001	0	57.0	16.00	13.0	0.0E+00	14.60	1.56	1.3E-02	1.1E+03	19.4	16.00	0.00%	pass	6.5E-04	1.5E-03	5.7E-03
00122194	4	15	35	3	30	220.0	260.0	0.001	0	57.0	20.00	40.0	0.0E+00	1.71	1.50	5.0E-03	4.3E+02	7.5	20.00	0.00%	pass	6.5E-04	5.9E-04	1.8E-03
00140176	4	20	35	4	60	245.0	288.0	0.001	0	57.0	15.00	43.0	0.0E+00	1.28	4.00	1.4E-02	1.2E+03	20.6	15.00	0.00%	pass	1.7E-03	1.6E-03	4.4E-03
00145432	4	13	30	5	25	172.0	214.0	0.001	0	57.0	17.00	42.0	0.0E+00	1.42	1.47	4.9E-03	4.2E+02	7.4	17.00	0.00%	pass	6.3E-04	5.7E-04	1.7E-03
00147153	4	21	25	3	60	202.0	231.0	0.001	0	57.0	4.00	29.0	0.0E+00	4.14	15.00	7.0E-02	6.0E+03	105.6	4.00	0.00%	pass	6.4E-03	8.1E-03	2.7E-02
00154527	4	40	55	4	35	181.0	186.0	0.001	0	57.0	15.00	5.0	0.0E+00	35.86	2.33	3.7E-02	3.2E+03	56.0	15.00	0.00%	pass	9.6E-04	4.2E-03	1.9E-02
00155262	4	20	30	3	25	207.0	213.0	0.001	0	57.0	10.00	6.0	0.0E+00	30.09	2.50	3.4E-02	3.0E+03	52.0	10.00	0.00%	pass	1.0E-03	3.9E-03	1.7E-02
00169693	4	10	30	2	30	275.0	311.0	0.001	0	57.0	20.00	36.0	0.0E+00	2.42	1.50	5.3E-03	4.5E+02	8.0	20.00	0.00%	pass	6.5E-04	6.2E-04	2.1E-03
00178923	4	25	60	3	30	223.0	275.0	0.001	0	57.0	35.00	52.0	0.0E+00	0.35	0.86	2.3E-03	2.0E+02	3.5	35.00	0.00%	pass	3.7E-04	2.8E-04	6.9E-04
00179376	4	15	35	3	55	278.0	306.0	0.001	0	57.0	20.00	28.0	0.0E+00	4.45	2.75	1.2E-02	1.1E+03	18.5	20.00	0.00%	pass	1.2E-03	1.4E-03	5.1E-03
00190419	4	20	40	3	20	202.0	243.0	0.001	0	57.0	20.00	41.0	0.0E+00	1.56	1.00	3.2E-03	2.8E+02	4.8	20.00	0.00%	pass	4.3E-04	3.8E-04	1.2E-03
00197581	4	7	28	3	60	212.0	270.0	0.001	0	57.0	21.00	58.0	0.0E+00	-0.06	2.86	7.9E-03	6.8E+02	12.0	21.00	0.00%	pass	1.2E-03	9.4E-04	1.9E-03
00199906	4	26	50	2	30	201.0	220.0	0.001	0	57.0	24.00	19.0	0.0E+00	8.48	1.25	7.1E-03	6.2E+02	10.8	24.00	0.00%	pass	5.3E-04	8.2E-04	3.2E-03
00406314	4	10	100	1	50	210.0	280.0	0.001	0	57.0	90.00	70.0	0.0E+00	-0.62	0.56	1.1E-03	9.8E+01	1.7	90.00	0.00%	pass	2.5E-04	1.4E-04	4.1E-04
00406320	4	20	100	2	60	273.0	340.0	0.001	0	57.0	80.00	67.0	0.0E+00	-0.50	0.75	1.7E-03	1.5E+02	2.6	80.00	0.00%	pass	3.3E-04	2.1E-04	5.0E-04
00408981	4	15	45	2	35	195.0	231.0	0.001	0	57.0	30.00	36.0	0.0E+00	2.42	1.17	4.0E-03	3.5E+02	6.1	30.00	0.00%	pass	5.0E-04	4.7E-04	1.7E-03
00408981	4	15	45	3	35	195.0	231.0	0.001	0	57.0	30.00	36.0	0.0E+00	2.42	1.17	4.1E-03	3.6E+02	6.3	30.00	0.00%	pass	5.0E-04	4.8E-04	1.7E-03
00409516	4	15	245	3	12	217.0	245.0	0.001	0	57.0	230.00	28.0	0.0E+00	4.45	0.05	1.9E-04	1.7E+01	0.3	230.00	0.00%	pass	2.2E-05	2.3E-05	9.7E-05
00411507	4	20	40	3	30	256.0	335.0	0.001	0	57.0	20.00	79.0	0.0E+00	-0.99	1.50	3.4E-03	3.0E+02	5.2	20.00	0.00%	pass	6.6E-04	4.2E-04	1.6E-03
00429151	4	8	18	3	25	220.0	225.0	0.001	0	57.0	10.00	5.0	0.0E+00	35.86	2.50	3.9E-02	3.4E+03	59.8	10.00	0.00%	pass	1.0E-03	4.4E-03	2.0E-02
00435830	4	7	15	4	30	213.0	255.0	0.001	0	57.0	8.00	42.0	0.0E+00	1.42	3.75	1.3E-02	1.1E+03	19.5	8.00	0.00%	pass	1.6E-03	1.5E-03	4.3E-03
00435832	4	10	20	4	30	168.0	216.0	0.001	0	57.0	10.00	48.0	0.0E+00	0.71	3.00	9.4E-03	8.1E+02	14.2	10.00	0.00%	pass	1.3E-03	1.1E-03	2.8E-03
00437222	4	12	75	1	100	195.0	236.0	0.001	0	57.0	63.00	41.0	0.0E+00	1.56	1.59	4.9E-03	4.2E+02	7.4	63.00	0.00%	pass	6.9E-04	5.8E-04	1.9E-03
00437222	4	12	30	1	25	195.0	236.0	0.001	0	57.0	18.00	41.0	0.0E+00	1.56	1.39	4.2E-03	3.6E+02	6.4	18.00	0.00%	pass	6.0E-04	5.0E-04	1.7E-03
00437700	4	13	30	3	25	205.0	240.0	0.001	0	57.0	17.00	35.0	0.0E+00	2.62	1.47	5.4E-03	4.6E+02	8.1	17.00	0.00%	pass	6.3E-04	6.3E-04	2.2E-03
00450304	4	16	40	5	30	232.0	286.0	0.001	0	57.0	24.00	54.0	0.0E+00	0.20	1.25	3.5E-03	3.0E+02	5.3	24.00	0.00%	pass	5.5E-04	4.2E-04	9.4E-04
00450309	4	15	30	4	35	232.0	286.0	0.001	0	57.0	15.00	54.0	0.0E+00	0.20	2.33	6.7E-03	5.8E+02	10.2	15.00	0.00%	pass	1.0E-03	8.0E-04	1.7E-03
00450310	4	19	45	4	25	238.0	298.0	0.001	0	57.0	26.00	60.0	0.0E+00	-0.17	0.96	2.5E-03	2.1E+02	3.8	26.00	0.00%	pass	4.2E-04	3.0E-04	6.3E-04
00450325	4	25	45	5	30	232.0	291.0	0.001	0	57.0	20.00	59.0	0.0E+00	-0.12	1.50	4.1E-03	3.5E+02	6.2	20.00	0.00%	pass	6.6E-04	4.9E-04	1.0E-03
00477365	4	36	70	2	35	306.0	350.0	0.001	0	57.0	34.00	44.0	0.0E+00	1.15	1.03	3.0E-03	2.6E+02	4.6	34.00	0.00%	pass	4.5E-04	3.6E-04	1.1E-03
00494285	4	15	25	3	30	162.0	167.0	0.001	0	57.0	10.00	5.0	0.0E+00	35.86	3.00	4.7E-02	4.1E+03	72.0	10.00	0.01%	pass	1.2E-03	5.3E-03	2.4E-02
00506378	4	25	40	3	40	228.0	258.0	0.001	0	57.0	15.00	30.0	0.0E+00	3.85	2.67	1.1E-02	9.7E+02	17.1	15.00	0.00%	pass	1.1E-03	1.3E-03	4.6E-03
00509243	4	10	160	1	70	163.0	174.0	0.001	0	57.0	150.00	11.0	0.0E+00	16.37	0.47	3.9E-03	3.3E+02	5.9	150.00	0.00%	pass	1.9E-04	4.4E-04	1.8E-03
00509243	4	10	100	2	50	163.0	174.0	0.001	0	57.0	90.00	11.0	0.0E+00	16.37	0.56	4.7E-03	4.0E+02	7.1	90.00	0.00%	pass	2.3E-04	5.3E-04	2.2E-03
00510535	4	20	45	2	40	203.0	245.0	0.001	0	57.0	25.00	42.0	0.0E+00	1.42	1.60	5.0E-03	4.3E+02	7.6	25.00	0.00%	pass	6.9E-04	5.9E-04	1.8E-03
00510535	4	20	45	3	40	203.0	245.0	0.001	0	57.0	25.00	42.0	0.0E+00	1.42	1.60	5.2E-03	4.4E+02	7.8	25.00	0.00%	pass	6.9E-04	6.1E-04	1.8E-03
00511955	4	18	30	3.5	50	212.0	261.0	0.001	0	57.0	12.00	49.0	0.0E+00	0.61	4.17	1.3E-02	1.1E+03	19.7	12.00	0.00%	pass	1.8E-03	1.5E-03	3.7E-03
00562952	4	20	200	3	25	227.0	238.0	0.001	0	57.0	180.00	11.0	0.0E+00	16.37	0.14	1.1E-03	9.9E+01	1.7	180.00	0.00%	pass	5.8E-05	1.3E-04	5.5E-04
00587137	4	25	65	2	75	220.0	245.0	0.001	0	57.0	40.00	25.0	0.0E+00	5.52	1.88	8.8E-03	7.6E+02	13.3	40.00	0.00%	pass	8.0E-04	1.0E-03	3.8E-03
00599191	4	30	50	3	40	224.0	240.0	0.001	0	57.0	20.00	16.0	0.0E+00	10.65	2.00	1.3E-02	1.2E+03	20.2	20.00	0.00%	pass	8.4E-04	1.5E-03	5.8E-03
00624533	4	20	50	6	70	300.0	320.0	0.001	0	57.0	30.00	20.0	0.0E+00	7.89	2.33	1.4E-02	1.2E+03	20.5	30.00	0.00%	pass	9.8E-04	1.6E-03	5.7E-03
00705752	4	18	100	2	55	200.0	240.0	0.001	0	57.0	82.00	40.0	0.0E+00	1.71	0.67	2.1E-03	1.8E+02	3.1	82.00	0.00%	pass	2.9E-04	2.5E-04	8.3E-04

Max	6.0E+03	1.1E+02
Min	1.7E+01	2.9E-01
Geomean	5.3E+02	9.3E+00

References:

Bradbury, K.B., and E.R. Rothschild, 1985. A computerized technique for estimating the hydraulic conductivity of aquifer from specific capacity data: Ground Water vol. 23, No. 2, pp. 240-246.

ASTM International, 2004. Standard Test Method for Determining Specific Capacity and Estimating Transmissivity at the Control Well, Standard D 5472-93, in Annual Book of ASTM Standards, Vol. 04.08 pp. 1279-1282.



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:	1020017	PWS Name:	Coon Rapids
--------------------------------	---------	------------------	-------------

Contact Information for Person Completing this Form

Name:	John Greer
Address:	Barr Engineering Company
	4700 West 77th Street, Suite 200
City, State, Zip:	Edina, MN 55435
Phone, Fax, e-mail:	(952) 832-2691

Aquifer Properties Determination Methods

- 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) 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). A test plan must be approved before conducting the test.
- 4) 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). A test plan must be approved before conducting the test.
- 5) 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.
- 6) 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.
- 7) An existing published transmissivity value.
 - Include all test data and analysis documentation with the estimated transmissivity, ft²/day, when the aquifer properties determination method is; 1, 2, 5, 6, or 7, listed above.
 - Attach detailed aquifer test plan for methods 3 or 4.

Submitted by: <i>John Greer</i>	Prof. License: 30347	Date: 7/31/2015
--	-----------------------------	------------------------

To request this document in another format, please call our Section Receptionist (651/201-4700) or Division TTY (651/201-5797).



Rationale for: 1) Aquifer Properties Determination or 2) Proposed New Test

Briefly describe the rationale for: 1) selected method to determine aquifer properties from existing data, **or** 2) a new aquifer test to be conducted on the pumped well referenced below. Include unique well numbers of all wells that were (or will be) monitored during data collection. How does the existing or proposed test deviate from the ideal. (e.g. rate, duration, no. of obwells, interfering wells, etc.) Attach documentation as necessary.

Aquifer Name: Mt. Simon Sandstone Confined Unconfined Fractured Rock

Specific capacity data on the CWI log for Coon Rapids Well 18 (Unique Number 110469) was analyzed using the TGuess Method (Bradbury and Rothschild, 1985) to obtain a transmissivity of 4,700 ft²/day (see attached).

Four production tests were conducted on Andover Well 3 (Unique Number 431683) in 1987. See the attached plots (provided by MDH) for test data and analysis. Below is a summary of the results from the four tests:

Date	Flow Rate (gpm)	T(ft ² /day)
10/12/1987	600	1,880
10/13/1987	600	1,600
10/14/1987	800	2,200
10/16/1987	1000	2,130

The geometric mean transmissivity of all five tests is 2,310 ft²/day, which will be used in the base case model. The max and min of the four tests, 1,600 ft²/day and 4,700 ft²/day, respectively, will be used as the sensitivity analysis ranges.

Proposed New Test Information Summary

Pumped Well Name (Unique Number):	110469, 431683	Test Duration (Hours):	varies
Location: X, Y (meters) UTM-Z15N or Lat-Lon (decimal degrees) datum: NAD83	476962, 5004924 (110469) 476994, 5007465 (431683)	Pump Type:	unknown
		Discharge Rate:	600, 800, 1000, 1400 gpm
Number of Observation Wells:	0	Flow Rate Measuring Device Type:	unknown

▪ A map showing the location of the pumping well and observation well(s) must be included.

List the unique number of each public water supply well to which this DAP-ATP Form applies

202929	202965	110469			
202972	168721				
202951	161413				
202943	110460				
202932	110461				
202930	168720				

Reviewed by: Amal Djerrari **Approved:** Yes No **Approval Date:** 8/3/2015

Mt. Simon
Worksheet for Estimating Transmissivity and Hydraulic Conductivity from Specific Capacity Test Data

Explanation and notes attached.

Maximum iterations	100
Error tolerance (as drawdown)	0.001 feet

Field Data				Estimated Parameters			Calculated Results					Diagnostics												
Location	Well Diam. inches	Depth to Water		Test Duration hours	Mean Pumping Rate gpm	Screened Interval		Storage Coef. (S)	Well loss Coef. (C) sec ² /ft ² S	Aquifer Thickness (b) feet	Measured Drawdown (s _m) feet	Saturated Screen Length (L) feet	Well loss (s _w) feet	Partial Penetration Parameter (s _p) -	Specific Capacity gpm/ft	Transmissivity (T) sq ft/sec	T (ft ² /day)	Conductivity (K) ft/day	Solution Integrity		Sensitivity of T:			
		Initial feet	Final feet			Depth to Top feet	Depth to Bottom feet												Calculated Drawdown feet	Error as Drawdown %	Well Bore Storage Test pass	to S at ± 1 factor of 10 sq ft/sec	to s _w at 10% of s _m sq ft/sec	to b at ± 25% sq ft/sec
00110469 (Coon Rapids 18)	24	140	248	36	1400	575.0	637.0	0.001	0	128.0	108.00	62.0	0.0E+00	3.53	12.96	5.4E-02	4.7E+03	36.7	108.00	0.00%	pass	5.5E-03	6.3E-03	1.9E-02

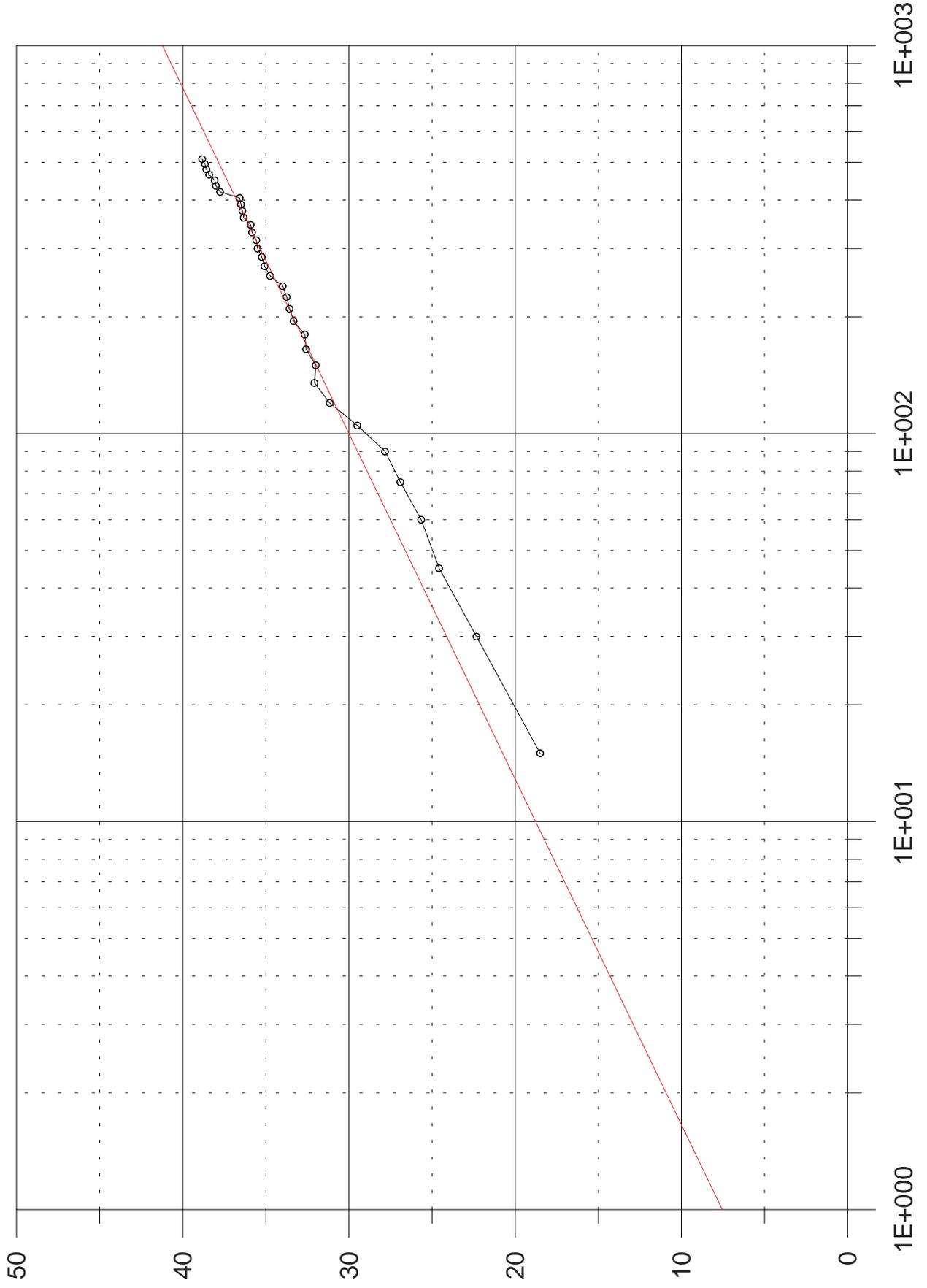
References:

Bradbury, K.B., and E.R. Rothschild, 1985. A computerized technique for estimating the hydraulic conductivity of aquifer from specific capacity data: Ground Water vol. 23, No. 2, pp. 240-246.

