Appendix F

Dewatering Radius of Impact Analysis
Reference: Estimation of Radius of Influence at Proposed Dewatering Locations Along Nicols Road to Support the 7031-9003 Siphon Outlet Improvements Project

BACKGROUND AND OBJECTIVE

The Metropolitan Council Environmental Services (MCES) plans to complete dewatering activities to support the 7031-9003 Siphon Outlet Improvements Project (Project) located along Nicols Road within the city of Eagan near the border of Dakota and Hennepin County and the Minnesota River.

The Project includes the replacement of the South Junction Structure, replacement of Manhole No. 1 (MH1), Interceptor 7033 joint repair near MH6, and replacement of Interceptor 7030 that extends along Nicols Road between the L13 lift station and the South Junction structure. The Project Location is shown on Figure 1.

Dewatering is proposed to support construction activities around MH1, South Junction Structure and M501A (Figure 1). Construction is currently planned to occur for two winter seasons (2024 - 2025 and 2025 - 2026) when surficial soils are frozen, plants are dormant, and when the groundwater table is potentially more predictable.

MCES is preparing a discretionary Environment Assessment Worksheet (EAW) for the Project. In accordance with Minnesota Rules 4410.0500, Subpart 5.A, MCES is the Responsible Governmental Unit (RGU) for the EAW. MCES and Stantec conducted an early coordination meeting with the Minnesota Department of Natural Resources (DNR) on November 2, 2022. During this meeting, Joe Richter, the DNR District Appropriations Hydrologist requested that cross sections and geospatial analysis is provided to support the temporary water appropriation permit along with the EAW. Additionally, Jennie Skancke, DNR Wetlands Program Coordinator, discussed the need for a Calcareous Fen Management Plan (CFMP). Based on subsequent correspondence and discussions with the DNR, it was suggested that documentation is provided to demonstrate that impacts to the fen would be avoided. Furthermore, based on direction from the DNR, it was decided to incorporate the Project into the CFMP concurrently being prepared for the Seneca Wastewater Treatment Plant. This memo has been prepared to provide documentation as recommended by the DNR to support the EAW and inform the CFMP to be prepared separate from the Project.

The purpose of this memorandum is to summarize the methodology used to estimate the Radius of Influence (ROI) or the distance of influence produced during the planned dewatering activities.
SITE CHARACTERIZATION DATA

The Project location is approximately 3,000 feet south of the Minnesota River within the Minnesota River Valley. Surface elevations within the Project Location range between 720 feet to 750 feet North American Vertical Datum of 1983 (NAVD 1983; Figure 1). Based on nearby topographic information, the surface water elevation of the Minnesota River near the Hwy 77 Bridge is estimated to be 690 feet NAVD 1983 (Figure 1).

Figure 1 shows the location of Nicols Fen as provided by Jennie Skancke (DNR) during email correspondence on November 7, 2022. The Nicols Fen is located adjacent west of the Project Location approximately 350 feet (Figure 1).

Figure 2 shows the surficial geology as mapped by the Minnesota Geological Survey (MGS; 2019) underlying the Project Location. Terrace alluvium deposits are identified at the Project Location, which are defined as gravelly sand that coarsens to cobbly gravel. These deposits are preserved above the modern floodplain and were deposited during higher stages of flow along rivers that served as outlets for glacial meltwater (MGS, 2019). Floodplain alluvium deposits are identified to the north of the Project Location and consist mostly of gravelly sand to sandy silt (MGS, 2019).

The Report of Geotechnical Exploration (MCES L-13 Siphon Outlet Structures) prepared by American Engineering Testing (AET; 2021) summarizes the geotechnical investigation conducted in 2021. The investigation was completed in the southern portion of the Project Location in the vicinity of MH1 and South Junction Structure. Soil borings B-1 and B-2 and piezometer P-1 were advanced during the 2021 investigation to identify the underlying soils. The location of the soil borings and piezometer are shown on Figure 3. Fill deposits overlying swamp deposits and coarse alluvial sands and gravels are identified in the boring logs provided in the 2021 AET Report. The fill deposits are comprised of silty sand with little gravel and ranged in thickness between 9.5 and 15.5 feet (AET, 2021). The swamp deposits consist of hemi and sapric peats and were encountered below the fill deposits (AET, 2021). The peat deposits extend to depths of more than 24 feet below ground surface (bgs) and are underlain by coarse alluvial deposits (AET, 2021). The coarse alluvium consists of poorly graded sands and poorly graded sands with silt (AET, 2021).

Piezometer P-1 is screened (perforated well interval) in the peat deposits between 13 and 23 feet bgs. Groundwater was not observed in P-1 immediately after well installation on October 28, 2021, which likely indicates the soils surrounding the screen interval do not transmit groundwater readily. Groundwater elevations of 747.3 and 747.5 feet NAVD 1983 (1.6 and 1.3 bgs) were measured at P-1 on November 8, 2021 and December 16, 2021, respectively.

Figure 3 shows the location of wells and borings identified by the Minnesota Well Index (MWI) in the vicinity of the Project Location. MWI provides basic information about location, depth, geology, construction and static water level, for many wells and borings drilled in Minnesota (Minnesota Department of Health [MDH], 2023).

Figure 3 shows the location of cross section A-A’ and cross section B-B’. Cross section A-A’ was selected to roughly intersect the proposed M501A dewatering location and generally parallels the railroad corridor. Cross section B-B’ was selected to roughly intersect the proposed M501A, South Junction Structure, and MH1 dewatering locations and generally parallels Nicols Road. Cross section

Design with community in mind
A-A' and B-B' bisect each other proximal to the intersection of the railroad corridor and Nicols Road (Figure 3). Cross section A-A' is shown on Figure 4 and cross section B-B' is shown Figure 5.

**Attachment 1** provides Minnesota Well Index (MWI) boring and well logs used in the development of cross section A-A’ and cross section B-B’. Boring and well logs for B-1, B-2, and P-1 were used in the development of cross section A-A’ and are provided in the Report of Geotechnical Exploration (AET, 2021). **Figure 4 and Figure 5** identify some boring and well logs, which were projected a short distance onto each respective cross section.

Cross section A-A’ and cross section B-B’ show the geology underlying the Project Location generally consists of 5 to 15 feet of peat overlying coarse-grained sand. Heterogeneities include fill deposits within the peat deposits and gravel and clay lenses within the coarse-grained sand.

