

WATER PERMIT NO. 8579-3

Name of Applicant: **Brett Guthmiller**

Address: **28680 435th, Menno SD 57045**

Phone: **605 660-1479**

Amount of Water Claimed: **0.89 cfs**

Total Acres: **32**

Source of Water Supply: **groundwater (one well)**

Water to be used for: **irrigation**

County: **Hutchinson**

Type of Waste Disposal System:

Location: **4 miles southeast of Menno**

PRIORITY

Date Received: **1-10-22**

Application/License Fee: **\$ 700**

Corrected Application Received:

Period of Annual Use: **May 1 – September 30**

Remarks:

Diversion Point: **NE 1/4 Sec 18-T97N-R56W**

Land to be Irrigated: **NE 1/4 Sec 18-T97N-R56W**

Depth of Well: **200 feet deep**

Well Driller:

Remarks:

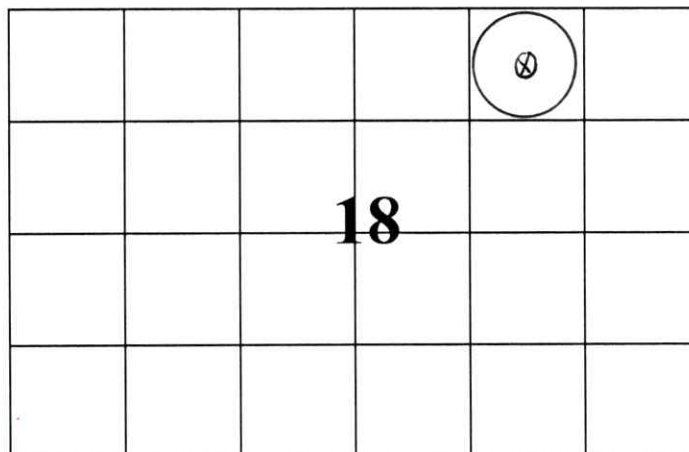
Type of Map: **aerial**

Prepared by:

Reviewed and the Number Assigned on: **1-13-22**

By: **Karen Schlaak**

Notice of Hearing - date to intervene: _____



**SOUTH DAKOTA
WATER PERMIT NO. 8579-3**

Date of first receipt of application January 10, 2022.

The Water Management Board approved Water Permit No. 8579-3 on October 2, 2024 for Brett Guthmiller, 28680 435th Avenue, Menno SD 57045, authorizing the construction of the water use system and the placing of water to beneficial use subject to the following limitations, conditions and qualifications:

1. Water Permit No. 8579-3 appropriates 0.89 cubic feet of water per second (cfs) from one well to be completed into the Niobrara Aquifer (approximately 200 feet deep) located in the NE 1/4 NE 1/4 Section 18 for irrigation of 32 acres located in the NE 1/4 NE 1/4 Section 18; all in T97N-R56W. This site is located approximately 4 miles southeast of Menno SD.
2. The amount of the appropriation may not exceed 2 acre feet annually for each acre of land to which water is actually and beneficially applied for irrigation. The water is to be used during the following described annual period: May 1 – September 30.
3. The date from which applicant may claim right is January 10, 2022.
4. One-fifth of the construction is to be completed on or before April 2, 2027.
5. All construction is to be completed on or before October 2, 2029.
6. Water is to be put to beneficial use on or before October 2, 2033.
7. Water rights obtained in compliance with the laws of the State of South Dakota may not be unlawfully impaired by this appropriation.

QUALIFICATIONS

1. The well approved under Water Permit No. 8579-3 is located near domestic wells and other wells which may obtain water from the same aquifer. Water withdrawals must be controlled so there is not a reduction of needed water supplies in adequate domestic wells or in adequate wells having prior water rights.
2. The well authorized by Permit No. 8579-3 must be constructed by a licensed well driller and construction of the well and installation of the pump must comply with Water Management Board Well Construction Rules, Chapter 74:02:04 with the well casing pressure grouted (bottom to top) pursuant to Section 74:02:04:28.
3. Pursuant to SDCL 46-5-6 which allows a greater diversion rate if the method of irrigation, time constraints, or type of soils so requires, Permit No. 8579-3 authorizes a maximum diversion rate of 0.89 cfs for the irrigation of 32 acres with an annual volume not to exceed 2 acre-feet of water per acre per year.
4. This Permit is approved subject to the irrigation water use questionnaire being submitted each year.

WATER MANAGEMENT BOARD

By: Eric Gronlund

Eric Gronlund, Chief Engineer
Water Rights Program
Department of Agriculture and Natural Resources

OCT 11 2024
date



FORM 2: Application for irrigation in South Dakota

(type or print)

Mail to: DENR - Water Rights 523 E Capitol Ave Pierre, SD 57501-3182 ph. (605) 773-3352	No. <u>8579-3</u> (office use only) Hydrologic Unit <u>10160611</u>
	Basin <u>James R</u>
	Newspaper <u>Freeman Courier</u>
	<u>Daily Press & Dakotan</u>

PAID

JAN 10 2022

Ck# 3708

Rec't# _____

RECEIVED

JAN 10 2022

WATER RIGHTS
PROGRAM

Application For Permit To Appropriate Water For Irrigation

Type of Application: ☒ New ☐ Vested Right ☐ Amendment/Correction to Permit No. _____

(Use predates Mar 2, 1955)

Description of amendment/correction: (i.e. change diversion point(s), add diversion point(s), change use, etc.)

1. Name to Appear on Irrigation Permit Brett Guthmiller

Note: The "Name to Appear on Irrigation Permit" must be the name in which the property to be irrigated is held in.

Mailing Address 28680 435th Ave Menno SD 57045
(Address) (City) (State) (Zip Code)Phone 605-387-2392 Mobile 660-1474 Email turbobrett23@hotmail.com2. Amount of water claimed 0.89*CFS or 400**GPM ***AF Total Acreage 32
(*Cubic Feet per Second) (**Gallons per Minute) (***) Acre Feet - storage capacity of dam/dugout or annual use if applicable)3. Source of water supply well4. Location of point of diversion 1 well in NE 1/4 NE 1/4 18-97N-56W Hutchinson
(example - 3 wells in SW 1/4 NE 1/4 section 12-T104N-R53W)County Hutchinson5. County or counties where water will be used Hutchinson6. Annual period during which water is to be used May - Sept 307. List below each forty acre division, or lot, or fraction thereof and show number of acres to be irrigated in each.
(Attach sheet if more space is needed)

Land Description	Acres	Land Description	Acres
NE 1/4 NE 1/4 18-97-56	32		

8. Give a description of the project. (Attach sheet if more space is needed)

I plan to irrigate 32 of 37.70 acres in NE 1/4 of NE 1/4 section 18-97-56,
from one well located in the center through a 4-tower pivot
Requesting a diversion rate greater than statutory limits.

I, Brett Guthmiller Owner, the applicant, certify under
Name of Person Title (if applicable)

penalty of perjury that I have read this application, examined the attached map, and that the matters stated are true. I further certify, if acting on behalf of an entity or individual other than myself, that I am authorized to submit this application.

Supplemental Information

(type or print)

1. Well Information (check one or both as applicable) ☐ Drilling new well(s) ☐ Using existing well(s)

a) If new wells, how many 1 Have test holes been drilled ☐ Yes ☒ No Drilled by _____
(if yes, please provide copies of logs)

b) If existing wells, how many _____ Provide copy of log(s), if available. Drilled by _____

For either Existing or Proposed Wells:

c) Well Depth (required) 200' Depth to Top of Water Bearing Material 20' Depth to Water from Surface 25'

d) Distance to nearest domestic well on applicant's property 2400' Property owned by others 2600'

2. Wastewater Disposal System Information

a) Type of System (i.e. septic tank, drain field) _____

b) System Capacity (gallons) _____ Year Constructed _____

c) Connected to the City of _____ Sanitary System

3. Dugout Information

a) Surface Dimensions _____ Depth _____

b) Depth to water (ground surface to water level) _____

4. Water Storage Dams

If the proposed water use system contains one or more storage dams, please furnish the information requested below for each dam. The locations of the dams need to be shown on the map submitted with the application.

a) If a private engineering firm or government agency was involved in the design of this dam, please give their name and address:

b) Freeboard _____

c) Crest Width _____

Crest Length _____

d) Height _____

e) Primary Outlet Capacity _____

If pipe, diameter _____

f) Secondary Spillway Capacity _____

Spillway Width _____

g) X & Y Slope (e.g. 3 to 1 is a typical slope)

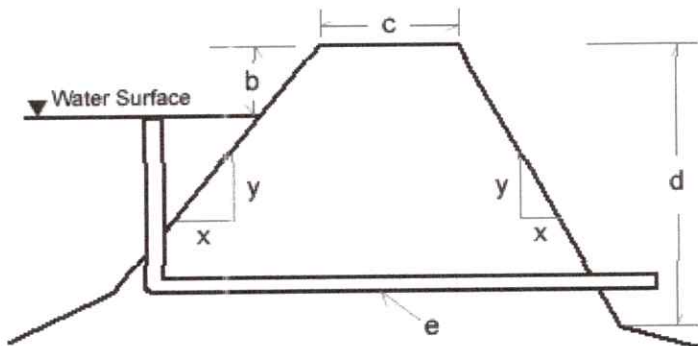
Upstream _____

Downstream _____

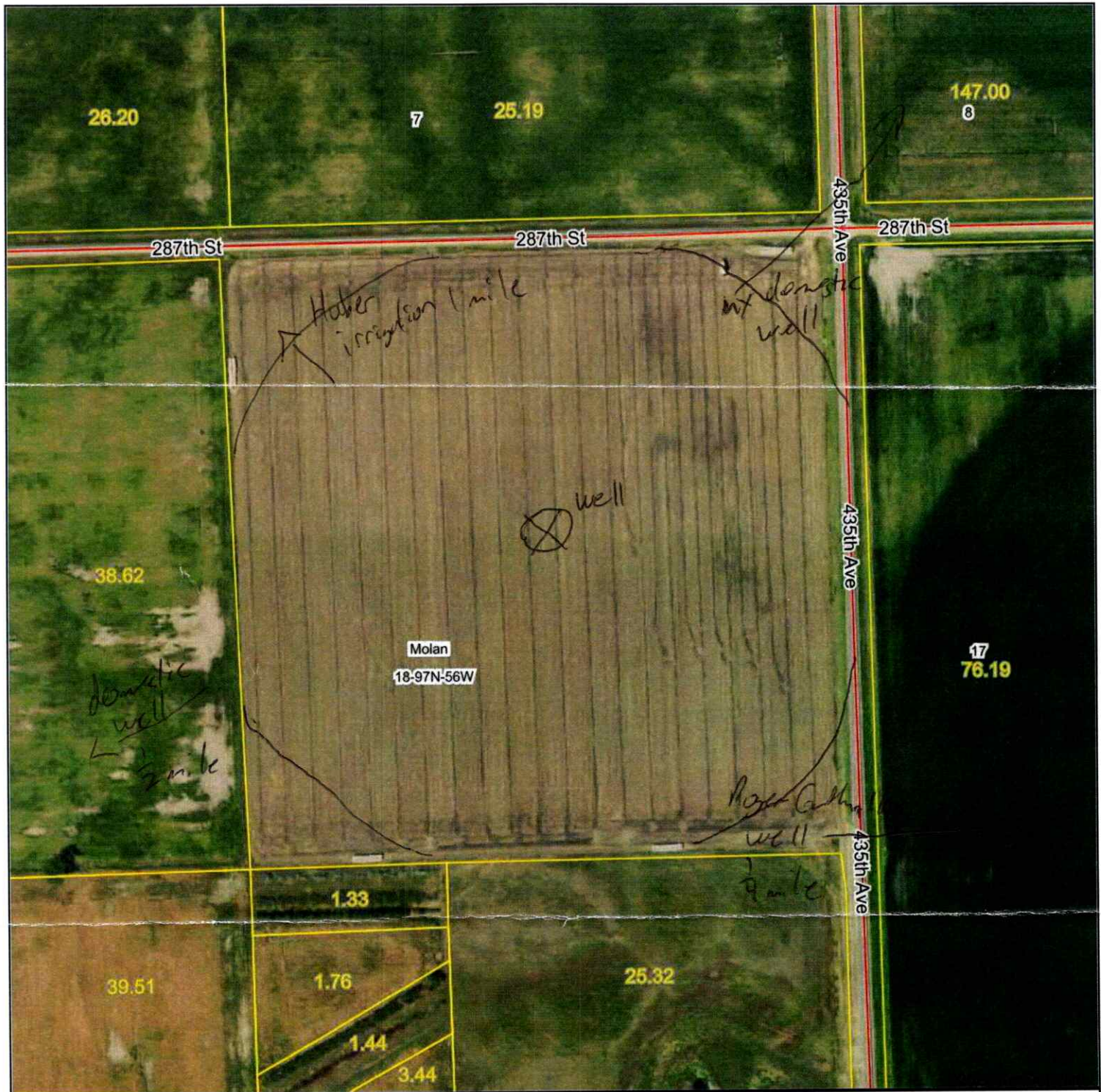
h) Surface Area of Impoundment _____

i) Storage _____ Acre Feet

j) Drainage Area Above Dam _____ Acres



Aerial Map



Map Center: 43° 13' 30.35, -97° 30' 2.77



1/7/2022



People...Products...Knowledge...

Maps Provided By:



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www.AgrDataInc.com

18-97N-56W
Hutchinson County
South Dakota

Field borders provided by Farm Service Agency as of 5/21/2008.

RECEIPT

WATER RIGHTS PROGRAM

South Dakota Department of Agriculture and Natural Resources

Date January 10, 2022

RECEIVED OF Brett/Rachel Guthmiller 28680 435th Ave., Menno SD 57045

The following amount in fees for services rendered as provided for by law:

Fee for Application for Permit No. <u>8579-3</u> to Appropriate Water, to construct and to put water to beneficial use	\$ <u>500.00</u>
Fee for Application for Permit No. _____ to Appropriate Water for Future use	\$ _____
Fee to retain Future Use Permit No. _____ after period of seven years.	\$ _____
Fee for Inspecting Constructed Works, confirming beneficial use and issuing Water License No. <u>8579-3</u>	\$ <u>200.00</u>
Fee for Filing Transfer Form _____	\$ _____
Fee for _____	\$ _____
Fee for Issuing New Well Driller's License No. _____	\$ _____
Fee for Renewal of Well Driller's License No. _____	\$ _____
Fee for Issuing Well Pump Installer's License No. _____	\$ _____
Fee for Renewal of Well Pump Installer's License No. _____	\$ _____
(Any Other Work Provided by Law)	
TOTAL	\$ <u>700.00</u>

By Eric Gronlund
Chief Engineer

Um

Schlaak, Karen

From: Schlaak, Karen
Sent: Tuesday, March 22, 2022 1:13 PM
To: 'turbobrett23@hotmail.com'
Subject: Water Permit Application No. 8579-3
Attachments: 3103.pdf

Attached is a copy of the report, chief engineer recommendation and information regarding the public notice for your water permit application. As stated in the letter, please contact the paper(s) as soon as possible to authorize publication and arrange for payment. This information is being mailed to you today.

Karen Schlaak

DANR - Water Rights Program

(605) 773-3352

Website: <https://danr.sd.gov>



Water Rights Program - DANR
File Documentation

NAME OF PERSON OR FILE: Niobrara domestic well issue

ADDRESS: COUNTY: Hutchinson

DATE: January 10, 2023 TELEPHONE:

Roger Guthmiller called in response to my January 4, 2023, letter regarding irrigators efforts to find a solution to their pumping impacting the Twyla Melhlaf and Dale Melhlaf two domestic wells. Mr. Guthmiller stated that those two wells are now hooked up to B-Y Rural Water.

I contacted Dale Mehlhaf (605 661-1701). He indicated that both farmsteads are now hooked up to rural water. He explained that B-Y required them to pay for installation of a four inch line which cost them \$40,000. He did not believe that large of a line was necessary. He said their domestic water use needs are now met by the rural water system.

He indicated that other domestic well users in the area remain concerned about the impact of the irrigators pumping on their wells.

I indicated that there are three applications pending in this area seeking to appropriate water from the Niobrara aquifer.

- Brent Guthmiller's application for 40 acres.
- Michael Schultz's application for additional acres to reflect what was developed under a prior water permit.
- Schultz's dairy application (existing dairy that wasn't permitted).

Mr. Mehlhaf indicated that while his domestic use needs are now met that it is likely that opposition will be received to these applications.

NAME: Eve Lund

Schlaak, Karen

From: Gronlund, Eric
Sent: Friday, January 7, 2022 2:14 PM
To: Schlaak, Karen
Cc: Mathiowetz, Adam (DENR); Kiltz, Whitney (DENR)
Subject: Brett Guthmiller - will be applying for additional irrigation from the Niobrara

Brett Guthmiller will be applying to irrigate 38 acres from a Niobrara well.

Mr. Guthmiller is one of the three irrigators that agreed to shut down this fall when the two adequate domestic wells were being impacted. He understands there could be an issue with the application.

His artesian well that he believe is completed into the Niobrara is flowing at the surface once again. He indicated in December they had an 8" snowfall but that is all the moisture they've had. He said the ground is currently bare in their area.



Eric Gronlund, PE
Chief Engineer, Water Rights Program
Department of Agriculture and Natural Resources
523 E. Capitol Ave. Pierre SD, 57501
605.773.3352
danr.sd.gov



**DEPARTMENT of AGRICULTURE
and NATURAL RESOURCES**

JOE FOSS BUILDING
523 E. CAPITOL AVE
PIERRE SD 57501-3182
danr.sd.gov

**REVISED RECOMMENDATION OF CHIEF ENGINEER FOR WATER PERMIT
APPLICATION NO. 8579-3, Brett Guthmiller**

Pursuant to SDCL 46-2A-2, the following is the revised recommendation of the Chief Engineer, Water Rights Program, Department of Agriculture and Natural Resources concerning Water Permit Application No. 8579-3, Brett Guthmiller, 28680 435th Avenue, Menno SD 57045.

Based on impacts to adequate domestic wells being mitigated by the domestic well owners connecting to rural water and installation of observation wells, the Chief Engineer is recommending APPROVAL of Application No. 8579-3 because 1) there is reasonable probability that there is unappropriated water available for the applicant's proposed use, 2) the proposed diversion can be developed without unlawful impairment of existing domestic water uses and water rights, 3) the proposed use is a beneficial use and 4) it is in the public interest as it pertains to matters of public interest within the regulatory authority of the Water Management Board with the following qualifications:

1. The well approved under Water Permit No. 8579-3 is located near domestic wells and other wells which may obtain water from the same aquifer. Water withdrawals must be controlled so there is not a reduction of needed water supplies in adequate domestic wells or in adequate wells having prior water rights.
2. The well authorized by Permit No. 8579-3 must be constructed by a licensed well driller and construction of the well and installation of the pump must comply with Water Management Board Well Construction Rules, Chapter 74:02:04 with the well casing pressure grouted (bottom to top) pursuant to Section 74:02:04:28.
3. Pursuant to SDCL 46-5-6 which allows a greater diversion rate if the method of irrigation, time constraints, or type of soils so requires, Permit No. 8579-3 authorizes a maximum diversion rate of 0.89 cfs for the irrigation of 32 acres with an annual volume not to exceed 2 acre-feet of water per acre per year.
4. This Permit is approved subject to the irrigation water use questionnaire being submitted each year.

See report on application for additional information.

Eric Gronlund, Chief Engineer
August 20, 2024

NOTE: This Permit is in an area with a history of adequate domestic wells being impaired by pumping of high-capacity wells. Enforcement of Qualification No. 1 may result in a shutoff order being issued to prevent impairment of adequate domestic wells or prior rights with adequate wells.

Updated Report to the Chief Engineer
Water Permit Application 8579-3
Brett Guthmiller
August 20, 2024

Water Permit Application No. 8579-3 proposes to appropriate water for the irrigation of 32 acres at a maximum instantaneous diversion rate of 0.89 cubic feet per second (cfs) from one well (approximately 200 ft deep) to be completed into the Niobrara aquifer. Both the proposed well and proposed acres for irrigation are located in the NE ¼ NE ¼ Section 18-T97N-R56W in Hutchinson County. The applicant is requesting a diversion rate greater than the statutory limit 1 cfs per 70 acres. This site is located approximately four miles southeast of Menno, SD.

This application was initially filed with the Water Rights Program on January 10, 2022. On May 4th, 2022, the South Dakota Water Management Board took action to defer Application No. 8579-3 for up to two years to allow for study to determine if existing irrigation in the area was unlawfully impairing two adequate domestic wells. On January 10th, 2023, the Water Rights Program was notified that the adequate domestic wells in question had been replaced with connections to a rural water system. Two years have passed since this application was deferred; therefore, it is being brought back for re-evaluation. Initial analysis work for this report was done in March 2023 and portions of that analysis were reviewed and updated in June and July 2024 (primarily water use reporting and observation well data).

There are several applications related to this portion of the Niobrara aquifer, which are summarized in Table 1 with locations shown in Figure 1. The test holes for Application No. 8587-3 suggested that the target aquifer is a sand and gravel deposit that overlies this portion of the Niobrara aquifer, and the application was held for further investigation. In June 2024, the target aquifer for Application No. 8587-3 was updated to this portion of the Niobrara aquifer.

Table 1: Applications Related to this Portion of the Niobrara Aquifer (Water Rights, 2024b)					
Application Number	Diversion Rate (cfs)	Acres	Purpose	Priority Date	Status
8579-3	0.89	32	irrigation	01/10/2022	deferred by Board-unlawful impairment review
8587-3	1.78	134	irrigation	01/25/2022	2022-deferral recommendation-for aquifer determination June 2024-test hole received for Niobrara aquifer
8616-3	no additional	21	irrigation	03/23/2022	abeyance-deferral recommendation due to 8579-3, adding additional acres to Water Permit No. 7344-3

Aquifer: Niobrara (NBRR)

Aquifer Information

Geology and Basic Hydrogeology

The Niobrara Formation is a bedrock formation that underlies most of eastern and western South Dakota (Hedges et al, 1982; Allen et al, 1985). The Niobrara Formation is a Late Cretaceous age white to dark grey argillaceous (clay containing) chalk, marl, and shale that can contain thin bentonite beds, minor sand, and chalky carbonaceous shale (Tomhave, and Schulz, 2004). Locally,

the Niobrara Formation is also known as “chalk rock” and is extensive throughout South Dakota; however, characteristics of the Niobrara aquifer vary greatly across the state (Hedges et al., 1982).

The Niobrara aquifer is contained within portions of the Niobrara Formation where sufficient permeability exists to allow for the transmission of groundwater and where the permeable portions of the formation are sufficiently saturated to yield quantities of groundwater to wells. Both Hedges et al. (1982) and Stephens (1967) identified fractures and solution cavities as the main means of water movement through the Niobrara aquifer. Hedges et al. (1982) noted these features are partially controlled by flexures and faults. Where these secondary porosity features are absent, the Niobrara Formation is generally a low-permeability or almost a no-permeability formation that transmits little to no water (Hedges et al., 1982; Stephens, 1967). Weathering and glacial activity may also contribute to higher productive zones in the Niobrara aquifer (Hedges et al., 1982), with greater amounts of weathering and glacial activity generally having occurred where the Niobrara Formation is exposed at ground surface or directly underlies glacial deposits and generally less where the Niobrara Formation underlies the Pierre Shale.

In southeastern South Dakota, there are several areas where portions of the Niobrara Formation were isolated from the main body of the Niobrara through erosional forces (Tomhave and Schulz, 2004). The proposed well site is located within the extent of one of these isolated portions of the Niobrara Formation. The initial mapping of this portion of the Niobrara Formation was done by Tomhave and Schulz (2004) and is shown in Figure 1. Holmes and Filipovic (2015) as part of a study of the Upper Vermillion aquifer updated a section of the eastern boundary of this portion of the Niobrara aquifer. This update is shown in Figure 2. This portion of the Niobrara Formation underlies approximately 338,130 acres (Figure 2 extent-Niobrara Portion (Holmes and Filipovic, 2015)) of portions of Hutchinson, Clay, Turner, Yankton, and McCook Counties. In general, this portion of the Niobrara directly underlies either the Pierre Shale (shown in Figure 1) or glacial deposits (in areas not underlying the Pierre Shale) and overlies the Carlile Shale (Tomhave and Schulz, 2004). This portion of the Niobrara may also directly underlie a portion of the undifferentiated Tertiary deposits of the Turkey Ridge aquifer (Kilts, 2023a and SDGS, 2023). Well completion reports on file with the Water Rights Program report encountering water throughout this portion of the Niobrara Formation generally indicating aquifer potential throughout this portion of the formation (Water Rights, 2023a; 2023b; 2023c). Since this portion of the Niobrara aquifer is isolated from the main body, the remainder of this report will focus solely on this portion of the Niobrara aquifer.

No test hole or water well completion report was submitted with this application. However, there is sufficient information to determine that at the proposed well location the requested well depth of approximately 200 feet would be expected to be completed into the Niobrara aquifer (Water Rights, 2024a and SDGS, 2024). Well completion reports on file with the Water Rights Program within one mile of the proposed well location for this application indicated that the Niobrara Formation can have sufficient permeability and saturated thickness to act as an aquifer in this area (Water Rights, 2023a). The Niobrara aquifer is expected to be under confined conditions at the proposed well location for this application (Water Rights, 2022a).

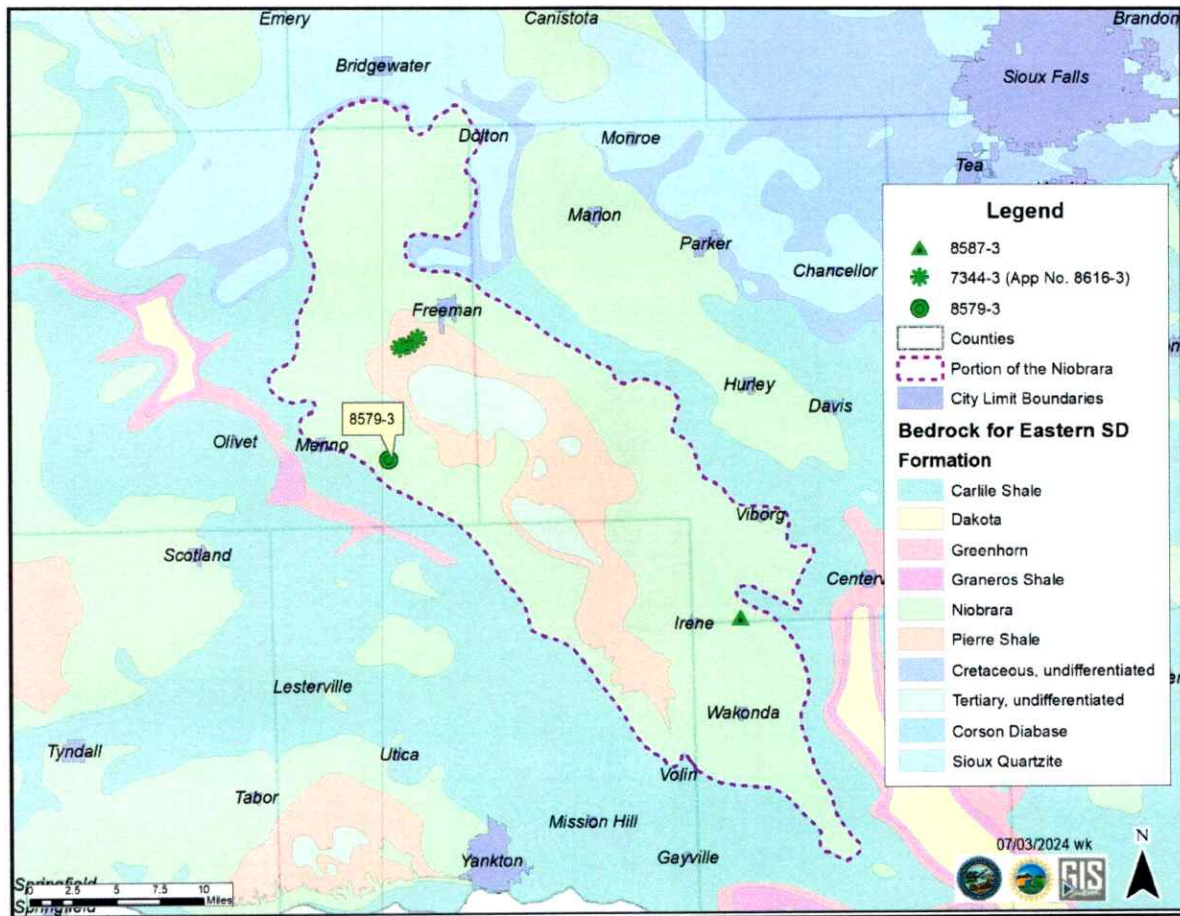


Figure 1: Map showing the first occurrence of bedrock material with the erosional remnant of the Niobrara Formation this application proposes to use (modified from Tomhave and Schulz, 2004)

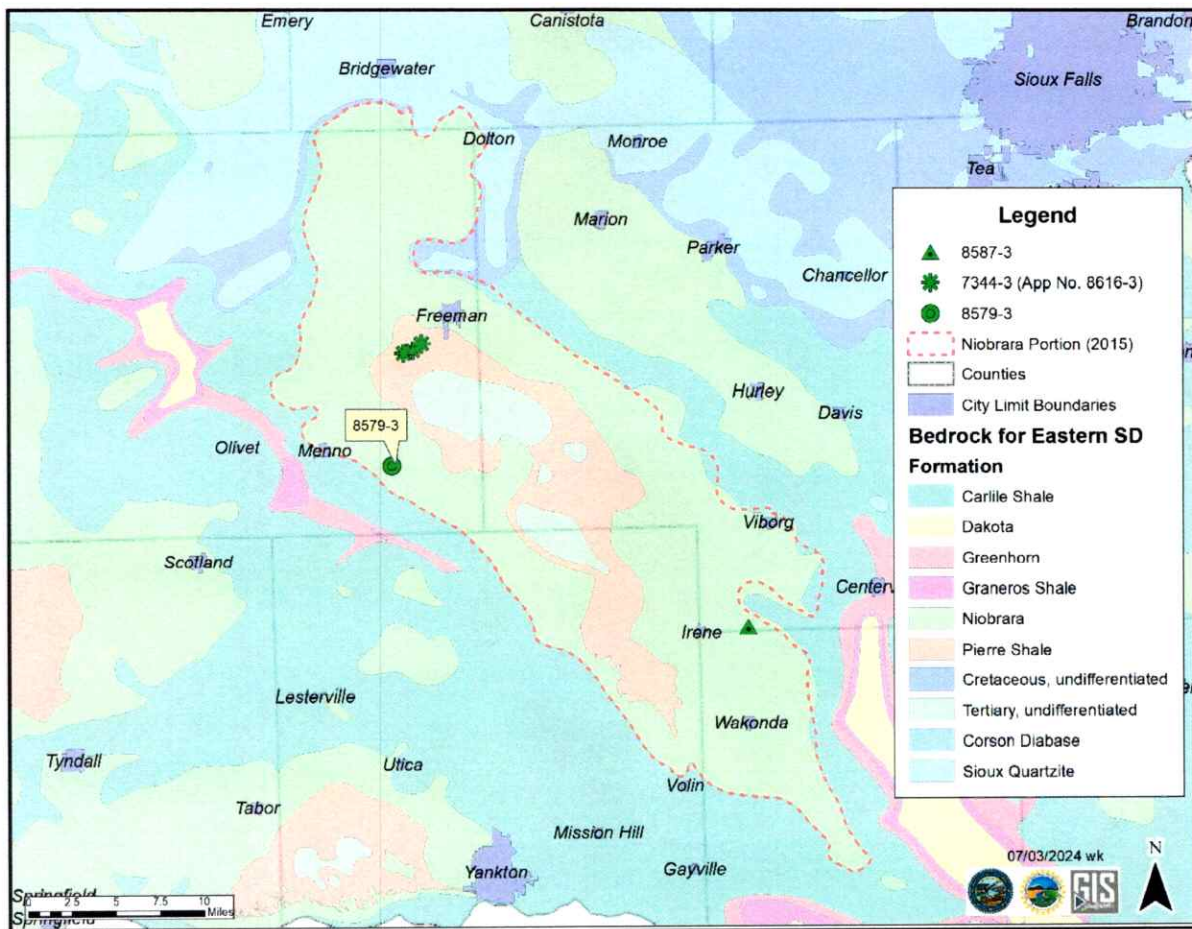


Figure 2: Map showing the approximate extent of the erosional remnant of the Niobrara Formation this application proposes to use and the first occurrence of bedrock material (modified from Tomhave and Schulz, 2004 and Holmes and Filipovic, 2015)

Potentiometric Surface Mapping

A potentiometric surface map is a spatial mapping of groundwater levels in an aquifer at a given period in time. Potentiometric surface maps are created by plotting elevations of the static water level and then generating contours or lines of equal elevation. The maps can yield several insights into aquifer behavior. Since groundwater moves from higher elevation to lower elevation, potentiometric surface maps can be used to determine the direction of groundwater flow. On a potentiometric surface map, the direction of groundwater flow is perpendicular to the contours from higher elevations to lower elevations (see the arrows in Figure 3 as an example). Initial potentiometric surface mapping for this portion of the Niobrara aquifer was done by Lindgren and Hansen (1990) shown in Figure 3. Mathiowetz (2016) also examined the potentiometric surface for May 2016, shown in Figure 4, as part of further analysis of this portion of the Niobrara aquifer concerning water permit applications summarized in Table 1 and Water Permit No. 8684-3. Further potentiometric surface mapping was generated for this portion of the Niobrara aquifer for May 2013 and May 2022; Figures 5-6. Potentiometric surface mapping was also generated for

[illegible]

Figure 3: Potentiometric surface contours from 1986 (modified from Lindgren and Hansen, 1990). Elevation reference NGVD29.

