



**DEPARTMENT of AGRICULTURE
and NATURAL RESOURCES**

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

May 10, 2024

NOTICE OF ENTRY OF ORDER

TO: Dustin Haase
44881 SD Highway 44
Parker SD 57053

Jennifer L. Verleger, Assistant Attorney General
Legal Counsel for Chief Engineer
1302 East Highway 14, Suite 1
Pierre SD 57501-8501

FROM: Amanda Dewell, Permitting Administrator
SD DANR, Water Rights Program

SUBJECT: Deferral of Water Permit Application No. 8566-3, Dustin Haase

Notice is given that on May 8, 2024, the South Dakota Water Management Board deferred Application No. 8566-3 for up to five years as recommended by the Chief Engineer. Presently, there are only two years of observation well readings for this aquifer (Pleistocene Series: Unknown Aquifer), at the current level of development. As noted in the Chief Engineer's recommendation, deferral of the application is to allow time for more observation well data to be collected to aid in the determination of whether water is available for appropriation.

Prior to expiration of the five-year deferral, the applicant may request that Application No. 8566-3 be brought back to the Board for further consideration. However, regardless of when the application is reconsidered by the Board, the burden of proof that there is water available for appropriation falls upon the applicant. Since it is the applicant's burden of proof, if you decide to request the application be brought back before the Board prior to five years it may be in your interest to retain a consultant to demonstrate water is available.

c: David McVey, Assistant Attorney General, Legal Counsel for SD Water Management Board

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 10, 2024, regarding deferral of Water Permit Application No. 8566-3 Dustin Haase, was served upon the following by enclosing the same in envelopes with first class postage prepaid, and depositing said envelopes in the United States mail on May 10, 2024.

Dustin Haase
44881 SD Highway 44
Parker SD 57053

Above also Sent Inter-office to:

Jennifer L. Verleger, 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


Shannon Konst

Shannon Konst
Water Rights Program, DANR

[illegible]

Sworn to, before me, this 10th day of May, 2024.



Rachel Rodriguez
Notary Public
My Commission expires May 16, 2029



FORM 2: Application for irrigation in South Dakota
(type or print)

FILE COPY

RECEIVED

DEC - 2 2021

PAID

DEC 02 2021

Ck# 7479

Mail to: DENR - Water Rights 523 E Capitol Ave Pierre, SD 57501-3182 ph. (605) 773-3352	No.	8566-3	(office use only) Hydrologic Unit	10170102
	Basin	Vermillion River		
	Newspaper			

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 Dustin Haase

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

Mailing Address 44881 SD Hwy 44. Parker SD 57053
(Address) (City) (State) (Zip Code)

Phone 605-360-3218 Mobile 605-360-3218 Email DustinHaase@yahoo.com

2. Amount of water claimed 1.78 *CFS or 800 **GPM ***AF Total Acreage 160
(*Cubic Feet per Second) (**Gallons per Minute) (***)Acre Feet - storage capacity of dam/dugout or annual use if applicable)

3. Source of water supply ground.

4. Location of point of diversion 1 well in the SW 1/4 of NE 1/4 of 15-99-54
(example - 3 wells in SW 1/4 NE 1/4 section 12-T104N-R53W)

County Turner

5. County or counties where water will be used Turner

6. Annual period during which water is to be used June 1 - September 30

7. 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
NW 1/4 of NW 1/4 16-99-54	40		
NE 1/4 of NW 1/4 16-99-54	40		
SW 1/4 of NW 1/4 16-99-54	40		
SE 1/4 of NW 1/4 16-99-54	40		

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

drill well in section 15 to irrigate 160A in section 16
see map (test hole #5)

I, Dustin Haase [Signature] 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 ____ 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) 236 ^{see well log #5} Depth to Top of Water Bearing Material ____ Depth to Water from Surface ____

d) Distance to nearest domestic well on applicant's property 3/4 mile Property owned by others approximately 1 mile

2. Wastewater Disposal System Information

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

b) System Capacity (gallons) ____ Year Constructed ____

c) Connected to the City of ____ Sanitary System

3. Dugout Information

a) Surface Dimensions NA 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 NA