ASTM International, 2004. Standard Test Method for Determining Specific Capacity and Estimating Transmissivity at the Control Well, Standard D 5472-93, in Annual Book of ASTM Standards, Vol. 04.08 pp. 1279-1282.

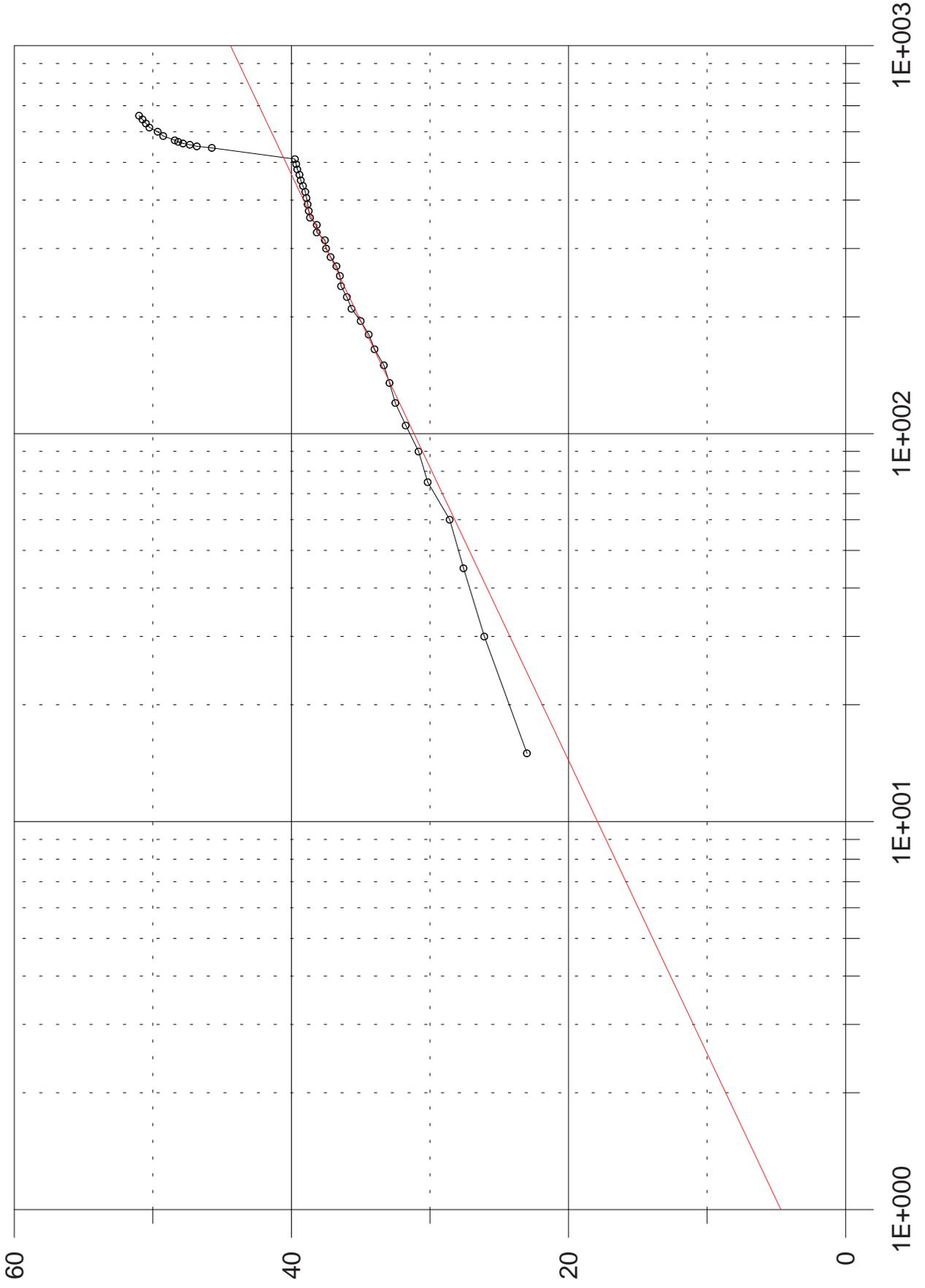
**Test of Andover Well #3 (431683)
10/12/1987
Production Test**

$T = 35.3 \text{ 600} / 11.24 = 1880 \text{ ft}^2/\text{day}$



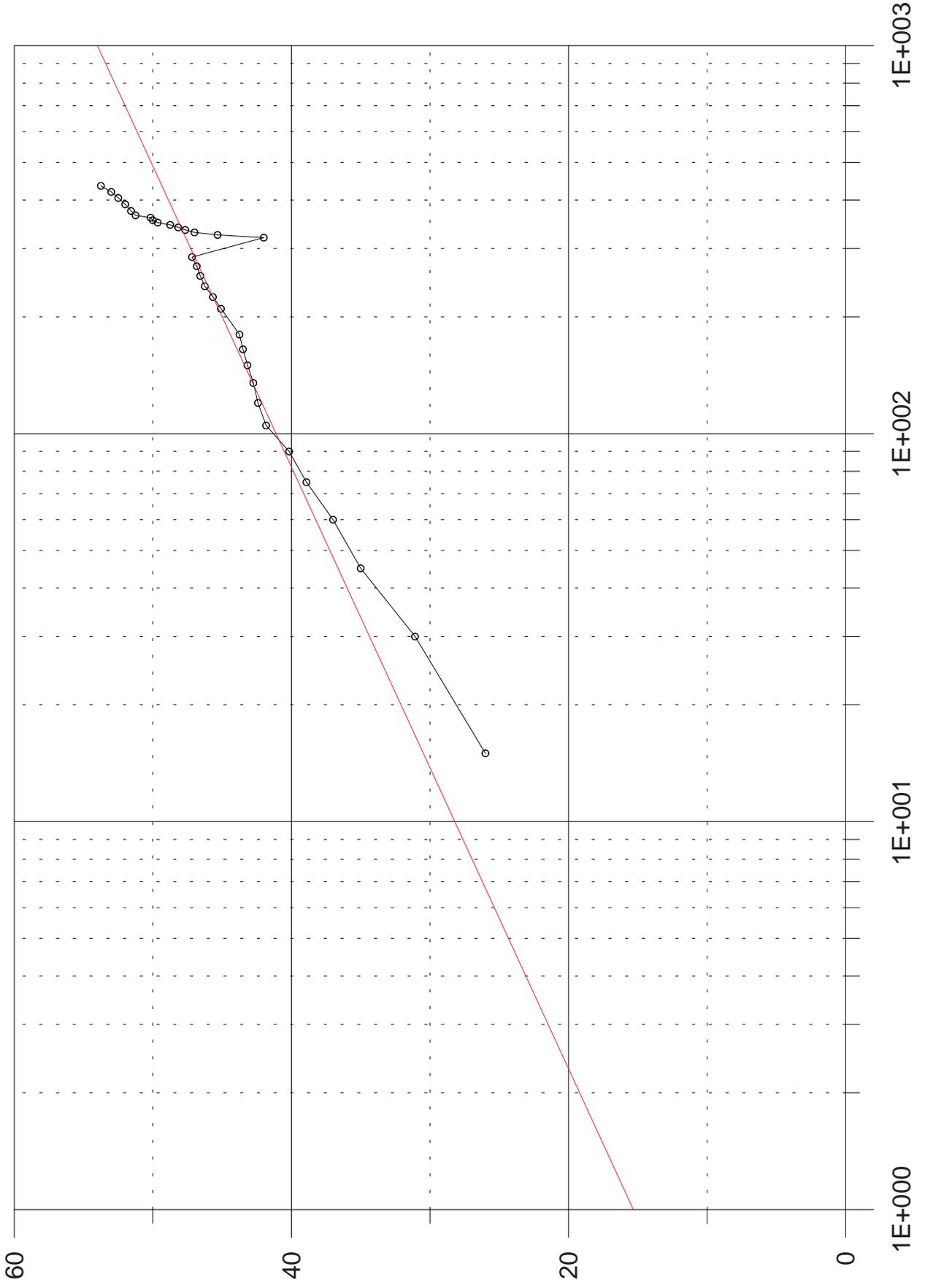
Test of Andover Well #3 (431683)
10/13/1987
Production Test

$T = 35.3 \text{ 600} / 13.24 = 1600 \text{ ft}^2/\text{day}$



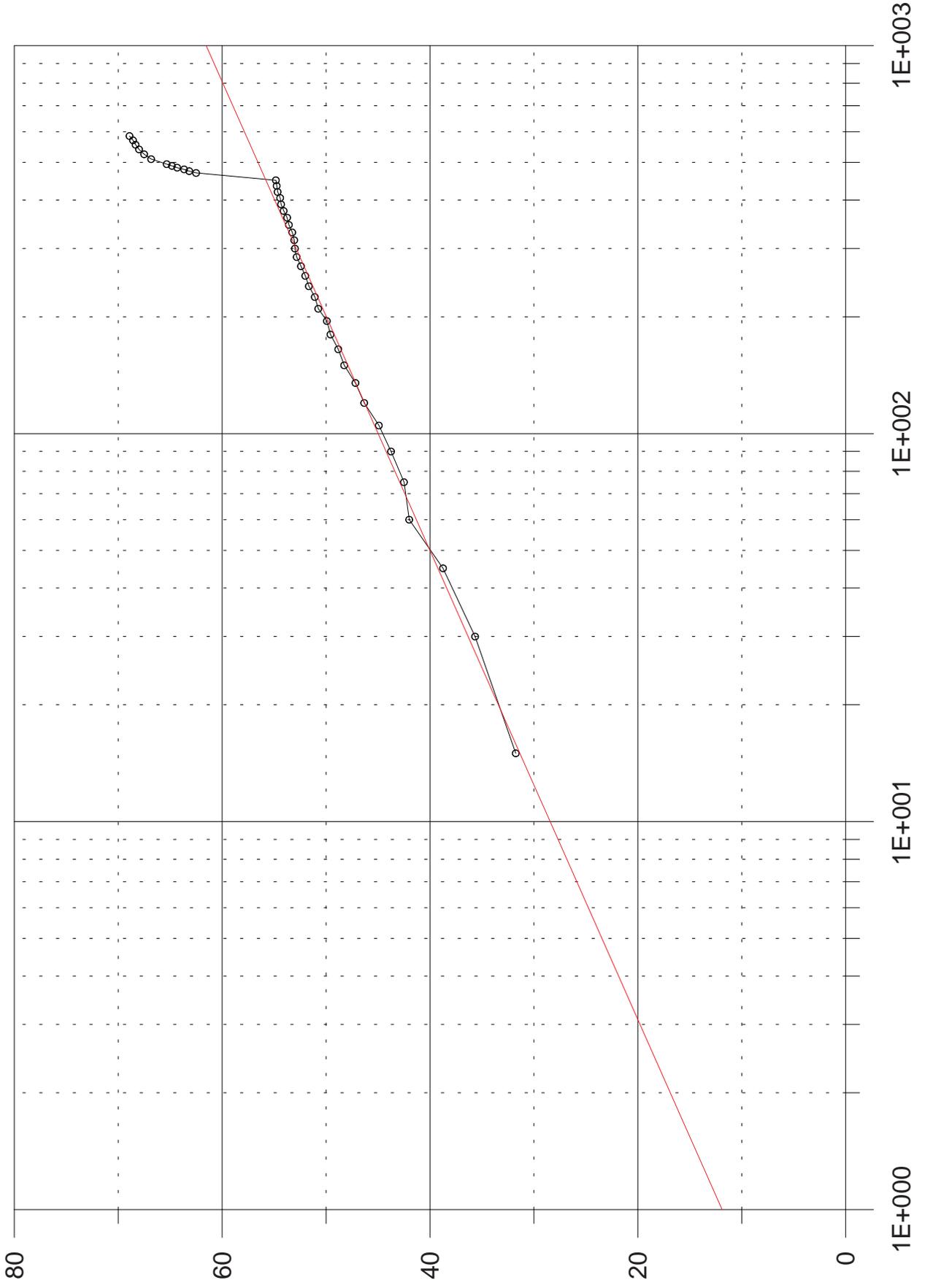
Test of Andover Well #3 (431683)
10/14/1987
Production Test

$T = 35.3 \text{ 800} / 12.89 = 2200 \text{ft}^2/\text{day}$



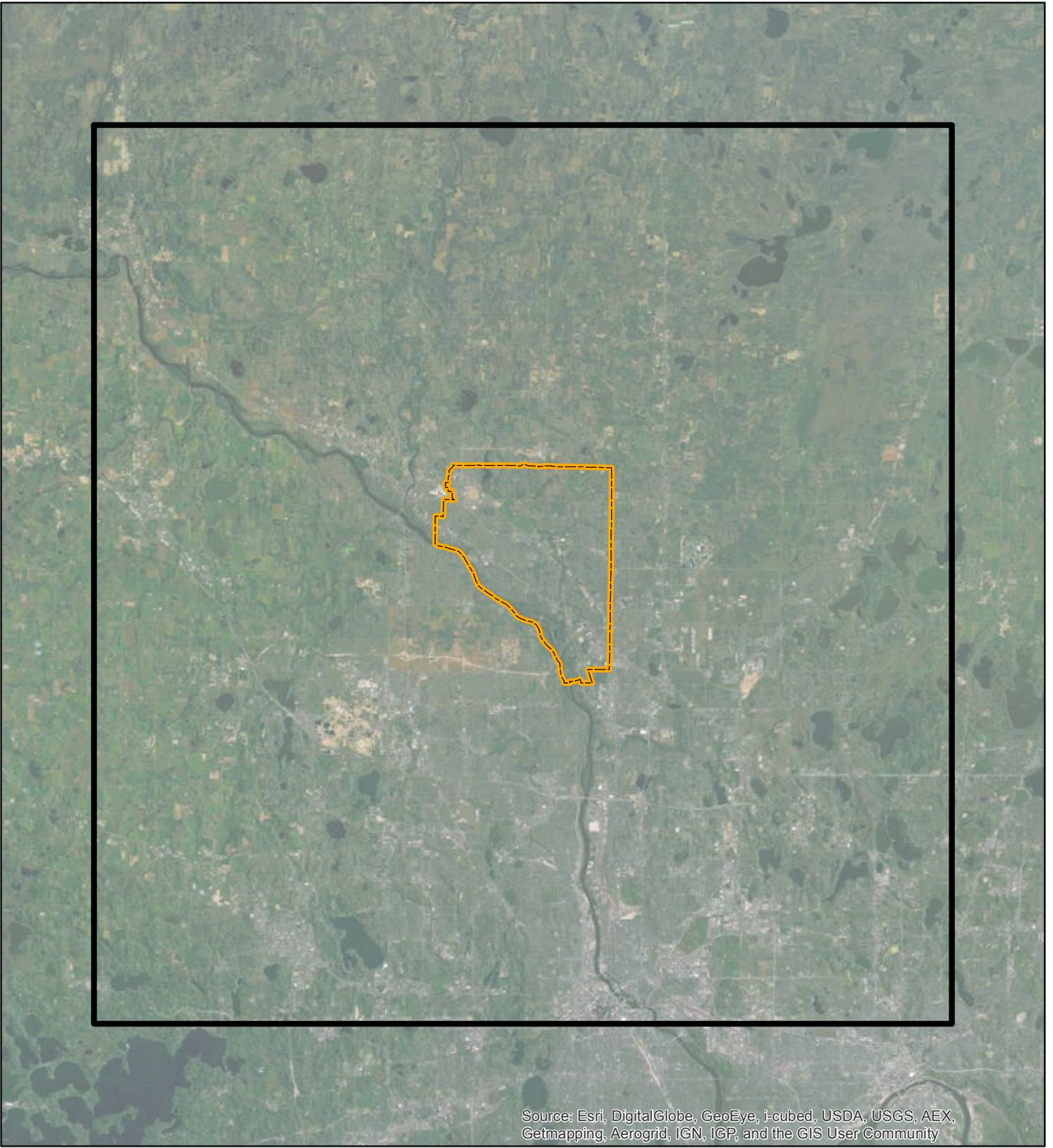
**Test of Andover Well #3 (431683)
10/16/1987
Production Test**