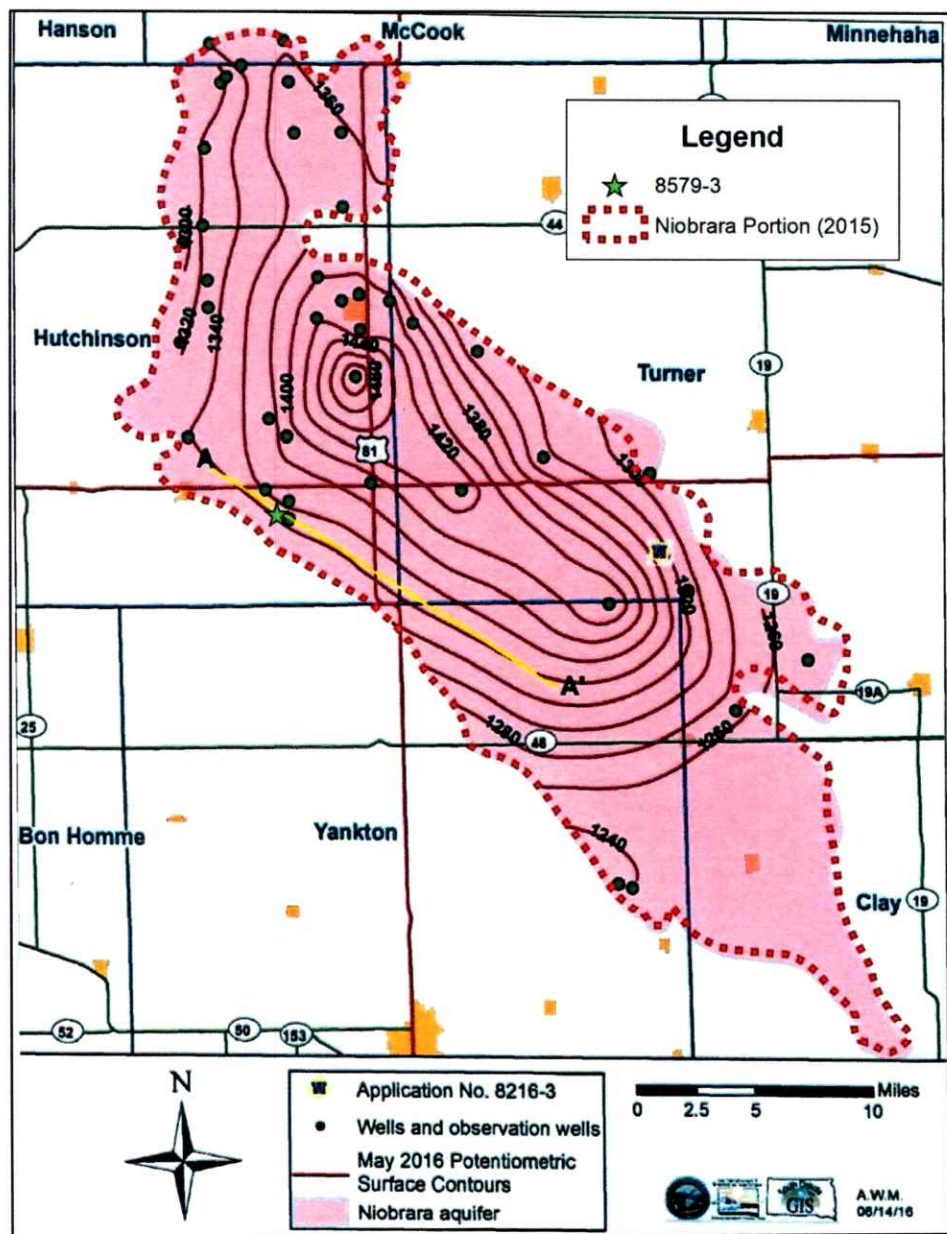


Figure 4: Potentiometric surface contours for May 2016 modified from Mathiowetz 's (2016) report on Application No. 8216-3. Elevation reference NGVD29.

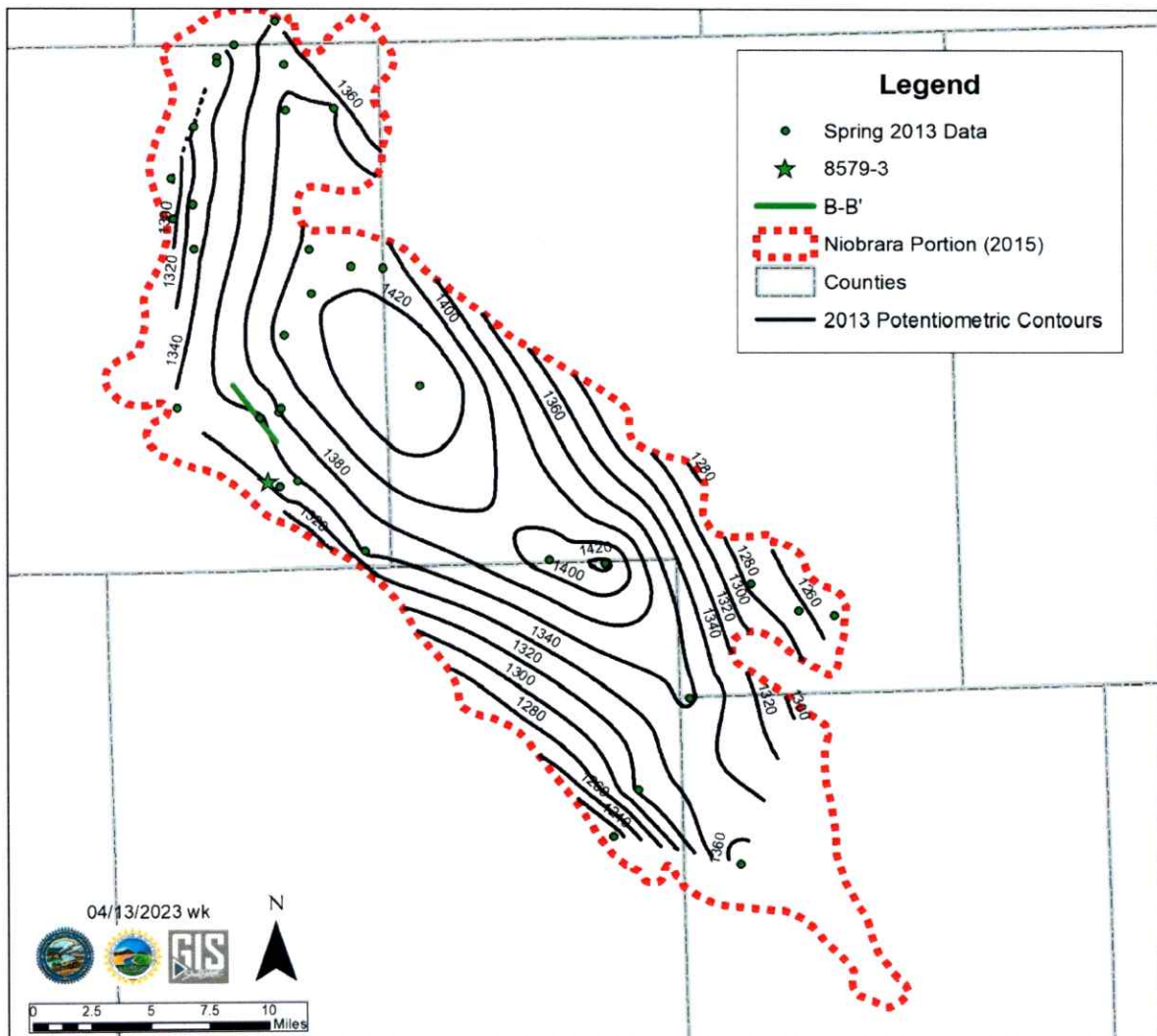


Figure 5: Potentiometric surface contours from May 2013 (Water Rights, 2023a;2023b;2023c). Elevation reference NAVD88.

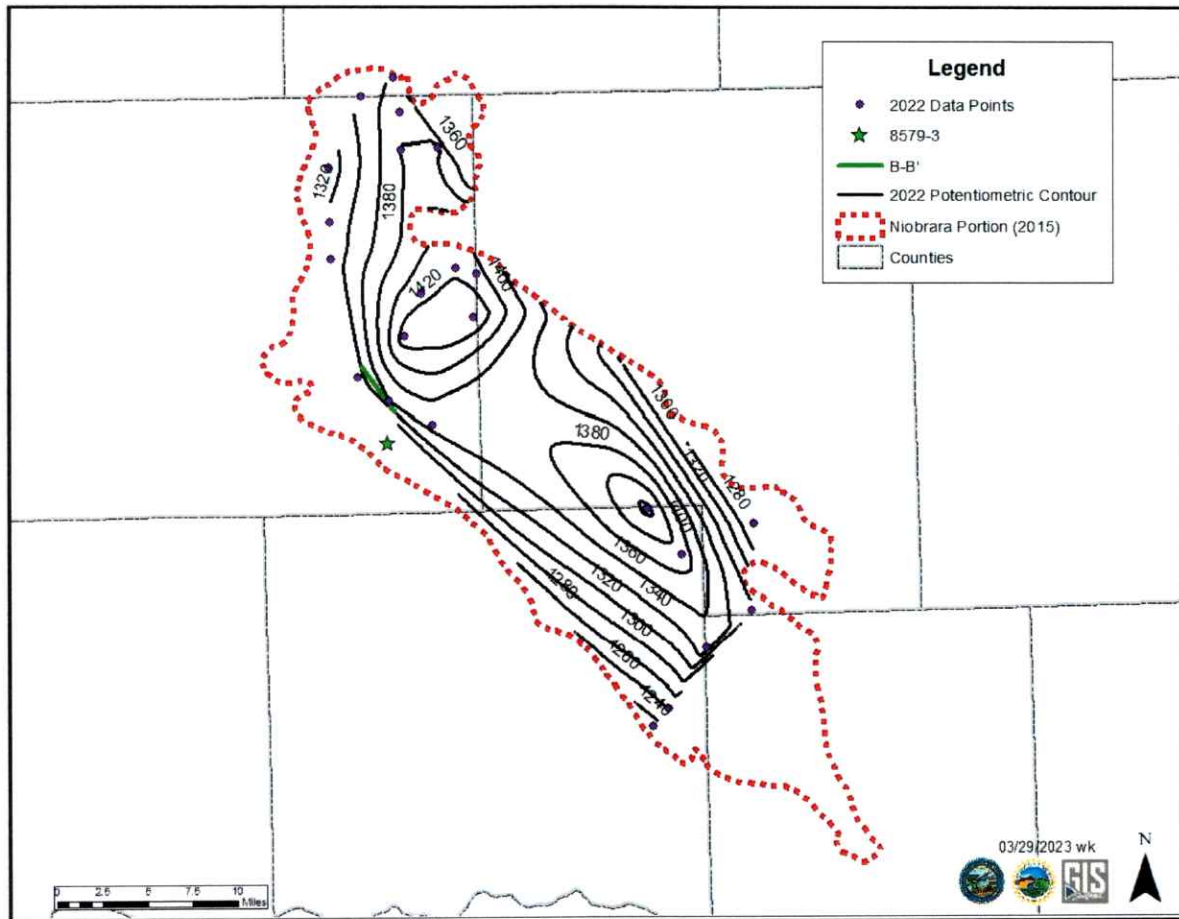


Figure 6: Potentiometric surface contours from May 2022 (Water Rights, 2023a;2023b;2023c). Elevation reference NAVD88.

Table 2: Summary of Potentiometric Surface Mapping			
Time Period	Figure	Data Points	Sources
November 1986	Figure 3	16	Lindgren and Hansen (1990)
May 2016	Figure 4	41	Mathiowetz (2016)
May 2013	Figure 5	34	Water Rights, 2023a and 2023c
May 2018	Appendix B	17	Water Rights, 2023a and 2023c
May 2022	Figure 6	23	Water Rights, 2023a and 2023c

The springtime period is typically chosen by the Water Rights Program for potentiometric surface mapping to map conditions as close to natural as possible. Natural groundwater flow goes from areas of recharge to areas of discharge. In Figures 3-6, the general direction of groundwater movement is generally from the central area of this portion of the Niobrara aquifer toward the edges. This indicates two things: first, this portion of the Niobrara aquifer is likely discharging to water sources near the outer edges of the aquifer and second, there is likely a higher rate of recharge near the edges of the overlying Pierre Shale.

In the northern part of this portion of the Niobrara aquifer, the most likely possibility for a recharge source is the Turkey Ridge aquifer (Lindgren and Hansen, 1990 and Kilts, 2023a). The Turkey Ridge aquifer is made up of Tertiary undifferentiated sands overlaying portions of the Pierre Shale overlaying the central portion of the aquifer (Kilts, 2023a). Near the peripheries of the Turkey Ridge aquifer there are areas where the aquifer is in direct contact with the Niobrara aquifer or separated from the Niobrara aquifer by a relatively thin layer of weathered Pierre Shale (Kilts, 2023a; SDGS, 2023; and Water Rights, 2024a). Additionally, water level comparisons by Kilts (2023a) supported the Turkey Ridge aquifer as a likely source of recharge to this portion of the Niobrara aquifer, since water level elevations in the Turkey Ridge aquifer are higher than in the Niobrara aquifer. Further sources of recharge to this portion of the Niobrara aquifer are likely infiltration of precipitation through overlaying glacial deposits, especially where those deposits have a higher amount of more transmissive materials like sands and gravels (Lindgren and Hansen, 1990).

This portion of the Niobrara aquifer is surrounded by valleys in the bedrock where the Niobrara Formation has been eroded, which contain glacial outwash aquifers. Where these glacial outwash aquifers are in contact with this portion of the Niobrara (either overlaying or are adjacent to), there is potential for leakage between the aquifers based on hydraulic head. The Lower James Missouri (LJM) aquifer lies in the bedrock valley to the west of this portion of the Niobrara and in some locations extends far enough east to be in contact with this portion of the Niobrara (Tomhave and Schulz, 2004; Hedges et al., 1982) as shown in Figure 7. To further illustrate the nature of this connection, select cross sections from Lindgren and Hansen (1990) are provided in Appendix A. Although these cross sections would likely have slight changes if updated to reflect additional drilling since Lindgren and Hansen (1990), they still illustrate the general nature of the connection. The Upper Vermillion Missouri aquifer lies in the bedrock valley to the east of this portion of the Niobrara aquifer and can also be hydrologically connected (Lindgren and Hansen, 1990). Stephens (1967) indicated the presence of a glacial outwash aquifer (named the Wakonda aquifer) directly overlaying and with a strong hydrologic connection to this portion of the Niobrara in portions of Clay County. However, the first occurrence of aquifer materials mapping by Jensen (2000) indicates that the Wakonda aquifer is unlikely to be as extensive as was mapped by Hedges et al. (1982). Lindgren and Hansen (1990) also indicate seepage into Wolf Creek in the very north part of the aquifer is possible.

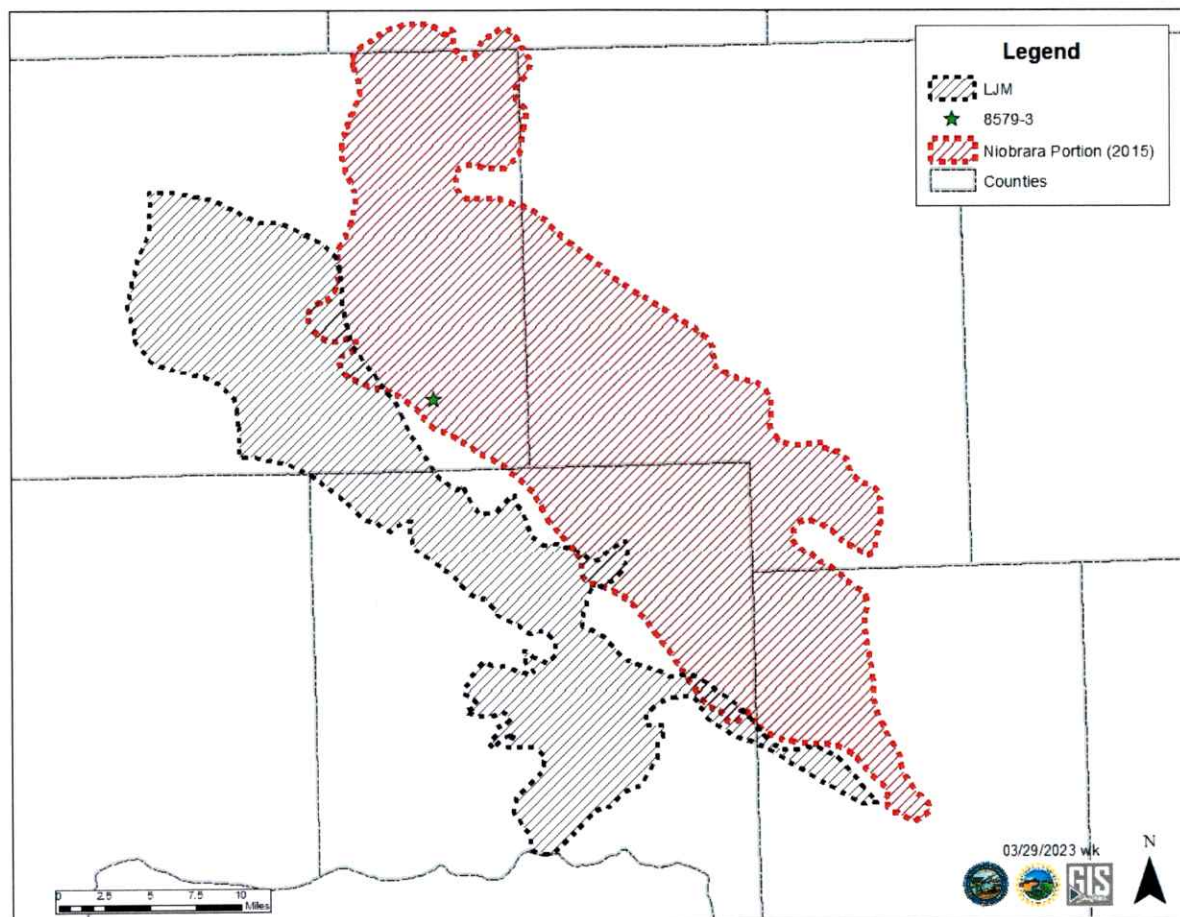


Figure 7: Approximate areas of contact between this portion of the Niobrara Aquifer and the Lower James Missouri aquifer (modified from Hedges et al., 1982; Tomhave and Schulz, 2004 and Holmes and Filipovic, 2015)

Natural Discharge

The natural discharge from this portion of the Niobrara aquifer can be estimated using information from potentiometric surface mapping in addition to other data. The flow rate for natural discharge is estimated using equation 1.

$$\text{Equation 1: } Q = T * I * L * c$$

Where:

Q=flow rate, units: acre-feet per year

T= Transmissivity (hydraulic conductivity times aquifer thickness), units: gallons per day per foot (gpd/ft)

I=Gradient of the Potentiometric surface, units: feet per mile (ft/mi)

L=Length of aquifer contact, units: miles

c=conversion factor equal to 365 days per year divided by 325,851.429 gallons per acre-feet=0.00112

The green B-B' line in Figure 8 is 3.0 miles long. It is the approximate length of the Niobrara aquifer and Lower James Missouri aquifer connection downgradient of the proposed wellsite for this application. Due to limited data availability along the edge of the aquifer, for analysis the discharge line had to be shifted slightly upgradient of the actual area of connection between the two aquifers. This length, 3.0 miles, is used for "L" in equation 1. Pumping data from both domestic and appropriative wells were used to calculate specific capacity, which was then used to estimate transmissivity and hydraulic conductivity. This information is summarized in Table C1 of Appendix C. The calculation of hydraulic conductivity was used as a check of calculated transmissivity values. Appendix C includes further discussion of data points tagged as outliers. Table C1 is split into three sections: data within one mile of the B-B' line (Section 1), data from the rest of the aquifer (Section 2), and outlier data (Section 3). The average gradient of the potentiometric surface, I, across line B-B' for each time period is shown in Table 3. The estimated flow across B-B' for each time period is summarized in Table 3. Average estimated discharge across the B-B' line is 173 acre-feet per year. While calculation utilizing the overall estimated non-outlier average transmissivity for the aquifer are also presented in Table 3, the more representative transmissivity value for estimated discharge across B-B' is the average of transmissivity values within one mile of the B-B' line (Table C1 Section 1 average).

Table 3: Estimated Discharge Across B-B'						
Year	Gradient (ft/mi)	Table C1 Section 1- Average Transmissivity (T) (gpd/ft)	Table C1 Section 1 & 2- Average Transmissivity (T) (gpd/ft)	Length (mi)	Discharge (acre-feet/yr) using Section 1 Average T	Discharge (acre-feet/yr) using Section 1 & 2 Average T
1986	30	2,243.7	4,293.2	3.0	226.17	432.75
2016	10	2,243.7	4,293.2	3.0	75.39	144.25
2013	17	2,243.7	4,293.2	3.0	128.16	245.23
2018	insufficient data coverage				n/a	n/a
2022	35	2,243.7	4,293.2	3.0	263.86	504.88
Average					173.39	331.78

Kilts (2024) estimated flow through the discharge area to the Lower James Missouri aquifer directly north of this discharge area (shown in Figure 8 as the peach-colored C-C' line) to be 346 acre-feet per year. Kilts (2023b) estimated discharge from this portion of the Niobrara aquifer to the Upper Vermillion Missouri: West aquifer downgradient of the well site for Application No. 8684-3 to range between 685 to 890 acre-feet per year. Kilts (2023b) also noted there was likely additional natural discharge potential to the Upper Vermillion Missouri: South aquifer and other adjacent aquifers along the eastern edge of this portion of the Niobrara aquifer that have not yet been quantified.

Rather than estimate discharge to the Lower James Missouri aquifer utilizing local discharge area estimates (as done above and in Kilts (2024 and 2023b)), Mathiowetz (2016) used a single line (the yellow A-A' line in Figure 4) with a total length equal to the various areas of connection between this portion of the Niobrara aquifer and the Lower James Missouri aquifer to estimate total natural discharge to the Lower James Missouri aquifer. Mathiowetz (2016) used equation 1 with a L of 17.5 miles, a I of 20 ft/mi, and a T of 25,092 gpd/ft to estimate a total natural discharge to the Lower James Missouri aquifer from this portion of the Niobrara aquifer of approximately 9,837 acre-feet per year. Mathiowetz (2016) estimated transmissivity using data from 27 high-capacity wells (primarily for irrigation use) authorized by water rights/permits, several of the data points used by Mathiowetz (2016) were tagged as outliers in Table C1. Given

that water movement in the Niobrara aquifer is dominated by secondary porosity features, the average transmissivity of Mathiowetz (2016) only represented areas of higher transmissivity within the aquifer that are capable of supporting high capacity well yields and only captured an average of the very high end of transmissivity within the aquifer. The non-outlier average transmissivity (4,293.2 gpd/ft) presented in Table C1 (which includes domestic well data) is a transmissivity that is much more representative of average conditions in the aquifer than the transmissivity estimate of Mathiowetz (2016). Recalculation of the total natural discharge to the Lower James Missouri aquifer for May 2016 using the more representative value for transmissivity for this aquifer results in an estimated total natural discharge to the Lower James Missouri aquifer from this portion of the Niobrara aquifer of 1,803 acre-feet. Given that this discharge estimate uses a more representative value for transmissivity for this aquifer, 1,803 acre-feet per year is a closer estimate of the magnitude of natural discharge occurring from this aquifer to the Lower James Missouri aquifer. In looking at Table 3, Kilts (2024), and Kilts (2023b) the localized natural discharge estimates for May 2016 are consistently at the lower end of the range for the time periods examined, so this estimate could be considered slightly conservative.

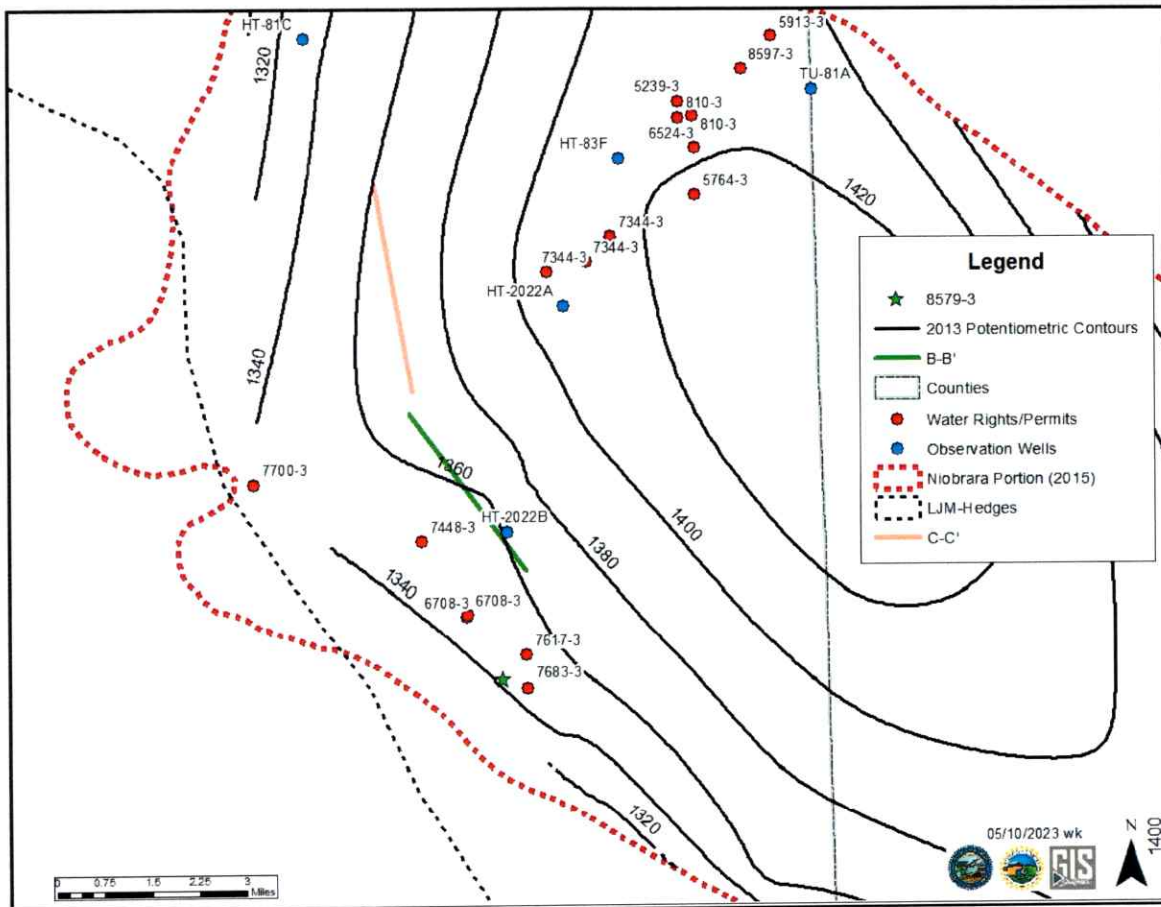


Figure 8: Location of reference lines used to estimate localized natural discharge for this application and Kilts (2024). Also shown for reference is the approximately boundary of the Lower James Missouri (LJM) aquifer (Hedges et al., 1982) and the May 2013 potentiometric surface contours.

South Dakota Codified Law (SDCL) 46-2A-9

Pursuant to SDCL 46-2A-9, “A permit to appropriate water may be issued only if there is a reasonable probability that there is unappropriated water available for the applicant’s proposed use, that the diversion point can be developed without unlawful impairment of existing domestic water uses and water rights, and that the proposed use is a beneficial use and in the public interest as it pertains to matters of public interest within the regulatory authority of the Water Management Board as defined by SDCL 46-2-9 and 46-2-11.” This report will address the availability of unappropriated water and the potential for unlawful impairment of existing domestic water uses and water rights within this portion of the Niobrara aquifer.

Water Availability

Water Permit Application No. 8579-3 proposes to appropriate water from the Niobrara aquifer for irrigation use. The probability of unappropriated water being available from an aquifer can be evaluated by considering SDCL 46-6-3.1 which requires, “No application to appropriate groundwater may be approved if, according to the best information reasonably available, it is probable that the quantity of water withdrawn annually from a groundwater source will exceed the quantity of the average estimated annual recharge of water to the groundwater source.” If the source of the water is older or lower than the Greenhorn Formation and the application is for a water distribution system defined in SDCL 46-1-6 (17), the Board need not consider the recharge/withdrawal issue. The Niobrara Formation is neither older or stratigraphically lower than the Greenhorn Formation and this application is not for a water distribution system as defined in SDCL 46-1-6 (17); therefore, the withdrawal/recharge issue must be considered.

Observation Well Data

In determining the availability of unappropriated water for a permit application, Administrative Rule 74:02:05:07 requires the Water Management Board to rely on the record of observation well measurements, in addition to other data, to determine that the quantity of water withdrawn annually from the aquifer does not exceed the estimated annual recharge.

The DANR Water Rights Program monitors 13 observation wells completed into this portion of the Niobrara aquifer (Water Rights, 2024c). Two of those observation wells (HT-2022A and HT-2022B) were installed in 2022 and have a limited period of record, so their data is of limited usefulness in evaluating long term water availability. During the winter of 2022 and early spring of 2023, a programming error in the dataloggers resulted in no data collection during that time. The hydrographs for these two wells also include both data logger data and manual readings. The nearest observation well to the proposed well location for this application is observation well HT-2022B located approximately 2.3 miles to the north of the well location for this application. The next nearest observation well is HT-2022A located approximately 5.9 miles to the north of the proposed well site for this application. The hydrographs for these observation wells are shown in Figure 9.