Historical groundwater levels reported on the boring or well log are shown on **Figure 4 and Figure 5**. The groundwater table at the Project Location is likely unconfined, near the surface, and mimics topography at depth. An average depth to groundwater of 1.5 feet bgs is anticipated to occur across the Project Location.

**PLANNED DEWATERING ACTIVITIES**

Dewatering activities to support construction at MH1 and the South Junction Structure will employ steel sheeting, which will provide a barrier to horizontal groundwater flow on all four sides of the excavation. General seepage through the perimeter steel sheeting is anticipated to only occur through any defects or imperfections such as leaking joints. Although the steel sheeting is proposed to be installed to an approximate depth of 30 feet at each location, excavation and dewatering activities are not planned beyond a depth of 20 feet. **Figure 6** shows the approximate perimeter of the proposed excavation (20 feet x 20 feet at MH1; 20 feet x 30 feet at South Junction Structure).

Dewatering activities to support construction near M501A will likely employ multiple trench boxes instead of steel sheeting to minimize the size of the excavation (it is currently unknown whether dewatering will be needed during construction near M501A). The trench box will provide a barrier to horizontal groundwater flow on each side of the excavation cut. Excavation and dewatering activities are not planned beyond a depth of 8 feet. **Figure 6** shows the approximate perimeter of the proposed excavation using a single trench box (12 feet x 4 feet in the vicinity of M501A).

**METHODOLOGY AND ASSUMPTIONS**

The most reliable means of estimating the radius of influence (ROI) or the distance of influence induced by groundwater drawdown is by Jacob analysis of a pumping test. This method will reveal the degree of connection with surface water bodies and recharge from other aquifers (Powers, 2013). Smaller values (i.e., distance) for ROI are typically identified for unconfined aquifers (Powers, 2013).
Lacking results from a completed pumping test, it is possible to estimate ROI based on an empirical relationship developed by Sichardt. This equation provides ROI as a function of drawdown (H-h) and hydraulic conductivity (K):

\[ ROI = 3000 (H - h) \sqrt{K} \]

Where:
- \( H \) = the total head of the water table aquifer in meters (m)
- \( h \) = the total head of the dewatered aquifer in m
- \( ROI \) = radius of influence in m, calculated using the Sichardt equation
- \( K \) = hydraulic conductivity, in m/second (s)

The relationship between the total head of the water table aquifer (H) and the total head of the dewatered aquifer (h) is equal to anticipated drawdown within the excavation due to groundwater pumping during dewatering activities.

Based on the estimated depth to groundwater of 1.5 feet bgs and the maximum estimated depth to groundwater during excavation dewatering of 20 feet bgs, the anticipated drawdown within the proposed excavations at MH1 and South Junction Structure is assumed to be 18.5 feet (H-h).

Based on the average estimated depth to groundwater of 1.5 feet bgs and the maximum estimated depth to groundwater during excavation dewatering of 8 feet bgs, the anticipated drawdown within the proposed excavation near M501A for a single trench box is assumed to be 6.5 feet (H-h).

Figure 5 shows peat deposits from the ground surface to the proposed excavation depth at M501A. Figure 5 shows fill deposits from the ground surface to about 10 feet bgs and peat deposits to the proposed excavation depth at South Junction Structure and MH1.

The peat deposits are not expected to yield predictable volumes of water when compared with inorganic soils like clay, sand and gravel due to their unique characteristics (i.e., high compressibility, high moisture content, and low bearing capacities). Cross section A-A’ and cross section B-B’ show the fill deposits appear to be localized to a small portion of the Project Location. Based on the presence of a limited quantity of fill deposits, a substantial groundwater yield is not anticipated from this material.

Wong et al. (2009) reported the vertical hydraulic conductivity (K) of peat deposits range between \( 10^{-5} \) to \( 10^{-4} \) meter/second (m/s), (2.8 to 0.0028 feet/day [ft/day]).
RESULTS AND CONCLUSIONS

Solving for ROI using the Sichardt’s equation returns an estimated ROI extent at which drawdown could be observed due to proposed dewatering activities at MH1, South Junction Structure, and M501A.

Assuming a hydraulic conductivity anisotropy ratio of 1:1 vertical to horizontal hydraulic conductivity and dewatering at MH1, South Junction Structure, and M501A will not occur simultaneously. The ROI was estimated to be 176 feet at MH1, 176 feet at South Junction Structure, and 62 feet at M501A using the most conservative vertical hydraulic conductivity value ($10^{-5}$ m/s; 2.8 ft/day) reported by Wong et al. (2009).

Figure 6 shows the estimated ROI at each proposed dewatering/excavation location is not anticipated to extend to Nicols Fen.

Attachment 2 provides the results from a sensitivity analysis by varying the magnitude of hydraulic conductivity value at each of the proposed dewatering locations. The sensitivity analysis shows the ROI is smaller with lower hydraulic conductivity values and larger with higher hydraulic conductivity values.

The ROI is anticipated to be substantially less than estimated at each of the proposed locations, based on the following reasons:

- The lack of observable groundwater at piezometer P-1 immediately after well installation on October 28, 2021 likely indicates the hydraulic conductivity is much lower than the conservative hydraulic conductivity value used to estimate the ROI at each location.
- The estimation method does not account for the use of steel sheeting and trench boxes, which will provide a barrier to groundwater flow and should greatly reduce the flow of groundwater into the excavation.
- Dewatering may not be required at M501A. Additionally, if excavation activities were to occur, the total depth is limited to 8 feet.
- The estimate method assumes that dewatering activities within the excavation are performed long enough for pseudo steady-state conditions to be reached, which is unlikely to occur.

LIMITATIONS

The following limitations affect the estimation of the ROI:

- There is a relatively large literature range and few references for aquifer properties of peat materials.
- There is no site-specific aquifer property data.
- The estimation method assumes a homogenous anisotropic aquifer with a constant head.