T = 35.3 1000/ 15.56 = 2130 ft²/day



Appendix C

Groundwater Model Details

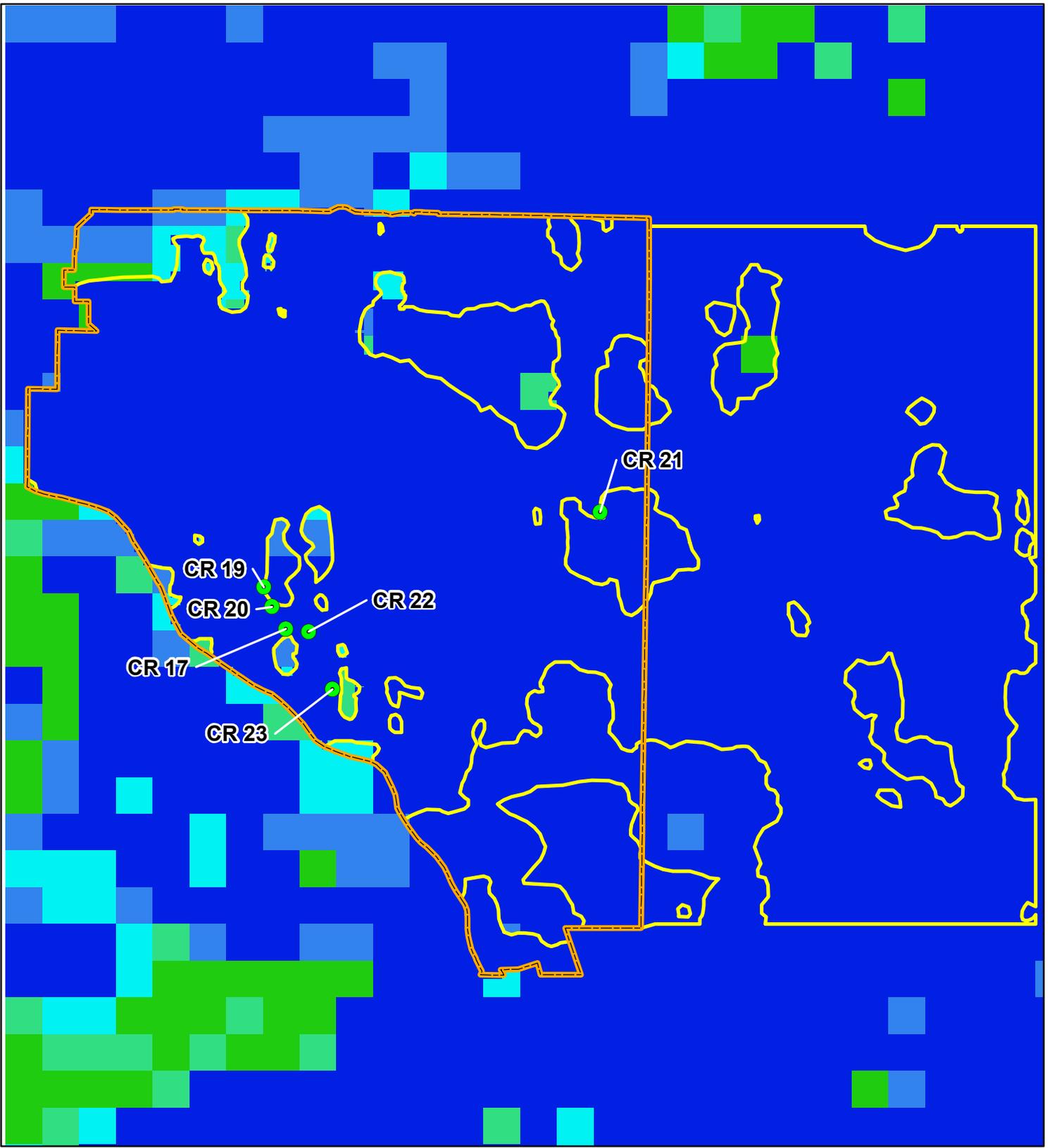


-  Model Boundary
-  Coon Rapids City Limits



Figure C1

MODEL DOMAIN
Coon Rapids WHPP Amendment
City of Coon Rapids, MN



-  Coon Rapids Municipal Well open to Quaternary
 -  Coon Rapids City Limits
 -  Till Unit Ce Extent in K Modification Area
- Layer 2 Kz (m/day)**
-  0.0001 - 0.0549
 -  0.0550 - 0.2536
 -  0.2537 - 1.0045
 -  1.0046 - 3.3159
 -  3.3160 - 7.6300

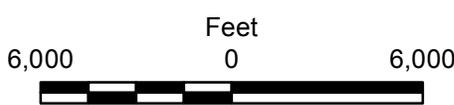


Figure C2

HYDRAULIC CONDUCTIVITY
LAYER 2
Coon Rapids WHPP Amendment
City of Coon Rapids, MN

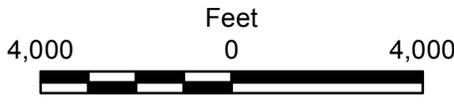
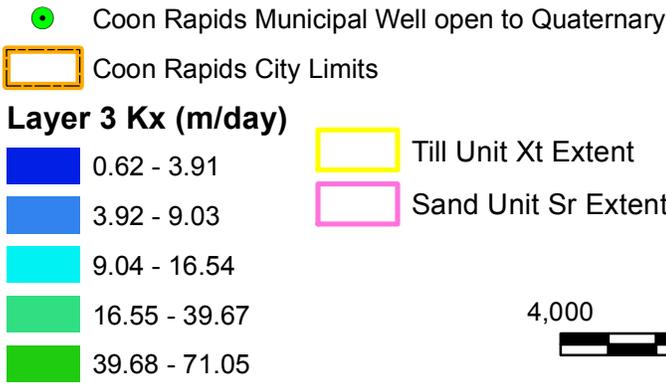
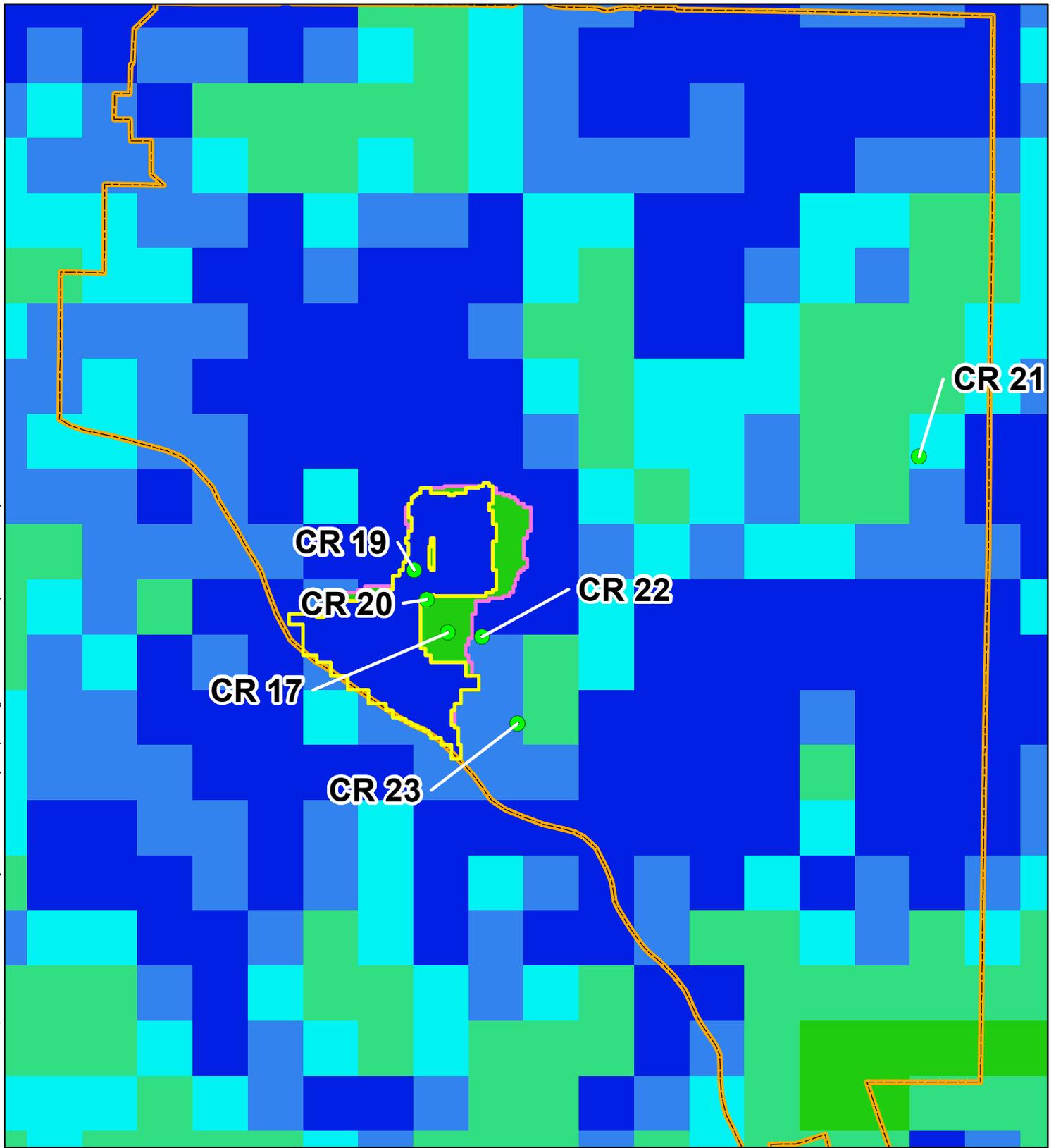


Figure C3

HYDRAULIC CONDUCTIVITY
LAYER 3
Coon Rapids WHPP Amendment
City of Coon Rapids, MN

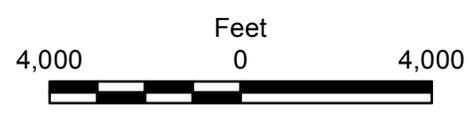
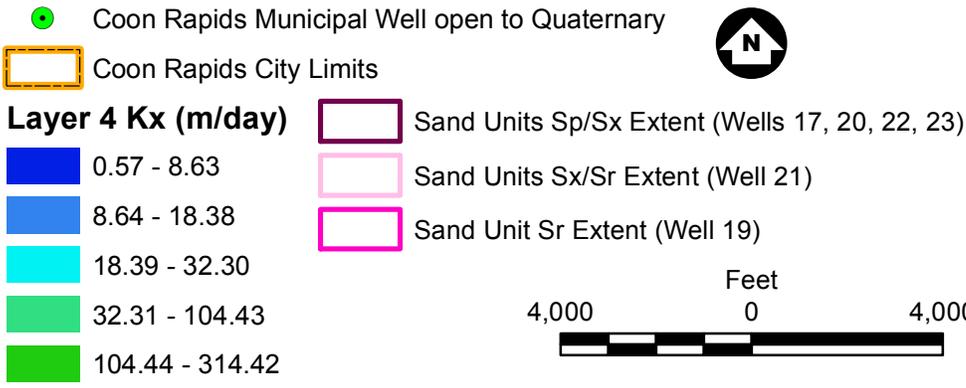
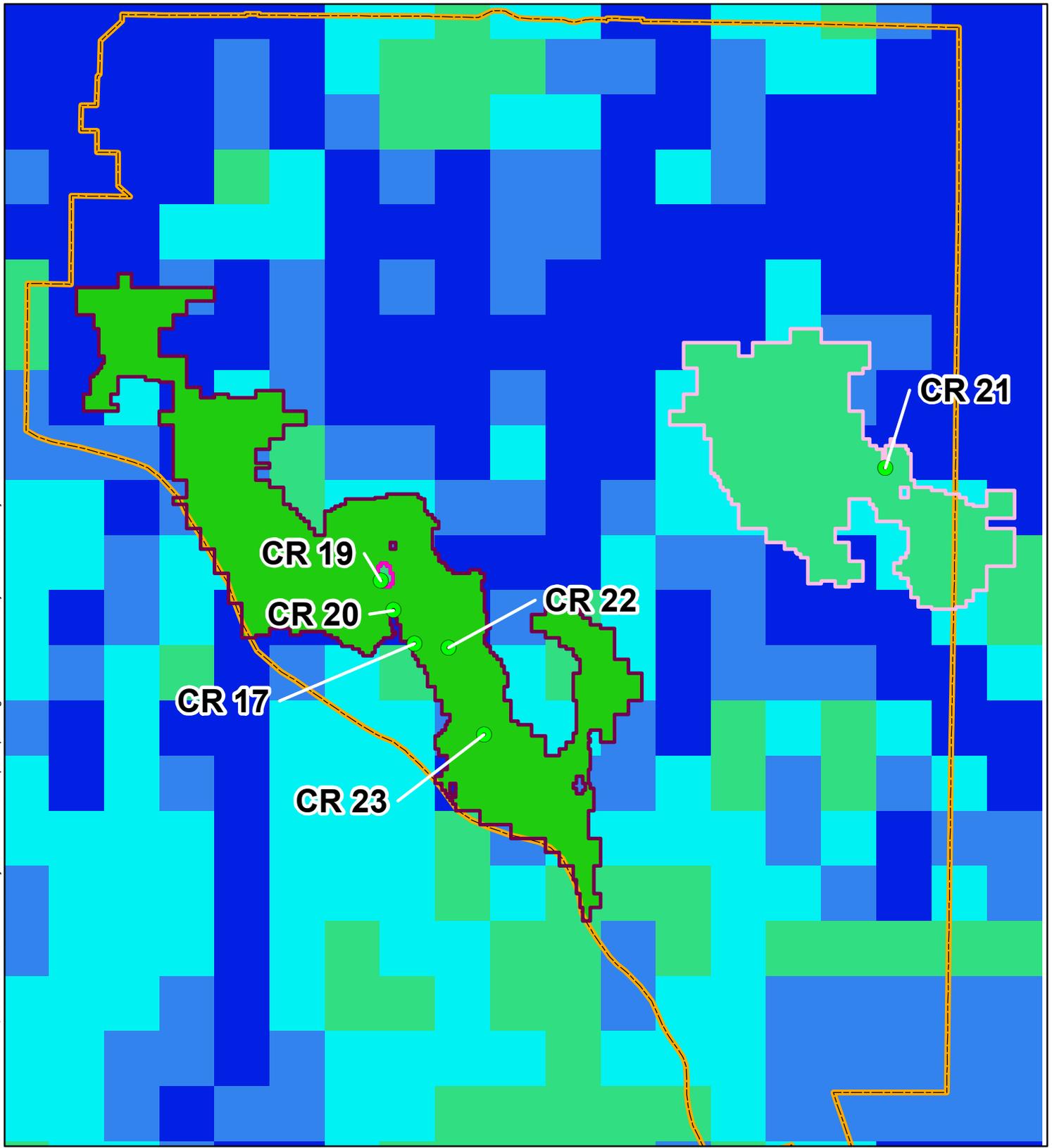


Figure C4

HYDRAULIC CONDUCTIVITY
LAYER 4
Coon Rapids WHPP Amendment
City of Coon Rapids, MN