The closest observation wells to the proposed well site for this application with long periods of record are HT-83F (approximately 8.3 miles north) and TU-81A (approximately 10.4 miles north-northeast). The remaining hydrographs for the observation wells completed into this portion of the Niobrara aquifer are shown in Figure 10, with just observation wells in the northern portion

of the aquifer shown in Figure 11. Readings on TU-81A were suspended in 2023 due to the presence of iron bacteria in the well (Water Rights, 2024c). The location of these observation wells are shown in Figure 12.



Figure 9: Hydrograph of Observation Wells HT-2022A and HT-2022B (Mathiowetz, 2024 and Water Rights, 2024c).

Of note in the hydrograph for observation well HT-2022A, is what appears to be a response in the water levels to a nearby high capacity well operating in November of 2023. In talking to the holder of the closest permit (Water Permit No. 7344-3 held by Michael Schultz), Mr. Schultz indicated he likely operated the Niobrara wells associated with Permit No. 7344-3 around that time (Schultz, 2024). The system for Permit No. 7344-3 includes a storage pond and typically irrigation is done out of the storage pond. Depending on the pond level, water is sometimes added to the storage pond outside of the irrigation season in preparation for the next season (Schultz, 2024 and Water Rights, 2024b). Mr. Schultz indicated he does not track when he runs his wells for the annual irrigation questionnaire to the Water Rights Program, just when he irrigates, but believed he ran the wells last winter to partially refill the pond (Schultz, 2024). This response is not seen in the hydrograph for HT-2022B either the pumping did not go on for a long enough period of time to reach the observation well or some hydrogeologic property of the aquifer limits the impacts of pumping of the wells for Water Permit No. 7344-3 from reaching HT-2022A.

In looking at the hydrograph for HT-2022B during both the 2022 and 2023 irrigation seasons, the water level drops below the top of the Niobrara Formation. Although the period of record is limited for HT-2022B, the hydrograph indicates that during periods of dry climatic conditions and higher than average pumping (Table 7) water levels likely do not fully recover from the previous year's irrigation seasons prior to the start of the next irrigation season. However, the period of record is not long enough to determine if, long-term, the combination of wetter climatic periods with less irrigation and dry climatic periods with increased irrigation will result in stable, increasing, or decreasing water levels in this area of the aquifer. Also, in looking at the hydrograph for HT-2022B, response to a single pumping well cannot be distinguished from the cumulative pumping in the area.

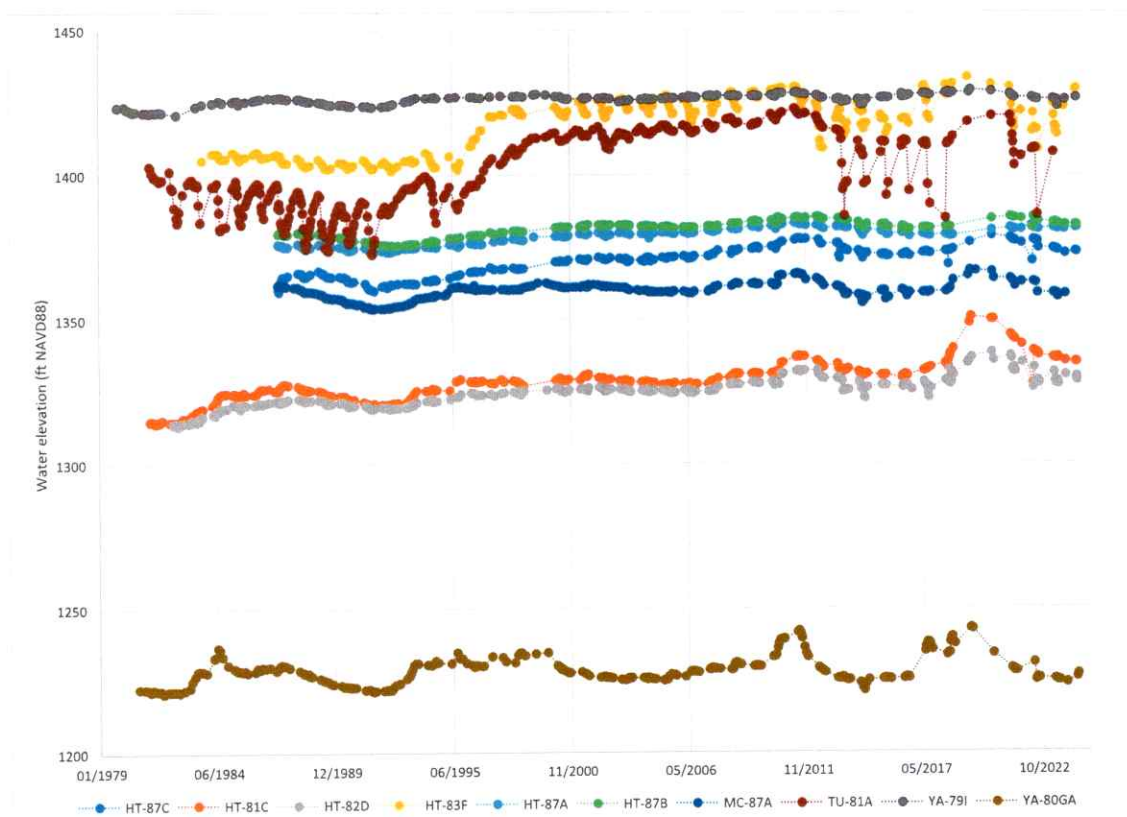


Figure 10: Hydrographs for observation wells monitoring this portion of the Niobrara aquifer with over 20 years of data (Water Rights, 2024c)

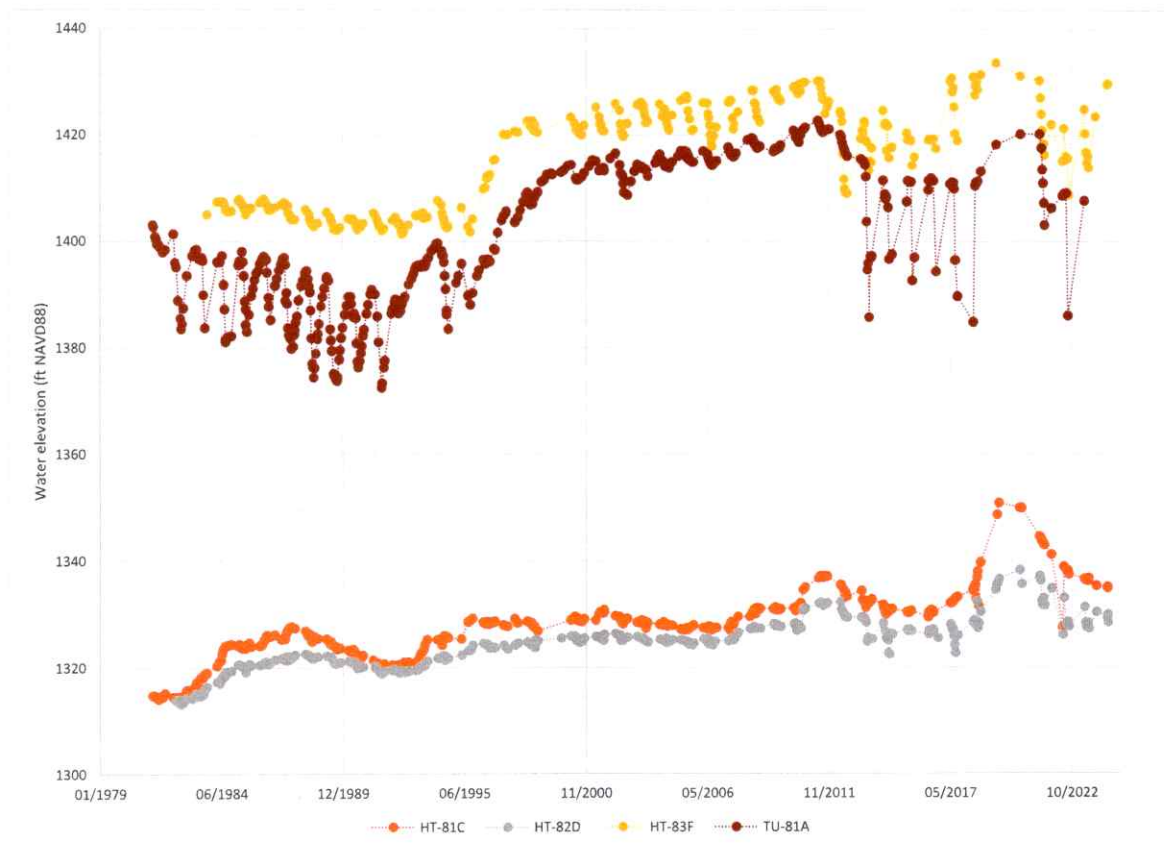


Figure 11: Hydrographs for the observation wells within approximately 10 miles of the well site for this application monitoring this portion of the Niobrara aquifer with over 20 years of data (Water Rights, 2024c). Note these wells are also shown in Figure 10. The top of the Niobrara elevation (NAVD88) is approximately 1,281 ft at HT-81C, 1,292 ft at HT-82D, 1,403 ft at HT-83F, and 1,284 ft at TU-81A (Water Rights, 2024c).

The hydrographs shown in Figures 10 and 11 are representative of the longer term (approximately 35 to 42 years) showing stable to slightly to moderately increasing water level trends in this portion of the Niobrara aquifer. The magnitude of shorter period fluctuations in response to wet and dry climatic cycles varies between observation wells. For example, see the variation in the hydrographs for observation wells YA-79I and YA-80GA. Several observation wells (for example HT-83F and TU-81A) in close proximity to irrigation wells show localized seasonal dips in measured water levels during the irrigation season in response to pumping (Water Rights, 2024b and 2024c). This is representative of the artesian head pressure of the aquifer in the area responding to seasonal irrigation pumping. However, water levels recover after the end of the irrigation season when pumping ends. Around 1996, behavior changes in both TU-81A and HT-83F is noticeable; this is approximately when The Town of Freeman began using rural water (Water Rights, 2024b). HT-83F is approximately 1 mile from the town's wells and TU-81A is approximately 2 miles away. TU-81A appears to start responding to seasonal pumping in 2013; this corresponds with Water Right No. 5913-3 located 1.1 miles to the north-northwest starting to consistently report a higher volume of water use during the irrigation season.

Water levels in the observation wells monitoring this aquifer generally rise during wet periods and decline to stable levels during drier periods. This type of behavior, along with aquifer recovery following the irrigation season, is indicative that climatic conditions, and therefore the effects of recharge to and natural discharge from the aquifer, govern the long-term fluctuations in water levels in the aquifer instead of pumping. Since recharge to and natural discharge from an aquifer can be captured for pumping, there is a reasonable probability that unappropriated water is available from this portion of the Niobrara aquifer for the proposed appropriation.

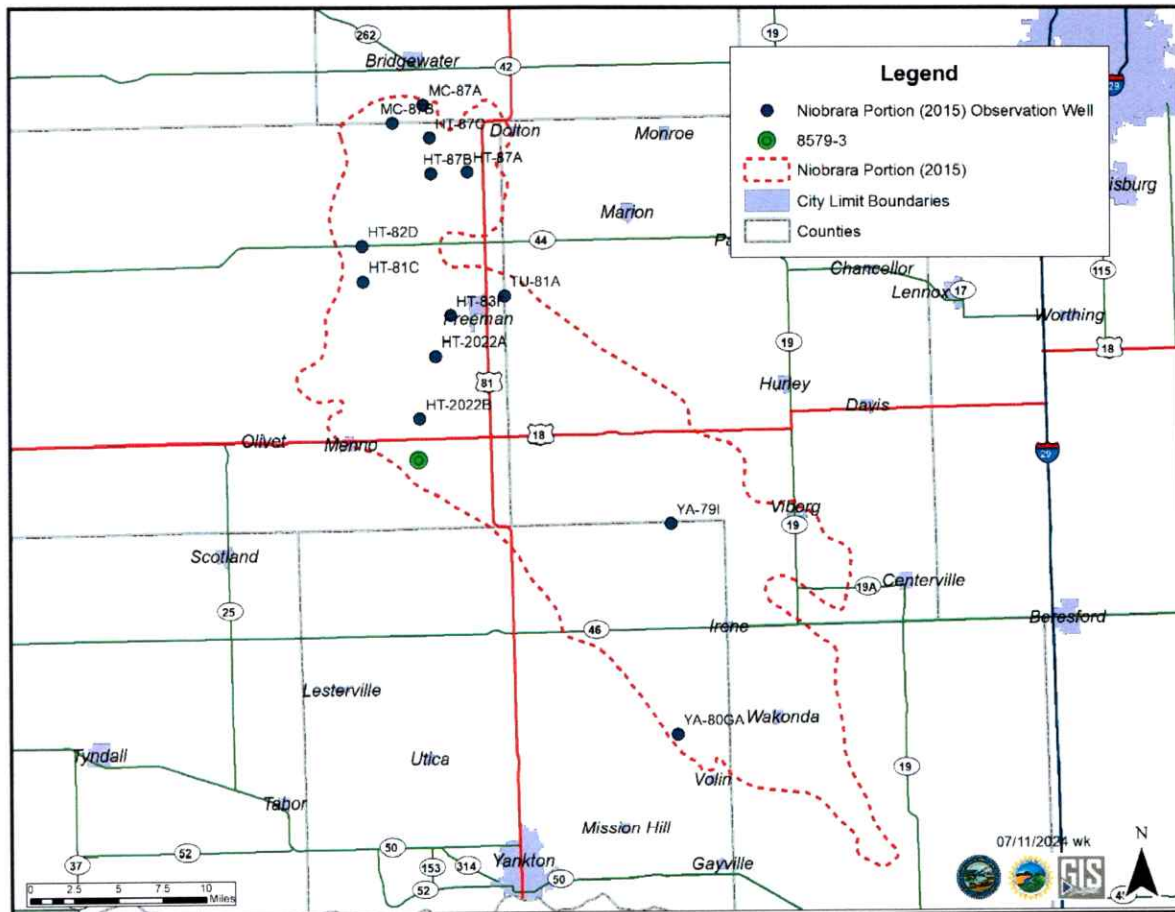


Figure 12: Location of observation wells monitoring this portion of the Niobrara aquifer (Water Rights, 2024c)

Hydrologic Budget

Direct comparison of average annual withdrawals to average annual recharge is statutorily required to determine whether water is available for appropriation from an aquifer. However, other components of an aquifer's budget can be used to examine the approximate status of water availability (or provide a general idea of the magnitude of recharge to an aquifer) in an aquifer or area of an aquifer. In general, for aquifers under natural conditions (no artificial withdrawals), the hydrologic budget of an aquifer can be represented by equation 2. When using equation 2 to look

at the natural conditions of an aquifer, the change in storage is typically estimated to average out to zero over the longer term. However, the shorter-term recharge and discharge fluctuate from year to year based on climatic conditions. Thus, the shorter-term changes can be examined to estimate water movement through the aquifer.

$$\text{Equation 2: } \Delta S = R - D$$

Where:

ΔS = change in storage

R = recharge (water entering the aquifer)

D = discharge (water leaving the aquifer)

In general, once pumpage (artificial withdrawals) from the aquifer starts, the discharge component of the equation can be broken down into pumping withdrawals and natural discharges (i.e. seepage to other aquifers, evapotranspiration, seepage to surface water, etc.), shown in equation 3.

$$\text{Equation 3: } \Delta S = R - (W + D_{nat})$$

Where:

ΔS = change in storage

R = recharge (water entering the aquifer)

D_{nat} = natural discharge (water leaving the aquifer through natural means)

W = withdrawals (water leaving the aquifer through artificial means (e.g. pumpage))

Given the management requirements, that the quantity of water withdrawn from a groundwater source not exceed the quantity of the average estimated annual recharge to the groundwater source, the goal is long-term change in storage in the aquifer be zero or be positive. In order for this balance to be achieved, either additional recharge has to occur (e.g. by pumping the target aquifer in close proximity to a connected aquifer creating a gradient to allow flow from the connected aquifer into the target aquifer) or natural discharge to other connected water sources has to decrease (or a combination of the two). Ultimately, there is a limit to how much recharge can increase, and natural discharge can decrease to support increasing withdrawals; when this limit is exceeded, depletion of the water in storage in an aquifer begins. Equation 3 also illustrates how natural discharge estimates can be used as part of monitoring an aquifer's hydrologic budget, since groundwater tends to move from areas of recharge to areas of discharge (which can be seen in the potentiometric surface map of an aquifer). Ideally the location of the natural discharge estimate is at the location of the discharge; however, data limitations typically prevent this.

There are two approaches to dealing with data limitations when doing natural discharge estimates. Approach one is estimating water movement across a cross section between the recharge and pumping area of an aquifer and the discharge area of an aquifer (similar to the C-C' line in Figure 8). Approach two is estimating water movement across a cross section between the recharge area of an aquifer and the discharge and pumping area of an aquifer (similar to the B-B' line in Figure 8).

For natural discharge estimates, water levels from the late April to May time period are targeted to minimize the impact of local pumping (drawdown from an individual pumping well) on the estimate, since by late April to May water levels have typically recovered to the greatest extent possible at the current climatic conditions from the prior irrigation season and pumping on the next irrigation season has not yet begun. Additionally, critical to using natural discharge estimates from an aquifer to examine the status of the hydrologic budget is having observation well data to approximate the direction of storage changes in an aquifer over the long term (e.g. increasing, stable, or decreasing). While changes in the water level in an observation well under confined conditions is not a direct measurement of the change in storage of an aquifer, depending on aquifer characteristics in confined observation wells with limited artesian head pressure (less than 50 ft or so) changes in water level can still be indicative of changes in aquifer storage. Especially when water level can be seen to be dropping below the top of the formation during the year, for example HT-2022B. In the Niobrara aquifer where fractures and solution cavities are the main means of water movement and the compressibility of the aquifer material itself is limited, confined observation wells in this type of aquifer material with limited artesian head pressure can be indicative of changes in water storage in the aquifer.

Recharge

Recharge to this portion of the Niobrara aquifer is primarily from groundwater inflow from adjacent or overlying aquifers due to leakage from these hydrologically connected aquifers when the potentiometric gradients are favorable (a higher hydraulic head in the connected overlying or adjacent aquifer than in the Niobrara aquifer indicates potential for leakage into the Niobrara aquifer). Kilts (2023a) presents the support for the Turkey Ridge aquifer being a source of recharge to this portion of the Niobrara aquifer. Some recharge is also likely from infiltration from precipitation where the Niobrara is at or near ground surface, and leakage through till (Lindgren and Hansen, 1990).

There is no estimate of average annual recharge to this portion of the Niobrara aquifer or the Niobrara aquifer in general available for South Dakota (Hedges et al., 1985). However, of the Niobrara aquifer in South Dakota, Hedges, et al. (1985) noted the Niobrara aquifer had such high storage and low use it was unlikely that withdrawals are approaching or exceeding recharge and there was no evidence of significant head loss in the aquifer to suggest that use is exceeding recharge at that time. As documented in the observation well section of this report, the additional years of observation well data collected since Hedges, et al. (1985) still show no evidence of significant long term head loss across the entirety of the aquifer (Water Rights, 2024b).

Discharge

Discharge from this portion of the Niobrara aquifer is due to well withdrawals and leakage to hydrologically connected aquifers where the potentiometric gradients are favorable (a higher water level elevation in the Niobrara aquifer than in an overlying or adjacent aquifer would indicate potential for discharge from the Niobrara) and some limited seepage to surface water. There are currently 24 active water rights/permits in this portion of the Niobrara aquifer, and two pending irrigation applications with priority dates junior to this application for irrigation use (summarized in Table 1). The approximate location of the diversion point or points for these water rights/permits

and pending applications is shown in Appendix B Figure B4. Of the water rights/permits, 16 are for irrigation use, 3 for municipal use, 4 for commercial use, and 1 for institutional use.

The eight non-irrigation water rights/permits are summarized in Table 4. The Town of Irene and the City of Freeman both purchase their water from a rural water system but keep their water rights on standby for emergency use, so their average annual withdrawal is estimated to be zero (Drinking Water, 2023). Historically, average water use by non-irrigation appropriations limited solely by instantaneous diversion rate have been estimated as pumping 60% of the time at the maximum permitted diversion rate. For water rights/permits limited to an annual volume, full use of that volume is assumed for estimation of average annual withdrawal. Appropriative non-irrigation water use is summarized in Table 4. The estimated average annual appropriative non-irrigation use from this portion of the Niobrara aquifer is 539.7 acre-ft per year. There are domestic wells completed into this portion of the Niobrara aquifer that do not require appropriative water permits or report annual pumpage. Due the development of rural water systems in the area and to their relatively limited diversion rates, it is assumed the volume pumped from domestic wells is negligible to the hydrologic budget for this aquifer.

Table 4: Non-irrigation Use (Water Rights, 2024b)							
Permit No.	Name of Permit Holder	Priority Date	Status	Use	Rate (cfs)	Annual Volume Limit (acre-ft)	Estimated Average Annual Use (acre-ft per yr.)
810-3	City of Freeman	01/01/1950	LC	MUN	1.26	n/a	0 (system on standby)
1229-3	Town of Irene	01/01/1915	LC	MUN	0.56	n/a	0 (system on standby)
5239-3	City of Freeman	10/17/1988	LC	MUN	0.33	n/a	0 (system on standby)
6524-3	Freeman Jr College & Freeman Academy	07/19/2004	LC	INS	0.07	n/a	30
6706-3	Pheasant Run Farm	02/21/2006	PE	COM	0.1	n/a	43
8216-3	B&K Dairy Farms LLC	02/01/2016	PE	COM	0.67	460	460
8597-3	CHS Farmers Alliance	02/22/2022	PE	COM	0.1	1.3	1.3
8626-3	Tri-Cross Renewable Energy	03/28/2022	PE	COM	0.1	4.6	4.6
						Total	539.7
LC-water right, PE-water permit, MUN-municipal, INS-institutional, COM-commercial							

The majority of water rights/permits for irrigation in South Dakota are required to report annual irrigation usage to the Water Rights Program. The 16 active irrigation water rights for this aquifer are summarized in Table 5. Reported use for 15 of the 16 active water rights/permits for irrigation from this portion of the Niobrara aquifer are summarized in Table 6. Water Permit No. 8684-3 is still in its five-year construction period and has not yet started irrigation. Water Right No. 5913-3 incorporated portions of another permit when licensed, so reported irrigation usage for the incorporated permit is also included in Table 6.

Updated Report on Water Permit Application No. 8579-3

Table 5: Summary of Irrigation Water Rights/Permits (Water Rights, 2024b)						
Permit No.	Name of Permit Holder	Priority Date	Status	Rate (cfs)	Acres	Comments
5764-3	City of Freeman	03/15/1993	LC	0.24	27.5	irrigation reporting started in 2016
5913-3	Roger Schmidt	04/02/1981	LC	0.77	123	incorporates portions of 4679-3, starts being consistent in 2013
6708-3	David Huber	04/03/2006	LC	1.78	271	
7344-3	Michael Schultz	04/09/2012	PE	5.33	399	has been inspected, developed 21 extra acres
7448-3	Robert Heckenlaible	10/03/2012	LC	6.67	560	
7515-3	Greg Wirth	10/24/2012	PE	2.28	160	
7526-3	Derrick Walter	11/15/2012	PE	3.56	257	
7617-3	Brett Guthmiller	01/07/2013	LC	1.34	119	
7683-3	Roger Guthmiller	01/28/2013	LC	1.34	134	
7700-3	David Huber	02/14/2013	LC	2.22	160	
7893-3	Wayne or Trina Knutson	09/03/2013	LC	0.07	1.2	allows up to 3 acre-feet per year
8162-3	Don Schellpfeffer	05/28/2015	LC	1.78	122.65	
8260-3	Cameron Johnson	12/27/2016	LC	1.67	117.35	
8326-3	Jerry Nelsen	01/08/2018	PE	2.00	120	reported system destroyed in 2020 & no water available since
8416-3	Jerome Poeschl	12/02/2019	LC	1.56	116	
8684-3	Matthew Wirth	11/30/2022	PE	2.11	300	not yet irrigating
LC-license, PE-permit						

Average reported irrigation usage for the water rights/permits for irrigation from this portion of the Niobrara aquifer is 233 acre-ft per year. Since the number of irrigation water rights/permits has continued to increase, the estimated average annual withdrawal rate for irrigation appropriations for the entire period of record may not accurately reflect the current level of development. The average annual withdrawal rate for irrigation appropriations from 2013 to 2023 better represents the current level of irrigation development in this portion of the Niobrara aquifer. Average reported irrigation usage from 2013 to 2023 for the water rights/permits in this portion of the Niobrara aquifer is 773 acre-ft per year. Water Permit Application No. 8616-3 is the result of a licensing inspection for Water Permit No. 7344-3, to reflect an additional 21 acres being irrigated by the irrigation systems authorized under Water Permit No. 7344-3. Since irrigation of these acres is being reported as part of water use under Water Permit No. 7344-3, the water use proposed by Application No. 8616-3 is assumed to be already reflected in the reported irrigation data. Typically, average irrigation rates in eastern South Dakota are less than 10 inches per acre per year (Water Rights, 2024b). Water Permit Nos. 8326-3 and 8684-3 have yet to report any use, so using this rate, average annual water usage is estimated at less than 350 acre-feet per year. This application and Application No. 8587-3 propose to irrigate a total of 166 new acres, estimated average annual water use for these applications is less than 138 acre-feet per year. Total estimated average annual irrigation use plus expected irrigation use from this and other pending applications from this portion of the Niobrara aquifer is less than 1,261 acre-feet per year.

Table 6: Reported Irrigation use (Water Rights, 2024e)

Year	No. Permits	Reported Pumping (acre-feet)
1981	1	0.0
1982	1	69.7
1983	1	35.6
1984	1	42.0
1985	1	50.0
1986	1	50.0
1987	1	120.0
1988	1	72.9
1989	1	136.6
1990	1	92.8
1991	1	106.1
1992	1	6.6
1993	1	0.0
1994	1	33.1
1995	1	29.4
1996	1	6.6
1997	1	9.0
1998	1	0.0
1999	1	0.0
2000	1	0.0
2001	1	0.0
2002	1	25.2
2003	1	7.7
2004	1	0.0
2005	1	0.0
2006	1	0.0
2007	2	23.1
2008	2	49.5
2009	2	28.3
2010	2	0.0
2011	2	141.4
2012	3	381.6
2013	13	999.1
2014	14	928.9
2015	15	724.6
2016	16	518.1
2017	17	616.8
2018	18	98.0
2019	18	20.5
2020	19	815.0
2021	19	1024.5
2022	19	1451.1
2023	15	1310.7
Max	19	1451.1
Min	1	0
1981-2023 Avg	5.2	233.1
2013-2023 Avg	16.6	773.4

Natural discharge from an aquifer can be used to gain understanding into the status of an aquifer's hydrologic budget when an estimated average annual recharge value is not available. The updated May 2016 estimate of natural discharge occurring from this aquifer to the Lower James Missouri aquifer is 1,803 acre-feet per year. Since this estimate is for a single point in time (May 2016), this value does not represent an average annual value for discharge from the aquifer but does offer insight into the magnitude of discharge from the western flank of the aquifer at the time the analysis was performed. Actual natural groundwater discharge from this aquifer (and therefore recharge to) is likely higher than indicated by this estimate. This is due to the direction of groundwater flow being generally from the center of the aquifer outward to the edges of the aquifer and this estimate is only for natural discharge from the western side of the aquifer. Additionally, Kilts (2023b) estimated discharge from this portion of the Niobrara aquifer to the Upper Vermillion Missouri: West aquifer downgradient of the well site for Water Permit No. 8684-3 to be 685 to 890 acre-feet per year. Kilts (2023b) also noted there was likely additional natural discharge potential to the Upper Vermillion Missouri: South aquifer and other adjacent aquifers that have not yet been quantified. Therefore, there is a reasonable probability that over the total extent of this portion of the Niobrara aquifer, water is available for this application and the other applications summarized in Table 1. However, since this natural discharge estimate only serves as an indicator of the magnitude of discharge from the aquifer at the point in time of the estimate, it is worth emphasizing the importance of observation well data as part of assessing water availability in this aquifer.

Balance

Estimated average appropriative withdrawals from this aquifer, including the applications summarized in Table 1, is less than 1,801 acre-feet per year (irrigation: 1,123 acre-feet, non-irrigation: 540 acre-feet, Application No. 8587-3 and this application: 138 acre-feet). There is no recharge estimate for this portion of the Niobrara aquifer. However, natural discharge estimates can be used to gain an understanding of the approximate amount of recharge an aquifer is receiving. Estimated overall natural discharge from this portion of the Niobrara aquifer to the Lower James Missouri aquifer to approximately 1,803 acre-feet per year for May of 2016. Kilts (2023b) estimated natural discharge to the Upper Vermillion: West on the eastern side of the aquifer ranging between 685 to 890 acre-feet per year. This totals an estimated natural discharge ranging from 2,488 to 2,693 acre-feet per year based on the points in time the discharge was calculated. Kilts (2023b) also noted there is likely additional natural discharge occurring to the Upper Vermillion: South aquifer from this portion of the Niobrara aquifer. Based on these estimates of natural discharge from the aquifer, there is a reasonable probability that water is available from the overall extent of this portion of the Niobrara aquifer for the appropriation requested by this application.

Localized Budget

Localized budgets are utilized in subareas of aquifers where (based on the engineering judgment of Water Rights staff) a combination of significant hydrogeology characteristics and appropriative water use results in a locally distinct subarea of water availability from the overall water availability in an aquifer. Examples of where subareas are routinely utilized would be the

Madison, Minnelusa, and Inyan Kara aquifers at locations in close proximity to the aquifer outcrop areas in the Black Hills (Water Rights, 2023b). For this portion of the Niobrara aquifer, the potentiometric surface mapping consistently indicates that water movement is generally from the central area of the aquifer to the outer edges of the aquifer indicating the potential for differing water availability between the various flanks of the aquifer.

Figure 8 shows the water rights/permits in the vicinity of the localized natural discharge estimate summarized in Table 3 and in Kilts (2024). The water rights/permits associated with the localized natural discharge estimate shown in Table 3 (approximately 173 acre-feet per year) are Water Right Nos. 6708-3, 7448-3, 7617-3, 7683-3, and 7700-3. Given the close proximity of Water Right No. 7700-3 to the natural discharge area to the north (C-C' line) of the one represented by the B-B' line, Water Right No. 7700-3 is likely also utilizing some amount of natural discharge occurring to the north of the discharge area being examined in this localized budget. Water use for the water rights associated with the localized natural discharge estimate is shown in Table 7. Water Right No. 7700-3 reported no pumping in 2022; it was indicated the system was damaged in a storm (Water Rights, 2024e).