These limitations are not believed to substantively affect the ability to meet the primary objective to approximate the radius of influence at each proposed excavation area.
REFERENCES


FIGURES

Figure 1 - Site Location
Figure 2 - Surficial Geology
Figure 3 - Cross Section Location
Figure 4 - Cross Section A-A’
Figure 5 - Cross Section B-B’
Figure 6 - Estimated Radius of Influence
Notes:
2. Data Sources: Topography (http://arcgis.dnr.state.mn.us/maps/mntopo/), MCES, MnDNR, MnDOT, Dakota Co.
4. Location of Nicols Fen as shown by Jennie Skandze (DNR) in November 7, 2022 email

Disclaimer: This document has been prepared based on information provided by others as cited in the Notes section. Stantec has not verified the accuracy and/or completeness of this information and shall not be responsible for any errors or omissions which may be incorporated herein as a result. Stantec assumes no responsibility for data supplied in electronic format, and the recipient accepts full responsibility for verifying the accuracy and completeness of the data.
Legend

Surficial Geology
- al - Floodplain Alluvium
- nl - Villard Member
- nuo - Outwash
- te - Terrace Alluvium

Streets
Railroad
Project Location

Notes:
2. Data Sources: Topography (http://arcgis.dnr.state.mn.us/maps/mntopo/), MCES, MNNR, MNDOT, Dakota Co.
4. Location of Nicols Fen as shown by Jennie Skance (DNR) in November 7, 2022 email

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**Project Location**

**Client/Project**

**Figure No.**

**Title**

**Legend**

**A-A' Cross Section**

**Met Council Environmental Services**

**Estimation of Radius of Influence to Support Siphon Outlet Improvements Project**

**T27N, R23W, S18**

**Eagan, Dakota Co., MN**

**1. Coordinate System: MN Dakota Lambert Conformal Conic**

**2. Data Sources: Stantec, MDH/MGS, AET, Wells: Minnesota Health Department Well Index. Last accessed August 10, 2023 https://mnwellindex.web.health.state.mn.us/**

**3. Background: MnGeo WMS service (aerial photography):**

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The ROI is anticipated to be substantially less than shown. Please see text for supporting information.
ATTACHMENT 1
Minnesota Well Index Boring and Well Logs
MINNESOTA DEPARTMENT OF HEALTH
WELL AND BORING REPORT
Minnesota Statutes Chapter 1031

Minnesota Unique Well Number
227989

County     Dakota
Quad       St Paul SW
Quad ID    103C

Elevation: 722 ft.  Elev. Method: LiDAR 1m DEM (MNDNR)

Entry Date: 12/04/1992  Update Date: 08/31/2018

Well Name: MWCC PROP.
Township: 27
Range: 23
Dir Section: W 18
Subsection: CDBACD

Address: 702 POST OFFICE BLDG. ST PAUL MN 55101

Well Depth: 8 ft.  Depth Completed: 8 ft.  Date Well Completed: 05/20/1988

Use: monitor well  Status: Sealed

Well Hydrofractured?: Yes  No: From  To

Casing Type: Single casing  Joint: Above/Below: 3 ft.

Casing Diameter: 2 in.  Weight: 5 ft.  lbs./ft.

Open Hole: From ft. To ft.

Screen?: X  Type: stainless  Make: JOHNSON

Diameter: 2 in.  Slot/Gauze: 10  Length: 3 ft.  Set: 5 ft.  8 ft.

Static Water Level

Wellhead Completion

Wellhead Completion: Yes  No: From  To

Material: neat cement  Amount: 3 ft.

Grouting Information

Well Grouted?: Yes  No: From  To

Nearest Known Source of Contamination

20 feet  Direction: South  Other Type:

Well disinfected upon completion?: Yes  No

Pump

Manufacturer's name

Model Number: HP


Abandoned

Does property have any not in use and not sealed well(s)?

Variance

Was a variance granted from the MDH for this well?

Miscellaneous

First Bedrock: peat-black  Aquifer: Quat. Water

Located by: Minnesota Geological Survey

Locate Method: Digitization (Screen) - Map (1:24,000) (15 meters or System: UTM - NAD83, Zone 15, Meters

Unique Number Verification: Site Plan

Angled Drill Hole

Well Contractor

U.S. Geol Survey

Licensee Business

Lic. or Reg. No.: M0113

Name of Driller

Remarks

40' W. OF NICOLS RD. & 100' N. OF RR.
CONTAMINATION: MWCC STATION.
WELL SEALED 10-1-1990 BY 27194.
ORIGINAL USE MW - MONITOR WELL.
**MINNESOTA DEPARTMENT OF HEALTH**  
**WELL AND BORING REPORT**  
*Minnesota Statutes Chapter 1031*

**Minnesota Unique Well Number**  
343265

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<td>Quad ID: 103C</td>
<td>Received Date:</td>
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### Well Name and Location Information

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<td>23</td>
<td>W</td>
<td>18</td>
<td>CDBABC</td>
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**Elevation:** 719.1  
**Elev. Method:** Surveyed

### Address Information

- **Address:***

### Stratigraphy Information

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<th>Hardness</th>
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<td>BLK/BRN</td>
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<td>MUCK</td>
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<td>20</td>
<td>BRN/GY</td>
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<td>LEAN CLAY, LENSES</td>
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<td>GRAY</td>
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<td>SILTY SAND W/A</td>
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<td>28</td>
<td>GRAY</td>
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<td>FINE SAND,</td>
<td>28</td>
<td>81</td>
<td>GRY/BRN</td>
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</table>

### Well Depth Information

- **Well Depth:** 81 ft.  
- **Depth Completed:** 81 ft.  
- **Date Well Completed:** 12/14/1992

### Drill Method Information

- **Drill Method:** Hollow Stem Auger  
- **Drill Fluid:** eniron. bore hole

### Casing and Screening Information

- **Casing Type:** Joint  
- **Drive Shoe:** No Above/Below

### Static Water Level Information

- **Static Water Level:** 9 ft. land surface  
- **Measure:** null

### Wellhead Completion Information

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

### Grouting Information

- **Well Grouted:** No

### Nearest Known Source of Contamination Information

- **Nearest Known Source of Contamination:** feet  
- **Direction:** Type

### Well Disinfected Information

- **Well Disinfected upon completion:** No

### Pump Information

- **Manufacturer's name:**
- **Model Number:**
- **Length of drop pipe:** ft  
- **Capacity:** g.p.  
- **Typ:**

### Abandoned Information

- **Does property have any not in use and not sealed well(s)?** Yes No

### Variance Information

- **Was a variance granted from the MDH for this well?** Yes No

### Miscellaneous Information

- **First Bedrock:** Aquifer
- **Last Strat:** sand  
- **Depth to Bedrock:** ft

### Remarks

- **Locate Method:** Digitization (Screen) - Map (1:24,000) (15 meters or
- **System:** UTM - NAD83, Zone 15, Meters
- **UTM Values:** X 482517 Y 4963246
- **Unique Number Verification:** Info/GPS from data  
- **Input Date:** 06/06/2023