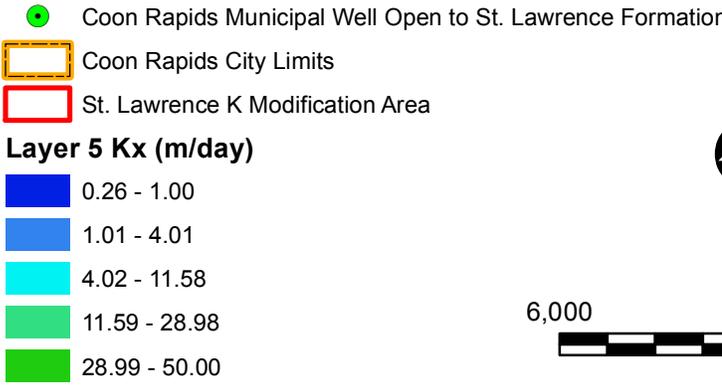
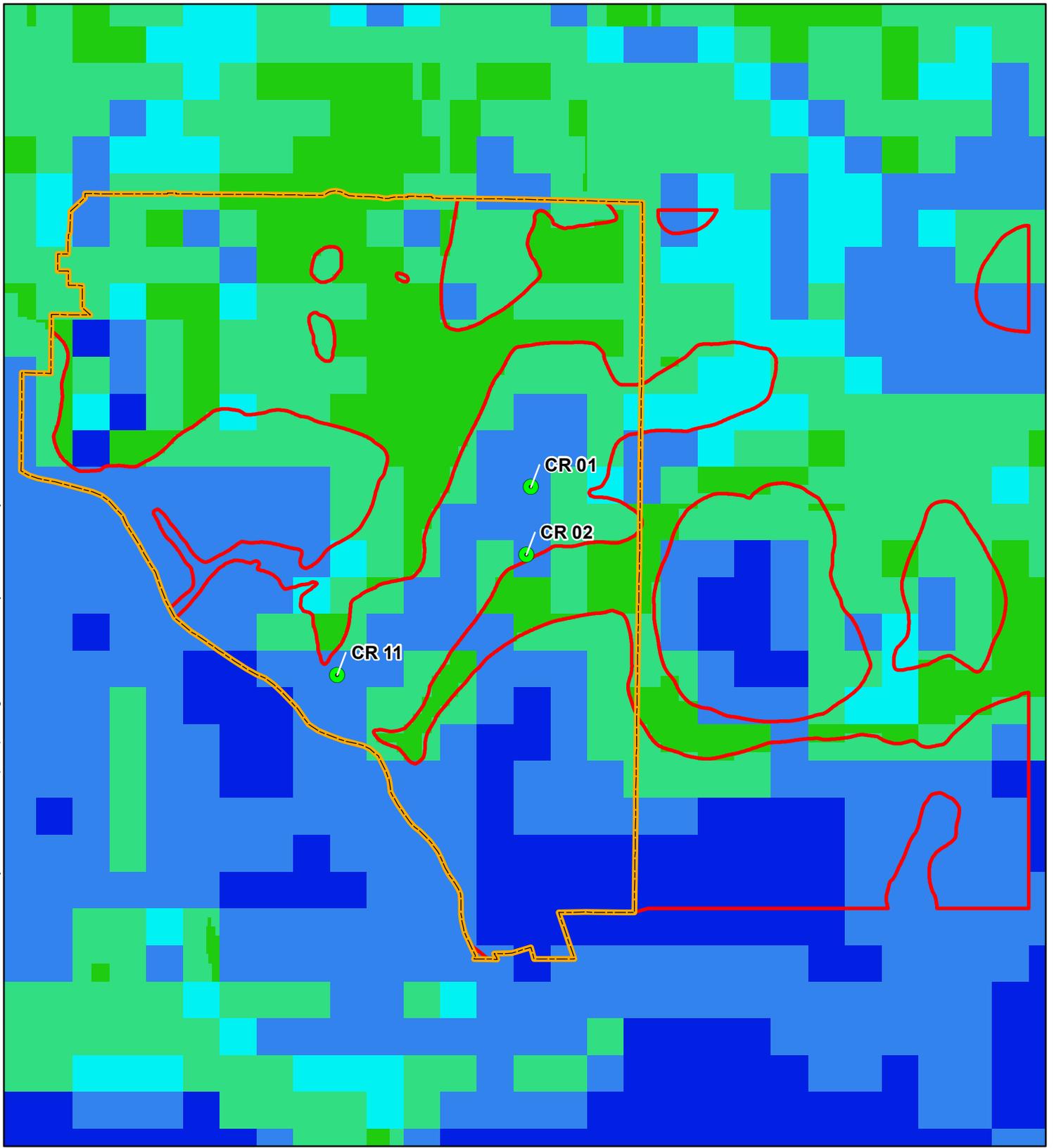
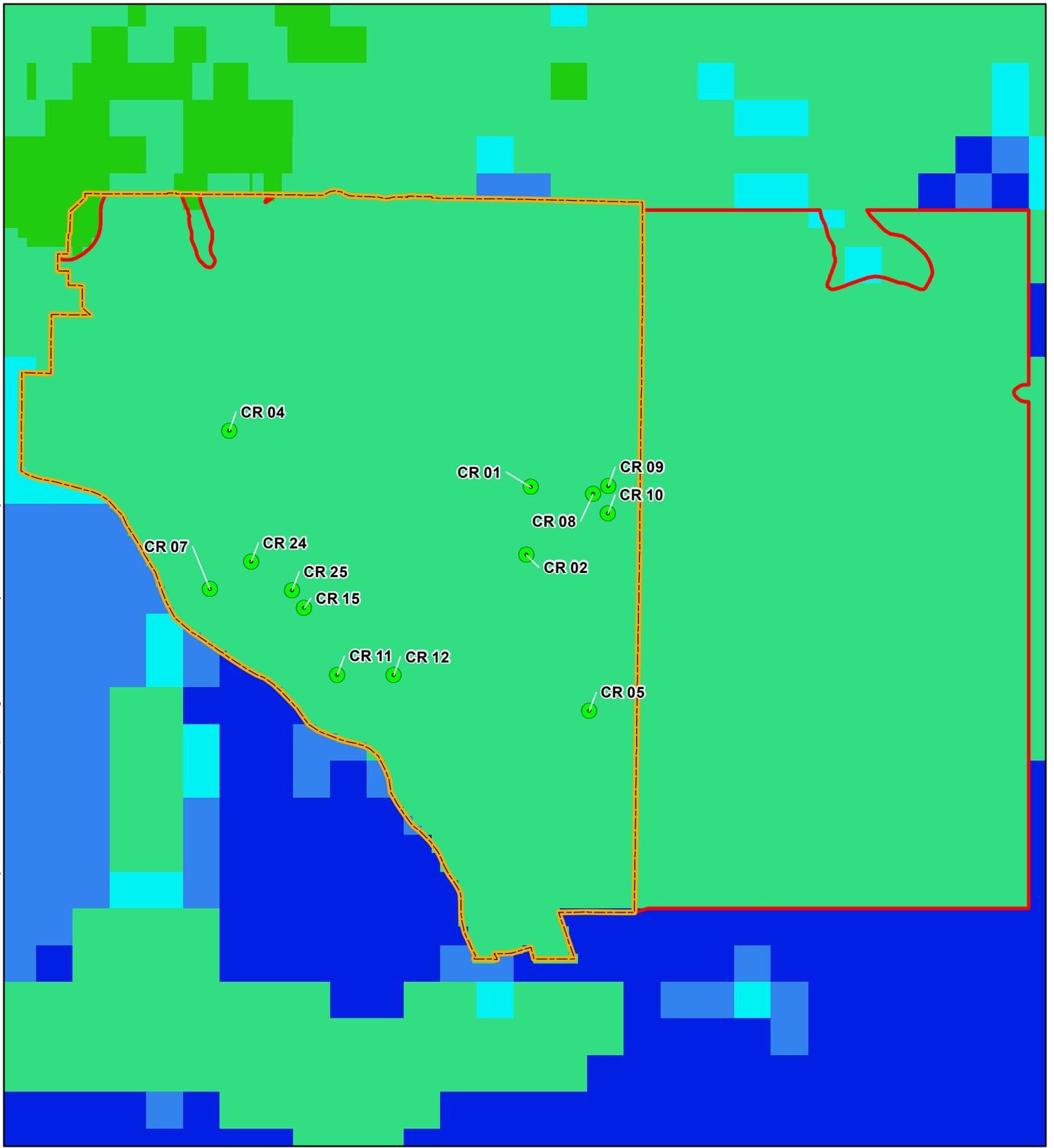


Figure C5

HYDRAULIC CONDUCTIVITY
LAYER 5
Coon Rapids WHPP Amendment
City of Coon Rapids, MN



-  Coon Rapids Municipal Well Open to Tunnel City Group
-  Coon Rapids City Limits
-  Tunnel City K Modification Area

Layer 6 Kx (m/day)

-  0.33 - 0.41
-  0.42 - 0.48
-  0.49 - 1.32
-  1.33 - 15.00
-  15.01 - 50.00



Figure C6

HYDRAULIC CONDUCTIVITY
LAYER 6
Coon Rapids WHPP Amendment
City of Coon Rapids, MN

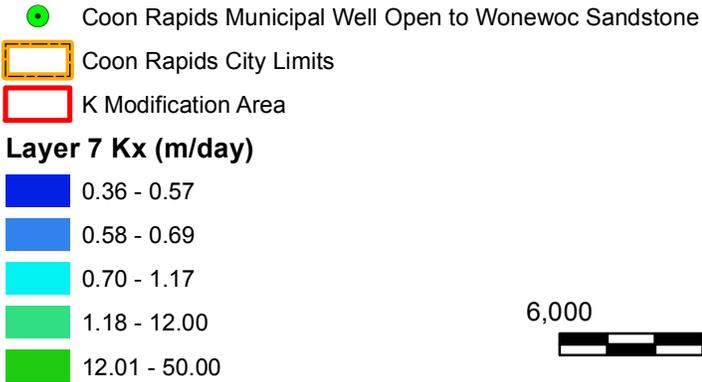
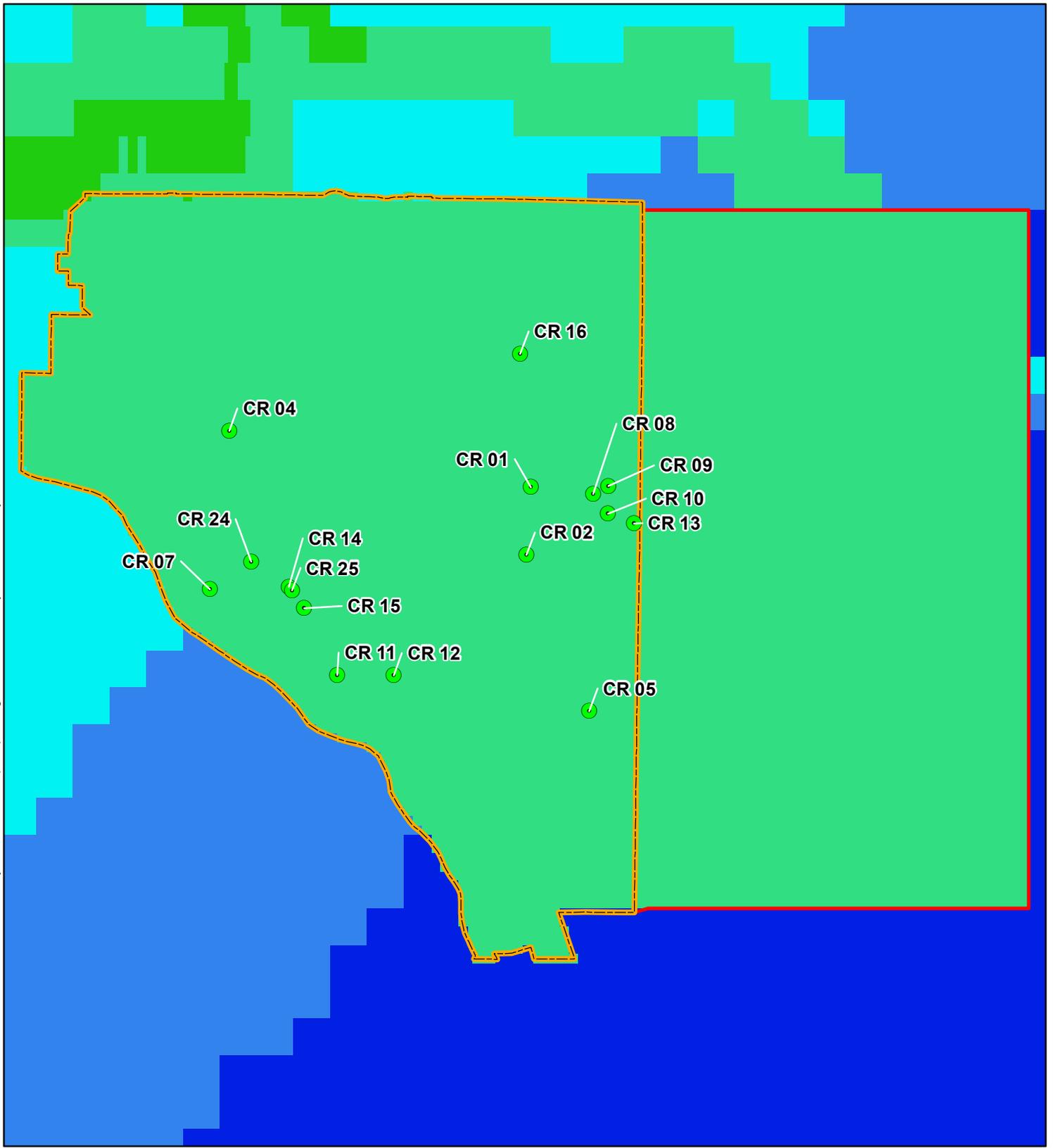
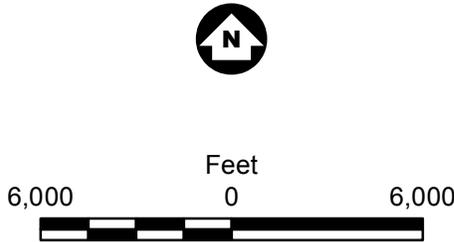
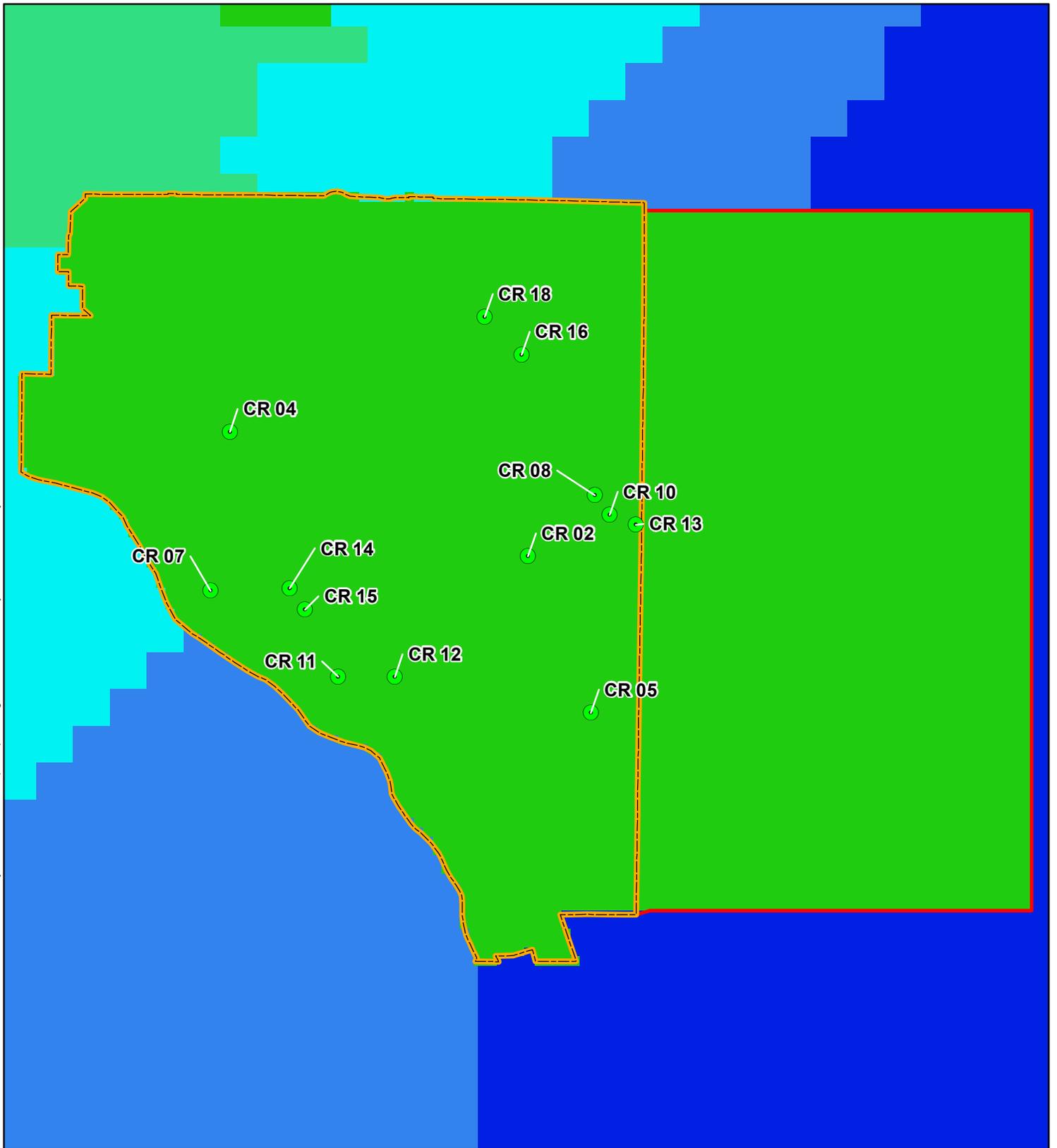


Figure C7

HYDRAULIC CONDUCTIVITY
LAYER 7
Coon Rapids WHPP Amendment
City of Coon Rapids, MN