Table 7: Reported Irrigation by Year in the Area of B-B' in Acre-Feet (Water Rights, 2024e)

Permit No.	6708-3	7448-3	7617-3	7683-3	7700-3	Total
Priority Date	04/03/2006	10/03/2012	01/07/2013	01/28/2013	02/14/2013	
Approximate distance to complaint wells (miles)	2.1	1.9	2.6	3.1	4.3	
Total Acres	271	304	119	134	146	974.0
2023	167.9	179	69	33.4	58.9	508.2
2022	243.06	201.63	89.82	82.58	0.00	617.1
2021	86.9	192.5	43.1	57.4	15.5	395.4
2020	103.3	125.4	35.7	38.1	51.6	354.0
2019	0.0	0.0	0.0	0.0	0.0	0.0
2018	0.0	29.0	5.7	0.0	0.0	34.7
2017	10.6	26.5	25.4	28.7	42.4	133.6
2016	0.0	117.7	30.5	31.6	28.3	208.0
2015	77.8	75.1	18.6	21.1	56.6	249.1
2014	169.7	136.7	60.8	80.4	120.2	567.8
2013	155.6	175.7	43.1	59.1	141.4	574.9
2012	272.2	n/a	n/a	n/a	n/a	272.2
2011	141.4	n/a	n/a	n/a	n/a	141.4
2010	0.0	n/a	n/a	n/a	n/a	0.0
2009	28.3	n/a	n/a	n/a	n/a	28.3
2008	49.5	n/a	n/a	n/a	n/a	49.5
2007	23.1	n/a	n/a	n/a	n/a	23.1
Average 2007-2023						244.5
Average 2013-2023						331.2

This application is seeking to irrigate 32 acres, so estimated average annual use for this application is less than 27 acre-feet per year. This results in a localized estimated average annual water use of 358 acre-feet per year. The estimated localized natural discharge in this area is 173 acre-feet per year (Table 4). This indicates that caution should be used in adding additional appropriative users to this localized area, since to support additional users in this area horizontal groundwater movement into the area downgradient of B-B' would have to be induced from the areas adjacent to the area downgradient of B-B' (such as the area downgradient of C-C') by

pumpage from water users in the area downgradient of B-B'. Withdrawals exceeding groundwater movement into a localized area, can result in a localized long-term decreasing trend in local water levels (that does not eventually stabilize in relation to withdrawals) governing local water levels rather than climatic conditions. In areas dominated by seasonal pumping, this would start as one or two wells being impacted toward the middle and end of an irrigation season when higher-than-average irrigation pumping is occurring. Then, unless water levels stabilize as water levels decrease over time, the number of wells impacted would increase with the most impacted wells experiencing issues sooner in the irrigation season even with average irrigation pumpage. Since this natural discharge estimate only serves as an indicator of the magnitude of recharge to a localized area within an aquifer at the point of time of the estimate, it is worth emphasizing the importance of observation wells as part of monitoring this aquifer. The only observation well in this localized area is HT-2022B for which limited data is available. Depending on the aquifer and climatic conditions, it takes five to ten years of data before conclusions can be drawn on water availability from observation well data.

The localized budget for this subarea of this portion of the Niobrara aquifer and the localized budget areas Kilts (2024) and Kilts (2023b), is not to be considered as a budget representing separate groundwater sources pursuant to SDCL 46-6-3.1. Therefore, average annual withdrawals exceeding average annual recharge within a subarea of a groundwater source is not a violation of SDCL 46-6-3.1. However, impacts of average annual withdrawals exceeding average annual recharge within this localized area, may eventually result in unlawful impairment of existing users. So, while this localized budget is presented in the water availability section of this report (since it uses methodology based on the overall review of water availability from the groundwater source), the review of this localized budget serves more as an analysis reviewing the potential for cumulative appropriative use in a localized area resulting in unlawful impairment of existing domestic water uses and water rights over a longer term time scale than is typically reviewed as part of the potential for unlawful impairment. The potential for unlawful impairment review generally focuses more on the potential for direct impact and unlawful impairment of existing users as a result of drawdown caused by pumping. In this particular instance, it is prudent to consider whether the longer-term cumulative impacts of pumping by the proposed application and existing users may eventually cause an unlawful impairment of existing users due to relatively limited local transmissivity and natural discharge.

Potential for Unlawful Impairment

Area water rights/permits completed into this portion of the Niobrara aquifer are shown in Figure 8 and summarized in Tables 4 and 5. The nearest water right/permit to the proposed well site for this application is Water Permit No. 7683-3 for irrigation of 134 acres located approximately 0.4 miles to the southeast. The nearest domestic well on file with the Water Rights Program not under the last name of Guthmiller is for Ernest Handel located approximately 0.7 miles to the northwest based on the legal description provided by the well driller in the well completion report (Water Rights, 2023a). There could potentially be other domestic wells completed into the Niobrara aquifer near the diversion point that are not on file with the DANR-Water Rights Program.

In 2013, the Water Rights Program received a complaint of a domestic well being impacted in this portion of the Niobrara aquifer in the general area of this application; however, when

investigated, it was determined that the well had likely collapsed and was not an adequate well as defined by Administrative Rules of South Dakota (ARSD) 74:02:04:20(6) (Water Rights, 2023d). ARSD 74:02:04:20(6) defines an adequate well as, “a well constructed or rehabilitated to allow various withdrawal methods to be used, to allow the inlet to the pump to be placed not less than 20 feet into the saturated aquifer or formation material when the well is constructed, or to allow the pump to be placed as near to the bottom of the aquifer as is practical if the aquifer thickness is less than 20 feet”.

In 2015, a complaint was received that Water Permit No. 7526-3 (near the northern edge of this portion of the Niobrara aquifer) was impacting springs; however, the springs were identified as artesian in nature and artesian head pressure is not protected as a means of delivery. Therefore, it was concluded that no unlawful impairment was occurring (Water Rights, 2023d), since in the case of Water Permit Application No. 2313-2 for the Coca-Cola Bottling Company of the Black Hills the Water Management Board adopted findings that noted that if the increased costs or decreased production as a result of the impacts of legitimate users on artesian head pressure could be considered an adverse impact, it would conflict with SDCL 46-1-4 (Water Rights, 1995). SDCL 46-1-4 requires the water resources of the state be put to beneficial use to the maximum extent of which they are capable (Water Rights, 1995).

On May 4th, 2022, the South Dakota Water Management Board took action to defer Application No. 8579-3 (this application) for up to two years to allow for study to determine if existing irrigation in the area was unlawfully impairing two adequate domestic wells located approximately 2.3 miles to the north of the well site for this application in relation to a complaints starting in August 2021 (Water Rights, 2023b). On January 10th, 2023, the Water Rights Program was notified that the water supply from the adequate domestic wells in question had been replaced with connections to a rural water system. However, the available information for these domestic wells (D. Mehlhaf and T. Mehlhaf wells both drilled in 2012) and another area domestic well (Streyle well drilled 08/06/2013) will be reviewed to consider potential for unlawful impairment to occur.

To aid in the consideration of unlawful impairment, the Water Management Board has adopted the definition of an adversely impacted domestic well in ARSD 74:02:04:20(7). The Board has defined an adversely impacted domestic well as “a well in which the pump intake was set at least 20 feet below the top of the aquifer at the time of construction or, if the aquifer is less than 20 feet thick, is as near to the bottom of the aquifer as is practical and the water level of the aquifer has declined to a level that the pump will no longer deliver sufficient water for the well owner's needs.” While in most aquifers 20 feet is an adequate depth of water for prior users and domestic wells, in some areas of the Niobrara aquifer, 20 feet of aquifer is not sufficient for a well to be a dependable water supply; ARSD 74:02:04:60 could be used to aid in identifying these areas.

ARSD 74:02:04:60 specifies requirements for the installation of pumps in wells. The rule requires that the depth of the pump inlet placement be determined by dividing the specific capacity of the well into the required yield and adding at least 10 additional feet. This represents an estimate of the pump inlet depth needed to maintain pump submergence below the maximum anticipated drawdown that would likely occur due to pumping from the well itself. This is the estimated depth of pump inlet placement to prevent the pump from pumping itself dry. Review of

the basic data from the domestic wells at the time of drilling and the calculation for ARSD 74:02:04:60 is summarized in Table 8. The review of the data and the ARSD 74:02:04:60 calculation indicates that the D. Mehlhaf and Streyle wells, aquifer characteristics, and the requirements for pump inlet placement per ARSD 74:02:04:60 point to 20 feet of aquifer thickness not being sufficient for the well to be a dependable water supply.

Table 8: Domestic Well Information (Water Rights, 2023a and Water Rights, 2023d)

Information	Well		
	D. Mehlhaf 2012	T. Mehlhaf (10/10/2012)	Streyle (08/06/2013)
Ground elevation* (ft)	1460	1450	1400
Static water level drill date (ft)	74	73	44
Static water elevation drill date (ft)	1386	1377	1356
Depth to top of Niobrara (NBRR) (ft)	80	70	58
Elevation top of NBRR (ft)	1380	1380	1342
Elevation 20ft below top of NBRR	1360	1360	1322
Total well depth (ft)	141	101	100
Elevation of bottom of well (ft)	1319	1349	1300
Test pumping rate (gpm)	8	15	15
Draw down from test pump (ft)	36	7	16
Specific Capacity (gpm/foot of drawdown)	0.222	2.143	0.938
Pump Inlet Depth per ARSD 74:02:04:60 (ft)	126	87	84
Pump Inlet Depth per ARSD 74:02:04:60 below top of NBRR (ft)	46	17	26
Pump inlet depth 5/9/2022 driller visit (ft)	137	90	n/a
Pump inlet elevation 5/9/2022 driller visit (ft)	1323	1360	n/a
Static water level 5/9/2022 driller visit (ft)	93	73	n/a
Static water elevation 5/9/2022 driller visit (ft)	1367	1377	n/a
Comments			Showed water at 77ft. Based on this pump inlet placement is likely lower then the estimated 84 ft

*all elevations in Table 8 refer to NAVD88

To attempt to assess impacts to these wells, the water level data from HT-2022B and the other observation wells in this aquifer were utilized to create an estimated potentiometric surface map for this area of the aquifer for Fall 2022. This map is show in Appendix B, Figure B2 with Figure B3 are also included to show the location of existing water rights in relation to these domestic wells. This Fall 2022 potentiometric surface map was used to estimate water levels at these domestic wells under the cumulative impacts of the dry climatic conditions of 2022 and the higher-than-average irrigation pumping that occurred during the 2022 irrigation season. The Fall 2022 estimated water level elevations at these wells are provided in Table 9, along with the estimated water levels from the potentiometric surface maps from other time periods. Also shown in Table 9 is the calculated depth of maximum pump inlet placement per ARSD 74:02:04:60, adjusted for the Fall 2022 water levels, where the calculation per ARSD 74:02:04:60(2) from the Fall 2022 water levels is being used to estimate if the well could have been supplied sufficient water for domestic needs under the combined impact of climatic conditions and pumping on water levels

As a check on the potentiometric surface mapping of the water levels, the water levels for the D. Mehlhaf and T. Mehlhaf wells from the May 2022 driller site visit (not used in the generation of the potentiometric surface mapping) was compared to the generated potentiometric surface mapping. For the T. Mehlhaf well, the difference in water level elevation was three feet, which for the amount of processing and interpreting of data indicates a reasonably good correlation between the generated potentiometric surface and reported water level in the area of this domestic well. For the D. Mehlhaf well, the difference in water level elevation was 11 feet, which is still within reason for the amount of processing and interpreting of data that goes into potentiometric surface mapping. However, in comparing the D. Mehlhaf and T. Mehlhaf well water levels for May 2022, expected well behavior would be to see full recovery of water levels from the pumping of the previous irrigation season. This is seen in the T. Mehlhaf well but not the D. Mehlhaf well, indicating there is potentially another unknown factor influencing water levels in the D. Mehlhaf well (such as notable lower transmissivity in the aquifer locally at the well location or vertical variations in aquifer productivity in the well bore due to fracturing).

Table 9: Estimated Potentiometric Surface at Different Time Periods			
Time Period	Estimated water level elevation at well locations (ft)		
	D. Mehlhaf 2012	T. Mehlhaf (10/10/2012)	Streyle (08/06/2013)
November 1986	1445	1440	1390
May 2016	1390	1390	1355
May 2013	1385	1379	1356
May 2018	n/a	n/a	n/a
May 2022	1378	1374	1354
Fall 2022	1352	1347	1332
Pump inlet depth calculated per ARSD 74:02:04:60 at Fall 2022 water levels (ft)	154	120	94
Pump inlet elevation* calculated per ARSD 74:02:04:60 at Fall 2022 water levels (ft)	1306	1330	1306
Total well depth (ft)	141	101	100

*all elevations in Table 9 refer to NAVD88

The Fall 2022 water level elevation reflects the cumulative impacts of the dry climatic conditions of 2022 and the higher-than-average irrigation pumping that occurred during the 2022 irrigation season. There is not sufficient data available to separate the climatic impacts from the pumping impacts on the estimated Fall 2022 water levels for the location of these domestic wells. Based on the specific capacity of the D. Mehlhaf and T. Mehlhaf wells, the estimated Fall 2022 water level elevations at the wells, and the calculation for ARSD 74:02:04:60 at the Fall 2022 water level; the pump inlet in these wells would need to have been set below the total depth of the wells (and in excess of 20 feet below the pump placement calculated by ARSD 74:02:04:60 at the time of drilling). Based on the specific capacity of Streyle well, the estimated Fall 2022 water level elevations at the wells, and the calculation for ARSD 74:02:04:60 at the Fall 2022 water level; the pump inlet in this well would need to have been set at approximately 94 ft or 6 ft from the bottom of the well (this is 10 ft below the calculated pump inlet placement at the time of drilling). Additionally, although it is the most distant water right from these wells included in the analysis

of localized hydrologic budget, Water Right No. 7700-3 did not operate during the 2022 irrigation season (Table 7). Information is also not available to determine if sufficient thickness exists in the Niobrara aquifer at any of these three domestic well locations to allow for these wells to be deepened while still being open to only the Niobrara aquifer.

Based on the information presented in Table 8, the domestic wells had sufficient depth to meet ARSD 74:02:04:60 requirements at the time of drilling. Since there is not sufficient data available to separate the climatic impacts from the pumping impacts on the estimated Fall 2022 water levels for the location of these domestic wells, there is not sufficient information available to determine if the Mehlhaf wells could supply water needed for domestic use with only climatic impacts on water levels. However, the information from Table 8 and Table 9 suggests in the Fall of 2022 for the two Mehlhaf wells, the water level of the aquifer declined to a level where the pumps could no longer deliver sufficient water for the well owner's needs. As previously mentioned, the two Mehlhaf wells have been replaced by rural water connections. The information presented in Tables 8 and 9 indicates that development in this portion of the Niobrara aquifer could potentially cause unlawful impairment of existing adequate domestic wells (beyond the domestic users that have connected to rural water) during a combination of a dry climatic conditions and the cumulative effects of heavy irrigation pumping.

During the 2022 irrigation season appropriate pumping was shut down in the area of observation wells HT-2020A and HT-2020B. Water Rights/Permit Nos. 7244-3, 7700-3, 7448-3, 7682-3, 7617-3 were issued shutoff orders from July 20, 2022, to July 27, 2022 (Water Rights, 2024b). The location of these water rights/permits and observation wells in relation to each other is shown in Figure 8. The water level data collected by datalogger for 2022 for these two observation wells is shown in Figure 13 along with the date period of the shutoff order. The water levels in HT-2022A can be seen to make faster recovery with the cessation of pumping than in HT-2022B. There are couple of things this response can be indicative of. The magnitude of the seasonal response of water levels in the aquifer due to pumping near HT-2022A may be affected more by the pumping of a single permit rather than cumulative drawdown. Another possibility is that HT-2022A could be closer to recharge source than HT-2022B. Figure 13 and Figure 9 also point to water levels in the aquifer at HT-2022A making a quicker and more complete recovery with the cession of pumping at the end of the irrigation season than HT-2022B.

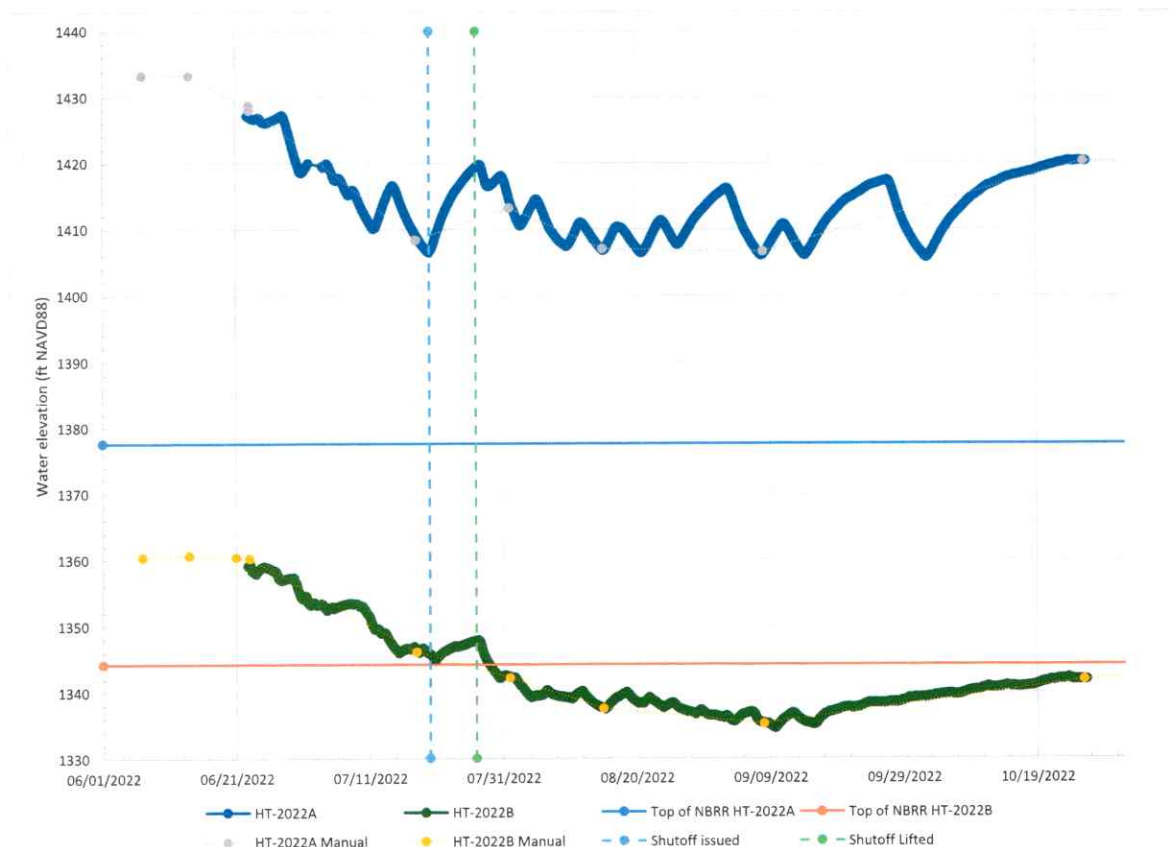


Figure 13: Water level data collected by datalogger for June 2022 to November 2022 for observation wells HT-2022A and HT-2022B (Mathiowetz, 2024 and Water Rights, 2024c).

A more in-depth analysis would require a combination of further information and an extensive groundwater modeling effort using specialized groundwater modeling software to account for the locally complex hydrogeologic conditions and cumulative impacts from the multiple appropriative wells in the area.

SDCL 46-5-6 Diversion Rate Limit

Pursuant to SDCL 46-5-6, the diversion rate for an irrigation appropriation cannot be in excess of one cfs for every 70 acres, or “the equivalent thereof.” The statute does provide that the Water Management Board may allow a greater diversion rate if the method of irrigation or soil types so require. Water Permit Application No. 8579-3 proposes to divert up to 0.89 cfs for the irrigation of 32 acres or the equivalent of 1.95 cfs per 70 acres. The application indicated that the proposed method of irrigation is by center pivot. Center pivots generally require a certain diversion rate for operation, so when a center pivot irrigation system is not making a full turn or consists of a shorter span than a full quarter (such as the case here) the one cfs for every 70 acres rate is sometimes exceeded. This reason has historically been accepted as an allowed exceedance due to the method of irrigation.

Conclusions

1. Water Permit Application No. 8579-3 proposes to appropriate water for irrigation of 32 acres at a maximum instantaneous diversion rate of 0.89 cubic feet per second (cfs) from one well (approximately 200 ft deep) to be completed into the Niobrara aquifer. Both the proposed well and proposed acres for irrigation are located in the NE $\frac{1}{4}$ NE $\frac{1}{4}$ Section 18-T97N-R56W in Hutchinson County.
2. On an aquifer wide scale, based on the hydrologic budget and observation well data, there is a reasonable probability that water is available in the aquifer to meet the water use proposed by this application.
3. Based on the localized hydrologic budget, there may be localized impacts to existing water users which, if determined to be unlawful impairment, may result in curtailment of water use under this application, if approved.
4. The currently best reasonable information available indicates development in this portion of the Niobrara aquifer is reaching the point where the potential for unlawful impairment of existing adequate domestic wells (beyond the domestic users that have connected to rural water) is becoming possible under certain conditions during the irrigation season when a combination of a dry climatic period and greater than average irrigation pumping coincide.
5. This application is requesting a diversion rate greater than the statutory limit 1 cfs per 70 acres due to the method of irrigation (shorter than standard pivot span). This reason has been accepted by the Water Rights Program and Water Management Board in the past.



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Appendix A: Select Geologic Cross Sections from Lindgren and Hansen, (1990)

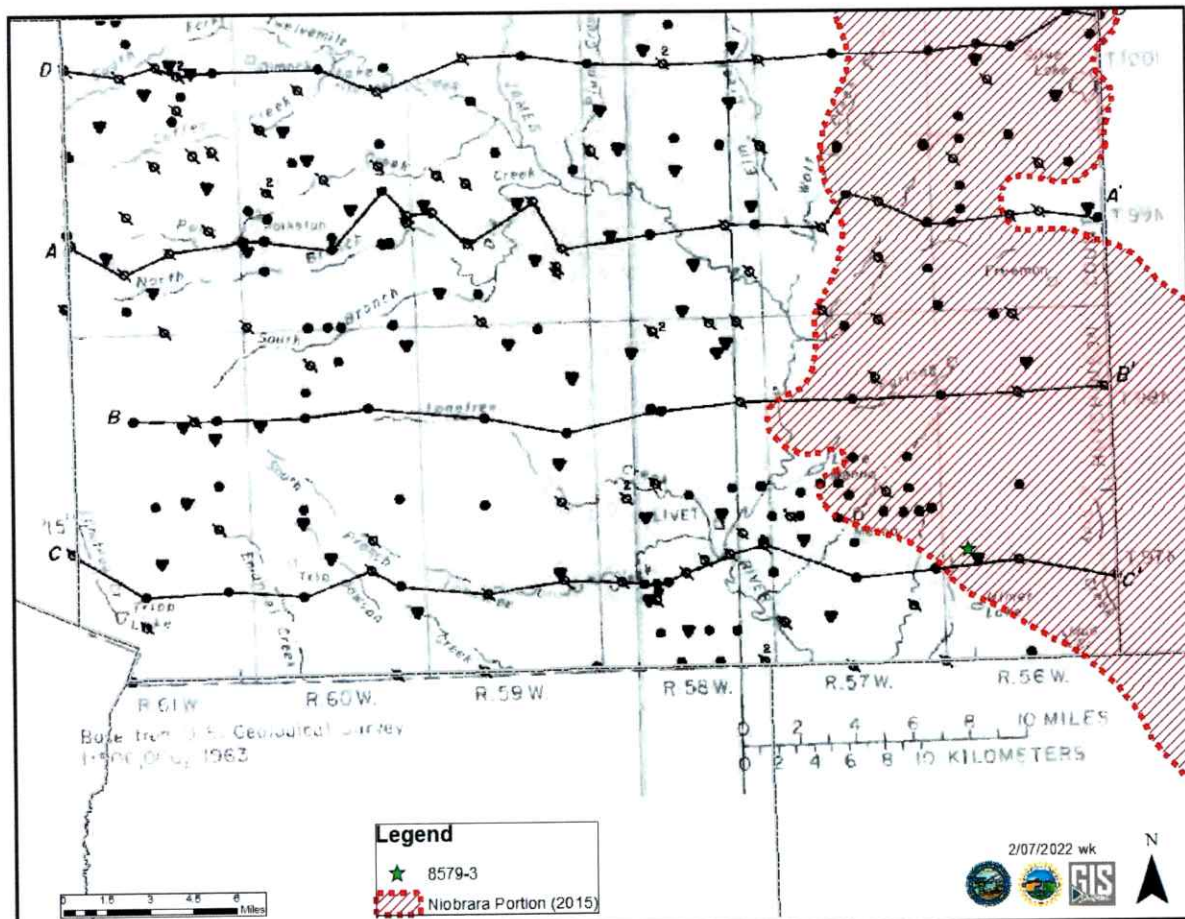


Figure A1: Location of Geologic Cross Sections from Lindgren and Hansen, (1990) (modified from Lindgren and Hansen, 1990)

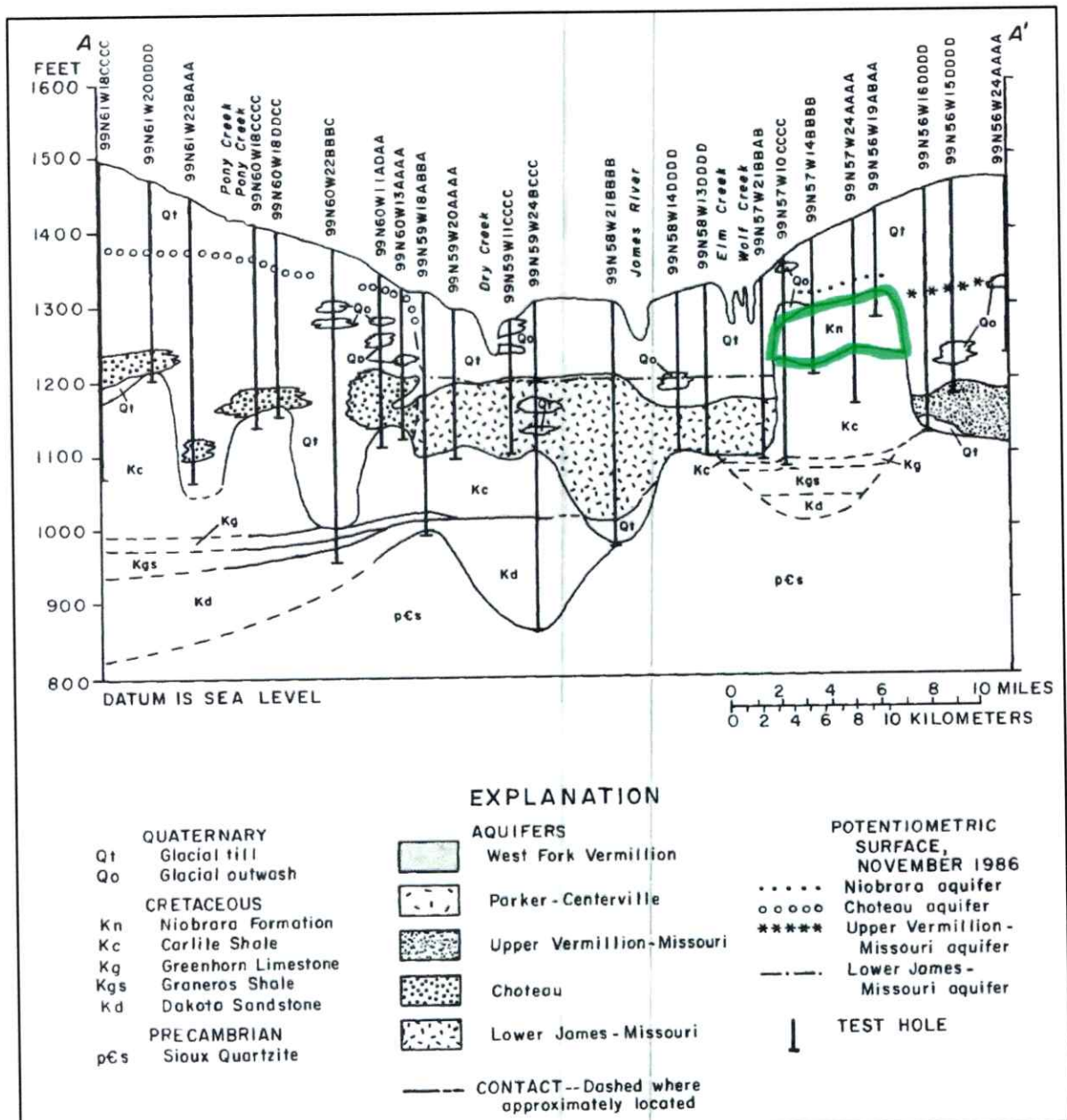


Figure A2: Geologic Cross Section A-A' with portion of Niobrara of interest indicated with green highlight (modified from Lindgren and Hansen, 1990). Elevation reference NGVD29.

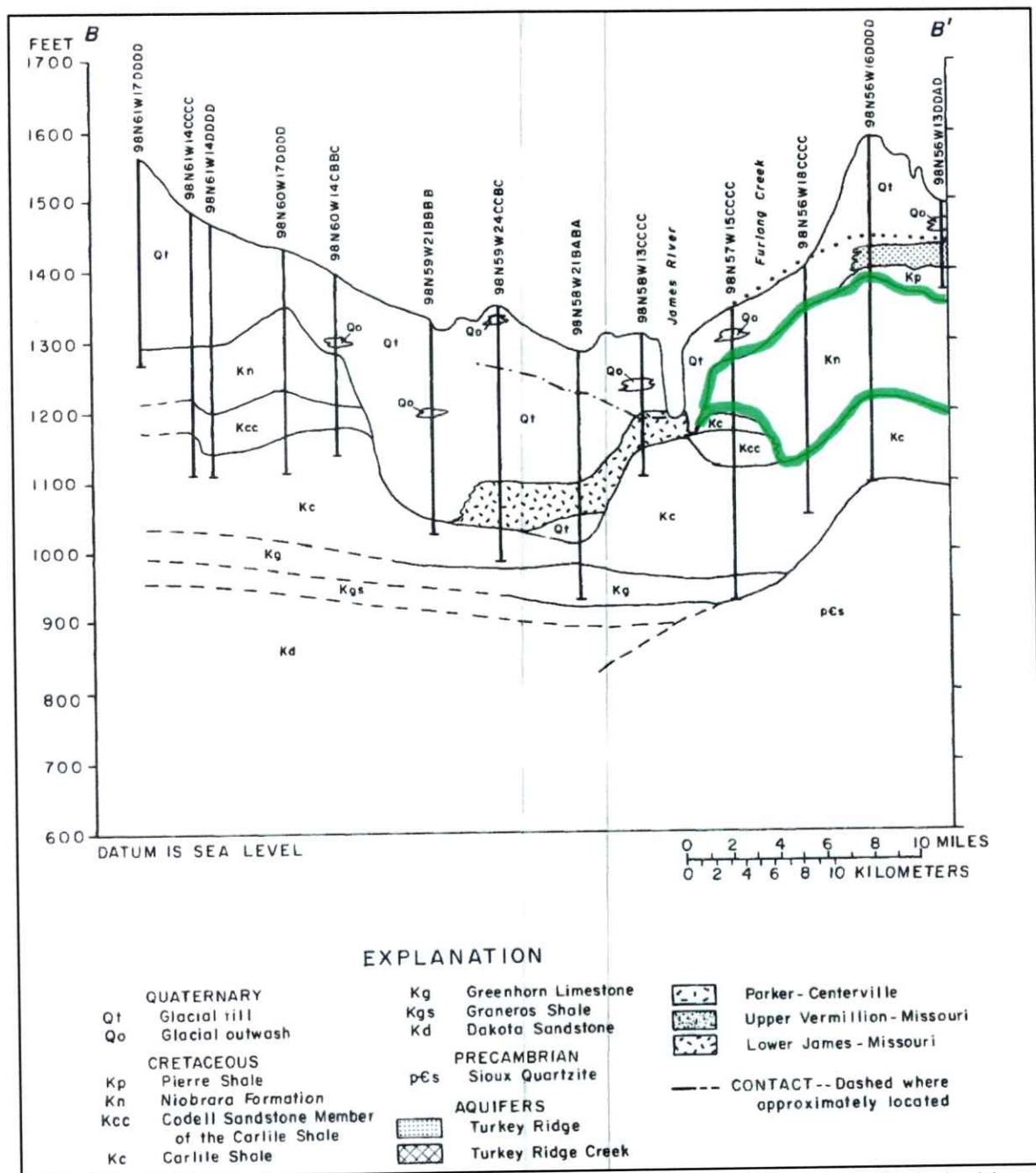
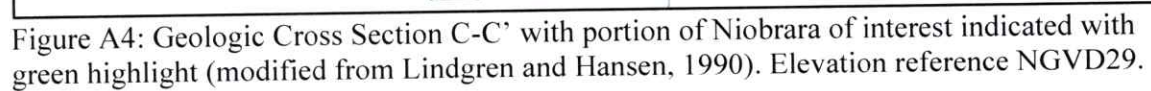


Figure A3: Geologic Cross Section B-B' with portion of Niobrara of interest indicated with green highlight (modified from Lindgren and Hansen, 1990). Elevation reference NGVD29.