### Angled Drill Hole

- **Angled Drill Hole:**

### Well Contractor Information

- **Well Contractor:** Twin City Testing  
- **Licensee Business:** M0112  
- **Lic. or Reg. No.:**
- **Name of Driller:**

---

**Minneapolis Well Index Report**  
343265

Printed on 08/16/2023  
HE-01205-15
### Minnesota Department of Health

#### Well and Boring Report

**Minnesota Statutes Chapter 1031**

#### Well Name and Address
- **Well Name**: PZ-1RN
- **Address**: 3800 NICOLS RD MN

#### Stratigraphy Information

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<td>SOFT</td>
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<tr>
<td>SAND LOOSE</td>
<td>26</td>
<td>36</td>
<td>BROWN</td>
<td></td>
</tr>
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</table>

#### Elevation and Method
- **Elevation**: 753.08 ft
- **Elev. Method**: Surveyed

#### At-grade Information
- **Nearest Known Source of Contamination**: feet Direction Type
- **Well disinfected upon completion?**: Yes No
- **Manufacturer's name**: Twin City Testing
- **Model Number**: M0122
- **Name of Driller**: HE-01205-15

#### Well and Boring Details

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<td>W</td>
<td>18</td>
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#### Well Details
- **Well Number**: 526702
- **County**: Dakota
- **Quad**: St Paul SW
- **Quad ID**: 103C
- **Entry Date**: 09/22/2008
- **Update Date**: 09/05/2020
- **Received Date**: 07/22/2019

#### Well Depth
- **Well Depth**: 36 ft
- **Depth Completed**: 36 ft
- **Date Well Completed**: 02/03/1993
- **Drill Method**: Driven
- **Drill Fluid**: piezometer
- **Use**: piezometer
- **Status**: Sealed

#### Casing Information
- **Casing Type**: Single casing
- **Drive Shoe?**: Yes
- **Casing Diameter**: 1.2 in
- **Weight**: 34 ft lbs./ft.
- **Casing Type**: Stainless
- **Make**: TEEL
- **Type**: Stainless

#### Open Hole Information
- **Open Hole Diameter**: 1.2 in
- **Slot/Gauze**: 60 ft.
- **Length**: 2 ft
- **Set**: 34 ft, 36 ft

#### Static Water Level
- **Static Water Level**: 7.3 ft
- **Location**: Measure
- **Date**: 02/05/1993
- **Screen**: 12 in. above grade

#### Wellhead Completion
- **Wellhead Completion**: Pitless adapter manufacturer
- **Model**: TEEL

#### Grouting Information
- **Grouting Information**: Well Grouted? Yes
- **Unique Number Verification Information from Input Date**: 07/22/2019

#### Well Contractor
- **Well Contractor**: Twin City Testing
- **Lic. or Reg. No.**: M0122

#### Remarks
- **Remarks**: SEALED 03-31-1997 BY M0143
**MINNESOTA DEPARTMENT OF HEALTH**

**WELL AND BORING REPORT**

*Minnesota Statutes Chapter 1031*

---

**Minnesota Unique Well Number:** 526706

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**Elevation:** 738.82

**Elev. Method:** Surveyed

**Address:**

Well 3800 NICOLS RD MN

**Well Depth**

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<td>37 ft.</td>
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**Drill Method:** Driven

**Drill Fluid:** Use piezometer

**Status:** Sealed

---

**Stratigraphy Information**

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<td>SAND LOOSE</td>
<td>26</td>
<td>36</td>
<td>BROWN</td>
<td></td>
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</table>

**Well Hydrofractured?**

- No

**Casing Diameter**

- 1.2 in. To 34.8 ft.

**Weight**

- lbs./ft.

---

**Open Hole**

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<th>Diameter</th>
<th>Slot/Gauze</th>
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<th>Set</th>
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<td>1.2 in.</td>
<td>60</td>
<td>2 ft.</td>
<td>34.8 ft.</td>
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**Static Water Level**

-3.1 ft. land surface

**Pumping Level (below land surface)**

Measure 02/05/1993

---

**Wellhead Completion**

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

**Grouting Information**

- Well Grouted? Yes X No

---

**Nearest Known Source of Contamination**

- feet Direction Type

**Well disinfected upon completion?**

- Yes X No

**Pump**

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**Length of drop pipe**

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</tbody>
</table>

**Abandoned**

- Does property have any not in use and not sealed well(s)? Yes X No

**Variance**

- Was a variance granted from the MDH for this well? Yes X No

**Miscellaneous**

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

**Located by**

- Minnesota Geological Survey

**System**

| UTM - NAD83, Zone 15, Meters | X 482644 | Y 4963080 |

**Unique Number Verification Information from Input Date**

- 07/22/2019

**Angled Drill Hole**

**Well Contractor**

- Twin City Testing M0122 BRABENDER, L.

---

**Remarks**

SEALED 03-31-1997 BY M0143

---

**Printed on:** 08/16/2023
### Minnesota Department of Health
#### Well and Boring Report

**Minnesota Statutes Chapter 1031**

#### 526708 Minnesota Well Index Report

**County:** Dakota  
**Quad:** St Paul SW  
**Quad ID:** 103C  
**Entry Date:** 09/22/2008  
**Update Date:** 09/05/2020  
**Received Date:**

<table>
<thead>
<tr>
<th>Well Name</th>
<th>Township</th>
<th>Range</th>
<th>Dir Section</th>
<th>Subsection</th>
</tr>
</thead>
<tbody>
<tr>
<td>PZ-3 LN</td>
<td>27</td>
<td>23</td>
<td>W 18</td>
<td>CDBDAD</td>
</tr>
</tbody>
</table>

**Elevation:** 727.71  
**Elev. Method:** Surveyed

<table>
<thead>
<tr>
<th>Address</th>
<th>Well Name</th>
<th>Township</th>
<th>Range</th>
<th>Dir Section</th>
<th>Subsection</th>
</tr>
</thead>
<tbody>
<tr>
<td>Well 3800 NICOLS RD MN</td>
<td>PZ-3 LN</td>
<td>27</td>
<td>23</td>
<td>W 18</td>
<td>CDBDAD</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Stratigraphy Information</th>
<th>Geological Material</th>
<th>From (ft.)</th>
<th>To (ft.)</th>
<th>Color</th>
<th>Hardness</th>
</tr>
</thead>
<tbody>
<tr>
<td>PEAT</td>
<td>0</td>
<td>30</td>
<td>BLACK</td>
<td>SOFT</td>
<td></td>
</tr>
<tr>
<td>SAND LOOSE</td>
<td>30</td>
<td>40</td>
<td>BROWN</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Well Depth:**