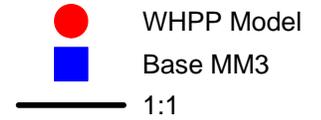
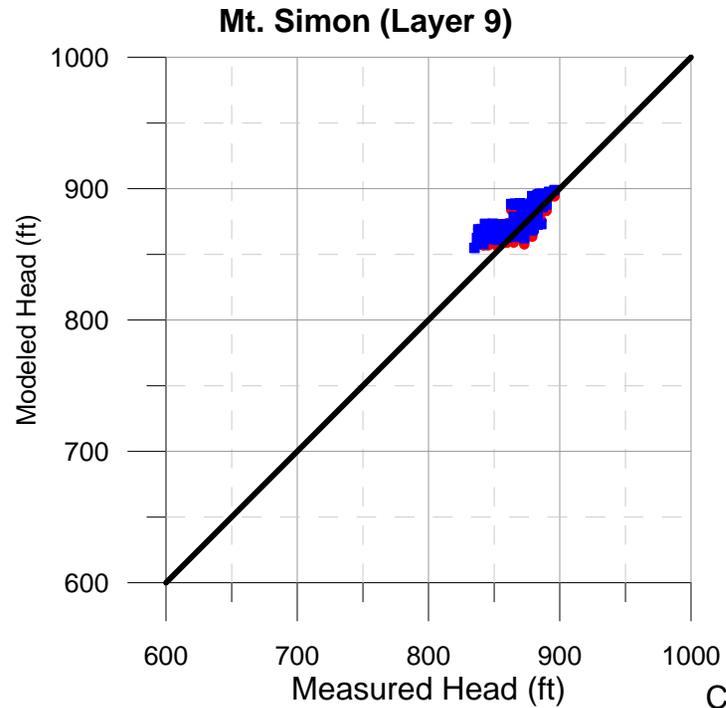
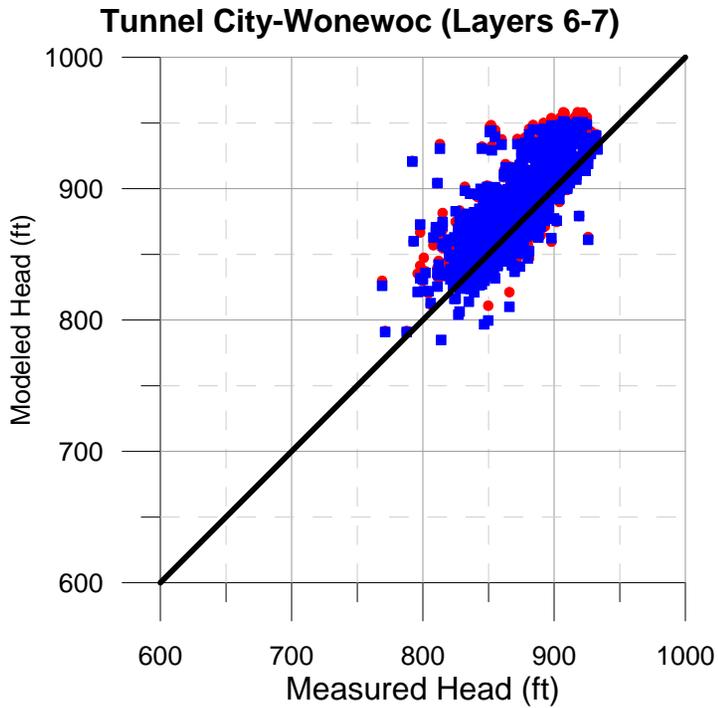
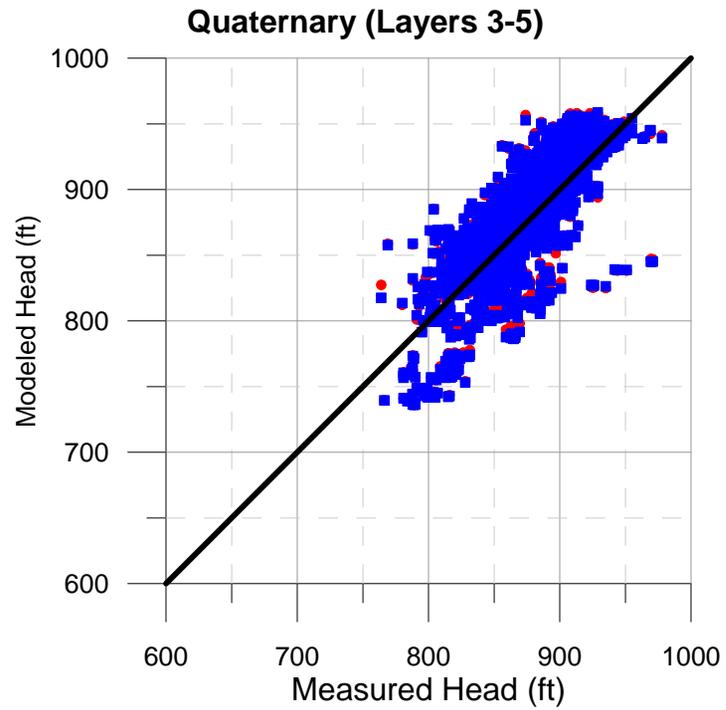
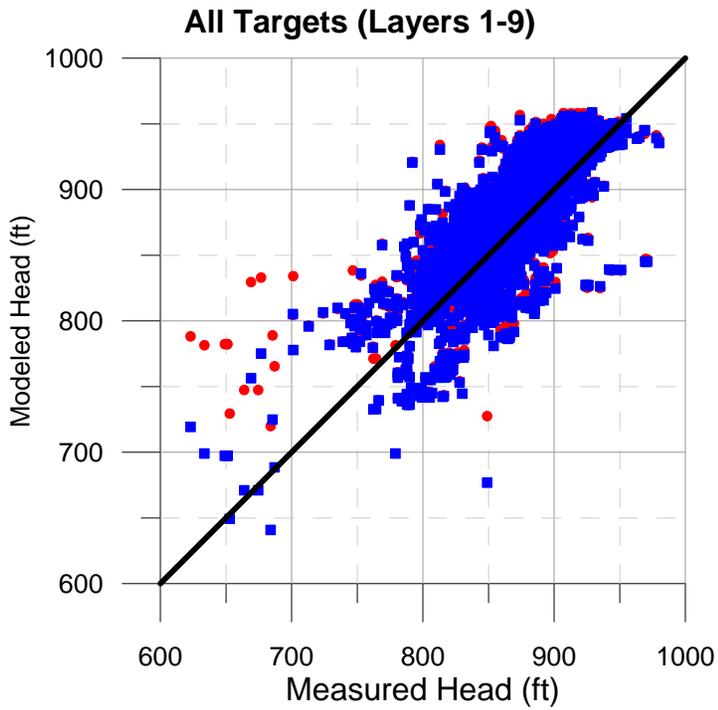
-  Coon Rapids Municipal Well Open to Mt. Simon
 -  Coon Rapids City Limits
 -  K Modification Area
- Layer 9 Kx (m/day)**
-  0.87 - 1.05
 -  1.06 - 1.17
 -  1.18 - 1.33
 -  1.34 - 2.42
 -  2.43 - 8.20



Figure C8



HYDRAULIC CONDUCTIVITY
LAYER 9
Coon Rapids WHPP Amendment
City of Coon Rapids, MN



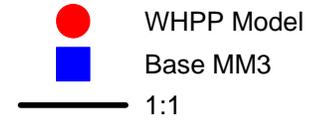
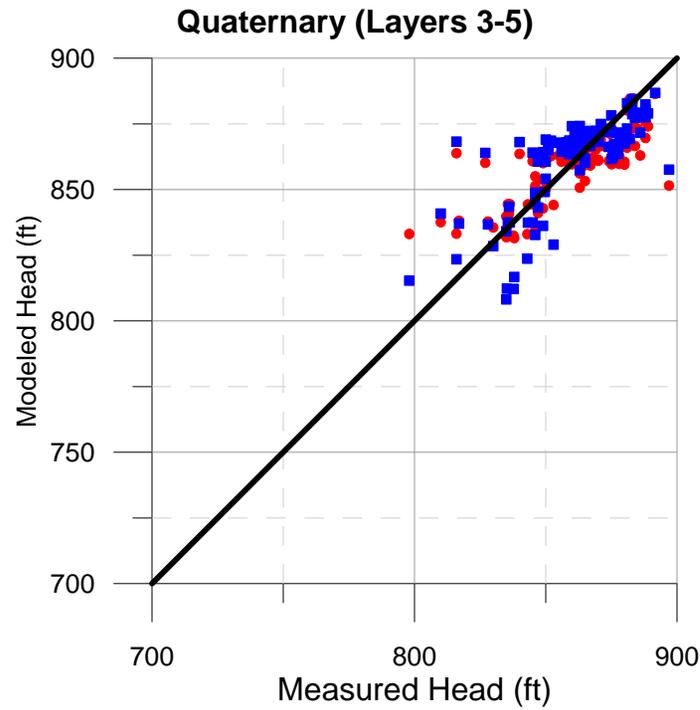
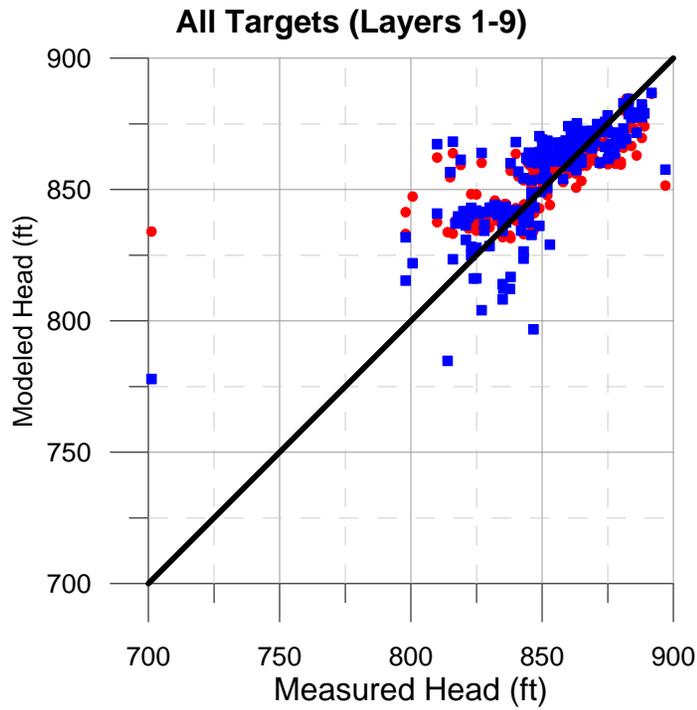
Only Metro Model 3 targets within the TMR model boundary shown.

WHPP model has updated K field but uses identical pumping rates to the base Metro Model 3.

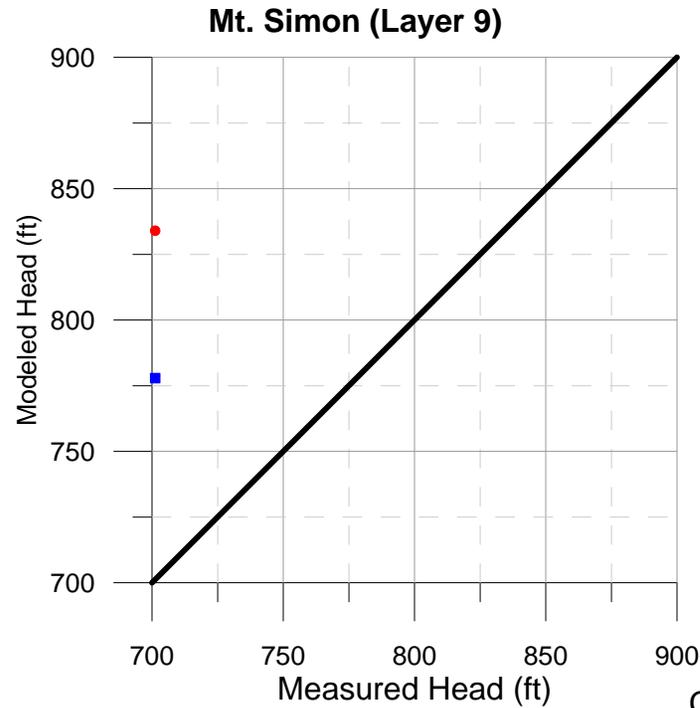
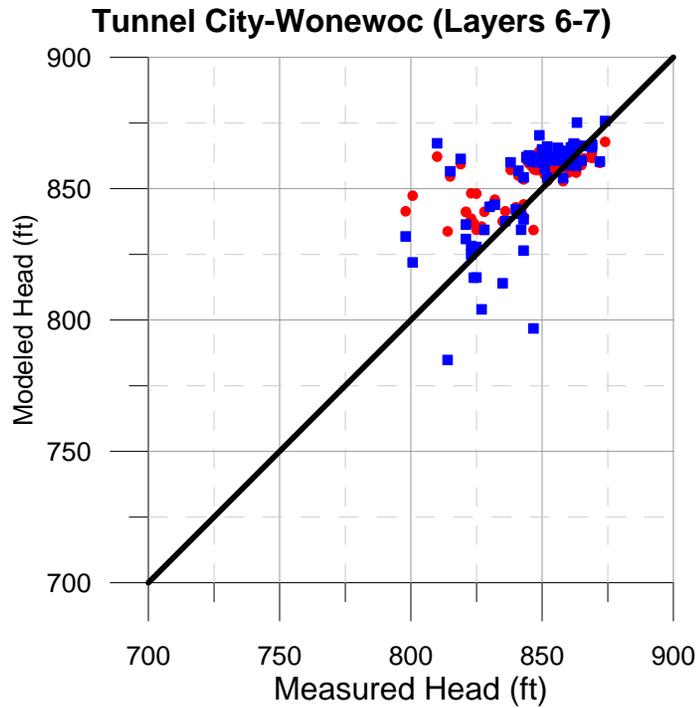


Figure C9

MODEL CALIBRATION
ALL MODEL TARGETS
Coon Rapids WHPP Amendment
City of Coon Rapids, MN



Only Metro Model 3 targets within Coon Rapids city limits shown.



WHPP model has updated K field but uses identical pumping rates to the base Metro Model 3.

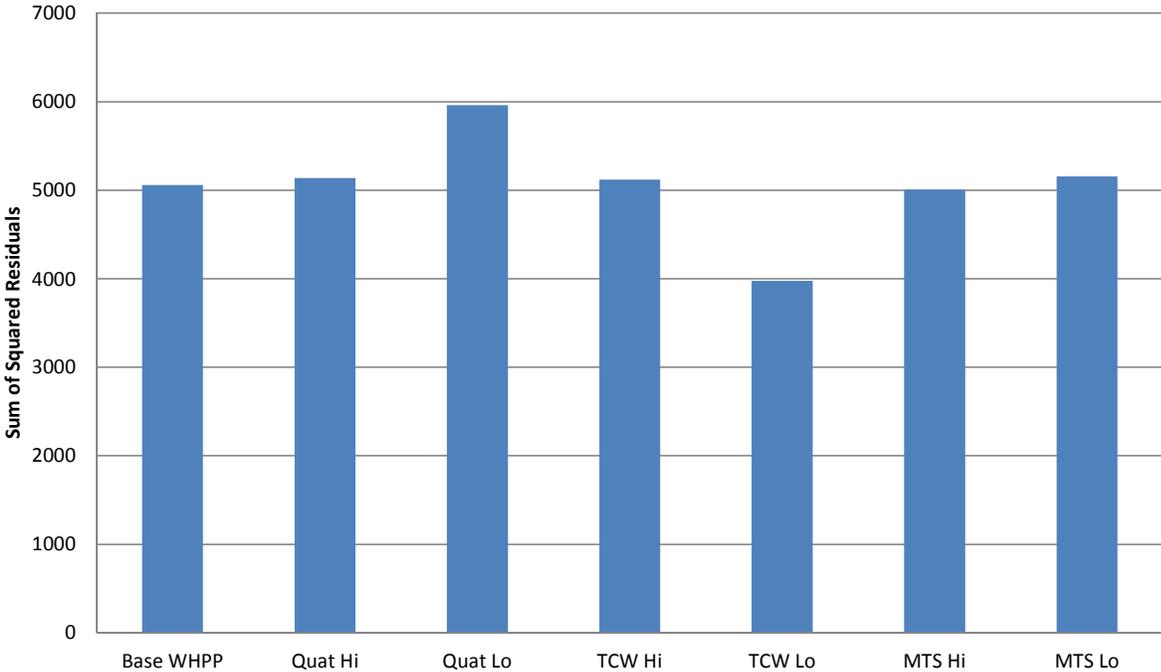


Figure C10

MODEL CALIBRATION
COON RAPIDS ONLY
Coon Rapids WHPP Amendment
City of Coon Rapids, MN