Appendix B: Additional Maps

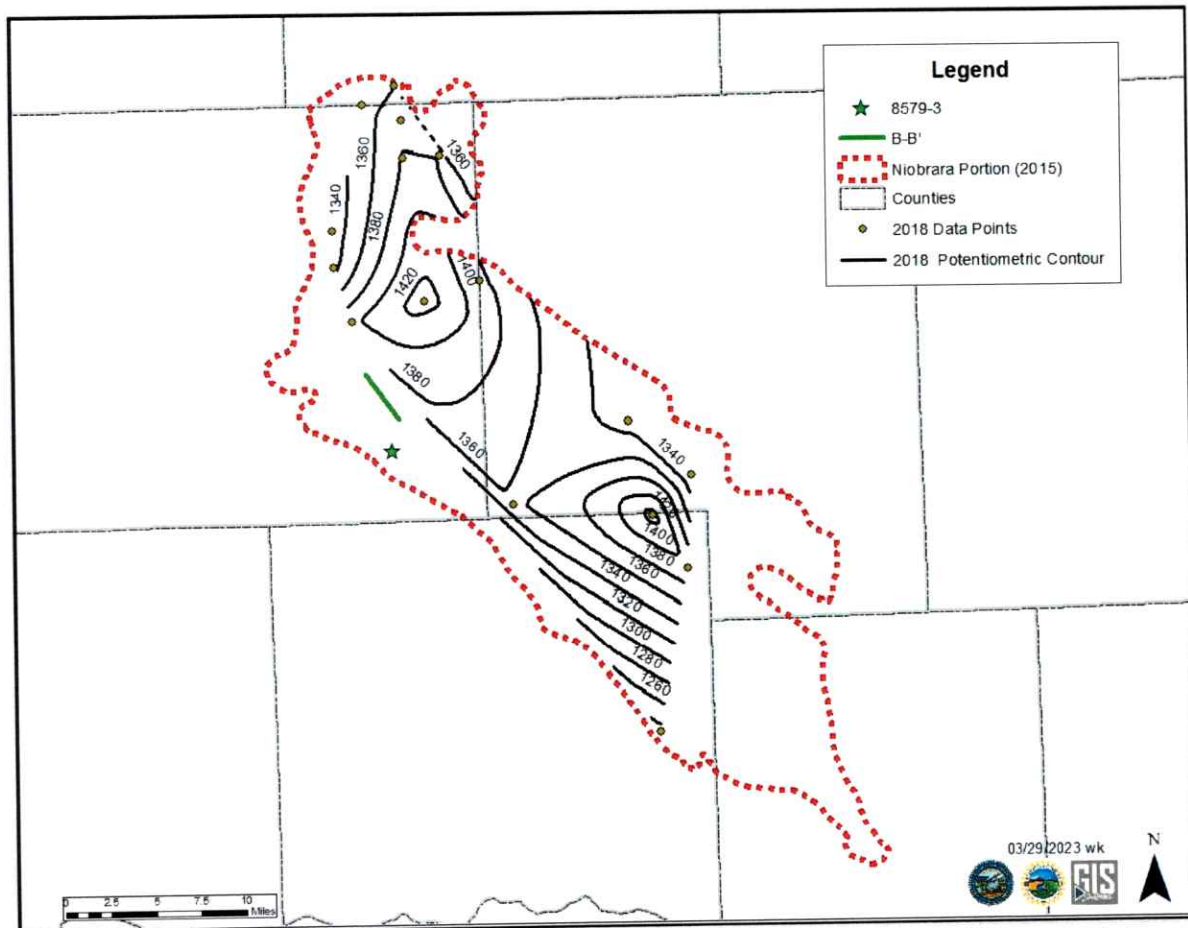


Figure B1: Potentiometric surface contours from May 2018 (Water Rights, 2023a and Water Rights, 2023c). Elevation reference NAVD88.

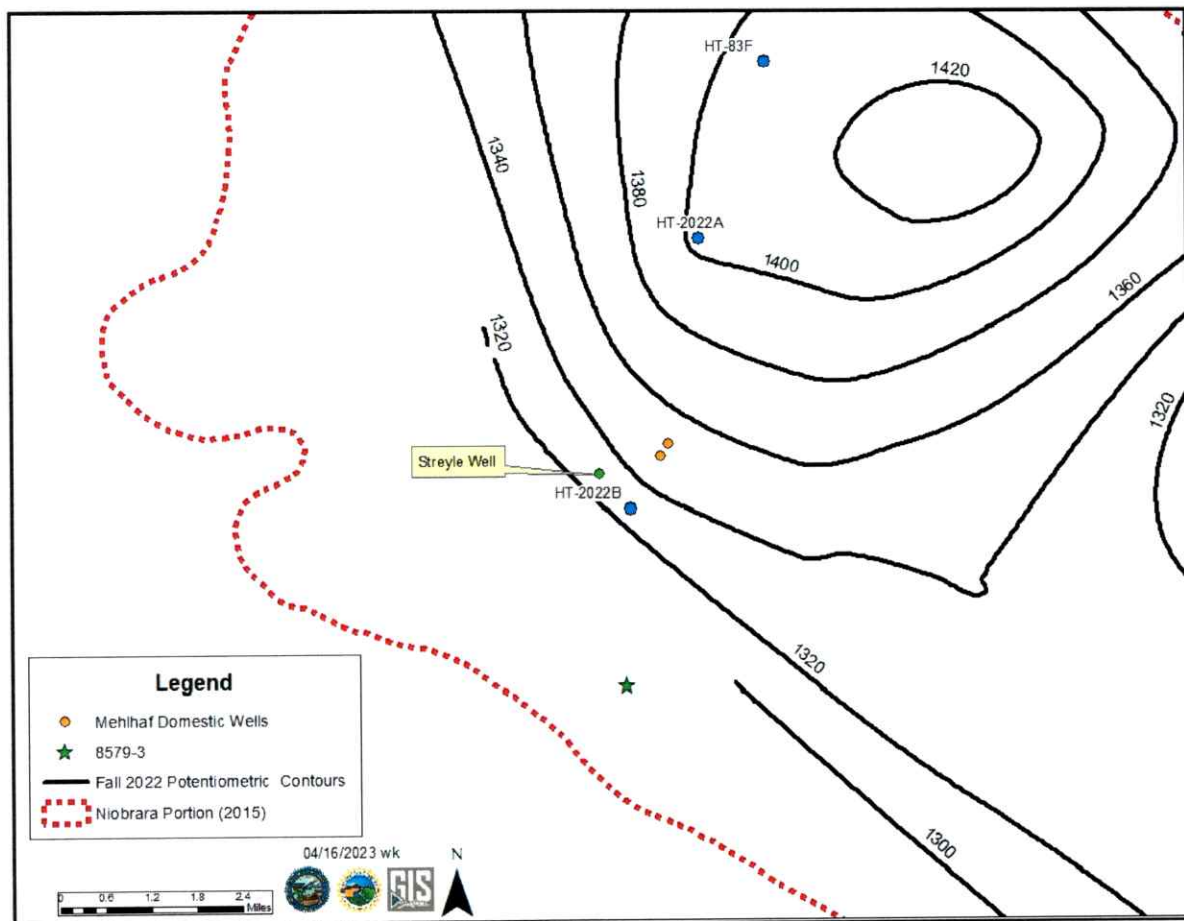


Figure B2: Potentiometric surface contours for Fall 2022 in the area of this application and the domestic wells discussed in the unlawful impairment section of this report (Water Rights, 2023a and Water Rights, 2023c). Elevation reference NAVD88.

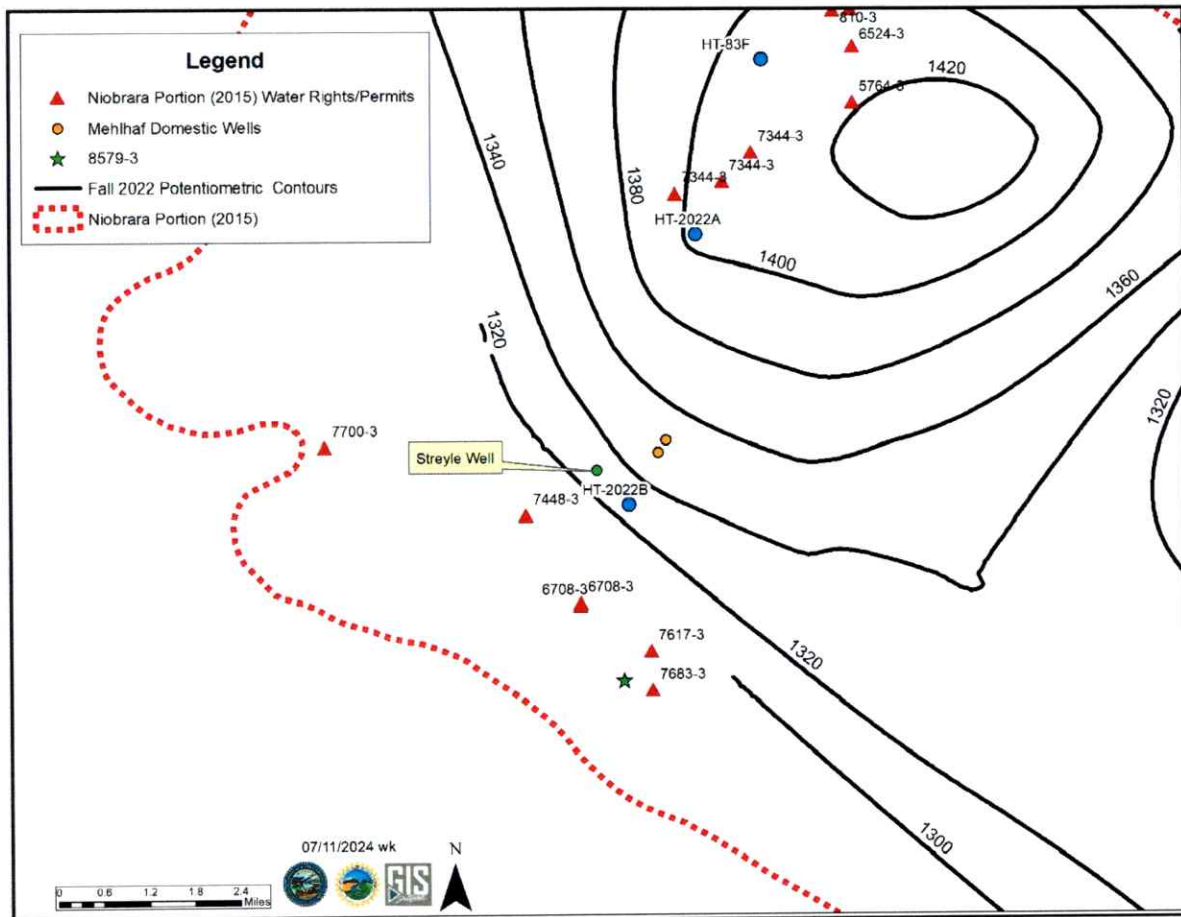


Figure B3: Potentiometric surface contours for Fall 2022 in the area of this application with area active water rights/permits from the Niobrara aquifer and the domestic wells discussed in the unlawful impairment section of this report (Water Rights, 2024a and Water Rights, 2024c). Elevation reference NAVD88.

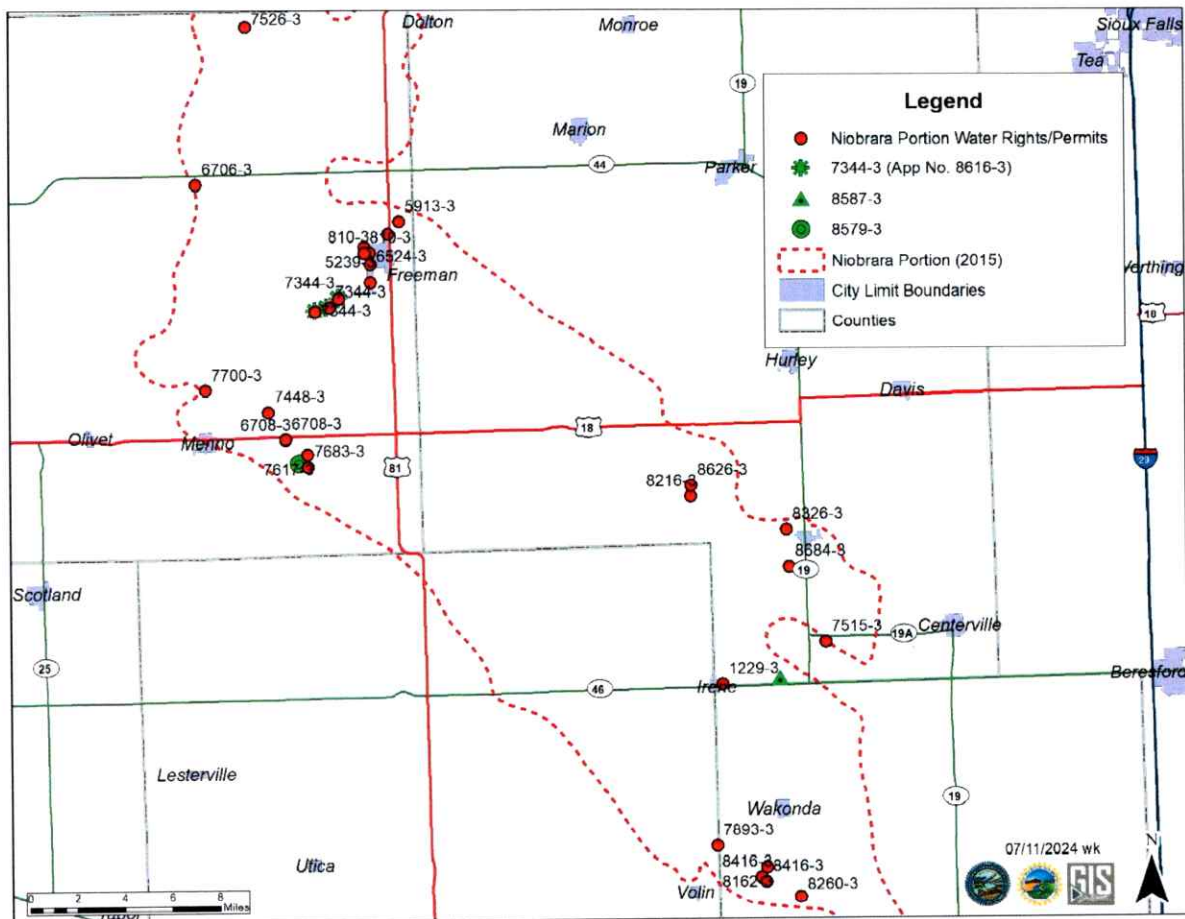


Figure B4: Location of active water rights/permits and pending applications from this portion of the Niobrara aquifer (Water Rights, 2024a and Water Rights, 2024c).

Appendix C: Estimated Transmissivity from Specific Capacity

Pumping data from both domestic and appropriative wells were used to calculate specific capacity, which was then used to estimate transmissivity and hydraulic conductivity. This data is summarized in Table C1. All well completion reports on file with the Water Rights Program for this portion of the Niobrara (Water Rights, 2023a) have sufficient pumping data to calculate specific capacity. The Aqtesolv online conversion tool was then used to estimate transmissivity from specific capacity (Aqtesolv, 2023). Aquifer thickness and/or screened interval was then used to calculate hydraulic conductivity from transmissivity. Typical values for hydraulic conductivity for different geologic materials are shown in Figure C1.

Tomhave and Schulz (2004) define the Niobrara Formation as “White to dark-gray argillaceous chalk, marl, and shale. Weathers yellow to orange. Contains thin, laterally continuous bentonite beds, chalky carbonaceous shale, minor sand, and small concretions.” Chalk is a carbonate rock and the well completion reports, along with other available information suggest that this portion of the Niobrara aquifer is much more fractured than cavernous (Water Rights, 2023a). Therefore, values for hydraulic conductivity would be expected to be on the lower end of the range for carbonate rocks (0.001 to 10 ft/d), especially since the Niobrara Formation can contain shale which has an even lower range for hydraulic conductivity. In looking at Table C1, the middle well for No. 7526-3 appeared to have a non-typical amount of sand in the screened interval compared to other wells in this portion of the Niobrara aquifer, based on all of this information, the transmissivity estimate for the middle well for No. 7526-3 and the other higher value transmissivity estimates were categorized as outliers and not included in the calculation of average transmissivity values for this portion of the Niobrara aquifer.

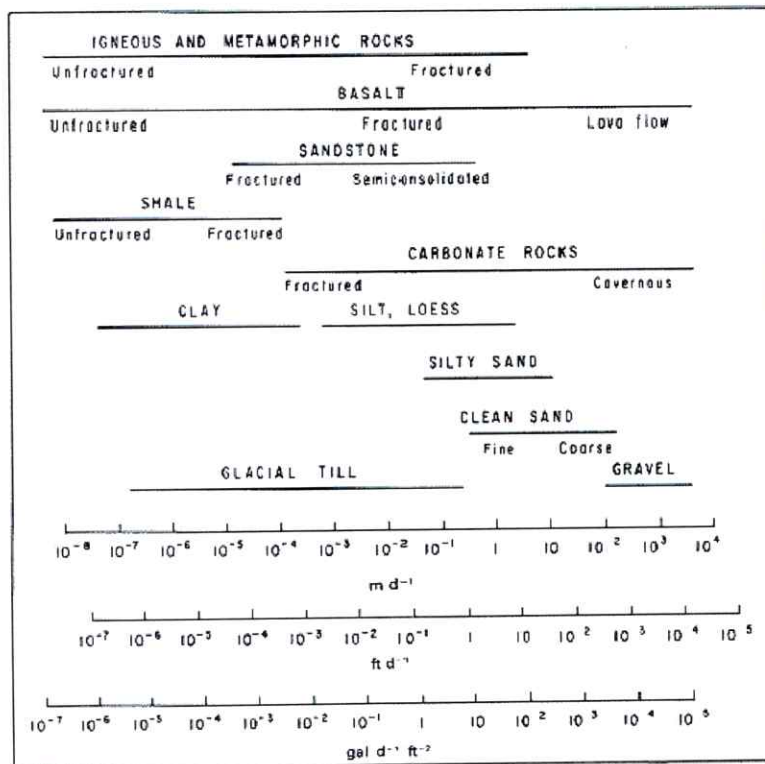


Figure C1: Typical values for hydraulic conductivity for different geologic material (Aqtesolv, 2019)

Updated Report on Water Permit Application No. 8579-3

Table C1: Table of Estimate Transmissivity and Hydraulic Conductivity (Aqtesolv, 2023; Water Rights, 2023a)

Well*	Construction Year	Specific Capacity (gpm/ft drawdown)	Transmissivity (square ft per day)	Hydraulic Conductivity (ft/d)	Comment
Section 1: Wells within 1 mile of B-B'					
D. Melhalf	2012	0.22	59.42	0.97	
Mehlhaf	2013	0.43	114.59	2.34	
Streyle	2016	2.50	668.45	11.14	
Melhaf	2019	0.50	133.69	6.68	
Streyle	2012	0.94	250.67	5.97	
T. Melhalf	2012	2.14	572.96	18.48	
Section 1 Average		1.12	299.96	7.60	
Section 2: Other well data					
Taylor	1994	0.05	13.83	0.13	
Kramer	1981	0.08	21.39	0.31	
Berberich	1991	0.15	40.11	0.50	
Pekron	2010	0.11	28.14	0.55	
Waltner	2002	0.09	22.92	0.62	
Swenson	2009	0.09	24.95	0.71	
Graber-well 2	2018	0.18	48.91	0.80	
Ryken	2009	0.18	48.61	0.81	
6706-3	2005	0.30	81.41	0.93	
Hofer	1983	0.11	28.15	0.94	
Houser	2022	0.14	38.20	0.95	
Hofer	1986	0.24	64.54	1.09	
Langeland	2013	0.28	73.59	1.34	
Boars	2019	0.31	81.85	1.44	
Aman	2014	0.33	87.51	1.51	
Graber-well 1	2018	0.37	97.82	1.60	
stahl	2017	0.29	77.13	1.84	
Gross	1981	0.23	60.16	2.15	
Eisenbeis	2008	0.50	133.69	2.30	
Hanson	1993	0.40	106.95	2.43	
Plate	2015	0.56	148.54	2.97	
Olsen	2021	0.35	92.84	3.09	
Highland 2	2015	0.70	188.16	3.14	
7654-3	2013	0.71	190.99	3.18	
T. Nelson	2021	0.50	133.69	3.34	
Koerner	1980	0.50	133.69	3.61	
6524-3	2005	0.90	240.64	3.82	
Highland 1	2015	0.50	133.69	4.46	
Deckert	2002	0.60	160.43	4.58	
Madsen	1999	1.03	276.60	4.69	
8626-3	2017	2.62	699.74	5.00	
Zimmarmen	1991	0.80	213.90	5.35	
8162-3 North	2014	1.54	410.16	5.47	
7344-3 well 2	2012	3.16	844.34	5.59	
Hofer	1982	1.00	267.38	6.08	
5764-3	1992	2.50	668.45	6.68	
Kleinsasser	1987	0.55	147.06	9.19	
Schultz	2008	0.78	208.89	9.95	
5239-3	1988	2.17	581.28	10.57	
Bradley	2018	4.29	1145.91	11.94	
Gross	1982	1.00	267.38	12.15	
7526-3 north	2013	4.59	1227.76	12.28	
Vandewalle	2022	2.14	572.95	15.49	
Booth	2013	3.60	962.57	16.04	
7893-3	2013	2.50	668.45	16.71	
Rang	1982	1.00	267.38	16.71	
8067-3 well2	2015	6.98	1399.06	17.94	
Glanzer	2015	3.75	1002.67	18.92	
L. Hofer	1984	1.88	501.34	20.05	
7344-3 well 1	2012	7.69	2056.68	21.65	
Waltner	2013	5.00	1336.90	22.28	
H. Waltner	1988	3.75	1002.67	22.79	
8067-3 well 1	2015	5.45	1458.42	24.31	
7617-3	2013	13.27	3546.87	24.46	
8162-3 south	2012	7.14	1909.85	27.28	
Schrag	2013	1.06	283.11	28.31	
T. Waltner	1988	2.25	601.60	28.65	
Fliginger	1986	2.00	534.76	35.65	
8260-3	2016	11.17	2986.69	37.81	
Olsen	2018	3.00	802.14	40.11	
Stone	2015	3.00	802.14	40.11	
Waltner	1998	4.50	1203.21	57.30	"well fractured chalk"
Perterson-north	2007	4.50	1203.21	60.16	siltstone
Perterson-south	2007	4.50	1203.21	63.33	siltstone
Massey	2018	11.54	3085.15	81.19	
W. Waltner	1984	2.14	572.96	95.49	
Section 2 Average		2.27	598.87	15.04	
Section 1 & 2 Average		2.17	573.96	14.42	
Section 3: Outlier well data based on hydraulic conductivity and other information					
7526-3 middle	2014	41.67	11140.78	139.26	sand in screened interval
7683-3	2013	81.25	21724.60	192.25	
Wirth	2014	25.00	6684.49	222.82	

*Well name based on either permit number or last name on well completion report (no attempt was made to verify spellings)



**DEPARTMENT of AGRICULTURE
and NATURAL RESOURCES**

JOE FOSS BUILDING
523 E. CAPITOL AVE
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**RECOMMENDATION OF CHIEF ENGINEER FOR WATER PERMIT
APPLICATION NO. 8579-3, Brett Guthmiller**

Pursuant to SDCL 46-2A-2, the following is the recommendation of the Chief Engineer, Water Rights Program, Department of Environment and Natural Resources concerning Water Permit Application No. 8579-3, Brett Guthmiller, 28680 435th Avenue, Menno SD 57045.

The Chief Engineer is recommending DEFERRAL of Application No. 8579-3 for further study because additional investigation is needed to determine if existing high capacity irrigation wells from the Niobrara aquifer in this area may unlawfully impair adequate domestic wells. The Water Rights Program is working in conjunction with the South Dakota Geological Survey to complete observation wells completed into the Niobrara aquifer in the spring of 2022. This will allow monitoring of water levels in the aquifer to aid in determining the effects pumping has on area domestic wells.

The deferral of Application No. 8579-3 is for up to two years at which time the application will be brought back before the Water Management Board for consideration. At that time, the Board will reconsider the application based on data received from the installed observation wells. The applicant can request the application be brought before the Board prior to expiration of the two year deferral period if they can show the proposed diversion can be developed without unlawful impairment of existing domestic water uses and water rights.

See report on application for additional information.

Eric Gronlund, Chief Engineer
March 18, 2022

Report to the Chief Engineer
Water Permit Application 8579-3
Brett Guthmiller

Water Permit Application No. 8579-3 proposes to appropriate water for the irrigation of 32 acres at a maximum instantaneous diversion rate of 0.89 cubic feet per second (cfs) from one well (approximately 200 ft deep) to be completed into the Niobrara aquifer. Both the proposed well and proposed acres for irrigation are located in the NE ¼ NE ¼ Section 18-T97N-R56W in Hutchinson County. The applicant is requesting a diversion rate greater than the statutory limit 1 cfs per 70 acres. This site is located approximately four miles southeast of Menno, SD.

Aquifer: Niobrara aquifer

Hydrogeology

The Niobrara Formation is a bedrock formation that underlies most of eastern and western South Dakota (Hedges et al, 1982; Allen et al, 1985). The Niobrara Formation is a Late Cretaceous age white to dark grey argillaceous (clay containing) chalk, marl, and shale that can contain thin bentonite beds, minor sand, and chalky carbonaceous shale (Tomhave, and Schulz, 2004). Locally, the Niobrara Formation is also known as “chalk rock” and is extensive throughout South Dakota; however, characteristics of the Niobrara aquifer vary greatly across the state (Hedges et al., 1982). The Niobrara aquifer is contained within portions of the Niobrara Formation where sufficient permeability exists to allow for the transmission of groundwater and where the permeable portions of the formation are sufficiently saturated to yield quantities of groundwater to wells. Both Hedges et al. (1982) and Stephens (1967) identified fractures and solution cavities as the main means of water movement through the Niobrara aquifer. Hedges et al. (1982) noted these features are partially controlled by flexures and faults. Where these secondary porosity features are absent, the Niobrara Formation is generally a low-permeability or almost a no-permeability formation that transmits little to no water (Hedges et al., 1982; Stephens, 1967). Weathering and glacial activity may also contribute to higher productive zones in the Niobrara aquifer (Hedges et al., 1982). The interconnected nature of secondary porosity is highly variable and unpredictable.

In southeastern South Dakota, there are several areas where portions of the Niobrara Formation were isolated from the main body of the Niobrara through erosional forces prior to being overlain by glacial deposits (Tomhave and Schulz, 2004). The proposed well site is located within the extent of one of these isolated portions of the Niobrara Formation. The extent of this portion of the Niobrara Formation is shown in Figure 1. This portion of the Niobrara Formation underlies approximately 340,550 acres (estimated from Tomhave and Schulz, 2004) of portions of Hutchinson, Clay, Turner, Yankton, and McCook Counties. This portion of the Niobrara directly underlies either the Pierre Shale (shown in Figure 1) or glacial deposits in areas not underlying the Pierre Shale and overlies the Carlilie Shale (Tomhave and Schulz, 2004). Well completion reports on file with the Water Rights Program report encountering water through this portion of the Niobrara Formation indicating widespread aquifer potential throughout this portion of the formation (Water Rights, 2022a; 2022b; 2022c). Since this portion of the Niobrara aquifer is

isolated from the main body, the remainder of this report will focus solely on this isolated portion of the aquifer.

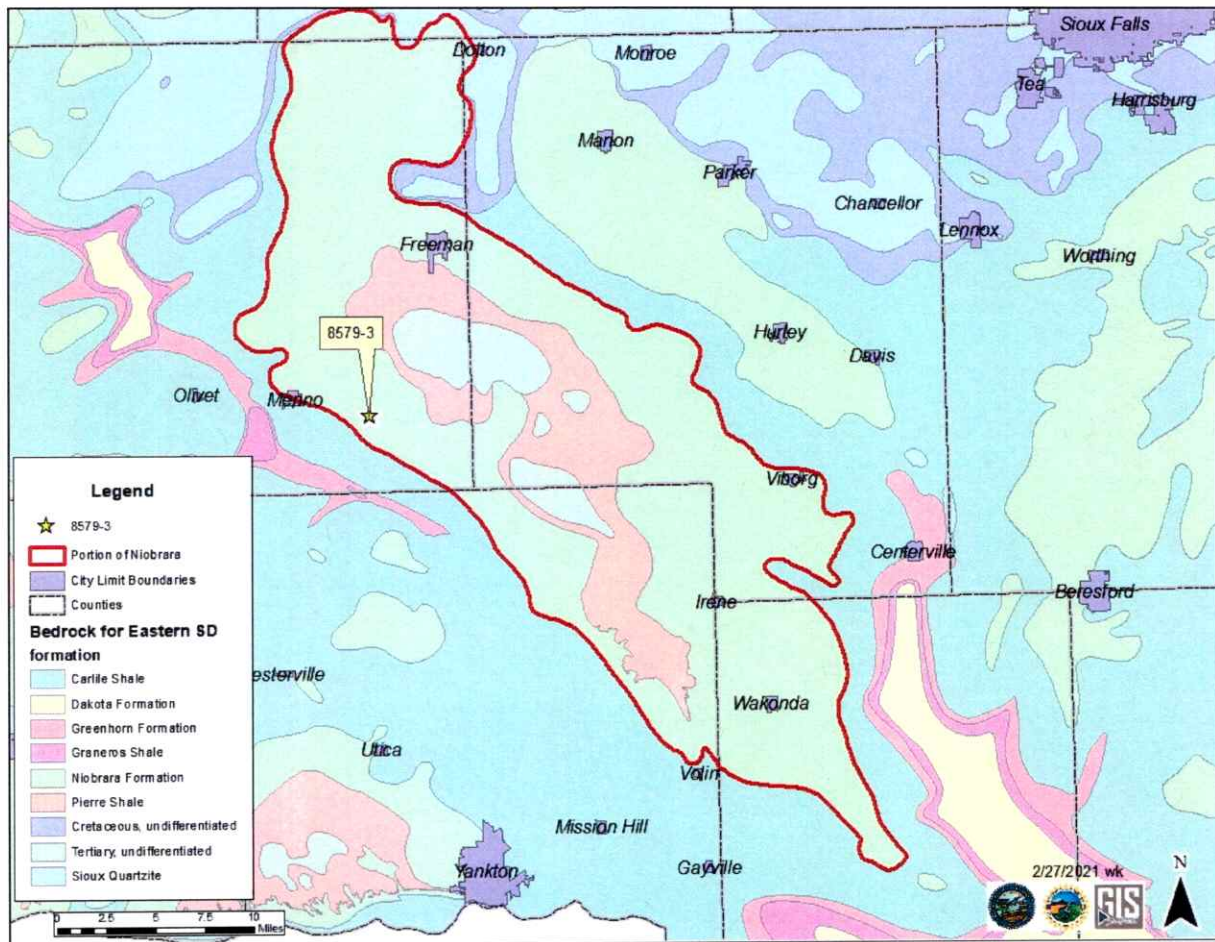


Figure 1: Map shown the first occurrence of bedrock material with the erosional remnant of the Niobrara Formation this application proposes to use (modified from Tomhave and Schulz, 2004)

This portion of the Niobrara aquifer is surrounded by valleys in the bedrock where the Niobrara Formation has been eroded, which contain deposits of glacial outwash that act as aquifers. Where these glacial outwash aquifers are in contact with this portion of the Niobrara (either overlaying or are adjacent to), there is potential for leakage between the aquifers based on hydraulic head. The Lower James Missouri aquifer lies in the bedrock valley to the west of this portion of the Niobrara and in some locations extends far enough east to be in contact with this portion of the Niobrara (Tomhave and Schulz, 2004; Hedges et al., 1982). The Upper Vermillion Missouri aquifer lies in the bedrock valley to the east of this portion of the Niobrara aquifer and can also be hydrologically connected (Lindgren and Hansen, 1990). Stephens (1967) indicated the presence of a glacial outwash aquifer (named the Wakonda aquifer) directly overlaying and with a strong hydrologic connection to this portion of the Niobrara in portions of Clay County. However, the first occurrence of aquifer materials mapping by Jensen (2000) indicates that the Wakonda aquifer is unlikely to be as extensive as was mapped by Hedges et al. (1982).