<table>
<thead>
<tr>
<th>Depth Completed</th>
<th>Date Well Completed</th>
</tr>
</thead>
<tbody>
<tr>
<td>40 ft.</td>
<td>02/02/1993</td>
</tr>
</tbody>
</table>

**Drill Method:** Driven  
**Drill Fluid:**

<table>
<thead>
<tr>
<th>Use</th>
<th>Status</th>
</tr>
</thead>
<tbody>
<tr>
<td>piezometer</td>
<td>Sealed</td>
</tr>
</tbody>
</table>

**Well Hydrofractured?** No

**Casing Type:** Single casing

<table>
<thead>
<tr>
<th>Drive Shoe?</th>
<th>From</th>
<th>To</th>
</tr>
</thead>
<tbody>
<tr>
<td>Yes □</td>
<td>No</td>
<td></td>
</tr>
</tbody>
</table>

**Casing Diameter:** 1.2 in.  
**Weight:** To 38 ft.

<table>
<thead>
<tr>
<th>Casing Diameter</th>
<th>Weight</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.2 in.</td>
<td>To 38 ft.</td>
</tr>
</tbody>
</table>

**Open Hole**

<table>
<thead>
<tr>
<th>Diameter</th>
<th>Slot/Gauze</th>
<th>Length</th>
<th>Set</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.2 in.</td>
<td>60</td>
<td>2 ft.</td>
<td>38 ft. 40 ft.</td>
</tr>
</tbody>
</table>

**Static Water Level**

**Wellhead Completion**

<table>
<thead>
<tr>
<th>Casing Protection</th>
<th>Model</th>
</tr>
</thead>
<tbody>
<tr>
<td>□</td>
<td>TEEL</td>
</tr>
</tbody>
</table>

**Grouting Information**

<table>
<thead>
<tr>
<th>Well Grouted?</th>
<th>□ Yes</th>
<th>□ No</th>
<th>□ Not Specified</th>
</tr>
</thead>
</table>

**Nearest Known Source of Contamination**

| Well disinfected upon completion? | □ Yes | □ No |

**Pump**

<table>
<thead>
<tr>
<th>Manufacturer's name</th>
<th>Model Number</th>
<th>HP</th>
<th>Volt</th>
<th>Length of drop pipe</th>
<th>Capacity</th>
<th>Typ</th>
</tr>
</thead>
<tbody>
<tr>
<td>□</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Abandoned**

| Does property have any not in use and not sealed well(s)? | □ Yes | □ No |

**Variance**

| Was a variance granted from the MDH for this well? | □ Yes | □ No |

**Miscellaneous**

<table>
<thead>
<tr>
<th>First Bedrock</th>
<th>Aquifer</th>
<th>Quat. Water</th>
<th>Depth to Bedrock</th>
</tr>
</thead>
<tbody>
<tr>
<td>sand-brown</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Located by:** Minnesota Geological Survey

**Locate Method:**

<table>
<thead>
<tr>
<th>System</th>
<th>X 482580</th>
<th>Y 4963140</th>
</tr>
</thead>
<tbody>
<tr>
<td>UTM - NAD83, Zone 15, Meters</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

| Unique Number Verification Information from Input Date | 07/22/2019 |

**Angled Drill Hole**

<table>
<thead>
<tr>
<th>Well Contractor</th>
<th>Licensee Business</th>
<th>Lic. or Reg. No.</th>
<th>Name of Driller</th>
</tr>
</thead>
<tbody>
<tr>
<td>Twin City Testing</td>
<td>M0122</td>
<td>BRABENDER, L.</td>
<td></td>
</tr>
</tbody>
</table>

**Remarks**

| STATIC WATER LEVEL: FROZEN  
SEALED 03-31-1997 BY M0143 |

Printed on 08/16/2023  
HE-01205-15
**Well Name** | MWCC PROP.  
---|---
**Township** | 27  
**Range** | 23  
**Dir** | W  
**Section** | 18  
**Subsection** | CDBACD

**Elevation** | 722 ft.  
**Elev. Method** | LiDAR 1m DEM (MNDNR)

**Address**  
Contact | 702 POST OFFICE BLDG. ST PAUL MN 55101

**Stratigraphy Information**  
Geological Material | FIBROUS PEAT  
From | To (ft.) | Color | Hardness  
---|---|---|---
0 | 8 | BLACK | SOFT

**Well Depth** |  
**Depth Completed** | 8 ft.  
**Date Well Completed** | 05/20/1988

**Drill Method** | Power Auger  
**Drill Fluid** |  
**Use** | monitor well  
**Status** | Sealed

**Well Hydrofractured?** | Yes ☐ No ☐  
**Casing Type** | Single casing  
**Joint** |  
**Drive Shoe?** | Yes ☐ No ☐ Above/Below 3 ft.

**Casing Diameter** | 2 in.  
**Weight** | To 5 ft. lbs./ft.  
**Hole Diameter** | 7 in.  
**To 8 ft.**

**Open Hole**  
**From ft.** | To ft.  
**Screen?** | ☑  
**Type** | stainless  
**Make** | JOHNSON  
**Diameter** | 2 in.  
**Slot/Gauze** | 10  
**Length** | 3 ft.  
**Set** | 5 ft.  
**Above/Below** | 8 ft.

**Static Water Level**  
**Pumping Level (below land surface)**

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

**Grouting Information**  
**Well Grouted?** | ☑ Yes ☐ No ☐ Not Specified  
**Material** | neat cement  
**Amount** | From 3 ft. To To 3 ft.