Figure C11
Sensitivity Analysis Results
Coon Rapids WHPP Amendment

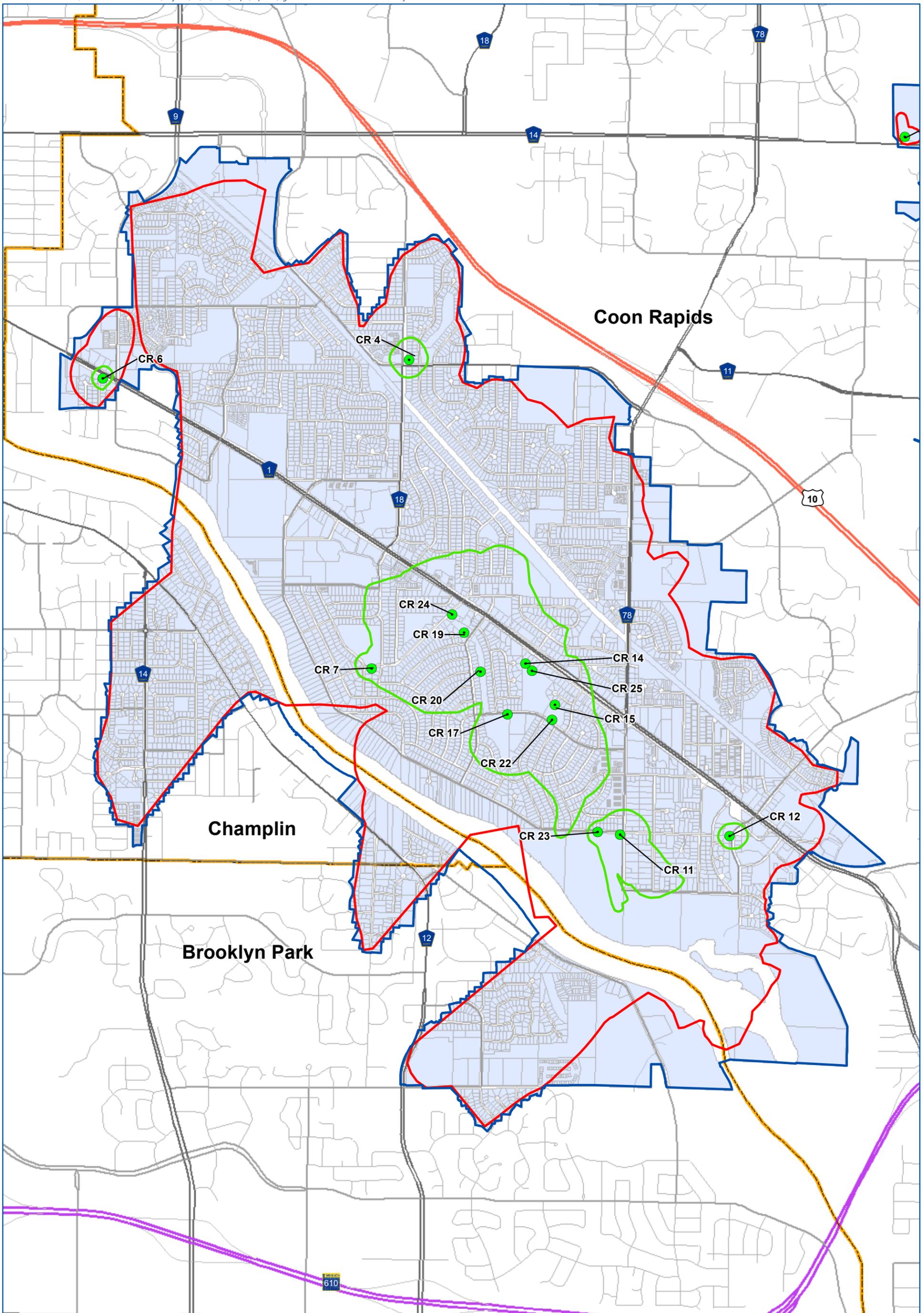
Sum of Squared Residuals^{1,2}



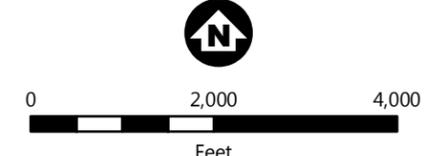
¹ Residuals calculated for the 220 Metro Model 3 calibration targets within Coon Rapids city limits only
² Residual = measured head - modeled head

Appendix D

1:24,000 DWSMA Maps

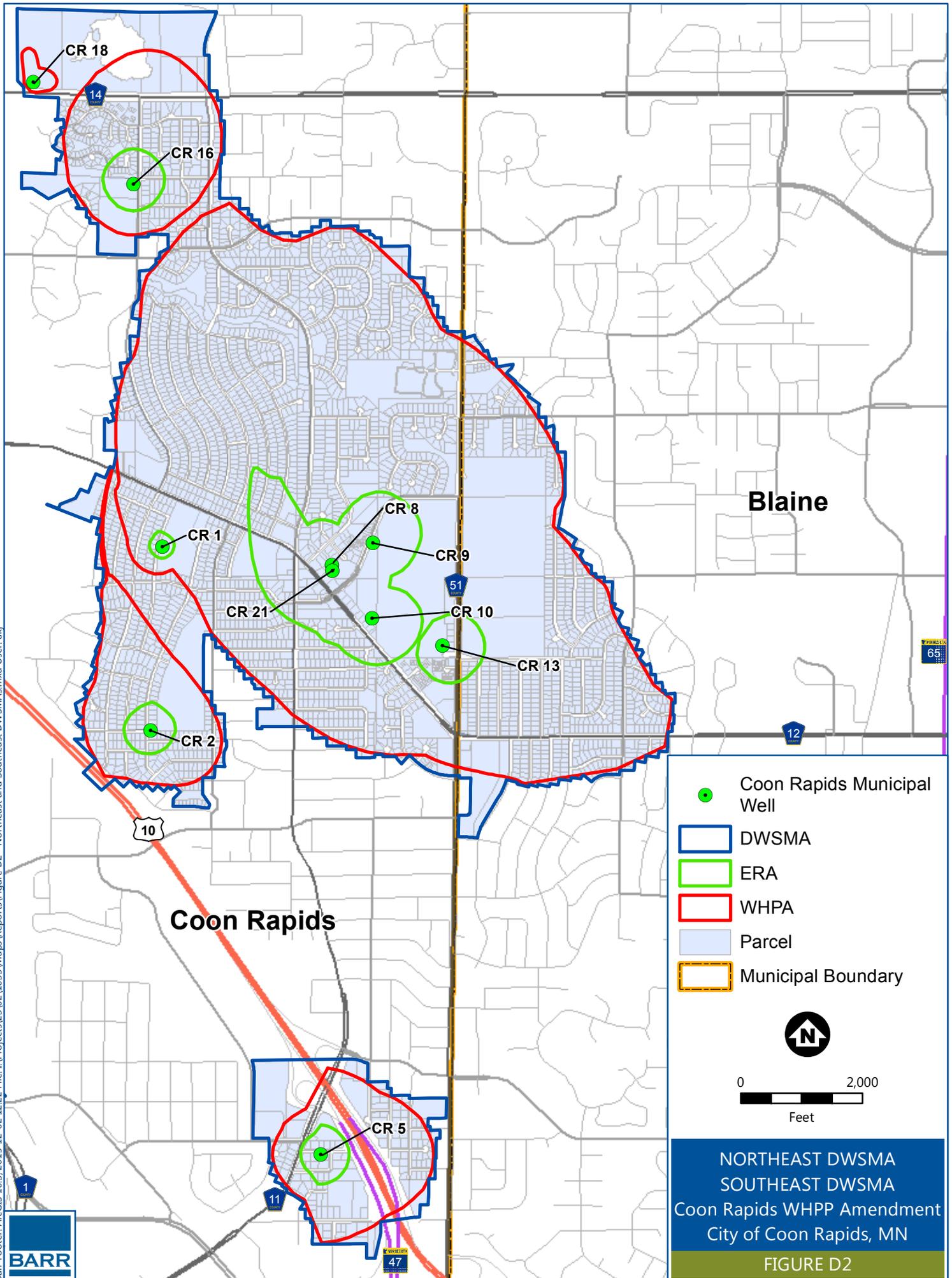


- Coon Rapids Municipal Well
- Parcel
- ▭ Municipal Boundary
- ▭ ERA
- ▭ WHPA
- ▭ DWSMA



WEST DWSMA
Coon Rapids WHPA Amendment
City of Coon Rapids, MN

FIGURE D1



Appendix E

MDH Well Vulnerability Assessments

Adam K. Janzen

From: Djerrari, Amal (MDH) <amal.djerrari@state.mn.us>
Sent: Friday, October 23, 2015 15:18
To: Adam K. Janzen
Cc: John Greer; Djerrari, Amal (MDH)
Subject: RE: Coon Rapids Tritium

Hi Adam
I just received the tritium results for Coon Rapids
Amal

Well Id	Collection Date	Analyte	Result	PWS Id
202931	7/9/2015	TRITIUM	2.902362371	1020017
110460	7/9/2015	TRITIUM	1.763706017	1020017
474384	7/9/2015	TRITIUM	8.563001794	1020017
202929	7/9/2015	TRITIUM	2.581490857	1020017
202951	7/9/2015	TRITIUM	<.8	1020017
202937	7/9/2015	TRITIUM	6.833970803	1020017
110469	7/9/2015	TRITIUM	<.8	1020017

Amal M. Djerrari, Ph.D., P.E.
Hydrologist

Minnesota Department of Health
Source Water Protection Unit
625 Robert Street North
St. Paul, MN 55164

ph: (651) 201-4577
Cell: (651) 245-1918
Fax: (651) 201-4701
e-mail: amal.djerrari@state.mn.us



**MINNESOTA DEPARTMENT OF HEALTH
SECTION OF DRINKING WATER PROTECTION
SWP Vulnerability Rating**



625 Robert St. N. St. Paul MN 55155
P.O. Box 64975 St. Paul MN 55164 - 0975

PWSID: 1020017
SYSTEM NAME: Coon Rapids
WELL NAME: Well #1

TIER: 2
WHP RANK:
UNIQUE WELL #: 00202926

COUNTY: Anoka TOWNSHIP NUMBER: 31 RANGE: 24 W SECTION: 13 QUARTERS: BCCA

<u>CRITERIA</u>	<u>DESCRIPTION</u>	<u>POINTS</u>
Aquifer Name(s)	: Multiple Aquifer	
DNR Geologic Sensitivity Rating	: Low	20
L Score	: 3	
Geologic Data From	: Well Record	
Year Constructed	: 1957	
Construction Method	: Cable Tool/Bored	0
Casing Depth	: 220	5
Well Depth	: 462	
Casing grouted into borehole?	Unknown	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	: 600	10
Pathogen Detected?		0
Surface Water Characteristics?		0
Maximum nitrate detected	: <.05 12/16/1997	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

ST. LAWRENCE - EAU CLAIRE



**MINNESOTA DEPARTMENT OF HEALTH
SECTION OF DRINKING WATER PROTECTION
SWP Vulnerability Rating**



625 Robert St. N. St. Paul MN 55155
P.O. Box 64975 St. Paul MN 55164 - 0975

PWSID: 1020017
SYSTEM NAME: Coon Rapids
WELL NAME: Well #2

TIER: 2
WHP RANK:
UNIQUE WELL #: 00202929

COUNTY: Anoka TOWNSHIP NUMBER: 31 RANGE: 24 W SECTION: 13 QUARTERS: CCCC

<u>CRITERIA</u>	<u>DESCRIPTION</u>	<u>POINTS</u>
Aquifer Name(s)	: Multiple Aquifer	
DNR Geologic Sensitivity Rating	: Low	20
L Score	: 1	
Geologic Data From	: Well Record	
Year Constructed	: 1957	
Construction Method	: Cable Tool/Bored	0
Casing Depth	: 226	5
Well Depth	: 685	
Casing grouted into borehole?	Unknown	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	: 600	10
Pathogen Detected?		0
Surface Water Characteristics?		0
Maximum nitrate detected	: .18 07/13/2004	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
ST. LAWRENCE - SOLOR CHURCH



**MINNESOTA DEPARTMENT OF HEALTH
SECTION OF DRINKING WATER PROTECTION
SWP Vulnerability Rating**



625 Robert St. N. St. Paul MN 55155
P.O. Box 64975 St. Paul MN 55164 - 0975

PWSID: 1020017
SYSTEM NAME: Coon Rapids
WELL NAME: Well #4

TIER: 2
WHP RANK:
UNIQUE WELL #: 00202972

COUNTY: Anoka TOWNSHIP NUMBER: 31 RANGE: 24 W SECTION: 9 QUARTERS: DCCC

<u>CRITERIA</u>	<u>DESCRIPTION</u>	<u>POINTS</u>
Aquifer Name(s)	: Franconia-Mt. Simon	
DNR Geologic Sensitivity Rating	: Low	20
L Score	: 1	
Geologic Data From	: Well Record	
Year Constructed	: 1960	
Construction Method	: Cable Tool/Bored	0
Casing Depth	: 233	5
Well Depth	: 605	
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?	Unknown	0
Isolation distance violations?		0
Pumping Rate	: 600	10
Pathogen Detected?		0
Surface Water Characteristics?		0
Maximum nitrate detected	: .46 07/08/2013	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

NITRATE DATA FROM PWSID 1989, 8/75 SAMPLE Low rating is based on the thickness of the St. Lawrence that is grouted off.
Log was not descriptive enough to assess the glacial deposits.



**MINNESOTA DEPARTMENT OF HEALTH
SECTION OF DRINKING WATER PROTECTION
SWP Vulnerability Rating**



625 Robert St. N. St. Paul MN 55155
P.O. Box 64975 St. Paul MN 55164 - 0975

PWSID: 1020017
SYSTEM NAME: Coon Rapids
WELL NAME: Well #5

TIER: 2
WHP RANK:
UNIQUE WELL #: 00202951

COUNTY: Anoka TOWNSHIP NUMBER: 31 RANGE: 24 W SECTION: 25 QUARTERS: ACBB

<u>CRITERIA</u>	<u>DESCRIPTION</u>	<u>POINTS</u>
Aquifer Name(s)	: Franconia-Mt. Simon	
DNR Geologic Sensitivity Rating	: Low	15
L Score	: 4	
Geologic Data From	: Well Record	
Year Constructed	: 1961	
Construction Method	: Cable Tool/Bored	0
Casing Depth	: 242	5
Well Depth	: 695	
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	: 900	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	:	35
Wellhead Protection Vulnerability Rating	:	NOT VULNERABLE
Vulnerability Overridden	:	

COMMENTS

Low score is based on the thickness of the St. Lawrence that is sealed off.



**MINNESOTA DEPARTMENT OF HEALTH
SECTION OF DRINKING WATER PROTECTION
SWP Vulnerability Rating**



625 Robert St. N. St. Paul MN 55155
P.O. Box 64975 St. Paul MN 55164 - 0975

PWSID: 1020017
SYSTEM NAME: Coon Rapids
WELL NAME: Well #6

TIER: 2
WHP RANK:
UNIQUE WELL #: 00202937

COUNTY: Anoka TOWNSHIP NUMBER: 31 RANGE: 24 W SECTION: 17 QUARTERS: BBAA

<u>CRITERIA</u>	<u>DESCRIPTION</u>	<u>POINTS</u>
Aquifer Name(s)	: Tunnel City Group	
DNR Geologic Sensitivity Rating	: Low	20
L Score	: 2	
Geologic Data From	: Well Record	
Year Constructed	: 1960	
Construction Method	: Cable Tool/Bored	0
Casing Depth	: 118	10
Well Depth	: 158	
Casing grouted into borehole?	Unknown	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	: 1050	20
Pathogen Detected?		0
Surface Water Characteristics?		0
Maximum nitrate detected	: <1	0
Maximum tritium detected	: 14.9 11/08/1999	VULNERABLE
Non-THMS VOCs detected?		0
Pesticides detected?		0
Carbon 14 age	: Unknown	0
Wellhead Protection Score	:	50
Wellhead Protection Vulnerability Rating	:	VULNERABLE
Vulnerability Overridden	:	

COMMENTS
NITRATE DATA FROM PWSID 1989, 8/75 SAMPLE



**MINNESOTA DEPARTMENT OF HEALTH
SECTION OF DRINKING WATER PROTECTION
SWP Vulnerability Rating**



625 Robert St. N. St. Paul MN 55155
P.O. Box 64975 St. Paul MN 55164 - 0975

PWSID: 1020017
SYSTEM NAME: Coon Rapids
WELL NAME: Well #7

TIER: 2
WHP RANK:
UNIQUE WELL #: 00202943

COUNTY: Anoka TOWNSHIP NUMBER: 31 RANGE: 24 W SECTION: 21 QUARTERS: BDAC

<u>CRITERIA</u>	<u>DESCRIPTION</u>	<u>POINTS</u>
Aquifer Name(s) :	Franconia-Mt. Simon	
DNR Geologic Sensitivity Rating :	Low	20
L Score :	3	
Geologic Data From :	Well Record	
Year Constructed :	1964	
Construction Method :	Cable Tool/Bored	0
Casing Depth :	189	10
Well Depth :	632	
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 :	1050	20
Pathogen Detected?		0
Surface Water Characteristics?		0
Maximum nitrate detected :	<.4	0
Maximum tritium detected :	1.1 11/08/1999	VULNERABLE
Non-THMS VOCs detected?		0
Pesticides detected?		0
Carbon 14 age :	Unknown	0
Wellhead Protection Score :		55
Wellhead Protection Vulnerability Rating :		VULNERABLE
Vulnerability Overridden :		

COMMENTS



**MINNESOTA DEPARTMENT OF HEALTH
SECTION OF DRINKING WATER PROTECTION
SWP Vulnerability Rating**



625 Robert St. N. St. Paul MN 55155
P.O. Box 64975 St. Paul MN 55164 - 0975

PWSID: 1020017
SYSTEM NAME: Coon Rapids
WELL NAME: Well #8

TIER: 2
WHP RANK:
UNIQUE WELL #: 00202932

COUNTY: Anoka TOWNSHIP NUMBER: 31 RANGE: 24 W SECTION: 13 QUARTERS: ACCD

<u>CRITERIA</u>	<u>DESCRIPTION</u>	<u>POINTS</u>
Aquifer Name(s)	: Franconia-Mt. Simon	
DNR Geologic Sensitivity Rating	: Low	20
L Score	: 1	
Geologic Data From	: Data Inferred From Nearby Wells	
Year Constructed	: 1965	
Construction Method	: Cable Tool/Bored	0
Casing Depth	: 283	5
Well Depth	: 700	
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?	Unknown	0
Isolation distance violations?		0
Pumping Rate	: 1000	10
Pathogen Detected?		0
Surface Water Characteristics?		0
Maximum nitrate detected	: <1	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

NITRATE DATA FROM PWSID 1989, 8/75 SAMPLE. Low rating is taken from the log of well #2 (202929).