Potentiometric surface mapping done in the late 1980's and early 1990s, indicated water movement in this portion of the Niobrara aquifer is generally from the center toward the edges (Lindgren and Hansen, 1990; Bugliosi, 1986). Using more recent observation well and water well data, Mathiowetz (2016) created a May 2016 potentiometric surface (shown in Figure 2) for this portion of the Niobrara aquifer. The May 2016 potentiometric surface shows water movement in the aquifer from the center toward the edges (moving from higher head to lower head). This indicates two things this portion of the Niobrara aquifer is likely primarily discharging to aquifers located within the bedrock valleys surrounding this portion of the Niobrara aquifer and second, there is likely a recharge source near the center of the aquifer. The available reports for the area do not specifically identify a recharge source to the Niobrara aquifer but there are likely two possibilities. A portion of the Pierre Shale near the center of this portion is overlain by the Turkey Ridge aquifer which near its edges could be separated from the Niobrara by limited amounts of glacial till through which leakage could occur or the undifferentiated tertiary material can include high permeability materials (sands and gravel) which could allow for greater potential for infiltration of precipitation through overlying materials (Lindgren and Hansen, 1990; Tomhave and Schulz, 2004).

No test hole or water well completion report was submitted with this application. However, there is sufficient information to determine that at the proposed well location the requested well depth of approximately 200 feet would be expected to be completed into the Niobrara aquifer (Water Rights, 2022a and SDGS, 2022). Well completion reports on file with the Water Rights Program within one mile of the proposed well location for this application indicated that the Niobrara Formation can have sufficient permeability and saturated thickness to act as an aquifer in this area (Water Rights, 2022a). The Niobrara aquifer is expected to be under confined conditions in the area of the proposed well location for this application (Water Rights, 2022a).

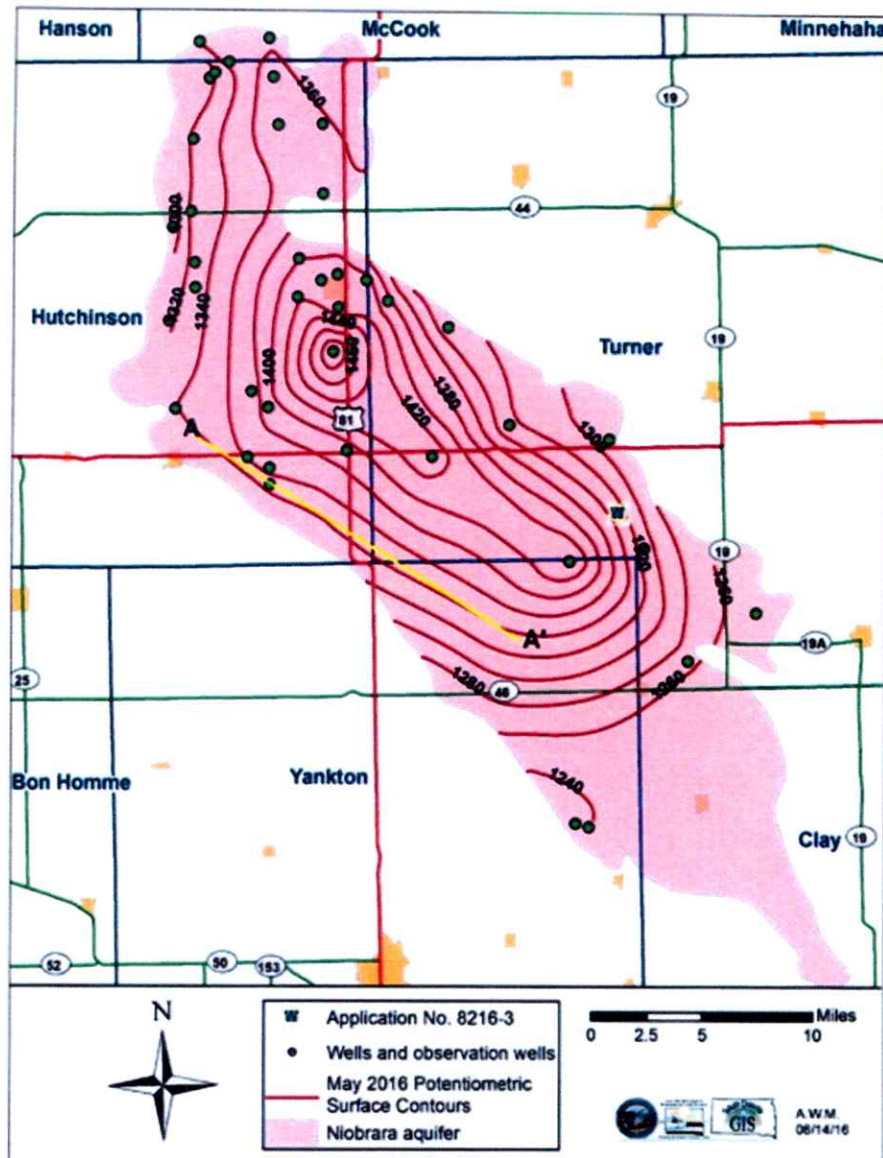


Figure 2: Approximate potentiometric surface contours from May 2016 (Mathiowetz, 2016)

South Dakota Codified Law (SDCL) 46-2A-9

Pursuant to SDCL 46-2A-9, “A permit to appropriate water may be issued only if there is a reasonable probability that there is unappropriated water available for the applicant’s proposed use, that the diversion point can be developed without unlawful impairment of existing domestic water uses and water rights, and that the proposed use is a beneficial use and in the public interest as it pertains to matters of public interest within the regulatory authority of the Water Management Board as defined by SDCL 46-2-9 and 46-2-11.” This report will address the availability of unappropriated water and the potential for unlawful impairment of existing domestic water uses and water rights within this portion of the Niobrara aquifer.

Water Availability

Water Permit Application No. 8579-3 proposes to appropriate water from the Niobrara aquifer for irrigation use. The probability of unappropriated water being available from an aquifer can be evaluated by considering SDCL 46-6-3.1 which requires, “No application to appropriate groundwater may be approved if, according to the best information reasonably available, it is probable that the quantity of water withdrawn annually from a groundwater source will exceed the quantity of the average estimated annual recharge of water to the groundwater source.” If the source of the water is older or lower than the Greenhorn Formation and the application is for a water distribution system defined in SDCL 46-1-6 (17), the Board need not consider the recharge/withdrawal issue. The Niobrara Formation is not older or lower than the Greenhorn Formation and this application is not for a water distribution system; therefore, the withdrawal/recharge issue must be considered.

Observation Well Data

In determining the availability of unappropriated water for a permit application Administrative Rule 74:02:05:07 requires the Water Management Board to rely on the record of observation well measurements, in addition to other data, to determine that the quantity of water withdrawn annually from the aquifer does not exceed the estimated annual recharge.

The Water Rights Program monitors 12 observation wells in this portion of the Niobrara aquifer. The location of those observation wells is shown in Figure 3. The nearest observation well to the proposed well location is observation well HT-83F located approximately eight miles to the north. The hydrograph for observation well HT-83F is shown in Figure 4. The remaining observation well hydrographs for this portion for the Niobrara aquifer are shown in Figure 5 through Figure 15. Observation well HT-81B has frequently been reported to be underwater since 2014 and, where there are readings from the well after 2014, the comments have indicated the presence of iron bacteria, which can impair observation well performance and measurement (Water Rights, 2022c). Therefore, the accuracy of any readings from HT-81B after 2014 are considered to be suspect.

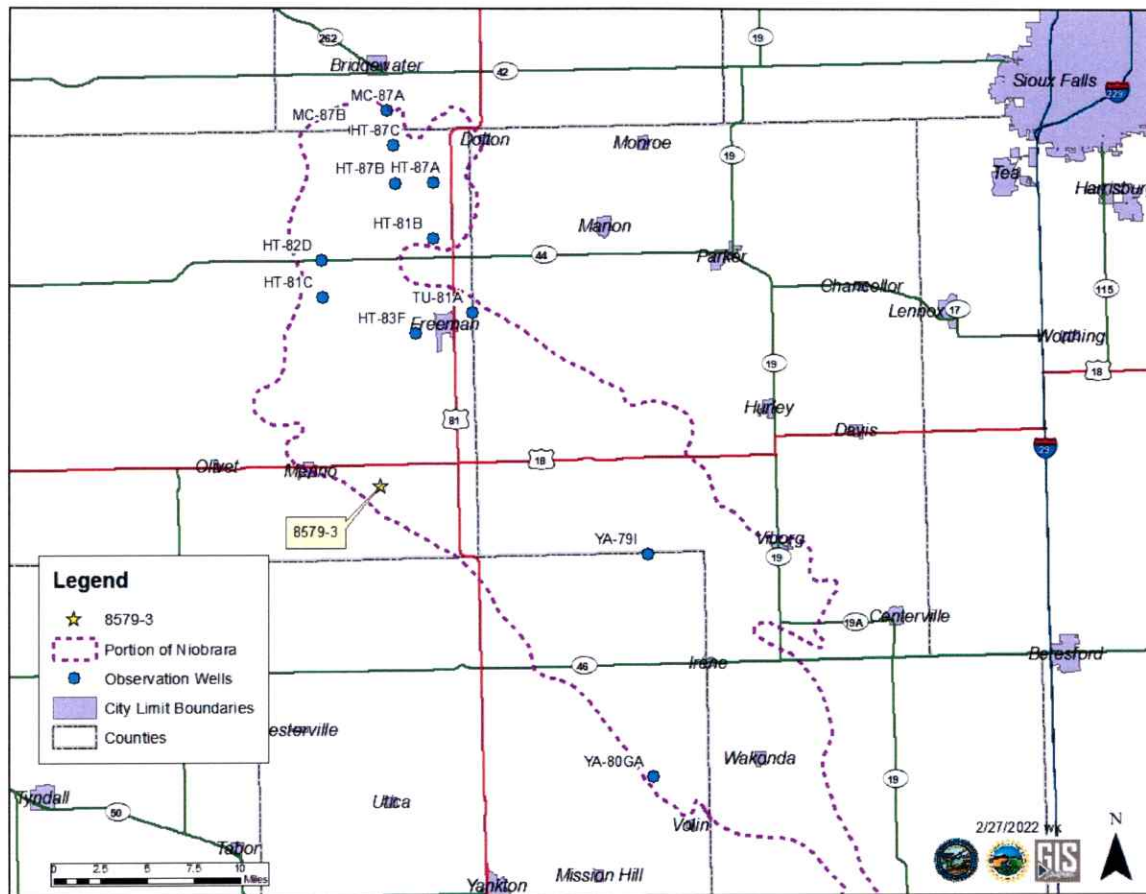


Figure 3: Location of Water Rights observation wells in this portion of the Niobrara aquifer (Water Rights, 2022c)

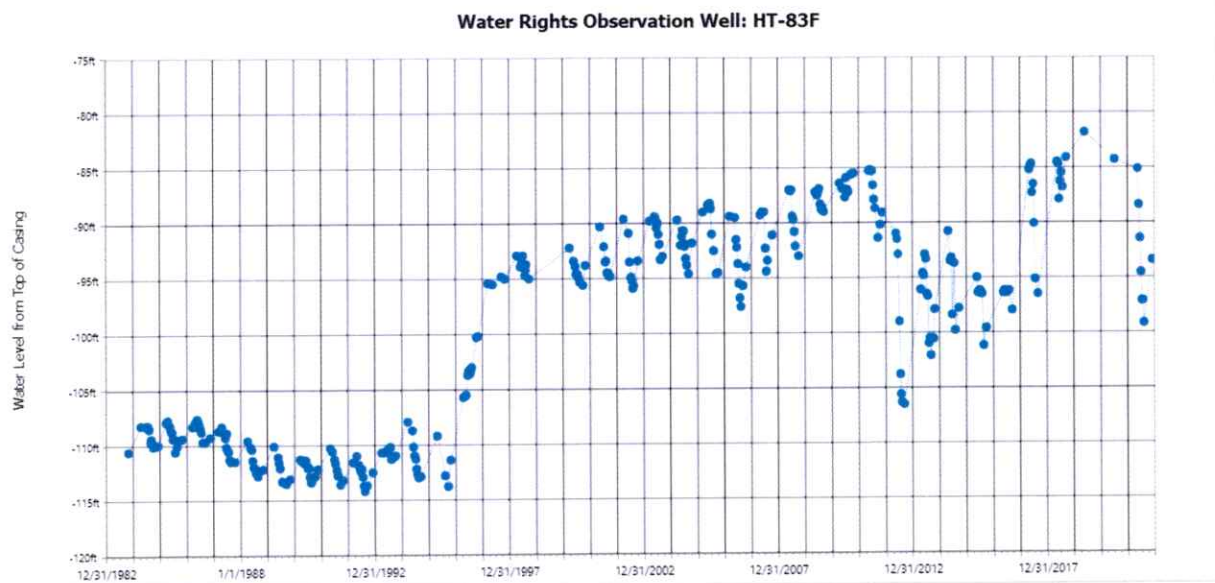


Figure 4: Hydrograph of observation well HT-83F located 8 miles north (Water Rights, 2022b)

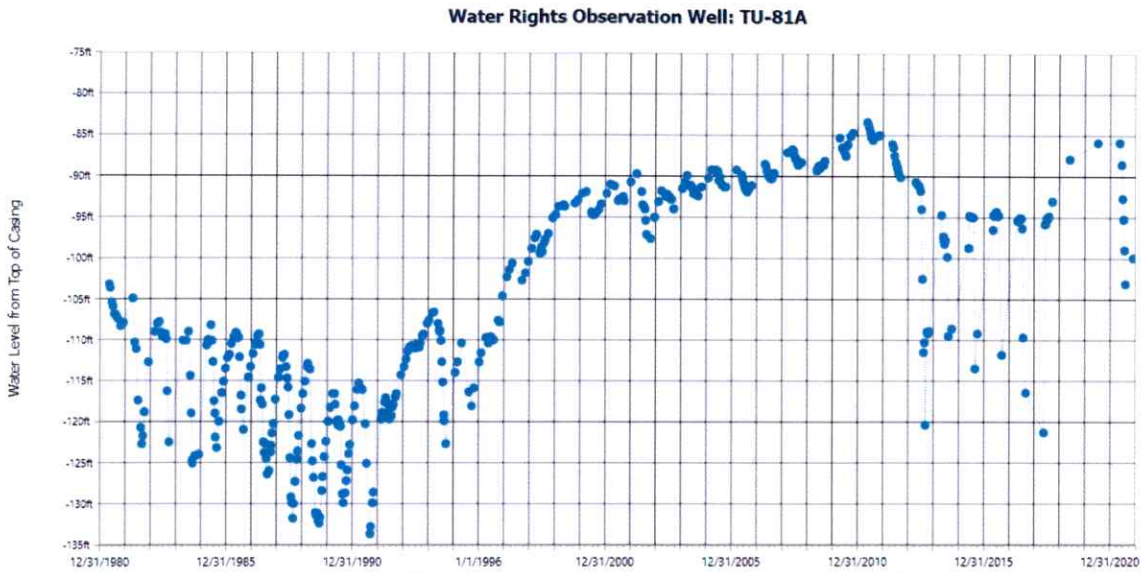


Figure 5: Hydrograph of observation well TU-81A located 10.4 miles north (Water Rights, 2022b)

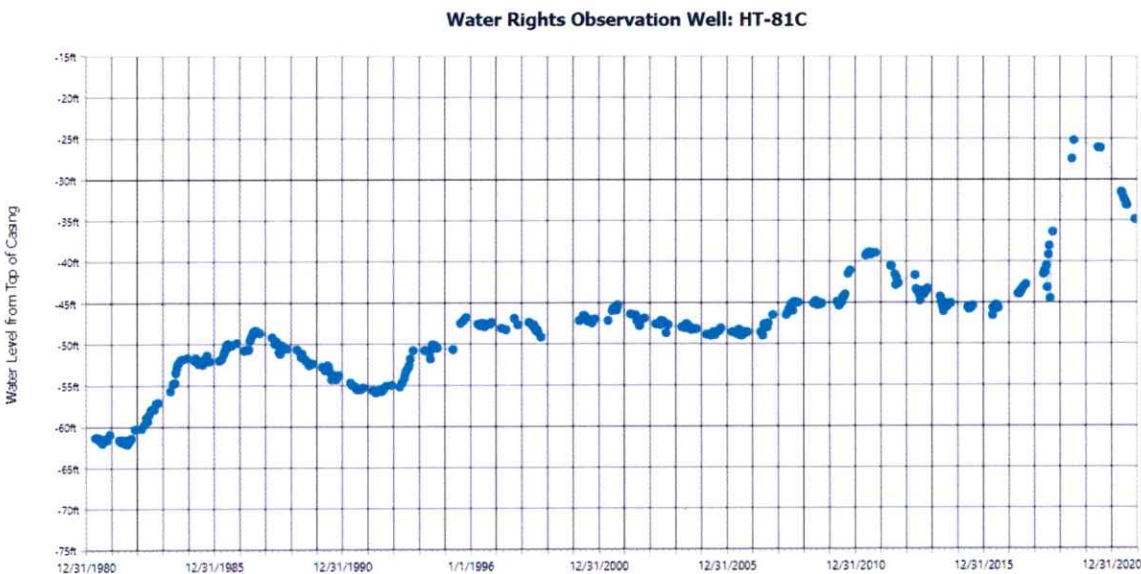


Figure 6: Hydrograph of observation well HT-81C located 10.5 miles north (Water Rights, 2022b)

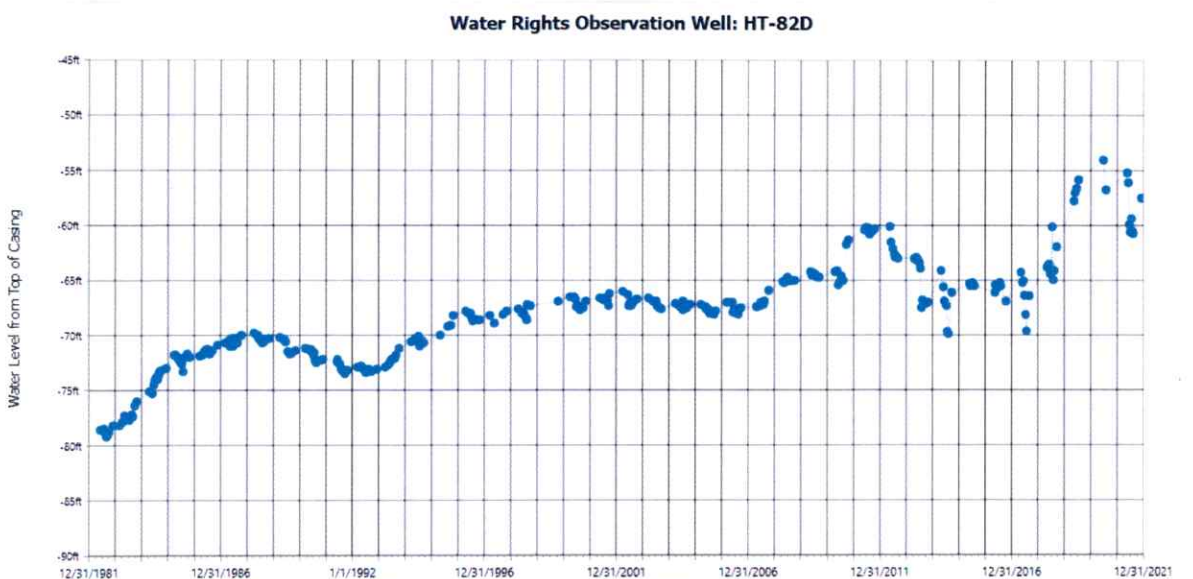


Figure 7: Hydrograph of observation well HT-82D located 12.4 miles north (Water Rights, 2022b)

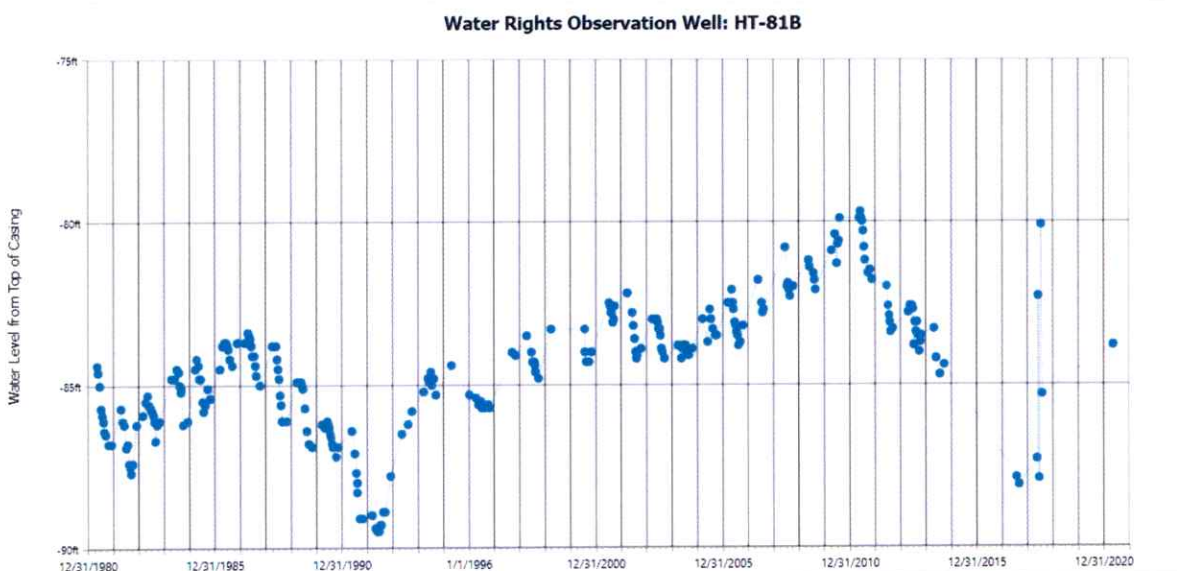


Figure 8: Hydrograph of observation well HT-81B located 13.4 miles north (Water Rights, 2022b)

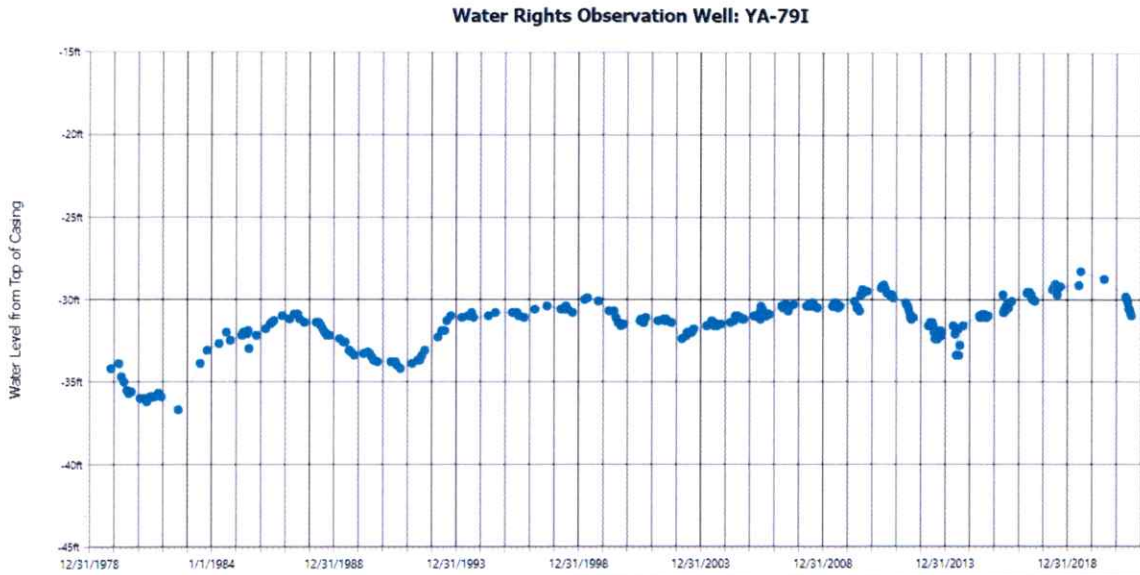


Figure 9: Hydrograph of observation well YA-79I located 14.7 miles southeast (Water Rights, 2022b)

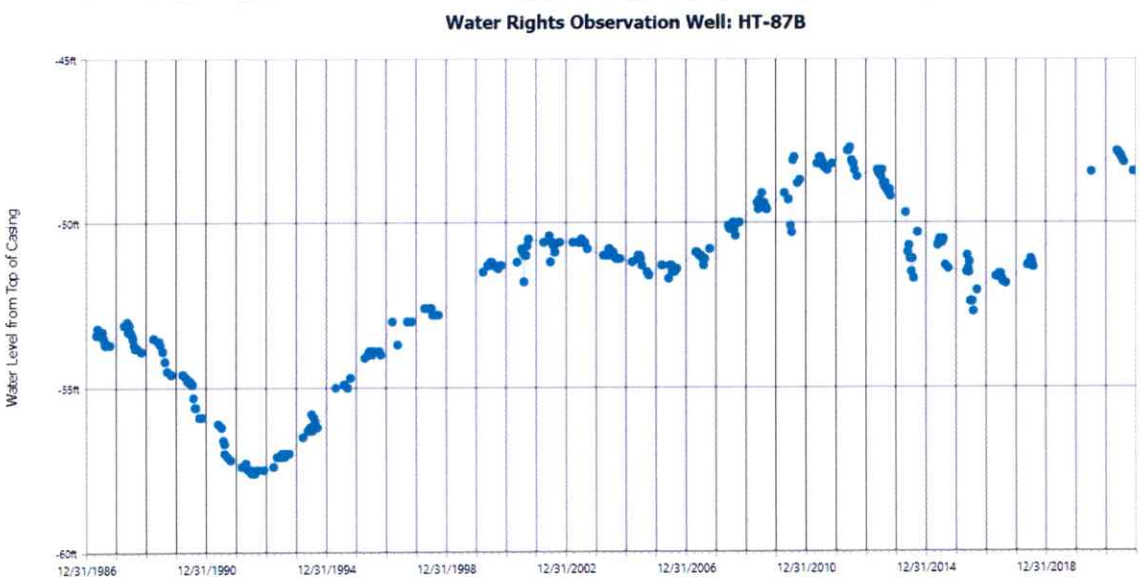


Figure 10: Hydrograph of observation well HT-87B located 16.1 miles north (Water Rights, 2022b)

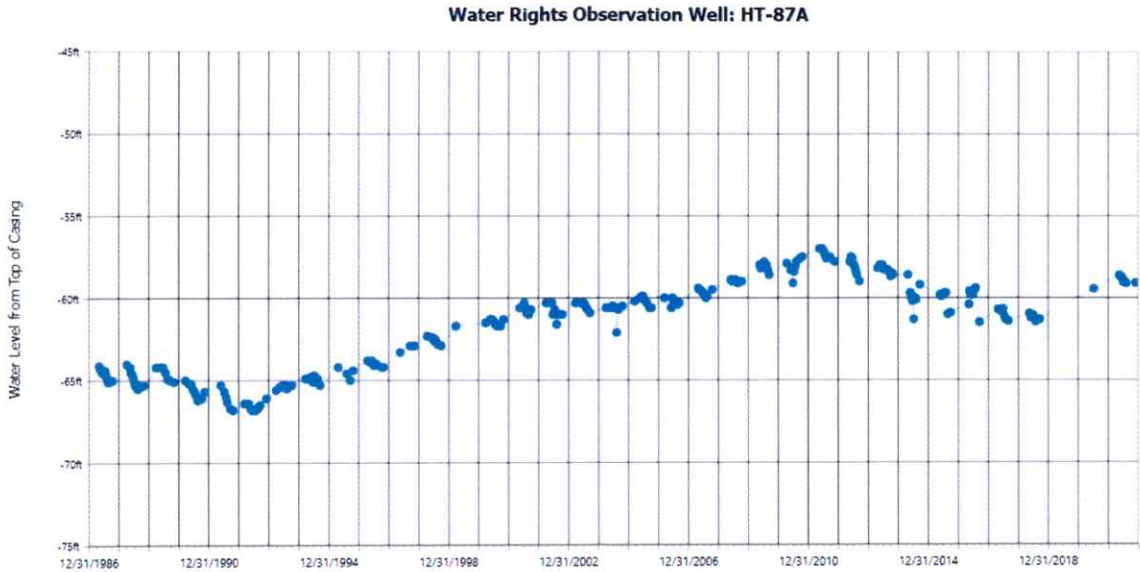


Figure 11: Hydrograph of observation well HT-87A located 16.4 miles north (Water Rights, 2022b)

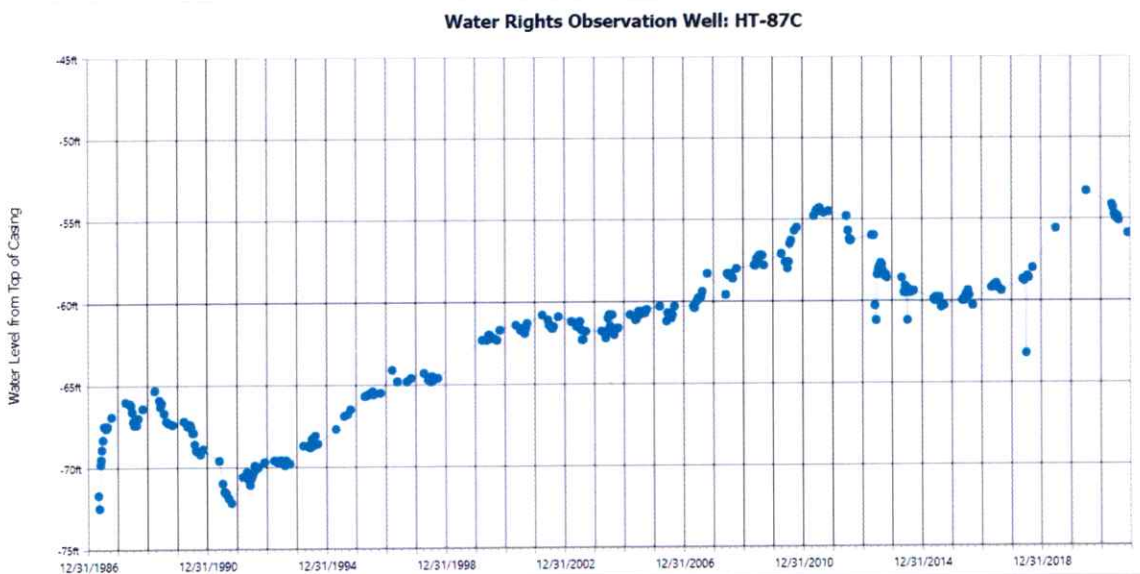


Figure 12: Hydrograph of observation well HT-87C located 18.1 miles north (Water Rights, 2022b)