**Nearest Known Source of Contamination**  
**Abandoned** | ☑  
**Does property have any not in use and not sealed well(s)?** | Yes ☐ No ☐  
**Pump** | Not Installed  
**Date Installed** |  
**Manufacturer's name** |  
**Model Number** |  
**HP** |  
**Volt** |  
**Length of drop pipe** | ft.  
**Capacity** | g.p.  
**Typ** |  
**Abandoned** |  
**Was a variance granted from the MDH for this well?** | Yes ☐ No ☐  
**Miscellaneous**  
**First Bedrock** | peat-black  
**Aquifer** | Quat. Water  
**Located by** | Minnesota Geological Survey  
**Locate Method** | Digitization (Screen) - Map (1:24,000) (15 meters or 1 meter)  
**System** | UTM - NAD83, Zone 15, Meters  
**Unique Number Verification** | Site Plan  
**Input Date** | 08/31/2018

**Angled Drill Hole**

**Well Contractor**  
**U.S. Geol Survey** | M0113  
**Licensee Business** |  
**Lic. or Reg. No.** |  
**Name of Driller** |  

Remarks  
40' W. OF NICOLS RD. & 100' N. OF RR.  
CONTAMINATION: MWCC STATION.  
WELL SEALED 10-1-1990 BY 27194.  
ORIGINAL USE MW - MONITOR WELL.
**MINNESOTA DEPARTMENT OF HEALTH**

**WELL AND BORING REPORT**

*Minnesota Statutes Chapter 1031*

---

**Minnesota Unique Well Number**

- **452924**

**County** Dakota

**Quad** St Paul SW

**Quad ID** 103C

---

**Entry Date** 09/22/2008

**Update Date** 03/12/2020

**Received Date**

---

**Well Name** MW-FEN-3

**Township** 27

**Range** 23

**Dir** W

**Section** 18

**Subsection** CADCDA

**Address**

**Elevation** 720.2

**Elev. Method** Surveyed

---

**Well Depth**

<table>
<thead>
<tr>
<th>Depth Completed</th>
<th>Date Well Completed</th>
</tr>
</thead>
<tbody>
<tr>
<td>75 ft.</td>
<td>05/25/1989</td>
</tr>
</tbody>
</table>

**Drill Method**

- Multiple methods used

**Drill Fluid**

- Bentonite

---

**Use**

- monitor well

**Status**

- Active

**Well Hydrofractured?**

- Yes [ ]

- No [ ]

**Casing Type**

- Single casing

**Drive Shoe?**

- Yes [ ]

- No [X]

**Joint**

- Above/Below 2.2 ft.

**Casing Diameter**

- 2 in. To 64.5 ft.

**Weight**

- lbs./ft.

**Hole Diameter**

- 6 in. To 74.5 ft.

---

**Open Hole**

<table>
<thead>
<tr>
<th>From ft.</th>
<th>To ft.</th>
</tr>
</thead>
<tbody>
<tr>
<td>2 in.</td>
<td>10</td>
</tr>
</tbody>
</table>

**Screen?**

- X

**Type** plastic

**Make** TIMCO

**Diameter**

- 2 in.

**Slot/Gauze**

- 10

**Length**

- 64.5 ft.

**Set**

- 74.5 ft.

---

**Static Water Level**

**Pumping Level (below land surface)**

**Wellhead Completion**

- Pitless adapter manufacturer

- Model

**Casing Protection**

- 12 in. above grade

**Grouting Information**

- Well Grouted? [X] Yes [ ] No [ ]

**Material**

- neat cement

**Amount**

- From ft.

**To ft.**

- 50.2 ft.

---

**Nearest Known Source of Contamination**

**feet Direction**

**Type**

**Well disinfected upon completion?**

- Yes [ ]

- No [X]

---

**Pump**

- Not Installed

**Manufacturer's name**

**Model Number**

**HP**

**Volt**

**Length of drop pipe**

**Capacity**

**g.p. Typ**

**Abandoned**

- Does property have any not in use and not sealed well(s)? [ ] Yes [ ] No

---

**Variance**

- Was a variance granted from the MDH for this well? [ ] Yes [ ] No

---

**Miscellaneous**

**First Bedrock**

- sand-brown

**Depth to Bedrock**

- ft

**Located by**

- Minnesota Geological Survey

**Locate Method**

- GPS SA Off (averaged) (15 meters)

**System**

- UTM - NAD83, Zone 15, Meters

**Unique Number Verification**

- Tag on well

**Input Date**

- 03/08/2018

---

**Angled Drill Hole**

---

**Well Contractor**

- Gislason, John

**Lic. or Reg. No.**

- M0070

**Name of Driller**

- NELSON, T.

---

**Remarks**

LOCATION: 550'E OF NICOLS RD ON RR RIGHT OF WAY

---

**Minnesota Well Index Report**

**452924**

Printed on 08/16/2023

**HE-01205-15**
**MINNESOTA DEPARTMENT OF HEALTH**

**WELL AND BORING REPORT**

**Minnesota Statutes Chapter 1031**

---

**Minnesota Unique Well Number**

452925

**County**

Dakota

**Quad**

St Paul SW

**Quad ID**

103C

---

### Well Name and Location

<table>
<thead>
<tr>
<th>Township</th>
<th>Range</th>
<th>Dir Section</th>
<th>Subsection</th>
</tr>
</thead>
<tbody>
<tr>
<td>27</td>
<td>23</td>
<td>W 18</td>
<td>CADCDA</td>
</tr>
</tbody>
</table>

**Address**

**Stratigraphy Information**

<table>
<thead>
<tr>
<th>Geological Material</th>
<th>From</th>
<th>To (ft.)</th>
<th>Color</th>
<th>Hardness</th>
</tr>
</thead>
<tbody>
<tr>
<td>LOG FROM ADJACENT</td>
<td>0</td>
<td>3</td>
<td>BLACK</td>
<td></td>
</tr>
<tr>
<td>ORGANIC CLAY DK</td>
<td>3</td>
<td>15</td>
<td>VARIED</td>
<td>SOFT</td>
</tr>
<tr>
<td>FINE SAND LOOSE TO</td>
<td>15</td>
<td>21</td>
<td>BRN/GRY</td>
<td></td>
</tr>
</tbody>
</table>

**Elevation**

721.2

**Elev. Method**

Surveyed

---

**Well Depth**

21 ft.

**Depth Completed**

20 ft.

**Date Well Completed**

05/26/1989

**Drill Method**

Power Auger

**Drill Fluid**

---

**Use**

monitor well

**Status**

Active

**Well Hydrofractured?**

Yes □ No □ From □ To □

**Casing Type**

Single casing

**Joint**

**Drive Shoe?**

Yes □ No X

**Above/Below**

2.4 ft.

**Casing Diameter**

2 in. To 14.6 ft.

**Weight**

lbs./ft.

**Hole Diameter**

8 in. To 21 ft.