**MINNESOTA DEPARTMENT OF HEALTH
SECTION OF DRINKING WATER PROTECTION
SWP Vulnerability Rating**



625 Robert St. N. St. Paul MN 55155
P.O. Box 64975 St. Paul MN 55164 - 0975

PWSID: 1020017
SYSTEM NAME: Coon Rapids
WELL NAME: Well #9

TIER: 2
WHP RANK:
UNIQUE WELL #: 00202931

COUNTY: Anoka TOWNSHIP NUMBER: 31 RANGE: 24 W SECTION: 13 QUARTERS: ACCD

<u>CRITERIA</u>	<u>DESCRIPTION</u>	<u>POINTS</u>
Aquifer Name(s)	: Franconia-Eau Claire	
DNR Geologic Sensitivity Rating	: Very low	10
L Score	: 10	
Geologic Data From	: Data Inferred From Nearby Wells	
Year Constructed	: 1969	
Construction Method	: Cable Tool/Bored	0
Casing Depth	: 294	5
Well Depth	: 500	
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?	Unknown	0
Isolation distance violations?		0
Pumping Rate	: 1000	10
Pathogen Detected?		NOT VULNERABLE
Surface Water Characteristics?		NOT VULNERABLE
Maximum nitrate detected	: <.4	NOT VULNERABLE
Maximum tritium detected	: <.8 04/21/1997	NOT VULNERABLE
Non-THMS VOCs detected?		0
Pesticides detected?		0
Carbon 14 age	: Unknown	0
Wellhead Protection Score	: 25	
Wellhead Protection Vulnerability Rating	: NOT VULNERABLE	
Vulnerability Overridden	:	

COMMENTS

Very low rating is based on the log for well #2 (202931).



**MINNESOTA DEPARTMENT OF HEALTH
SECTION OF DRINKING WATER PROTECTION
SWP Vulnerability Rating**



625 Robert St. N. St. Paul MN 55155
P.O. Box 64975 St. Paul MN 55164 - 0975

PWSID: 1020017
SYSTEM NAME: Coon Rapids
WELL NAME: Well #10

TIER: 2
WHP RANK:
UNIQUE WELL #: 00202930

COUNTY: Anoka TOWNSHIP NUMBER: 31 RANGE: 24 W SECTION: 13 QUARTERS: DABC

<u>CRITERIA</u>	<u>DESCRIPTION</u>	<u>POINTS</u>
Aquifer Name(s)	: Franconia-Mt. Simon	
DNR Geologic Sensitivity Rating	: Very low	10
L Score	: 10	
Geologic Data From	: Data Inferred From Nearby Wells	
Year Constructed	: 1970	
Construction Method	: Cable Tool/Bored	0
Casing Depth	: 272	5
Well Depth	: 684	
Casing grouted into borehole?	Unknown	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	: 1000	10
Pathogen Detected?		0
Surface Water Characteristics?		0
Maximum nitrate detected	: <1	0
Maximum tritium detected	: Unknown	0
Non-THMS VOCs detected?		0
Pesticides detected?		0
Carbon 14 age	: Unknown	0
Wellhead Protection Score	:	25
Wellhead Protection Vulnerability Rating	:	NOT VULNERABLE
Vulnerability Overridden	:	

COMMENTS

NITRATE DATA FROM PWSD 1989, 8/75 SAMPLE
NITRATE DATA FROM PWSD 1989, 6/84 SAMPLE
low rating is based on well #13 and the presence of the

NITRATE DATA FROM PWSD 1989, 7/80 SAMPLE
NITRATE DATA FROM PWWSD 1989, 7/79 SAMPLE
St. Lawrence confining layer.

Very



**MINNESOTA DEPARTMENT OF HEALTH
SECTION OF DRINKING WATER PROTECTION
SWP Vulnerability Rating**



625 Robert St. N. St. Paul MN 55155
P.O. Box 64975 St. Paul MN 55164 - 0975

PWSID: 1020017
SYSTEM NAME: Coon Rapids
WELL NAME: Well #11

TIER: 2
WHP RANK:
UNIQUE WELL #: 00202965

COUNTY: Anoka TOWNSHIP NUMBER: 31 RANGE: 24 W SECTION: 27 QUARTERS: BAAA

<u>CRITERIA</u>	<u>DESCRIPTION</u>	<u>POINTS</u>
Aquifer Name(s)	: Tunnel City-Wonewoc	
DNR Geologic Sensitivity Rating	: Very low	0
L Score	: 4	
Geologic Data From	: Well Record	
Year Constructed	: 1972	
Construction Method	: Rotary/Drilled	0
Casing Depth	: 189	10
Well Depth	: 421	
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	: 1100	20
Pathogen Detected?		0
Surface Water Characteristics?		0
Maximum nitrate detected	: <.4	0
Maximum tritium detected	: 2.7 06/08/2010	VULNERABLE
Non-THMS VOCs detected?		0
Pesticides detected?		0
Carbon 14 age	: Unknown	0
Wellhead Protection Score	:	30
Wellhead Protection Vulnerability Rating	:	VULNERABLE
Vulnerability Overridden	:	

COMMENTS

NITRATE DATA FROM PWSID 1989, 10/85 SAMPLE. Previous tritium result 7.2 on 11/08/1999.



**MINNESOTA DEPARTMENT OF HEALTH
SECTION OF DRINKING WATER PROTECTION
SWP Vulnerability Rating**



625 Robert St. N. St. Paul MN 55155
P.O. Box 64975 St. Paul MN 55164 - 0975

PWSID: 1020017
SYSTEM NAME: Coon Rapids
WELL NAME: Well #12

TIER: 2
WHP RANK:
UNIQUE WELL #: 00168721

COUNTY: Anoka TOWNSHIP NUMBER: 31 RANGE: 24 W SECTION: 27 QUARTERS: AAAA

<u>CRITERIA</u>	<u>DESCRIPTION</u>	<u>POINTS</u>
Aquifer Name(s)	: Franconia-Mt. Simon	
DNR Geologic Sensitivity Rating	: Very low	10
L Score	: 9	
Geologic Data From	: Well Record	
Year Constructed	: 1975	
Construction Method	: Cable Tool/Bored	0
Casing Depth	: 208	5
Well Depth	: 604	
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?	Unknown	0
Isolation distance violations?		0
Pumping Rate	: 850	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	:	25
Wellhead Protection Vulnerability Rating	:	NOT VULNERABLE
Vulnerability Overridden	:	

COMMENTS



**MINNESOTA DEPARTMENT OF HEALTH
SECTION OF DRINKING WATER PROTECTION
SWP Vulnerability Rating**



625 Robert St. N. St. Paul MN 55155
P.O. Box 64975 St. Paul MN 55164 - 0975

PWSID: 1020017
SYSTEM NAME: Coon Rapids
WELL NAME: Well #13

TIER: 2
WHP RANK:
UNIQUE WELL #: 00168720

COUNTY: Anoka TOWNSHIP NUMBER: 31 RANGE: 24 W SECTION: 13 QUARTERS: DADD

<u>CRITERIA</u>	<u>DESCRIPTION</u>	<u>POINTS</u>
Aquifer Name(s)	: Franconia-Mt. Simon	
DNR Geologic Sensitivity Rating	: Very low	10
L Score	: 10	
Geologic Data From	: Well Record	
Year Constructed	: 1977	
Construction Method	: Cable Tool/Bored	0
Casing Depth	: 395	5
Well Depth	: 693	
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?	Unknown	0
Isolation distance violations?		0
Pumping Rate	: 1000	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	:	25
Wellhead Protection Vulnerability Rating	:	NOT VULNERABLE
Vulnerability Overridden	:	

COMMENTS



**MINNESOTA DEPARTMENT OF HEALTH
SECTION OF DRINKING WATER PROTECTION
SWP Vulnerability Rating**



625 Robert St. N. St. Paul MN 55155
P.O. Box 64975 St. Paul MN 55164 - 0975

PWSID: 1020017
SYSTEM NAME: Coon Rapids
WELL NAME: Well #14

TIER: 2
WHP RANK:
UNIQUE WELL #: 00110460

COUNTY: Anoka TOWNSHIP NUMBER: 31 RANGE: 24 W SECTION: 22 QUARTERS: BCBB

<u>CRITERIA</u>	<u>DESCRIPTION</u>	<u>POINTS</u>
Aquifer Name(s)	: Franconia-Mt. Simon	
DNR Geologic Sensitivity Rating	: Medium	25
L Score	: 0	
Geologic Data From	: Well Record	
Year Constructed	: 1977	
Construction Method	: Cable Tool/Bored	0
Casing Depth	: 328	5
Well Depth	: 613	
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?	Unknown	0
Isolation distance violations?		0
Pumping Rate	: 1000	10
Pathogen Detected?		NOT VULNERABLE
Surface Water Characteristics?		NOT VULNERABLE
Maximum nitrate detected	: <.4	NOT VULNERABLE
Maximum tritium detected	: <.8 11/08/1999	NOT VULNERABLE
Non-THMS VOCs detected?		0
Pesticides detected?		0
Carbon 14 age	: Unknown	0
Wellhead Protection Score	: 40	
Wellhead Protection Vulnerability Rating	: NOT VULNERABLE	
Vulnerability Overridden	:	

COMMENTS



**MINNESOTA DEPARTMENT OF HEALTH
SECTION OF DRINKING WATER PROTECTION
SWP Vulnerability Rating**



625 Robert St. N. St. Paul MN 55155
P.O. Box 64975 St. Paul MN 55164 - 0975

PWSID: 1020017
SYSTEM NAME: Coon Rapids
WELL NAME: Well #15

TIER: 2
WHP RANK:
UNIQUE WELL #: 00110461

COUNTY: Anoka TOWNSHIP NUMBER: 31 RANGE: 24 W SECTION: 22 QUARTERS: BCDD

<u>CRITERIA</u>	<u>DESCRIPTION</u>	<u>POINTS</u>
Aquifer Name(s)	: Franconia-Mt. Simon	
DNR Geologic Sensitivity Rating	: Low	20
L Score	: 1	
Geologic Data From	: Well Record	
Year Constructed	: 1976	
Construction Method	: Cable Tool/Bored	0
Casing Depth	: 225	5
Well Depth	: 615	
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?	Unknown	0
Isolation distance violations?		0
Pumping Rate	: 1300	20
Pathogen Detected?		0
Surface Water Characteristics?		0
Maximum nitrate detected	: <.4	0
Maximum tritium detected	: 1 11/08/1999	VULNERABLE
Non-THMS VOCs detected?		0
Pesticides detected?		0
Carbon 14 age	: Unknown	0
Wellhead Protection Score	:	45
Wellhead Protection Vulnerability Rating	:	VULNERABLE
Vulnerability Overridden	:	

COMMENTS



**MINNESOTA DEPARTMENT OF HEALTH
SECTION OF DRINKING WATER PROTECTION
SWP Vulnerability Rating**



625 Robert St. N. St. Paul MN 55155
P.O. Box 64975 St. Paul MN 55164 - 0975

PWSID: 1020017
SYSTEM NAME: Coon Rapids
WELL NAME: Well #16

TIER: 2
WHP RANK:
UNIQUE WELL #: 00161413

COUNTY: Anoka TOWNSHIP NUMBER: 31 RANGE: 24 W SECTION: 11 QUARTERS: ADAA

<u>CRITERIA</u>	<u>DESCRIPTION</u>	<u>POINTS</u>
Aquifer Name(s)	: Wonewoc-Mt.Simon	
DNR Geologic Sensitivity Rating	: Very low	15
L Score	: 5	
Geologic Data From	: Well Record	
Year Constructed	: 1981	
Construction Method	: Cable Tool/Bored	0
Casing Depth	: 395	5
Well Depth	: 653	
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?	Unknown	0
Isolation distance violations?		0
Pumping Rate	: 1050	20
Pathogen Detected?		0
Surface Water Characteristics?		0
Maximum nitrate detected	: <.05 08/02/1994	0
Maximum tritium detected	: Unknown	0
Non-THMS VOCs detected?		0
Pesticides detected?		0
Carbon 14 age	: Unknown	0
Wellhead Protection Score	: 40	
Wellhead Protection Vulnerability Rating	: NOT VULNERABLE	
Vulnerability Overridden	:	

COMMENTS

L=5 Based on 58 feet of St. Lawrence Formation



**MINNESOTA DEPARTMENT OF HEALTH
SECTION OF DRINKING WATER PROTECTION
SWP Vulnerability Rating**



625 Robert St. N. St. Paul MN 55155
P.O. Box 64975 St. Paul MN 55164 - 0975

PWSID: 1020017
SYSTEM NAME: Coon Rapids
WELL NAME: Well #17

TIER: 2
WHP RANK:
UNIQUE WELL #: 00150357

COUNTY: Anoka TOWNSHIP NUMBER: 31 RANGE: 24 W SECTION: 21 QUARTERS: DAAA

<u>CRITERIA</u>	<u>DESCRIPTION</u>	<u>POINTS</u>
Aquifer Name(s)	: Quaternary Buried Artesian	
DNR Geologic Sensitivity Rating	: Medium	25
L Score	: 0	
Geologic Data From	: Well Record	
Year Constructed	: 1981	
Construction Method	: Cable Tool/Bored	0
Casing Depth	: 81	10
Well Depth	: 121	
Casing grouted into borehole?	No	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	: 1000	10
Pathogen Detected?		0
Surface Water Characteristics?		0
Maximum nitrate detected	: <.4	0
Maximum tritium detected	: 2 06/08/2010	VULNERABLE
Non-THMS VOCs detected?		0
Pesticides detected?		0
Carbon 14 age	: Unknown	0
Wellhead Protection Score	:	45
Wellhead Protection Vulnerability Rating	:	VULNERABLE
Vulnerability Overridden	:	

COMMENTS



**MINNESOTA DEPARTMENT OF HEALTH
SECTION OF DRINKING WATER PROTECTION
SWP Vulnerability Rating**



625 Robert St. N. St. Paul MN 55155
P.O. Box 64975 St. Paul MN 55164 - 0975

PWSID: 1020017
SYSTEM NAME: Coon Rapids
WELL NAME: Well #18

TIER: 2
WHP RANK:
UNIQUE WELL #: 00110469

COUNTY: Anoka TOWNSHIP NUMBER: 31 RANGE: 24 W SECTION: 2 QUARTERS: DCDC

<u>CRITERIA</u>	<u>DESCRIPTION</u>	<u>POINTS</u>
Aquifer Name(s)	: Mt. Simon	
DNR Geologic Sensitivity Rating	: Very low	0
L Score	: 18	
Geologic Data From	: Well Record	
Year Constructed	: 1986	
Construction Method	: Cable Tool/Bored	0
Casing Depth	: 575	0
Well Depth	: 637	
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?		NOT VULNERABLE
Surface Water Characteristics?		NOT VULNERABLE
Maximum nitrate detected	: <.4	NOT VULNERABLE
Maximum tritium detected	: <.8 04/21/1997	NOT VULNERABLE
Non-THMS VOCs detected?		0
Pesticides detected?		0
Carbon 14 age	: A	-20
Wellhead Protection Score	:	-5
Wellhead Protection Vulnerability Rating	:	NOT VULNERABLE
Vulnerability Overridden	:	

COMMENTS



**MINNESOTA DEPARTMENT OF HEALTH
SECTION OF DRINKING WATER PROTECTION
SWP Vulnerability Rating**



625 Robert St. N. St. Paul MN 55155
P.O. Box 64975 St. Paul MN 55164 - 0975

PWSID: 1020017
SYSTEM NAME: Coon Rapids
WELL NAME: Well #19

TIER: 2
WHP RANK:
UNIQUE WELL #: 00110475

COUNTY: Anoka TOWNSHIP NUMBER: 31 RANGE: 24 W SECTION: 16 QUARTERS:

<u>CRITERIA</u>	<u>DESCRIPTION</u>	<u>POINTS</u>
Aquifer Name(s)	: Quaternary Buried Artesian	
DNR Geologic Sensitivity Rating	: Low	20
L Score	: 3	
Geologic Data From	: Well Record	
Year Constructed	: 1987	
Construction Method	: Cable Tool/Bored	0
Casing Depth	: 115	10
Well Depth	: 135	
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	: 1150	20
Pathogen Detected?		0
Surface Water Characteristics?		0
Maximum nitrate detected	: .53 07/08/2014	0
Maximum tritium detected	: 36.7 07/16/1991	VULNERABLE
Non-THMS VOCs detected?		0
Pesticides detected?		0
Carbon 14 age	: M	0
Wellhead Protection Score	:	55
Wellhead Protection Vulnerability Rating	:	VULNERABLE
Vulnerability Overridden	:	