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)

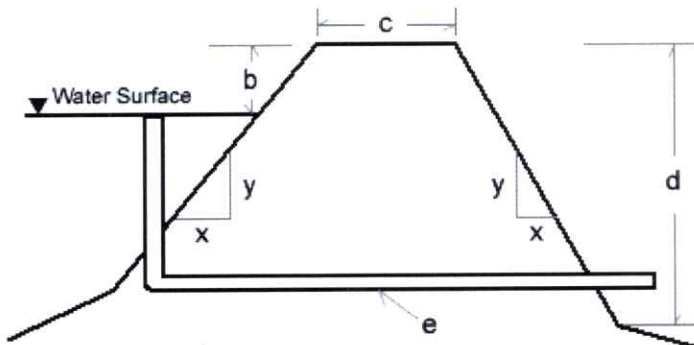
Upstream ____

Downstream ____

h) Surface Area of Impoundment ____

i) Storage ____ Acre Feet

j) Drainage Area Above Dam ____ Acres



Legend
📌 Dustin Haase

275 AVE

44

Dustin Haase Test Hole # 5 236'

Dustin Haase TH # 4 210' 📌

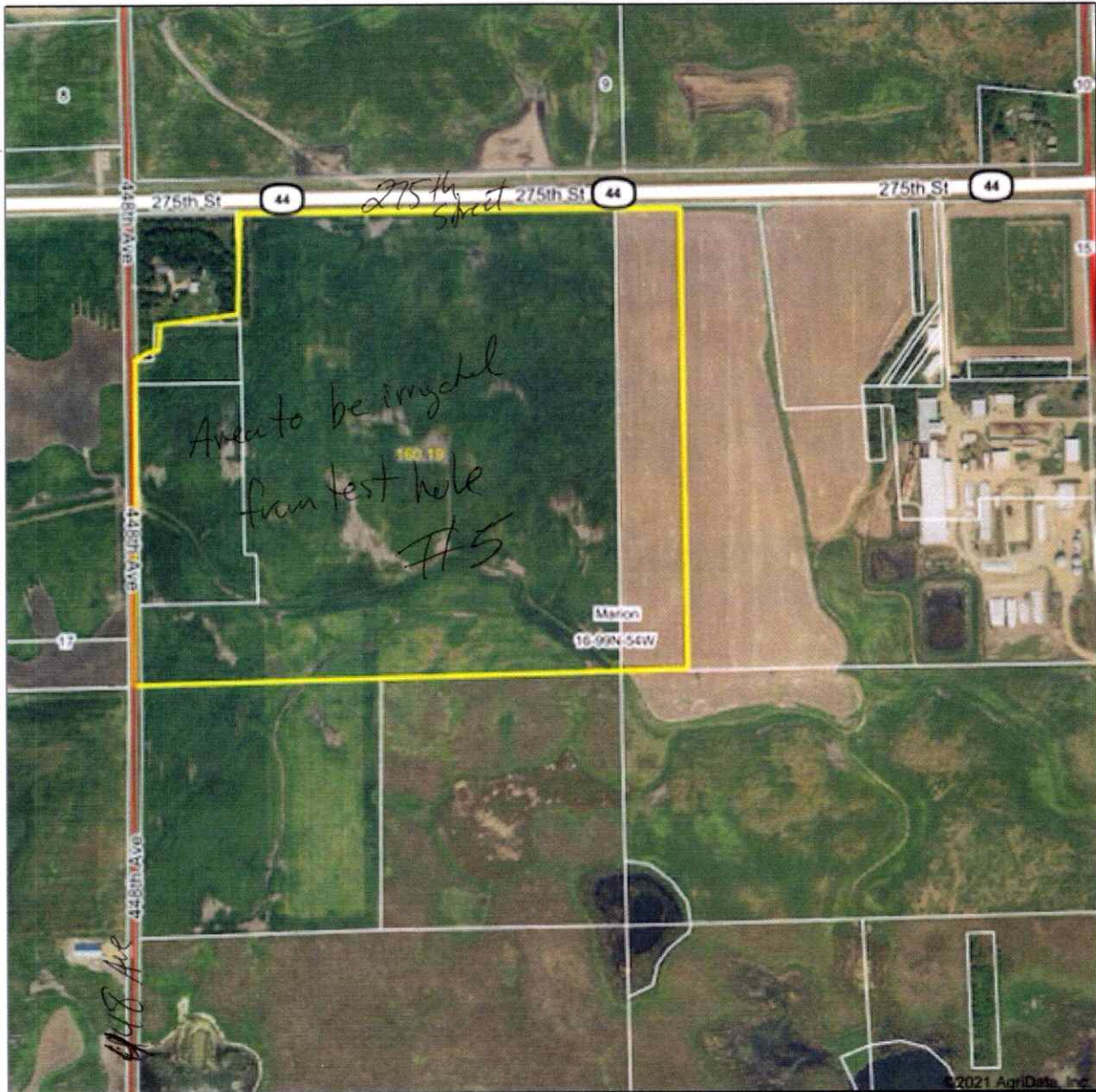
450 AVE

n 43 23.2320 w 97 12.1170 📌 Dustin Haase TH # 3 210'



From: Brett Petersen [REDACTED]
Subject: Wentzel
Date: Nov 29, 2021 at 8:02:41 PM
To: Dustin Haase dustinhaase@yahoo.com

Aerial Map



Map Center: 43° 23' 44.74, -97° 13' 56.03

0ft 832ft 1664ft



Dustin Haase Test Hole # 5 236' Section # 15 Parker SD

Formation Log	From	To
Top Soil	0	2
Clay Brown	2	11
Gravel	11	12
Clay Brown Gravelly	12	35
Gravel	35	38
Clay Brown	38	49
Clay Brown Gravelly	49	51
Gravel	51	53
Clay Gray	53	95
Gravel Coarse Clay Layer @ 130	95	131
Gravel Medium	131	141
Clay Gray	141	149
Sand & Coal	149	155
Clay Gray Some Sand layers & Coal	155	193
Coarse	193	236
Quartzite	236	



99N
Section

99N 54W
Section: 08

99N 54W
Section: 09

99N 54W
Section: 10

99N 54W
Section: 17

99N 54W
Section: 16

99N 54W
Section: 15

99N 54W
Section: 20

99N 54W
Section: 21

99N 54W
Section: 22

RECEIPT

WATER RIGHTS PROGRAM South Dakota Department of Agriculture and Natural Resources

Date December 2, 2021

RECEIVED OF Bruce/Dustin Haase 44881 SD Hwy 44 Parker SD 57053

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

Fee for Application for Permit No. <u>8566-3</u> to Appropriate Water, to construct and to put water to beneficial use	\$ <u>850.00</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>8566-3</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>1050.00</u>