**Open Hole**

<table>
<thead>
<tr>
<th>From ft.</th>
<th>To ft.</th>
<th>Diameter</th>
<th>Slot/Gauze</th>
<th>Length</th>
<th>Set</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>2 in.</td>
<td>10</td>
<td>5 ft.</td>
<td>14.6 ft. to 19.6 ft.</td>
</tr>
</tbody>
</table>

**Screen?**

X

**Type**

plastic

**Make**

TIMCO

---

**Static Water Level**

---

**Pumping Level (below land surface)**

---

**Wellhead Completion**

Pitless adapter manufacturer

**Model**

Casing Protection

X 12 in. above grade

At-grade (Environmental Wells and Borings ONLY)

**Grouting Information**

Material

neat cement

**Amount**

ft. 10.5 ft.

**Nearest Known Source of Contamination**

feet Direction Type

**Well disinfected upon completion?**

Yes □ No X

**Neighborhood**

---

**Abandoned**

Does property have any not in use and not sealed well(s)?

Yes □ No □

**Variance**

Was a variance granted from the MDH for this well?

Yes □ No □

---

### Miscellaneous

**First Bedrock**

Aquifer

**Last Strat**

sand

**Depth to Bedrock**

ft

**Located by**

Minnesota Geological Survey

**Locate Method**

GPS SA Off (averaged) (15 meters)

**System**

UTM - NAD83, Zone 15, Meters

| X 482693 | Y 4963326 |

**Unique Number Verification**

Tag on well

**Input Date**

03/08/2018

**Angled Drill Hole**

---

**Well Contractor**

Gislason, John

**Licensee Business**

Lic. or Reg. No.

M0070

Name of Driller

NELSON, T.

---

Printed on 08/16/2023

HE-01205-15
## MINNESOTA DEPARTMENT OF HEALTH
### WELL AND BORING REPORT

**Entry Date:** 09/22/2008  
**Update Date:** 09/05/2020  
**Received Date:**

#### Minnesota Unique Well Number
- **Number:** 526712
- **County:** Dakota  
- **Quad:** St Paul SW  
- **Quad ID:** 103C

### Well Name
- **PZ-4 LN**
- **Township:** 27  
- **Range:** 23  
- **Dir Section:** W 18  
- **Subsection:** CDBBB

### Address
- **Well:** 3800 NICOLS RD MN

### Elevations
- **Elevation:** 723.99  
- **Elev. Method:** Surveyed

### Stratigraphy Information
- **Geological Material:**
  - **PEAT:** From 0 To 23 ft., **Color:** BLACK, **Hardness:** SOFT
  - **SAND LOOSE:** From 23 To 33 ft., **Color:** BROWN

### Well Depth
- **Depth:** 33 ft.
- **Depth Completed:** 33 ft.
- **Date Well Completed:** 02/04/1993

### Drill Method
- **Driven**

### Well Hydrofractured?
- **Yes**

### Casing Type
- **Single casing**

### Drive Shoe?
- **Yes**  
- **X**

### Casing Diameter
- **Weight:** 1.2 in.
- **From:** 31 ft., **To:**

### Screen Information
- **Screen:** X  
- **Type:** stainless  
- **Make:** TEEL

### Open Hole
- **From:** 1.2 in.  
- **To:** 60 ft.

### Static Water Level
- **32.4 ft. land surface**
- **Measure:** 02/05/1993

### Pumphead Completion
- **Well disinfected upon completion:**
- **Yes**  
- **X**

### Nearest Known Source of Contamination
- **feet Direction Type:**

### Pump
- **Model Number:**
- **Manufacturer's name:**
- **Length of drop pipe ft:**
- **Capacity g.p. Typ.:**

### Abandoned
- **Does property have any not in use and not sealed well(s)?:**
- **Yes**  
- **X**

### Variance
- **Was a variance granted from the MDH for this well?:**
- **Yes**
- **X**
- **No**

### Miscellaneous
- **First Bedrock Aquifer:**
- **Quat. Water Depth ft:**
- **Located by:**
- **System:**
- **Locate Method:**
- **Unique Number Verification Information from Input Date:**
- **Angled Drill Hole**
- **Well Contractor**
- **Name of Driller:**

### Remarks
- **SEALED 03-31-1997 BY M0143**

---

### Printed on 08/16/2023
**HE-01205-15**
### MINNESOTA DEPARTMENT OF HEALTH

#### WELL AND BORING REPORT

**Minnesota Statutes Chapter 1031**

<table>
<thead>
<tr>
<th>Minnesota Unique Well Number</th>
<th>County</th>
<th>Dakota</th>
</tr>
</thead>
<tbody>
<tr>
<td>Quad</td>
<td>St Paul SW</td>
<td>103C</td>
</tr>
</tbody>
</table>

| Entry Date | 09/22/2008 |
| Update Date | 09/05/2020 |
| Received Date | |

#### 526714

<table>
<thead>
<tr>
<th>Minnesota Unique Well Index Report</th>
<th>526714</th>
</tr>
</thead>
</table>

**Well Name**
PZ-4 RN

**Township**
27

**Range**
23

**Dir**
W

**Section**
18

**Subsection**
CDBADB

| Elevation | 721.29 |
| Elev. Method | Surveyed |

**Address**
Well 3800 NICOLS RD MN

**Stratigraphy Information**

<table>
<thead>
<tr>
<th>Geological Material</th>
<th>From</th>
<th>To (ft.)</th>
<th>Color</th>
<th>Hardness</th>
</tr>
</thead>
<tbody>
<tr>
<td>PEAT</td>
<td>0</td>
<td>7</td>
<td>BLACK</td>
<td>SOFT</td>
</tr>
</tbody>
</table>

**Well Depth**

<table>
<thead>
<tr>
<th>Depth Completed</th>
<th>Date Well Completed</th>
</tr>
</thead>
<tbody>
<tr>
<td>7 ft.</td>
<td>02/04/1993</td>
</tr>
</tbody>
</table>

**Drill Method**
Driven

**Drill Fluid**

**Use**
piezometer

**Status**
Sealed

**Well Hydrofractured?**

- Yes [x]
- No [ ]
- From [ ]
- To [ ]

**Casing Type**
Single casing

**Drive Shoe?**

- Yes [x]
- No [ ]
- Above/Below 1.62 ft.

**Casing Diameter**

- 1.2 in. To 3.7 ft.
- Weight lbs./ft.