COMMENTS



**MINNESOTA DEPARTMENT OF HEALTH
SECTION OF DRINKING WATER PROTECTION
SWP Vulnerability Rating**



625 Robert St. N. St. Paul MN 55155
P.O. Box 64975 St. Paul MN 55164 - 0975

PWSID: 1020017
SYSTEM NAME: Coon Rapids
WELL NAME: Well #20

TIER: 2
WHP RANK:
UNIQUE WELL #: 00420956

COUNTY: Anoka TOWNSHIP NUMBER: 31 RANGE: 24 W SECTION: 21 QUARTERS: ADBD

<u>CRITERIA</u>	<u>DESCRIPTION</u>	<u>POINTS</u>
Aquifer Name(s)	: Quaternary Buried Artesian	
DNR Geologic Sensitivity Rating	: Low	20
L Score	: 1	
Geologic Data From	: Well Record	
Year Constructed	: 1988	
Construction Method	: Cable Tool/Bored	0
Casing Depth	: 95	10
Well Depth	: 135	
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?	Unknown	0
Isolation distance violations?		0
Pumping Rate	: 1100	20
Pathogen Detected?		0
Surface Water Characteristics?		0
Maximum nitrate detected	: .35 07/08/2014	0
Maximum tritium detected	: 6.9 06/08/2010	VULNERABLE
Non-THMS VOCs detected?		0
Pesticides detected?		0
Carbon 14 age	: Unknown	0
Wellhead Protection Score	:	50
Wellhead Protection Vulnerability Rating	:	VULNERABLE
Vulnerability Overridden	:	Jim Walsh

COMMENTS



**MINNESOTA DEPARTMENT OF HEALTH
SECTION OF DRINKING WATER PROTECTION
SWP Vulnerability Rating**



625 Robert St. N. St. Paul MN 55155
P.O. Box 64975 St. Paul MN 55164 - 0975

PWSID: 1020017
SYSTEM NAME: Coon Rapids
WELL NAME: Well #21

TIER: 2
WHP RANK:
UNIQUE WELL #: 00474384

COUNTY: Anoka TOWNSHIP NUMBER: 31 RANGE: 24 W SECTION: 13 QUARTERS: ACCD

<u>CRITERIA</u>	<u>DESCRIPTION</u>	<u>POINTS</u>
Aquifer Name(s)	: Quaternary Buried Artesian	
DNR Geologic Sensitivity Rating	: Low	20
L Score	: 1	
Geologic Data From	: Well Record	
Year Constructed	: 1990	
Construction Method	: Cable Tool/Bored	0
Casing Depth	: 170	10
Well Depth	: 203	
Casing grouted into borehole?	Unknown	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	: 900	10
Pathogen Detected?		0
Surface Water Characteristics?		0
Maximum nitrate detected	: <.05 07/07/2014	0
Maximum tritium detected	: 11.5 04/21/1997	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



**MINNESOTA DEPARTMENT OF HEALTH
SECTION OF DRINKING WATER PROTECTION
SWP Vulnerability Rating**



625 Robert St. N. St. Paul MN 55155
P.O. Box 64975 St. Paul MN 55164 - 0975

PWSID: 1020017
SYSTEM NAME: Coon Rapids
WELL NAME: Well #22

TIER: 2
WHP RANK:
UNIQUE WELL #: 00474385

COUNTY: Anoka TOWNSHIP NUMBER: 31 RANGE: 24 W SECTION: 22 QUARTERS: CBAA

<u>CRITERIA</u>	<u>DESCRIPTION</u>	<u>POINTS</u>
Aquifer Name(s) :	Quaternary Buried Artesian	
DNR Geologic Sensitivity Rating :	Medium	25
L Score :	0	
Geologic Data From :	Well Record	
Year Constructed :	1990	
Construction Method :	Cable Tool/Bored	0
Casing Depth :	80	10
Well Depth :	105	
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 :	250	5
Pathogen Detected?		0
Surface Water Characteristics?		0
Maximum nitrate detected :	.07 09/23/2014	0
Maximum tritium detected :	Unknown	0
Non-THMS VOCs detected?		0
Pesticides detected?		0
Carbon 14 age :	Unknown	0
Wellhead Protection Score :		40
Wellhead Protection Vulnerability Rating :		VULNERABLE
Vulnerability Overridden :		Jim Walsh

COMMENTS
Vulnerable because of tritium in Well 20.



**MINNESOTA DEPARTMENT OF HEALTH
SECTION OF DRINKING WATER PROTECTION
SWP Vulnerability Rating**



625 Robert St. N. St. Paul MN 55155
P.O. Box 64975 St. Paul MN 55164 - 0975

PWSID: 1020017
SYSTEM NAME: Coon Rapids
WELL NAME: Well #23

TIER: 2
WHP RANK:
UNIQUE WELL #: 00463020

COUNTY: Anoka TOWNSHIP NUMBER: 31 RANGE: 24 W SECTION: 27 QUARTERS: BAA

<u>CRITERIA</u>	<u>DESCRIPTION</u>	<u>POINTS</u>
Aquifer Name(s)	: Quaternary Buried Artesian	
DNR Geologic Sensitivity Rating	: Medium	25
L Score	: 0	
Geologic Data From	: Well Record	
Year Constructed	: 1991	
Construction Method	: Cable Tool/Bored	0
Casing Depth	: 93	10
Well Depth	: 128	
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	: 250	5
Pathogen Detected?		0
Surface Water Characteristics?		0
Maximum nitrate detected	: <.05 09/23/2014	0
Maximum tritium detected	: 7.7 06/08/2010	VULNERABLE
Non-THMS VOCs detected?		0
Pesticides detected?		0
Carbon 14 age	: Unknown	0
Wellhead Protection Score	:	45
Wellhead Protection Vulnerability Rating	:	VULNERABLE
Vulnerability Overridden	:	

COMMENTS

Previous tritium result 21.6 TU on 04/21/1997.



**MINNESOTA DEPARTMENT OF HEALTH
SECTION OF DRINKING WATER PROTECTION
SWP Vulnerability Rating**



625 Robert St. N. St. Paul MN 55155
P.O. Box 64975 St. Paul MN 55164 - 0975

PWSID: 1020017
SYSTEM NAME: Coon Rapids
WELL NAME: Well #24

TIER: 2
WHP RANK:
UNIQUE WELL #: 00674478

COUNTY: Anoka TOWNSHIP NUMBER: RANGE: SECTION: QUARTERS:

<u>CRITERIA</u>	<u>DESCRIPTION</u>	<u>POINTS</u>
Aquifer Name(s) :	Tunnel City-Wonewoc	
DNR Geologic Sensitivity Rating :	Medium	25
L Score :	0	
Geologic Data From :	Well Record	
Year Constructed :	2003	
Construction Method :	Cable Tool/Bored	0
Casing Depth :	241	5
Well Depth :	388	
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?	Unknown	0
Isolation distance violations?		0
Pumping Rate :	1150	20
Pathogen Detected?		0
Surface Water Characteristics?		0
Maximum nitrate detected :	<.05 07/08/2014	0
Maximum tritium detected :	7.7 07/15/2010	VULNERABLE
Non-THMS VOCs detected?		0
Pesticides detected?		0
Carbon 14 age :	Unknown	0
<hr/>		
Wellhead Protection Score :		50
Wellhead Protection Vulnerability Rating :		VULNERABLE
<hr/>		
Vulnerability Overridden :		

COMMENTS



**MINNESOTA DEPARTMENT OF HEALTH
SECTION OF DRINKING WATER PROTECTION
SWP Vulnerability Rating**



625 Robert St. N. St. Paul MN 55155
P.O. Box 64975 St. Paul MN 55164 - 0975

PWSID: 1020017
SYSTEM NAME: Coon Rapids
WELL NAME: Well #25

TIER: 2
WHP RANK:
UNIQUE WELL #: 00674479

COUNTY: Anoka TOWNSHIP NUMBER: RANGE: SECTION: QUARTERS:

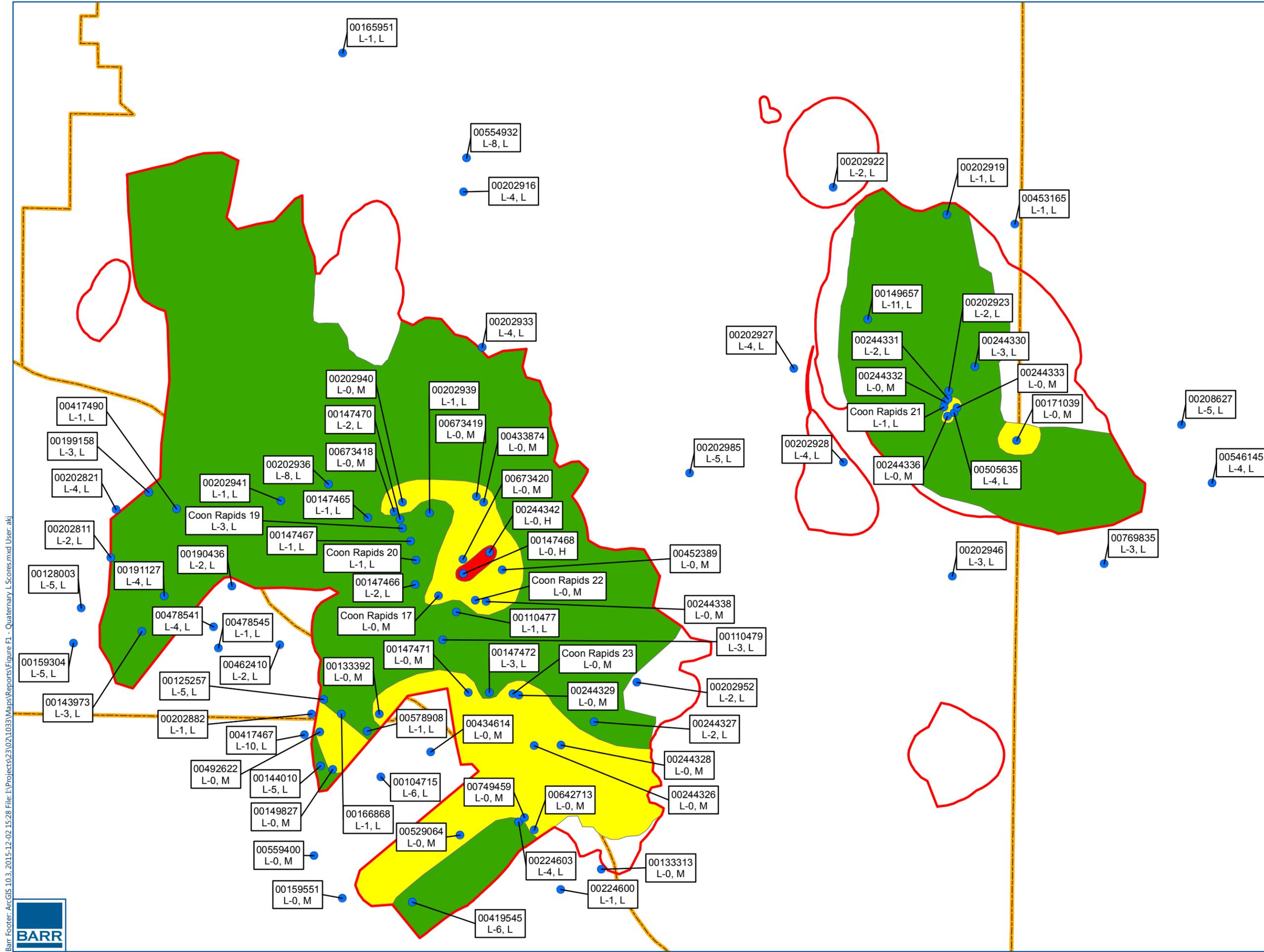
<u>CRITERIA</u>	<u>DESCRIPTION</u>	<u>POINTS</u>
Aquifer Name(s) :	Tunnel City-Wonewoc	
DNR Geologic Sensitivity Rating :	Low	20
L Score :	3	
Geologic Data From :	Well Record	
Year Constructed :	2003	
Construction Method :	Cable Tool/Bored	0
Casing Depth :	229	5
Well Depth :	388	
Casing grouted into 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?	Unknown	0
Isolation distance violations?		0
Pumping Rate :	1125	20
Pathogen Detected?		0
Surface Water Characteristics?		0
Maximum nitrate detected :	<.05 07/08/2014	0
Maximum tritium detected :	Unknown	0
Non-THMS VOCs detected?		0
Pesticides detected?		0
Carbon 14 age :	Unknown	0
<hr/>		
Wellhead Protection Score :		45
Wellhead Protection Vulnerability Rating :		VULNERABLE
<hr/>		
Vulnerability Overridden :		

COMMENTS

L=3 Based on 30 feet of St. Lawrence Formation

Appendix F

L-Score and Vulnerability Maps



- Quaternary L Score Well
- WHPA
- Municipal Boundary

Geologic Sensitivity

- Very High
- High
- Moderate
- Low

Unique Number/Well Name
L score, Geol. Sens.

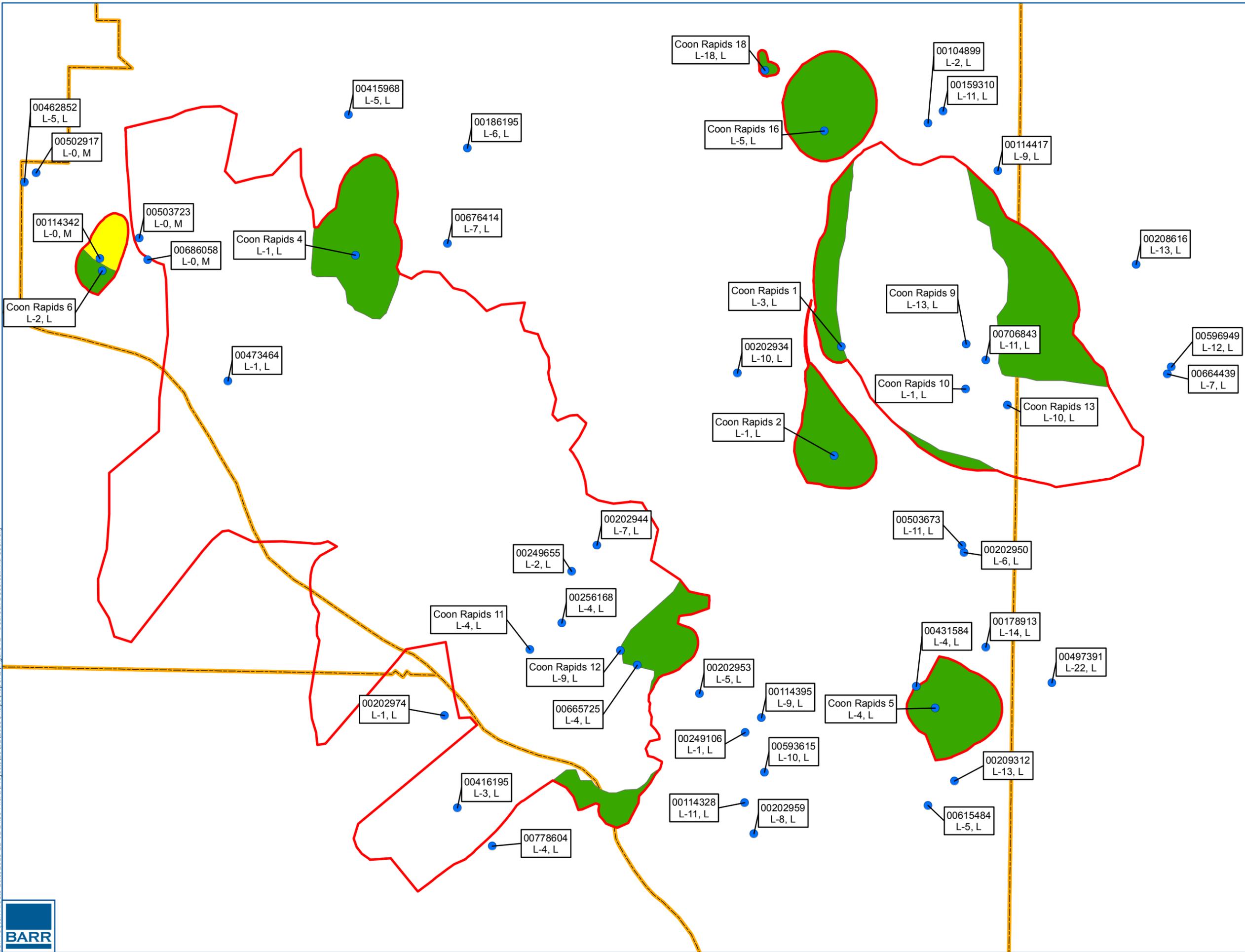
Geologic sensitivity shown only for areas where the capture zone from the Quaternary aquifer is the uppermost capture zone in the WHPA.

Note: Only Quaternary wells deeper than 80' used in the L score calculations. The shallowest Coon Rapids Well (20) is screened from 80-105' below ground surface.



**QUATERNARY L SCORES
AND GEOLOGIC SENSITIVITY**
Coon Rapids WHPA Amendment
City of Coon Rapids, MN

FIGURE F1



- Bedrock L Score Well
- WHPA
- Municipal Boundary

Geologic Sensitivity

- Very High
- High
- Moderate
- Low

Unique Number/Well Name
L score, Geol. Sens.

Geologic sensitivity shown only for areas where the capture zone from a bedrock aquifer is the uppermost capture zone in the WHPA.

All L scores computed using only strata above the Tunnel City Group-Wonewoc Sandstone aquifer except at Coon Rapids 18, where all strata above the Mt. Simon aquifer were used.

**BEDROCK L SCORES
AND GEOLOGIC SENSITIVITY**
Coon Rapids WHPA Amendment
City of Coon Rapids, MN

FIGURE F2



Appendix G

Groundwater Model Files and GIS Shapefiles