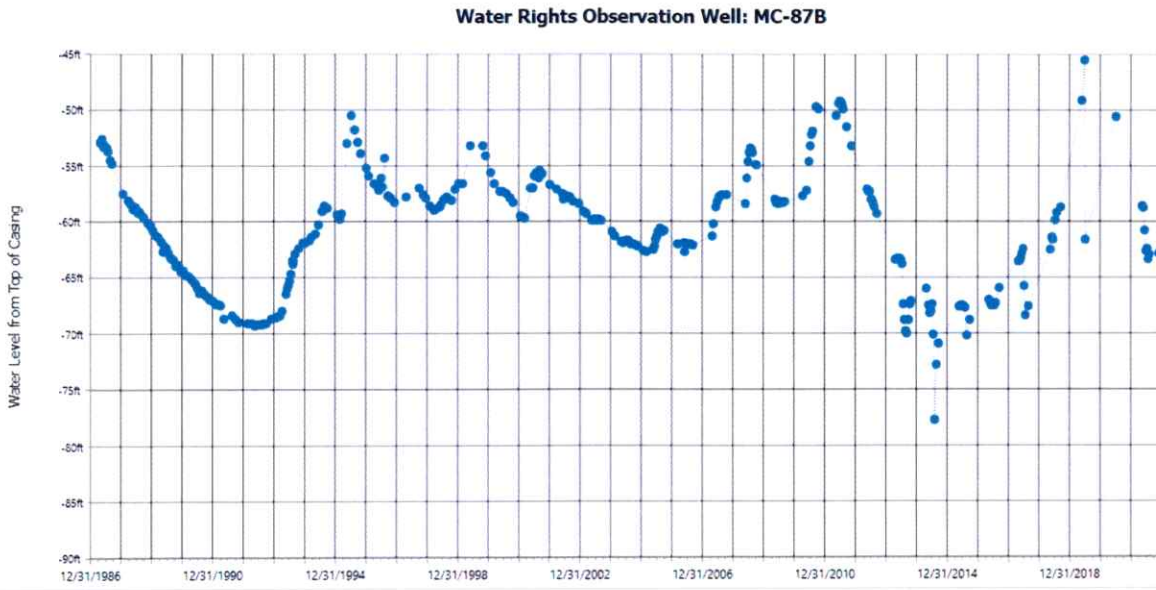


Figure 13: Hydrograph of observation well MC-87B located 19 miles north (Water Rights, 2022b)

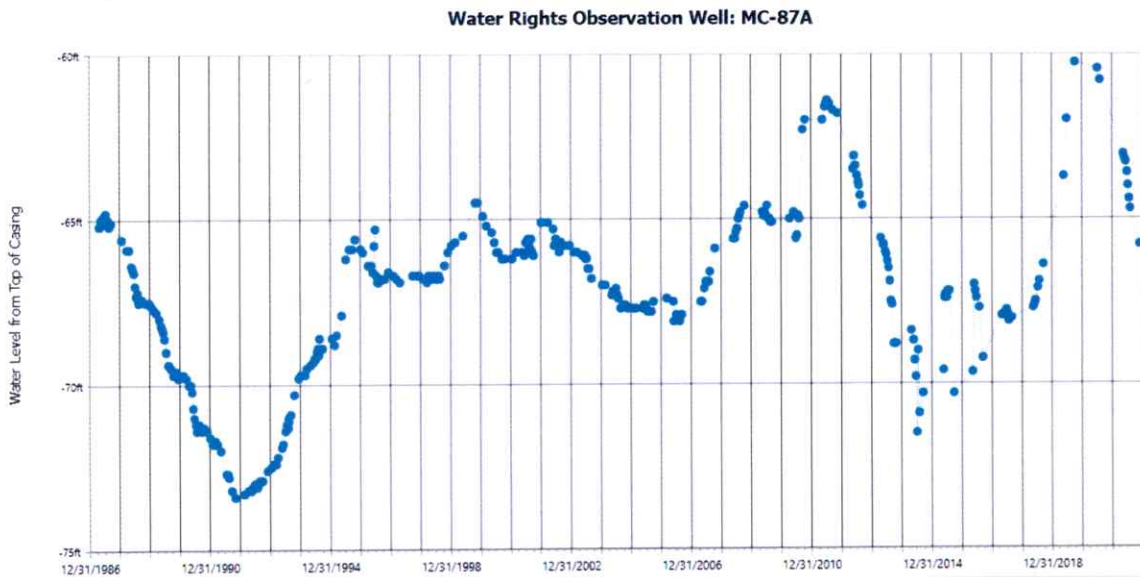


Figure 14: Hydrograph of observation well MC-87A located 20 miles north (Water Rights, 2022b)

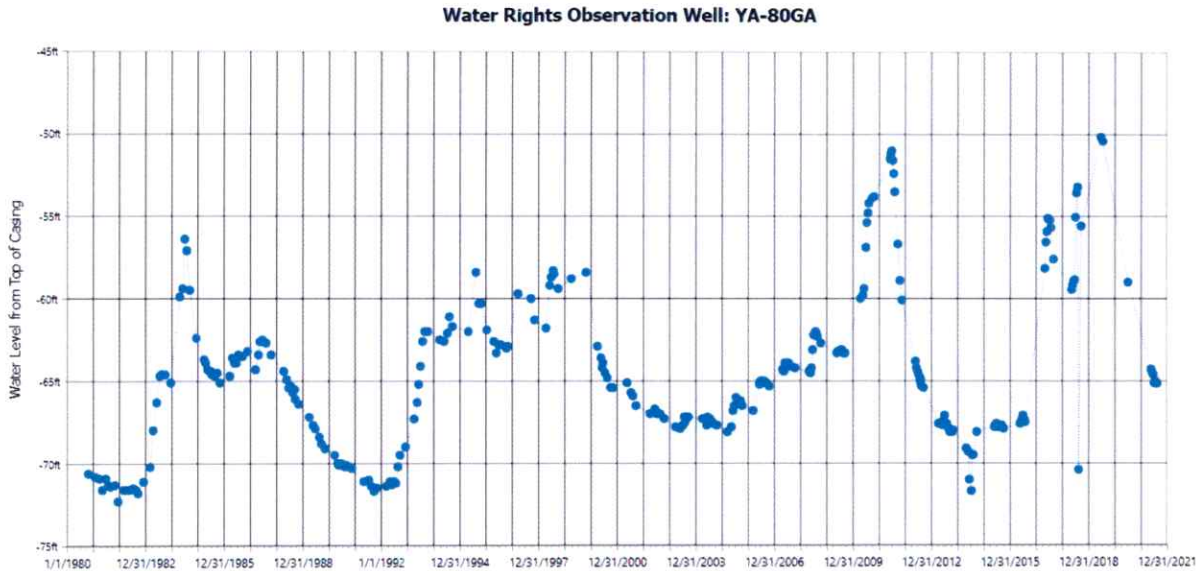


Figure 15: Hydrograph of observation well YA-80GA located 21 miles southeast (Water Rights, 2022b)

Generally, the observation wells show an increase in water levels since the start of their periods of record (excluding HT-81B). Within that increasing trend, the response of water levels to climatic conditions can be noted, although the magnitude of the response to climatic condition varies due to localized conditions within the aquifer. Several observation wells that are close to irrigation wells show localized seasonal dips in measured water levels during the irrigation season in response to pumping (for example HT-83F and TU-81A). This is representative of the artesian head pressure of the aquifer in the area responding to seasonal irrigation pumping. However, water levels recover after the end of the irrigation season when pumping ends for the season. Water levels in the observation wells monitoring the aquifer generally rise during wet periods and decline to stable levels during drier periods. This type of behavior, along with aquifer recovery following the irrigation season, is indicative that climatic conditions, and therefore the effects of recharge to and natural discharge from the aquifer, govern the long-term fluctuations in water levels in the aquifer instead of pumping. Since recharge to and natural discharge from an aquifer can be captured for pumping, there is a reasonable probability that unappropriated water is available from this portion of the Niobrara aquifer for the proposed appropriation.

Hydraulic Budget

Recharge

Recharge to this portion of the Niobrara aquifer is likely from groundwater inflow from adjacent or overlying aquifers due to leakage from these hydrologically connected aquifers when the potentiometric gradients are favorable (a higher hydraulic head in the connected overlying or adjacent aquifer than in the Niobrara aquifer would indicate potential for leakage into the Niobrara aquifer), infiltration from precipitation where the Niobrara is at or near ground surface, and leakage through till (Lindgren and Hansen, 1990). There is no estimate of average annual recharge to this portion of the Niobrara aquifer or the Niobrara aquifer in general available for South Dakota

(Hedges et al., 1985). However, of the Niobrara aquifer in SD, Hedges, et al. (1985) notes noted the Niobrara aquifer had such high storage and low use it was unlikely that withdrawals are approaching or exceeding recharge and that there was no evidence of significant head loss in the aquifer to suggest that use is exceeding recharge. As documented in the observation well section of this report the additional years of observation well data collected since Hedges, et al. (1985) still show no evidence of significant head loss in the aquifer (Water Rights, 2022b).

Discharge

Discharge from this portion of the Niobrara aquifer is due to well withdrawals and likely leakage to hydrologically connected aquifers where the potentiometric gradients are favorable (a higher hydraulic head in the Niobrara aquifer than in an overlying or adjacent aquifer would indicate potential for discharge from the Niobrara). There are currently 25 active water rights/permits in this portion of the Niobrara aquifer (Water Rights, 2022b). Of those 19 are for irrigation use, 3 for municipal use, 2 for commercial use, and 1 for institutional use. Mathiowetz (2016) created and analyzed a May 2016 potentiometric surface (Figure 2) for this portion of the Niobrara aquifer using observation well and water well data. The Mathiowetz (2016) analysis estimated that natural groundwater discharge along the western side of this portion of the Niobrara aquifer to the Lower James Missouri aquifer to be at least 9,837 acre-feet per year. Natural discharge from an aquifer serves as an indicator of the magnitude by which recharge is exceeding withdrawals from an aquifer. Since this estimate is for a single point in time (May 2016), this value does not represent an average annual value for discharge from the aquifer but does offer insight into the magnitude by which recharge is exceeding withdrawals on the western flank of the aquifer at the time the analysis was performed. Actual natural groundwater discharge from this aquifer is likely higher then indicated by Mathiowetz (2016). This is due to the direction of groundwater flow being generally from the center of the aquifer outward to the edges of the aquifer and Mathiowetz (2016) only quantified discharge from the western side of the aquifer, so an unquantified amount of natural discharge is likely occurring from the north, east, and south edges of the aquifer.

The six non-irrigation water rights/permits in this portion of the Niobrara aquifer are summarized in Table 1. The Town of Irene and the City of Freeman both purchase their water from a rural water system but keep their water rights on standby for emergency use, so their average annual withdrawal is estimated to be zero (Drinking Water, 2022). Historically, average water use by non-irrigation appropriations limited solely by instantaneous diversion rate have been less than 60% of full time pumping at the maximum permitted diversion rate. For water rights/permits limited to an annual volume, full use of that volume is assumed for estimation of average annual withdrawal. Appropriative non-irrigation water is summarized in Table 1. The estimated average annual appropriative non-irrigation use from this portion of the Niobrara aquifer is 533 acre-ft per year. There are a number of domestic wells completed into this portion of the Niobrara aquifer that do not require appropriative water permits or report annual pumpage. Due the development of rural water systems in the area and to their relatively limited diversion rates; it is assumed the volume pumped from domestic wells is negligible to the hydrologic budget for this aquifer.

Report on Water Permit Application 8579-3

Table 1: Non-irrigation Use (Water Rights, 2022b)							
Permit No.	Name of Permit Holder	Priority Date	Status	Use	Rate (cfs)	Annual Volume Limit (acre-ft)	Estimated Average Annual Use (acre-ft per yr.)
810-3	City of Freeman	01/01/1950	LC	MUN	1.26	n/a	0 (system on standby)
1229-3	Town of Irene	01/01/1915	LC	MUN	0.56	n/a	0 (system on standby)
5239-3	City of Freeman	10/17/1988	LC	MUN	0.33	n/a	0 (system on standby)
6524-3	Freeman Jr College & Freeman Academy	07/19/2004	LC	INS	0.07	n/a	30
6706-3	Pheasant Run Farm	02/21/2006	PE	COM	0.1	n/a	43
8216-3	B&K Dairy Farms LLC	02/01/2016	PE	COM	0.67	460	460
Total							533
LC-water right, PE-water permit, MUN-municipal, INS-institutional, COM-commercial							

The majority of water rights/ permits for irrigation are required to report annual irrigation usage to the Water Rights Program. The 19 active water rights/permits for irrigation from this portion of the Niobrara aquifer are summarized in Table 2 and their reported annual irrigation pumping summarized Table 3. Water Right No. 5913-3 incorporated portions of another permit when licensed, so reported irrigation usage for the incorporated permit is also included in Table 3. Water Permit Nos. 7512-3, 7513-3, and 7514-3 all have a required completion of construction date of February 19, 2018; however, the 2013-2021 irrigation questionnaires for these permits all indicated that the systems have not been constructed (Water Rights, 2022a; Water Rights, 1980-2022). Water Permit No. 7814-3 has a completion of construction date of June 24, 2018; however, the 2013-2021 irrigation questionnaires for this permit all indicated that the system has not been constructed (Water Rights, 2022a; Water Rights, 1980-2022). Water Permit Nos. 7512-3, 7513-3, 7514-3, and 7814-3 are all likely subject to cancellation due to failure to construct the system in the five year construction period for the permit. Therefore, since they are subject to cancellation the average annual usage for these permits is estimated at zero acre-feet per year.

Table 2: Summary of Irrigation Water Rights/Permits (Water Rights, 2022b)						
Permit No.	Name of Permit Holder	Priority Date	Status	Rate (cfs)	Acres	Comments
5764-3	City of Freeman	03/15/1993	LC	0.24	27.5	irrigation reporting started in 2016
5913-3	Roger Schmidt	04/02/1981	LC	0.77	123	incorporates portions of 4679-3
6708-3	David Huber	04/03/2006	LC	1.78	271	
7344-3	Michael Schultz	04/09/2012	PE	5.33	399	
7448-3	Robert Heckenlaible	10/03/2012	PE	6.67	560	
7512-3	Greg Wirth	10/24/2012	PE	2.28	160	not constructed
7513-3	Greg Wirth	10/24/2012	PE	1.74	122	not constructed
7514-3	Greg Wirth	10/24/2012	PE	2.28	160	not constructed
7515-3	Greg Wirth	10/24/2012	PE	2.28	160	
7526-3	Derrick Walter	11/15/2012	PE	3.56	257	
7617-3	Brett Guthmiller	01/07/2013	LC	1.34	119	
7683-3	Roger Guthmiller	01/28/2013	LC	1.34	134	
7700-3	David Huber	02/14/2013	PE	2.22	160	
7814-3	David Huber	04/01/2013	PE	1.78	80	not constructed
7893-3	Wayne or Trina Knutson	09/03/2013	LC	0.07	1.2	
8162-3	Don Schellpfeffer	05/28/2015	PE	1.78	122.65	
8260-3	Cameron Johnson	12/27/2016	PE	1.67	117.35	
8326-3	Jerry Nelsen	01/08/2018	PE	2	120	
8416-3	Jerome Poeschl	12/02/2019	PE	1.56	116	

Average reported irrigation usage for the water rights/permits for irrigation from this portion of the Niobrara aquifer is 156 acre-ft per year. Since the number of irrigation water rights/permits has continued to increase, the estimated average annual withdrawal rate for

irrigation appropriations for the entire period of record may not accurately reflect the current level of development. The average annual withdrawal rate for irrigation appropriations from 2013 to 2020 better represents the current level of irrigation development in this portion of the Niobrara aquifer. Average reported irrigation usage from 2013 to 2020 for the water rights/permits for irrigation from this portion of the Niobrara aquifer is 590 acre-ft per year.

Balance

Estimated average annual appropriative withdrawals for this portion of the Niobrara aquifer are estimated at 1,123 acre-ft per year (irrigation: 590 acre-ft per year and non-irrigation: 533 acre-ft per year). Natural discharge along the western side of this portion of the Niobrara aquifer to the Lower James Missouri aquifer is estimated to be at least 9,837 acre-feet per year (Mathiowetz, 2016). Since natural discharge from an aquifer represents water available in excess of withdrawals at the time of the estimation, and estimated natural discharge exceeds estimate average annual withdrawals, there is a reasonable probability that unappropriated water is available in this portion of the Niobrara aquifer.

Report on Water Permit Application 8579-3

Table 3: Reported Irrigation use (Water Rights,1981-2021; Water Rights, 1982-2022)

Year	No. Permits	Reported Pumping (acre-feet)
1981	1	0.0
1982	1	69.7
1983	1	35.6
1984	1	42.0
1985	1	50.0
1986	1	50.0
1987	1	120.0
1988	1	72.9
1989	1	136.6
1990	1	92.8
1991	1	106.1
1992	1	6.6
1993	1	0.0
1994	1	33.1
1995	1	29.4
1996	2	6.6
1997	2	18.0
1998	2	0.0
1999	2	0.0
2000	2	0.0
2001	2	0.0
2002	2	25.2
2003	2	7.7
2004	2	0.0
2005	2	0.0
2006	2	0.0
2007	2	23.1
2008	2	49.5
2009	2	28.3
2010	2	0.0
2011	2	141.4
2012	3	381.6
2013	13	999.1
2014	14	928.9
2015	15	724.6
2016	16	518.1
2017	17	616.8
2018	18	98.0
2019	18	20.5
2020	19	815.0
Max	19	999.09
Min	1	0
1981-2020 Avg	4.5	156.2
2013-2020 Avg	16.25	590.1

adversely impacted domestic well (ARSD 74:02:04:20(7)) as “a well in which the pump intake was set at least 20 feet below the top of the aquifer at the time of construction or, if the aquifer is less than 20 feet thick, is as near to the bottom of the aquifer as is practical and the water level of the aquifer has declined to a level that the pump will no longer deliver sufficient water for the well owner's needs”. A review of area observation wells completed into the Niobrara aquifer indicated that the nearest observation well, observation well HT-83F located 5.1 miles to the northeast of the domestic wells (shown in Figure 4), was too far away and in the wrong direction to be used to determine if an unlawful impairment was occurring. However, there were local aquifer characteristics identified that could explain why the domestic wells were experiencing loss of water issues before other domestic wells located closer to the irrigation wells. To gain further information on the situation Water Rights asked the nearest irrigators to the southwest to participate in a voluntary shut down of their irrigation systems. Within one week of the voluntary shut down one of the domestic wells was reported as starting to recover and the other had stopped sucking air (Water Rights, 2022d). The domestic well reported as sucking air did not recover until several weeks later after the irrigation to the north shut down (Water Rights, 2022d).

In 2013, the Water Rights Program received a complaint of a domestic well being impacted in the general area of this application; however, when investigated, it was determined that the well had likely collapsed and was not an adequate well as defined by ARSD 74:02:04:20(6) (Water Rights, 2022d). In 2015, a complaint was received that Water Permit No. 7526-3 (near the northern edge of this portion of the Niobrara aquifer) was impacting springs; however, the springs were identified as artesian in nature and artesian head pressure is not protected as a means of delivery. Therefore, it was concluded that no unlawful impairment was occurring (Water Rights, 2022). In the case of Water Permit Application No. 2313-2 for the Coca-Cola Bottling Company of the Black Hills the Water Management Board adopted findings that noted that if the increased costs or decreased production as a result of the impacts of legitimate users on artesian head pressure could be considered an adverse impact it would conflict with SDCL 46-1-4 (Water Rights, 1995). SDCL 46-1-4 requires the water resources of the state be put to beneficial use to the maximum extent of which they are capable (Water Rights, 1995).

The Water Rights Program began planning additional investigation activities in the area prior to receiving this application (Water Rights, 2022d). The plan is to work in conjunction with the South Dakota Geological Survey to install additional observation wells in the area to better understand how pumping impacts water levels in the area (Water Rights, 2022d). The current lack of observation well coverage between the irrigation wells and the complaint domestic wells means the Water Rights Program cannot be certain that unlawful impairment is not occurring to the domestic wells at the current level of development. Additional observation wells will assist in determining whether any possible unlawful impairment is caused by a single irrigation well; the seasonal, cumulative effect of multiple irrigation wells; or general drought conditions either in conjunction with the preceding or apart from the preceding. It should be noted that discounting seasonal fluctuations the two nearest observation wells (HT-83F and TU-81A (shown in Figures 4 and 5)) both show long term climatic fluctuations in excess of 20 feet. Additionally, the primary direction of water movement in the aquifer (from the center outward as indicated by Mathiowetz (2016)) indicates the need for additional observation wells in the area to better understand the effect of the irrigation wells on water levels in the area. The planned second activity is to perform

Report on Water Permit Application 8579-3

a licensing inspection of the water permits that are past their five year construction period or have indicated that development is complete (Water Rights, 2022d). Reported irrigation by year for the water rights/permits surrounding the domestic wells is shown in Table 4. Given the historic reported irrigation in the area and lack of complaints that could be an unlawful impairment until August of 2021, it is likely that some level of irrigation can be done in the area without unlawful impairment of adequate wells (if an impairment is occurring). The addition of another high capacity well in the area could cause additional seasonal drawdown in the area. Given the Water Rights Program is investigating if existing irrigation is causing unlawful impairment of domestic wells under extended high use in the area of this application, the addition of another high-capacity irrigation well to the area could further exacerbate the issue if it is determined that under high use conditions unlawful impairment can occur as a result of drawdown. Therefore, based on the information currently available, a conclusion cannot be made whether there is a reasonable probability unlawful impairment will occur if this application is developed.

Table 4: Reported Irrigation by Year in the Area of the Complaint in Acre-Feet (Water Rights, 1981-2021; Water Rights, 1982-2022)

Permit No.	6708-3	7344-3	7448-3	7617-3	7683-3	7700-3	7814-3	Total
Priority Date	04/03/2006	04/09/2012	10/03/2012	01/07/2013	01/28/2013	02/14/2013	04/01/2013	
Approximate distance to complaint wells (miles)	2.1	3.2	1.9	2.6	3.1	4.3	4.3	
2021	86.9	155.6	192.5	43.1	57.4	15.5	0.0	551.0
2020	103.3	227.0	125.4	35.7	38.1	51.6	0.0	581.0
2019	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
2018	0.0	51.7	29.0	5.7	0.0	0.0	0.0	86.4
2017	10.6	168.8	26.5	25.4	28.7	42.4	0.0	302.5
2016	0.0	205.1	117.7	30.5	31.6	28.3	0.0	413.1
2015	77.8	316.9	75.1	18.6	21.1	56.6	0.0	566.0
2014	169.7	181.4	136.7	60.8	80.4	120.2	0.0	749.2
2013	155.6	228.0	175.7	43.1	59.1	141.4	0.0	802.9
2012	272.2	109.4	n/a	n/a	n/a	n/a	n/a	381.6
2011	141.4	n/a	n/a	n/a	n/a	n/a	n/a	141.4
2010	0.0	n/a	n/a	n/a	n/a	n/a	n/a	0.0
2009	28.3	n/a	n/a	n/a	n/a	n/a	n/a	28.3
2008	49.5	n/a	n/a	n/a	n/a	n/a	n/a	49.5
2007	23.1	n/a	n/a	n/a	n/a	n/a	n/a	23.1

SDCL 46-5-6 Diversion Rate Limit

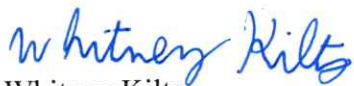
Pursuant to SDCL 46-5-6, the diversion rate for an irrigation appropriation cannot be in excess of one cfs for every 70 acres, or “the equivalent thereof.” The statute does provide that the Water Management Board may allow a greater diversion rate if the method of irrigation or soil types so require. Water Permit Application No. 8579-3 propose to diver up to 0.89 cfs for the irrigation 32 acres or the equivalent of 1.95 cfs per 70 aces. The application indicated that the proposed method of irrigation is by center pivot. Center pivots generally require a certain diversion rate for operation, so when center pivot irrigation system is not making a full turn or consists of a shorter span than a full quarter the one cfs for every 70 acres rate is sometimes exceeded. This reason has historically been accepted as an allowed exceedance due to the method of irrigation.

Conclusions

1. Water Permit Application No. 8579-3 proposes to appropriate water for the irrigation of 32 acres at a maximum instantaneous diversion rate of 0.89 cfs from one well to be completed

into the Niobrara aquifer both located in the NE $\frac{1}{4}$ NE $\frac{1}{4}$ Section 18-T97N-R56W in Hutchinson County.

2. Based on the hydrologic budget and observation well data, there is a reasonable probability that water is available in the aquifer to meet the water use proposed by this application.
3. Additional investigation is needed to determine if the existing high-capacity irrigation wells in the area maybe unlawfully impairing two existing domestic users with adequate wells under extended high use conditions. Adding another high-capacity irrigation well to the area before the Water Rights Program can further investigate the current unlawful impairment complaint could further exacerbate the issue if it is determined that under high use conditions unlawful impairment can occur as a result of drawdown from pumping of the existing high-capacity irrigation wells in the area.
4. Therefore, based on the information currently available, a conclusion cannot be whether there is a reasonable probability unlawful impairment will occur if this application is developed.
5. This application is requesting a diversion rate greater than the statutory limit 1 cfs per 70 acres due to the method of irrigation.



Whitney Kilts

SDDANR-Water Rights Program

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**DEPARTMENT of AGRICULTURE
and NATURAL RESOURCES**

JOE FOSS BUILDING
523 E CAPITOL AVE
PIERRE SD 57501-3182
danr.sd.gov

**NOTE: TO BE SURE OF PUBLICATION ON
THE CORRECT DATES, CONTACT
THE NEWSPAPERS RIGHT AWAY.**

March 22, 2022

Brett Guthmiller
28680 435th Ave
Menno SD 57045

Dear Mr. Guthmiller:

Water Permit Application No. 8579-3 for irrigation use have been examined and found to comply with the South Dakota Water Laws and applicable rules. A notice has been sent to the Freeman Courier printed at Freeman (Ph # 605 925-7033) and the Press & Dakotan printed at Yankton (Ph # 605 665-7811). You will need to contact the newspapers and authorize publication of this notice. For your information, a copy of the notice, the recommendation of the Chief Engineer and report on the application are enclosed. Please review the notice prior to publication and notify this office, if you have any corrections or questions.

Be sure to contact the above newspapers to authorize publication of your Notice and to arrange for payment. Early contact with the papers can eliminate delays. Upon receiving authorization from you, the publishers have been instructed to publish your notice. The newspapers have also been instructed to send us the Proof of Publication. We must receive Proof of Publication before action can be taken on the application.

Sincerely,

Karen Schlaak

Karen Schlaak
Water Rights Program
(605) 773-3352

enclosures

NOTE: If you plan to contest any part of the Chief Engineer's recommendation, you must file a petition pursuant to the procedures outlined in the attached notice of hearing. The Water Management Board will then consider your concerns during a hearing on the application.

NOTICE OF HEARING on Application No. 8579-3 to Appropriate Water

Notice is given that Brett Guthmiller, 28680 435th Ave, Menno SD 57045 has filed an application for a water permit to appropriate 0.89 cubic feet of water per second (cfs) from one well to be completed into the Niobrara Aquifer (approximately 200 feet deep) located in the NE 1/4 NE 1/4 Section 18 for irrigation of 32 acres located in the NE 1/4 NE 1/4 Section 18; all in T97N-R56W. The applicant is requesting a diversion rate greater than the statutory limit of 1 cfs per 70 acres. This site is located approximately 4 miles southeast of Menno SD.

South Dakota Codified Law (SDCL) 46-2A-4(10) provides that “if the applicant does not contest the recommendation of the Chief Engineer and no petition to oppose the application is received, the Chief Engineer shall act on the application pursuant to the Chief Engineer’s recommendation and no hearing may be held before the board, unless the Chief Engineer makes a finding that an application, even if uncontested, presents important issues of public policy or public interest that should be heard by the board.” In this case, the Chief Engineer finds that this application presents important issues of public interest that should be heard by the Water Management Board.

Pursuant to SDCL 46-2A-2, the Chief Engineer recommends DEFFERAL of Application No. 8579-3 for further study because additional investigation is needed to determine if existing high capacity irrigation wells from the Niobrara aquifer in this area may unlawfully impair adequate domestic wells. The Water Rights Program is working in conjunction with the South Dakota Geological Survey to complete observation wells completed into the Niobrara aquifer in the spring of 2022. This will allow monitoring of water levels in the aquifer to aid in determining the effects pumping has on area domestic wells.

The deferral of Application No. 8579-3 is for up to two years at which time the application will be brought back before the Water Management Board for consideration. At that time, the Board will reconsider the application based on data received from the installed observation wells. The applicant can request the application be brought before the Board prior to expiration of the two year deferral period if they can show the proposed diversion can be developed without unlawful impairment of existing domestic water uses and water rights.

The Chief Engineer’s recommendation with qualifications, the application, and staff report are available at <https://danr.sd.gov/public> or contact Ron Duvall for this information, or other information, at the Water Rights Program address provided below.

The Water Management Board will consider this application at 9:45 am, (Central Time) on May 4, 2022 in the Matthew Training Center, Joe Foss Bldg, 523 E. Capitol Ave., Pierre SD. The Chief Engineer's recommendation is not final or binding upon the Board. The Board is authorized to 1) approve, 2) approve with qualifications, 3) defer, or 4) deny this application based on the facts presented at the public hearing.

Any person who intends to participate in the hearing shall allege that the application, upon approval, will cause injury to the person that is unique from any injury suffered by the public in general. The injury must concern a matter either within the regulatory authority found in SDCL 46-2A-9 for approval or denial of the application, or other matter concerning the application within the regulatory authority of the board to act upon as defined by SDCL 46-2-9 and 46-2-11, or both. Any person meeting the petitioner requirements and wishing to be a party of record in a contested case hearing shall file a written petition to oppose the application with BOTH the applicant and Chief Engineer. A petition opposing the application shall be filed on a form provided by the Chief Engineer. The petition form is available online at <https://danr.sd.gov/public> or by contacting the Chief Engineer. The Chief Engineer's address is "Water Rights Program, Foss Building, 523 E Capitol, Pierre SD 57501" or call (605) 773-3352. The applicant's mailing address is given above. If contesting the Chief Engineer's recommendation, the applicant shall also file a petition. A petition filed by either an interested person or the applicant must be filed by April 11, 2022.

The petition shall be in writing and shall include a statement describing the unique injury upon approval of the application on the petitioner, the petitioner's reasons for opposing the application, and the name and mailing address of the petitioner or the petitioner's legal counsel, if legal counsel is obtained. The hearing is an adversary proceeding and any party has the right to be present at the hearing and to be represented by a lawyer. These and other due process rights will be forfeited if they are not exercised at the hearing and decisions of the Board may be appealed to the Circuit Court and State Supreme Court as provided by law.