**Open Hole**

<table>
<thead>
<tr>
<th>Screen?</th>
<th>Diameter</th>
<th>Slot/Gauze</th>
<th>Type</th>
<th>Make</th>
</tr>
</thead>
<tbody>
<tr>
<td>[x]</td>
<td>1.2 in.</td>
<td>60</td>
<td>stainless</td>
<td>TEEL</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Length</th>
<th>Set</th>
</tr>
</thead>
<tbody>
<tr>
<td>3 ft.</td>
<td>3.7 ft. 6.7 ft.</td>
</tr>
</tbody>
</table>

**Static Water Level**

3.1 ft. land surface

Measure 02/05/1993

**Pumping Level (below land surface)**

**Wellhead Completion**

<table>
<thead>
<tr>
<th>Plessor adapter manufacturer</th>
<th>Model</th>
</tr>
</thead>
<tbody>
<tr>
<td>[x] Casing Protection</td>
<td>12 in. above grade</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>At-grade (Environmental Wells and Borings ONLY)</th>
</tr>
</thead>
</table>

**Grouting Information**

<table>
<thead>
<tr>
<th>Well Grouted?</th>
<th>Yes [x] No [ ] Not Specified</th>
</tr>
</thead>
</table>

**Nearest Known Source of Contamination**

<table>
<thead>
<tr>
<th>feet</th>
<th>Direction</th>
</tr>
</thead>
<tbody>
<tr>
<td>[x] Well disinfected upon completion?</td>
<td>Yes [x] No [ ]</td>
</tr>
</tbody>
</table>

**Pump**

<table>
<thead>
<tr>
<th>Manufacturer's name</th>
<th>Model Number</th>
<th>HP</th>
<th>Volt</th>
</tr>
</thead>
<tbody>
<tr>
<td>[x]</td>
<td></td>
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<table>
<thead>
<tr>
<th>Length of drop pipe</th>
<th>Capacity</th>
<th>g.p.</th>
<th>Typ</th>
</tr>
</thead>
<tbody>
<tr>
<td>ft.</td>
<td></td>
<td></td>
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**Abandoned**

<table>
<thead>
<tr>
<th>Does property have any not in use and not sealed well(s)?</th>
<th>Yes [x] No [ ]</th>
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**Variance**

<table>
<thead>
<tr>
<th>Was a variance granted from the MDH for this well?</th>
<th>Yes [ ] No [x]</th>
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</table>

**Miscellaneous**

<table>
<thead>
<tr>
<th>First Bedrock</th>
<th>Aquifer</th>
<th>Quat. Water</th>
</tr>
</thead>
<tbody>
<tr>
<td>peat-black</td>
<td></td>
<td>ft</td>
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</table>

<table>
<thead>
<tr>
<th>Last Strat</th>
<th>Depth to Bedrock</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>ft</td>
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</tbody>
</table>

<table>
<thead>
<tr>
<th>Located by</th>
<th>Minnesota Geological Survey</th>
</tr>
</thead>
<tbody>
<tr>
<td>Locate Method</td>
<td>Digitization (Screen) - Map (1:24,000) (15 meters or System</td>
</tr>
<tr>
<td>Unique Number Verification Information from Input Date</td>
<td>X 482552 Y 4963230 07/22/2019</td>
</tr>
</tbody>
</table>

**Angled Drill Hole**

**Well Contractor**

| Twin City Testing | M0122 | BRABENDER, L. |
| Licensee Business | Lic. or Reg. No. | Name of Driller |

**Remarks**
SEALED 03-31-1997 BY M0143
## Well and Boring Report

### Minnesota Unique Well Number
- **526715**

### County
- Dakota

### Quad
- St Paul SW

### Quad ID
- 103C

### Minnesota Statutes Chapter 1031

#### Entry Date
- 09/22/2008

#### Update Date
- 09/05/2020

#### Received Date
- 09/05/2020

### Well Name
- PZ-4 RS

### Township
- 27

### Range
- 23

### Dir
- W

### Section
- 18

### Subsection
- CDBADB

### Elevation
- 721.29

### Elev. Method
- Surveyed

### Address
- 3800 NICOLS RD MN

### Well Depth
- 35 ft.

### Depth Completed
- 35 ft.

### Date Well Completed
- 02/03/1993

### Well Name
- PZ-4 RS

### Well Depth
- 35 ft.

### Depth Completed
- 35 ft.

### Date Well Completed
- 02/03/1993

### Drill Method
- Driven

### Drill Fluid
- Use:
  - Piezometer

### Status
- Sealed

### Well Hydrofractured?
- Yes [x]

### Casing Type
- Single casing

### Joint
- Yes [x]

### Casing Diameter
- 1.2 in. To 33 ft.

### Weight
- lbs./ft.

### Casing Protection
- 12 in. above grade

### At-grade (Environmental Wells and Borings ONLY)
- Yes [x]

### Grouting Information
- Well Grouted?:
  - Yes [x]
  - No
  - Not Specified

### Nearest Known Source of Contamination
- Distance:
  - feet

### Well disinfected upon completion?
- Yes [x]

### Pump
- Manufacturer's name
- Model
- Not Installed
- HP
- Volt
- Length of drop pipe
- ft

### Abandoned
- Does property have any not in use and not sealed well(s)?
  - Yes [x]
  - No

### Variance
- Was a variance granted from the MDH for this well?
  - Yes [x]
  - No

### Miscellaneous
- First Bedrock
- Aquifer
- Quat. Water
- Depth to Bedrock
- ft

### Located by
- Minnesota Geological Survey

### Locate Method
- Digitization (Screen) - Map (1:24,000) (15 meters or
System
- UTM - NAD83, Zone 15, Meters
- X 482552
- Y 4963230

### Unique Number Verification Information from
- Input Date
- 07/22/2019

### Angled Drill Hole
- Well Contractor
- Twin City Testing
- M0122
- BRABENDER, L.

### remarks
- SEALED 03-31-1997 BY M0143

---

**Minnesota Well Index Report**

526715

Printed on 08/16/2023

HE-01205-15
ATTACHMENT 2
Sensitivity Analysis
<table>
<thead>
<tr>
<th></th>
<th>ROI (ft)</th>
<th>ROI (m)</th>
<th>H-h (m)</th>
<th>H-h (ft)</th>
<th>K (m/sec)</th>
<th>K (ft/day)</th>
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</thead>
<tbody>
<tr>
<td><strong>MH1/South Junction Structure</strong></td>
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<tr>
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<td>1E-04</td>
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<td>0.28</td>
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</tbody>
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**Notes:**
- ROI - radius of influence (calculated using Sichardt Equation)
- H-h - Proposed drawdown within excavation
- K - hydraulic conductivity