The May 4, 2022, hearing date will be automatically delayed for at least 20 days upon written request to the Chief Engineer from the applicant or any person who has filed a petition to oppose the application. The request for an automatic delay must be filed by April 11, 2022. If an automatic delay is requested, the hearing will be rescheduled for a future Board meeting and personal notice will be provided to the applicant and all petitioners regarding the time, date, and location.

Any interested person may file a comment on the application with the Chief Engineer. The comment shall be filed on a form provided by the Chief Engineer and is available online at <https://danr.sd.gov/public> or by calling (605) 773-3352 or writing the Chief Engineer at the address provided above. Filing a comment does not make the commenter a party of record or a participant in any hearing that may be held. Any comment must be filed by April 11, 2022.

Notice is given to individuals with disabilities that this hearing is being held in a physically accessible place. Please notify the Department of Agriculture and Natural Resources at least 48 hours before the hearing if you have a disability for which special arrangements must be made at the hearing. The telephone number for making arrangements is (605) 773-3352.

Under SDCL 1-26-17(7) notices must state that "if the amount in controversy exceeds \$2,500.00 or if a property right may be terminated, any party to the contested case may require the agency to use the Office of Hearing Examiners by giving notice of the request to the agency no later than ten days after service of a notice of hearing issued pursuant to SDCL 1-26-17." This is a Notice of Hearing, service is being provided by publication, and the applicable date to give notice to the Chief Engineer is April 11, 2022. However, since this particular matter is a water permit application and not a monetary controversy in excess of \$2,500.00 or termination of a property right the Chief Engineer disputes the applicability of this provision and maintains that the hearing must be conducted by the Board.

As applicable, the following provides the legal authority and jurisdiction under which the hearing will be held and the particular statutes and rules pertaining to this application: SDCL 1-26-16 thru 1-26-28; SDCL 46-1-1 thru 46-1-9, 46-1-13 thru 46-1-16; 46-2-3.1, 46-2-9, 46-2-11, 46-2-17; 46-2A-1 thru 46-2A-12, 46-2A-14, 46-2A-15, 46-2A-20, 46-2A-21, 46-2A-23; 46-5-1.1, 46-5-2 thru 46-5-26, 46-5-30.2 thru 46-5-30.4, 46-5-31, 46-5-32 thru 46-5-34.1, 46-5-38 thru 46-5-39, 46-5-46, 46-5-47, 46-5-49; 46-6-1 thru 46-6-3.1, 46-6-6.1, 46-6-10, 46-6-13, 46-6-14, 46-6-21, 46-6-26; and Board Rules ARSD 74:02:01:01 thru 74:02:01:25.02; 74:02:01:35.01.

Published once at an approximate cost of_____.

Schlaak, Karen

From: Schlaak, Karen
Sent: Tuesday, March 22, 2022 1:10 PM
To: kelly.kronaizl@plaintalk.net
Subject: 8579-3, Brett Guthmiller
Attachments: 8579-3public.wmb_final.docx; FORM8.FRM.doc

Attached is a notice to be published on March 31, 2022 in the Press & Dakotan.

Brett Guthmiller, 28680 435th Ave, Menno SD 57045 (605 660-1479) has been notified to contact you to authorize publication and arrange for payment.

Please send the affidavit or return the attached Proof of Publication form ASAP to the Water Rights Program, 523 E Capitol, Pierre SD 57501.

Let me know if you have questions. Please acknowledge receipt of this email.

Karen Schlaak

DANR - Water Rights Program
(605) 773-3352
Website: <https://danr.sd.gov>



Schlaak, Karen

From: Schlaak, Karen
Sent: Tuesday, March 22, 2022 1:09 PM
To: Freeman Courier
Subject: 8579-3, Brett Guthmiller
Attachments: 8579-3public.wmb_final.docx; FORM8.FRM.doc

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Karen Schlaak

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Website: <https://danr.sd.gov>



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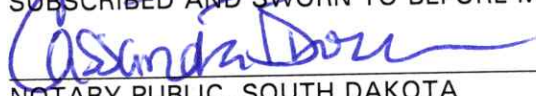
KELLY HERTZ, BEING FIRST DULY SWORN ON OATH DEPOSES
AND SAYS THAT (S)HE IS THE MANAGING EDITOR OF YANKTON
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PUBLISHED AND CIRCULATED IN THE CITY OF YANKTON, SAID COUNTY
AND STATE, AND ONE OF THE OFFICIAL NEWSPAPERS OF THE SAID
COUNTY OF FACTS STATED IN THIS AFFIDAVIT; THAT THE ANNEXED
3 + 31 NOTICE OF HEARING ON

TAKEN FROM THE PAPER, IN WHICH IT WAS LAST PUBLISHED IN THE
NEWSPAPER ON THE 31st DAY OF March, 2022
THAT THE FULL AMOUNT OF THE FEE CHARGED FOR THE PUBLICATION
OF SAID NOTICE TO WIT \$79.04 ENSURES TO THE
BENEFITS OF THE PUBLISHER OF SAID NEWSPAPER AND THAT NO
AGREEMENT AND UNDERSTANDING FOR THE DIVISION THEREOF HAS
BEEN MADE WITH ANY OTHER PERSON, AND THAT NO PART THEREOF
HAS BEEN AGREED TO BE PAID TO ANY PERSON WHOMSOEVER.

PUBLISHED ON: 03/31/2022

FILED ON: 03/31/2022


SUBSCRIBED AND SWORN TO BEFORE ME THIS 31st DAY OF March, 2022


NOTARY PUBLIC, SOUTH DAKOTA
MY COMMISSION EXPIRES 07/04/2026



NOTICE OF HEARING on Application No. 8579-3 to Appropriate Water

RECEIVED

APR 04 2022

WATER RIGHTS
PROGRAM

Notice is given that Brett Guthmiller, 28680 435th Ave, Menno SD 57045 has filed an application for a water permit to appropriate 0.89 cubic feet of water per second (cfs) from one well to be completed into the Niobrara Aquifer (approximately 200 feet deep) located in the NE 1/4 NE 1/4 Section 18 for irrigation of 32 acres located in the NE 1/4 NE 1/4 Section 18; all in T97N-R56W. The applicant is requesting a diversion rate greater than the statutory limit of 1 cfs per 70 acres. This site is located approximately 4 miles southeast of Menno SD.

South Dakota Codified Law (SDCL) 46-2A-4(10) provides that "if the applicant does not contest the recommendation of the Chief Engineer and no petition to oppose the application is received, the Chief Engineer shall act on the application pursuant to the Chief Engineer's recommendation and no hearing may be held before the board, unless the Chief Engineer makes a finding that an application, even if uncontested, presents important issues of public policy or public interest that should be heard by the board." In this case, the Chief Engineer finds that this application presents important issues of public interest that should be heard by the Water Management Board.

Pursuant to SDCL 46-2A-2, the Chief Engineer recommends DEFERRAL of Application No. 8579-3 for further study because additional investigation is needed to determine if existing high capacity irrigation wells from the Niobrara aquifer in this area may unlawfully impair adequate domestic wells. The Water Rights Program is working in conjunction with the South Dakota Geological Survey to complete observation wells completed into the Niobrara aquifer in the spring of 2022. This will allow monitoring of water levels in the aquifer to aid in determining the effects pumping has on area domestic wells.

The deferral of Application No. 8579-3 is for up to two years at which time the application will be brought back before the Water Management Board for consideration. At that time, the Board will reconsider the application based on data received from the installed observation wells. The applicant can request the application be brought before the Board prior to expiration of the two year deferral period if they can show the proposed diversion can be developed without unlawful impairment of existing domestic water uses and water rights.

The Chief Engineer's recommendation with qualifications, the application, and staff report are available at <https://danr.sd.gov/public> or contact Ron Duvall for this information, or other information, at the Water Rights Program address provided below.

The Water Management Board will consider this application at 9:45 am, (Central Time) on May 4, 2022 in the Matthew Training Center, Joe Foss Bldg, 523 E. Capitol Ave., Pierre SD. The Chief Engineer's recommendation is not final or binding upon the Board. The Board is authorized to 1) approve, 2) approve with qualifications, 3) defer, or 4) deny this application based on the facts presented at the public hearing.

Any person who intends to participate in the hearing shall allege that the application, upon approval, will cause injury to the person that is unique from any injury suffered by the public in general. The injury must concern a matter either within the regulatory authority found in SDCL 46-2A-9 for approval or denial of the application, or other matter concerning the application within the regulatory authority of the board to act upon as defined by SDCL 46-2-9 and 46-2-11, or both. Any person meeting the petitioner requirements and wishing to be a party of record in a contested case hearing shall file a written petition to oppose the application with BOTH the applicant and Chief Engineer. A petition opposing the application shall be filed on a form provided by the Chief Engineer. The petition form is available online at <https://danr.sd.gov/public> or by contacting the Chief Engineer. The Chief Engineer's address is "Water Rights Program, Foss Building, 523 E Capitol, Pierre SD 57501" or call (605) 773-3352. The applicant's mailing address is given above. If contesting the Chief Engineer's recommendation, the applicant shall also file a petition. A petition filed by either an interested person or the applicant must be filed by April 11, 2022.

The petition shall be in writing and shall include a statement describing the unique injury upon approval of the application on the petitioner, the petitioner's reasons for opposing the application, and the name and mailing address of the petitioner or the petitioner's legal counsel,

if legal counsel is obtained. The hearing is an adversary proceeding and any party has the right to be present at the hearing and to be represented by a lawyer. These and other due process rights will be forfeited if they are not exercised at the hearing and decisions of the Board may be appealed to the Circuit Court and State Supreme Court as provided by law.

RECEIVED

APR 04 2022

WATER RIGHTS
PROGRAM

The May 4, 2022, hearing date will be automatically delayed for at least 20 days upon written request to the Chief Engineer from the applicant or any person who has filed a petition to oppose the application. The request for an automatic delay must be filed by April 11, 2022. If an automatic delay is requested, the hearing will be rescheduled for a future Board meeting and personal notice will be provided to the applicant and all petitioners regarding the time, date, and location.

Any interested person may file a comment on the application with the Chief Engineer. The comment shall be filed on a form provided by the Chief Engineer and is available online at <https://danr.sd.gov/public> or by calling (605) 773-3352 or writing the Chief Engineer at the address provided above. Filing a comment does not make the commenter a party of record or a participant in any hearing that may be held. Any comment must be filed by April 11, 2022.

Notice is given to individuals with disabilities that this hearing is being held in a physically accessible place. Please notify the Department of Agriculture and Natural Resources at least 48 hours before the hearing if you have a disability for which special arrangements must be made at the hearing. The telephone number for making arrangements is (605) 773-3352.

Under SDCL 1-26-17(7) notices must state that "if the amount in controversy exceeds \$2,500.00 or if a property right may be terminated, any party to the contested case may require the agency to use the Office of Hearing Examiners by giving notice of the request to the agency no later than ten days after service of a notice of hearing issued pursuant to SDCL 1-26-17." This is a Notice of Hearing, service is being provided by publication, and the applicable date to give notice to the Chief Engineer is April 11, 2022. However, since this particular matter is a water permit application and not a monetary controversy in excess of \$2,500.00 or termination of a property right the Chief Engineer disputes the applicability of this provision and maintains that the hearing must be conducted by the Board.

As applicable, the following provides the legal authority and jurisdiction under which the hearing will be held and the particular statutes and rules pertaining to this application: SDCL 1-26-16 thru 1-26-28; SDCL 46-1-1 thru 46-1-9, 46-1-13 thru 46-1-16; 46-2-3.1, 46-2-9, 46-2-11, 46-2-17; 46-2A-1 thru 46-2A-12, 46-2A-14, 46-2A-15, 46-2A-20, 46-2A-21, 46-2A-23; 46-5-1.1, 46-5-2 thru 46-5-26, 46-5-30.2 thru 46-5-30.4, 46-5-31, 46-5-32 thru 46-5-34.1, 46-5-38 thru 46-5-39, 46-5-46, 46-5-47, 46-5-49; 46-6-1 thru 46-6-3.1, 46-6-6.1, 46-6-10, 46-6-13, 46-6-14, 46-6-21, 46-6-26; and Board Rules ARSD 74:02:01:01 thru 74:02:01:25.02; 74:02:01:35.01.

Published once at an approximate total cost of \$79.04.

AFFIDAVIT OF PUBLICATION

RECEIVED

APR 01 2022

WATER RIGHTS
PROGRAM

County of Hutchinson)

) ss.

State of South Dakota)

Jeremy Waltner, of said county and state, being duly sworn, on his oath, deposes and says: That the Freeman Courier is a weekly newspaper of general circulation and a legal newspaper as required by law, printed and published in the town of Freeman in said county and state by Jeremy Waltner, and has been such newspaper during the time hereinafter mentioned: That I, Jeremy Waltner, the undersigned, am publisher of said newspaper in charge of the advertising department thereof, and have personal knowledge of all the facts stated in this affidavit, and that the advertisement headed Appropriate Water

a printed copy of which is hereto attached, was printed and published in the said newspaper for one successive issues to-wit:

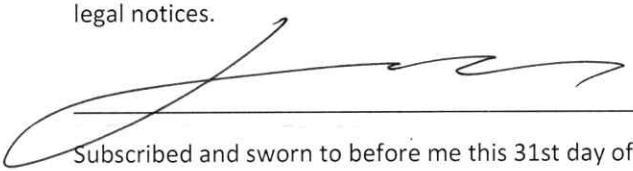
The first publication on:

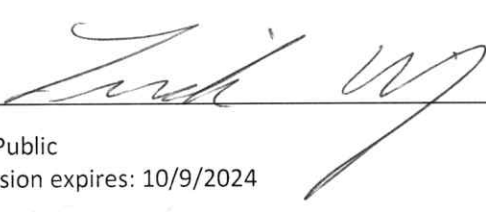
March 31, 2022

the second publication on:

and the third publication on:

That the full amount of the fees charged for publishing the same to-wit: The sum of \$80.00 insures solely to the benefit of the publisher of the Freeman Courier, that no agreement or understanding for any division thereof has been made with any other person whomsoever, and the amount of \$80.00 is the rate for publishing legal notices.


Subscribed and sworn to before me this 31st day of March 2022.


Notary Public

Commission expires: 10/9/2024

Publication fee: \$80.00

Notary fee:

Total: \$80.00

PUBLIC NOTICES

BECAUSE IT'S YOUR RIGHT TO KNOW

NOTICE OF HEARING

Guthmiller Application to appropriate water

Notice is given that Brett Guthmiller, 28680 435th Ave, Menno SD 57045 has filed an application for a water permit to appropriate 0.89 cubic feet of water per second (cfs) from one well to be completed into the Niobrara Aquifer (approximately 200 feet deep) located in the NE 1/4 NE 1/4 Section 18 for irrigation of 32 acres located in the NE 1/4 NE 1/4 Section 18; all in T97N-R56W. The applicant is requesting a diversion rate greater than the statutory limit of 1 cfs per 70 acres. This site is located approximately 4 miles southeast of Menno SD.

South Dakota Codified Law (SDCL) 46-2A-4(10) provides that "if the applicant does not contest the recommendation of the Chief Engineer and no petition to oppose the application is received, the Chief Engineer shall act on the application pursuant to the Chief Engineer's recommendation and no hearing may be held before the board, unless the Chief Engineer makes a finding that an application, even if uncontested, presents important issues of public policy or public interest that should be heard by the board." In this case, the Chief Engineer finds that this application presents important issues of public interest that should be heard by the Water Management Board.

Pursuant to SDCL 46-2A-2, the Chief Engineer recommends DEFERRAL of Application No. 8579-3 for further study because additional investigation is needed to determine if existing high capacity irrigation wells from the Niobrara aquifer in this area may unlawfully impair adequate domestic wells. The Water Rights Program is working in conjunction with the South Dakota Geological Survey to complete observation wells completed into the Niobrara aquifer in the spring of 2022. This will allow monitoring of water levels in the aquifer to aid in determining the effects pumping has on area domestic wells.

The deferral of Application No. 8579-3 is for up to two years at which time the application will be brought back before

the Water Management Board for consideration. At that time, the Board will reconsider the application based on data received from the installed observation wells. The applicant can request the application be brought before the Board prior to expiration of the two year deferral period if they can show the proposed diversion can be developed without unlawful impairment of existing domestic water uses and water rights.

The Chief Engineer's recommendation with qualifications, the application, and staff report are available at <https://danr.sd.gov/public> or contact Ron Duvall for this information, or other information, at the Water Rights Program address provided below.

The Water Management Board will consider this application at 9:45 am, (Central Time) on May 4, 2022 in the Matthew Training Center, Joe Foss Bldg, 523 E. Capitol Ave., Pierre SD. The Chief Engineer's recommendation is not final or binding upon the Board. The Board is authorized to 1) approve, 2) approve with qualifications, 3) defer, or 4) deny this application based on the facts presented at the public hearing.

Any person who intends to participate in the hearing shall allege that the application, upon approval, will cause injury to the person that is unique from any injury suffered by the public in general. The injury must concern a matter either within the regulatory authority found in SDCL 46-2A-9 for approval or denial of the application, or other matter concerning the application within the regulatory authority of the board to act upon as defined by SDCL 46-2-9 and 46-2-11, or both. Any person meeting the petitioner requirements and wishing to be a party of record in a contested case hearing shall file a written petition to oppose the application with BOTH the applicant and Chief Engineer. A petition opposing the application shall be filed on a form provided by the Chief Engineer. The petition form is available online at <https://danr.sd.gov/public> or by contacting the Chief

Engineer. The Chief Engineer's address is "Water Rights Program, Foss Building, 523 E Capitol, Pierre SD 57501" or call (605) 773-3352. The applicant's mailing address is given above. If contesting the Chief Engineer's recommendation, the applicant shall also file a petition. A petition filed by either an interested person or the applicant must be filed by April 11, 2022.

The petition shall be in writing and shall include a statement describing the unique injury upon approval of the application on the petitioner, the petitioner's reasons for opposing the application, and the name and mailing address of the petitioner or the petitioner's legal counsel, if legal counsel is obtained. The hearing is an adversary proceeding and any party has the right to be present at the hearing and to be represented by a lawyer. These and other due process rights will be forfeited if they are not exercised at the hearing and decisions of the Board may be appealed to the Circuit Court and State Supreme Court as provided by law.

The May 4, 2022, hearing date will be automatically delayed for at least 20 days upon written request to the Chief Engineer from the applicant or any person who has filed a petition to oppose the application. The request for an automatic delay must be filed by April 11, 2022. If an automatic delay is requested, the hearing will be rescheduled for a future Board meeting and personal notice will be provided to the applicant and all petitioners regarding the time, date, and location.

Any interested person may file a comment on the application with the Chief Engineer. The comment shall be filed on a form provided by the Chief Engineer and is available online at <https://danr.sd.gov/public> or by calling (605) 773-3352 or writing the Chief Engineer at the address provided above. Filing a comment does not make the commenter a party of record or a participant in any hearing that may be held. Any comment must be filed by April 11, 2022.

Notice is given to individuals with disabilities that this hearing is being held in a physically accessible place. Please notify the Department of Agriculture and Natural Resources at least 48 hours before the hearing if you have a disability for which special arrangements must be made at the hearing. The telephone number for making arrangements is (605) 773-3352.

Under SDCL 1-26-17(7) notices must state that "if the amount in controversy exceeds \$2,500.00 or if a property right may be terminated, any party to the contested case may require the agency to use the Office of Hearing Examiners by giving notice of the request to the agency no later than ten days after service of a notice of hearing issued pursuant to SDCL 1-26-17." This is a Notice of Hearing, service is being provided by publication, and the applicable date to give notice to the Chief Engineer is April 11, 2022. However, since this particular matter is a water permit application and not a monetary controversy in excess of \$2,500.00 or termination of a property right the Chief Engineer disputes the applicability of this provision and maintains that the hearing must be conducted by the Board.

As applicable, the following provides the legal authority and jurisdiction under which the hearing will be held and the particular statutes and rules pertaining to this application: SDCL 1-26-16 thru 1-26-28; SDCL 46-1-1 thru 46-1-9, 46-1-13 thru 46-1-16; 46-2-3.1, 46-2-9, 46-2-11, 46-2-17; 46-2A-1 thru 46-2A-12, 46-2A-14, 46-2A-15, 46-2A-20, 46-2A-21, 46-2A-23; 46-5-1.1, 46-5-2 thru 46-5-26, 46-5-30.2 thru 46-5-30.4, 46-5-31, 46-5-32 thru 46-5-34.1, 46-5-38 thru 46-5-39, 46-5-46, 46-5-47, 46-5-49; 46-6-1 thru 46-6-3.1, 46-6-6.1, 46-6-10, 46-6-13, 46-6-14, 46-6-21, 46-6-26; and Board Rules ARSD 74:02:01:01 thru 74:02:01:25.02; 74:02:01:35.01.

Published once at the total approximate cost of \$80.00

1-01FC



**DEPARTMENT of AGRICULTURE
and NATURAL RESOURCES**

JOE FOSS BUILDING
523 E. CAPITOL AVE
PIERRE SD 57501-3182
danr.sd.gov

August 21, 2024

NOTICE OF HEARING

TO: Brett Guthmiller
28680 435th Avenue
Menno SD 57045

FROM: Ron Duvall, Natural Resources Engineer
SD DANR, Water Rights Program

SUBJECT: Scheduling of Hearing on Deferred Water Permit Application No. 8579-3, Brett Guthmiller

On May 4, 2022, the Water Management Board (Board) deferred Water Permit Application No. 8579-3 for up to two years to determine whether existing high-capacity irrigation wells were unlawfully impairing adequate domestic wells. Since two years have passed, this application is being rescheduled for consideration by the Board. Enclosed is an updated staff report and revised Chief Engineer's recommendation, both dated August 20, 2024.

The Chief Engineer's revised recommendation is that the Board approve Application No. 8579-3. If you intend to oppose the recommendation that the Board approve the application, please file a petition opposing the recommendation by September 3, 2024. A petition form is enclosed for your use if you intend to oppose the recommendation. If you support the recommendation, no petition needs to be filed.

The Water Management Board will conduct the hearing to reconsider deferred Water Permit Application No. 8579-3 at 10:00 AM (Central Time), on Wednesday, October 2, 2024, at the Floyd Matthew Training Center, Joe Foss Building, 523 E. Capitol Avenue, Pierre SD. The time is an estimate and may be delayed due to prior items on the agenda.

Pursuant to SDCL 46-2-9, 46-2-11, and 46-2A-23, the Board has legal authority and jurisdiction to conduct this hearing. Applicable provisions of the public notice published in the Freeman Courier and the Yankton Daily Press & Dakotan on March 31, 2022, still apply.

Questions regarding the hearing process may be directed to Amanda Dewell or Ron Duvall, Water Rights Program at (605) 773-3352 or amanda.dewell@state.sd.us or ron.duvall@state.sd.us.

CERTIFICATION

The undersigned hereby certifies under the penalty of perjury that a true and correct copy of a Notice of Hearing dated August 21, 2024, regarding Water Permit Application No. 8579-3 – Brett Guthmiller, an updated report and revised recommendation both dated August 20, 2024, and an applicant's petition form was served upon the following by enclosing the same in an envelope with first class postage prepaid, and depositing said envelope in the United States mail on August 21, 2024.

Brett Guthmiller
28680 435th Avenue
Menno SD 57045

Above Sent Inter-office to:

Jennifer Verleger, Assistant Attorney General
1302 East Highway 14, Suite 1
Pierre SD 57501-8501

Shannon Konst

Shannon Konst
Water Rights Program, DANR

STATE OF SOUTH DAKOTA)
) SS
COUNTY OF HUGHES)

Sworn to, before me, this 21st day of August, 2024.

R. Rodriguez
Rachel Rodriguez
Notary Public
My Commission expires May 16, 2029





**DEPARTMENT of AGRICULTURE
and NATURAL RESOURCES**

JOE FOSS BUILDING
523 E. CAPITOL AVE
PIERRE SD 57501-3182

May 25, 2022

NOTICE OF ENTRY OF ORDER

TO: Brett Guthmiller, 28680 435th Ave, Menno SD 57045

FROM: Eric Gronlund, Chief Engineer *Eric Gronlund*
Water Rights Program

SUBJECT: Notice of Entry of Order Deferring Water Permit Application No. 8579-3, Brett Guthmiller

Notice is hereby given that on the 4th day of May 2022, the South Dakota Water Management Board took action to defer Application No. 8579-3 for up to two years as recommended by the Chief Engineer. As noted in the Chief Engineer's recommendation, the basis for deferral is to determine whether existing high capacity irrigation wells are unlawfully impairing adequate domestic wells. To aid in determining the effects of pumping on area domestic wells, the South Dakota Water Rights Program is working with the South Dakota Geological Survey to complete observation wells into the aquifer this spring. As noted in the Notice of Hearing published March 31, 2022, you may request Application No. 8579-3 be brought to the Board prior to expiration of the two-year deferral if it can be shown that the proposed diversion can be developed without unlawful impairment to existing water uses.

South Dakota statutes provide that decisions of the Board may be appealed to the Courts. Notice of appeal of the Board's decision must be filed within thirty days of this notice and be in accordance with procedures established in SDCL 1-26-31.

CERTIFICATION

The undersigned hereby certifies under the penalty of perjury that a true and correct copy of a Notice of Entry of Order dated May 25, 2022, in the matter of Deferral of Water Permit Application No. 8579-3, Brett Guthmiller, was served upon the following by enclosing the same in an envelope with first class postage prepaid and affixed thereto, and depositing said envelope in the United States mail on May 25, 2022.

Brett Guthmiller
28680 435th Avenue
Menno SD 57045

Above also Sent Inter-office to:

Ann Mines Bailey, Assistant Attorney General
1302 East Highway 14, Suite 1
Pierre SD 57501-8501

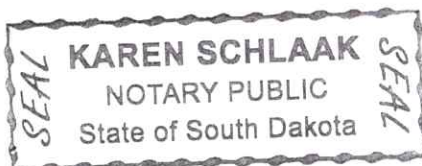
David McVey, Assistant Attorney General
1302 East Highway 14, Suite 1
Pierre SD 57501-8501

Vickie Maberry
Vickie Maberry
Water Rights Program, DANR

STATE OF SOUTH DAKOTA)
) SS
COUNTY OF HUGHES)

Sworn to, before me, this 25th day of May, 2022.

Karen Schlaak
Karen Schlaak
Notary Public
My Commission expires April 1, 2025





RECEIVED

APR 07 2022

WATER RIGHTS
PROGRAM

DEPARTMENT of AGRICULTURE
and NATURAL RESOURCES

JOE FOSS BUILDING
523 E. CAPITOL AVE
PIERRE SD 57501-3182
danr.sd.gov

Applicant's Petition

Opposing Chief Engineer's Recommendation on Water Permit Application

According to South Dakota Codified Law sections 46-2A-3, 46-2A-4(6) and 46-2A-23, the applicant needs to file a petition if opposing the Chief Engineer's recommended action on the applicant's water permit application.

Application No. 8579-3 Name of Applicant Brett Guthmiller

The Application No. can be found in the public notice mailed to you or at <https://danr.sd.gov/public>.

Filing Deadlines. If you are opposing a recommendation by the Chief Engineer to DENY your application, you need to submit this completed petition opposing the recommendation within twenty days of the date the recommendation was mailed to you. If you are opposing any other recommendation, this petition needs to be submitted no later than the deadline date provided in the public notice. The mailing address is provided above and should be sent to "Attention - Water Rights Program" or personally served upon Water Rights.

List the reasons for opposing the Chief Engineer's recommendation on this application:

I would like to urge the board to not defer this application but to approve it. Last summer, when the two wells, three miles north of my current well quit pumping, myself and two neighbors were told to stop irrigating. After a week, those domestic wells began to pump again. My father's well, which is a half mile further from these wells, was allowed to continue pumping and yet water returned to those domestic wells. This proposed well is located closer to his well and further away from those problem wells.

Secondly, I would refer to the engineer's report that states "there is reasonable probability that unappropriated water is available from this portion of the Niobrara aquifer for the proposed appropriation" (located on pg. 12). My father also has an artesian flow well in a pasture approximately one half mile from his irrigation well. This well dries up after he began pumping but it was running again by mid-October 2021, approximately 6 weeks after he quit pumping. I went and measured the water levels at both his well and mine in early March before the frost came out. They were both between 25 and 30 feet, which is considered normal levels.

I have talked to Dale Mehlhoff the one who called into the state last summer. He indicated the widow who he rents from and is a close relative of, would like to get on rural water (Bif), which is just over one half mile away. The biggest issue is Bif water can be difficult to work with. However, a neighbor one mile away was able to get connected last fall.

Continued →

Application No. 8579-3

Applicant's Name Brett Guthrie

Any additional reasons for opposing the Chief Engineer's recommendation on this application:

Lastly, this proposed well would only irrigate 32 acres. This means it will not be pumping a large volume over the season. This field contains heavy soil so it holds water much better than a sandy soil would. You probably wonder why I'm so passionate about this project. It comes down to feed for my cattle. I raise rye, corn, and alfalfa on this field as well as cover crops to make sure water and nutrients don't go unused with the current dry conditions and high feed costs. I am in need of this productive field to help supply the nutrition needs of our cattle.

I hope you can see that the stewardship of our resources are important to me. I hope to pass this passion of stewardship down through the generations along with our livestock and crop operation.

Thanks for your consideration.

Brett Guthrie



**DEPARTMENT of AGRICULTURE
and NATURAL RESOURCES**

JOE FOSS BUILDING
523 E. CAPITOL AVE
PIERRE SD 57501-3182
danr.sd.gov

OCT 11 2024

Brett Guthmiller
28680 435th Avenue
Menno SD 57045

Dear Mr. Guthmiller:

Enclosed is Water Permit No. 8579-3 authorizing construction of the water diversion system and beneficial use of the water, not exceeding the limits as specified in the Water Permit.

Form 10, *Notice of Completion of Works and Application of Water to Beneficial Use*, is enclosed. Please return this completed form after you have finished the system and have put the water to beneficial use. An investigation can then be scheduled so the water license may be issued, thus completing the acquisition of a water right.

An informational sheet *Common Water Right Questions* is also enclosed. This sheet is intended to answer some of the questions associated with obtaining and keeping a water right.

Sincerely,

Eric Gronlund, Chief Engineer
Water Rights Program
(605) 773-3352

enclosures



**DEPARTMENT of AGRICULTURE
and NATURAL RESOURCES**

JOE FOSS BUILDING
523 E. CAPITOL AVE
PIERRE SD 57501-3182
danr.sd.gov

STATE OF SOUTH DAKOTA)
) SS
COUNTY OF HUGHES)

**Affidavit of Public Notice
Posting on DANR Website**

Pursuant to SDCL § 46-2A-4, public notice of the following application was posted on the DANR web site at <https://danr.sd.gov/public>. The posted public notice is the same notice as published in the pertinent newspaper(s) and a copy of the public notice is maintained in the application file. If the application is contested, the posting is moved to the DANR contested case website at <https://danr.sd.gov/public/ContestedCase.aspx> until final action is taken on the application pursuant to SDCL § 46-2A-4.

Application No.: 8579-3

Name of Applicant: Brett Guthmiller

Date of Posting: 3/28/2022

Date of Removal: 8/1/2022



Ron Duvall, Engineer III

10/11/2024

Date

Subscribed and sworn to before me, a notary public, this 11th day of Oct, 2024.



Notary Public - South Dakota
My commission expires: **Rachel Rodriguez**
My Commission Expires
May 16, 2029



(SEAL)