By Eric Gronlund
Chief Engineer
me



**DEPARTMENT of AGRICULTURE
and NATURAL RESOURCES**

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

**RECOMMENDATION OF CHIEF ENGINEER FOR WATER PERMIT
APPLICATION NO. 8566-3, Dustin Haase**

Pursuant to SDCL 46-2A-2, the following is the recommendation of the Chief Engineer, Water Rights Program, Department of Agriculture and Natural Resources concerning Water Permit Application No. 8566-3, Dustin Haase, 44881 SD Highway 44, Parker SD 57053.

The Chief Engineer is recommending continued DEFERRAL of Application No. 8566-3 because at this time a determination cannot be made whether there is a reasonable probability unappropriated is available for the proposed use. Two factors for this conclusion are:

1. **Hydrologic budget comparison of estimated recharge versus estimated withdrawal.** The recharge rate needed to support the estimated average annual withdrawals, including this application, exceeds the estimated average annual recharge rate for a buried, unconfined aquifer.
2. **Area observation wells with a limited period of record showing declines warrants additional time.** The period of record for observation wells completed into this aquifer contains only two years of readings at the current level of development. Those two years show declines in water levels. Without a greater period of record, it cannot be determined if the water level declines are seasonal fluctuations due to the recent climatic conditions, due to recent development in the aquifer, or both.

The deferral of Application No. 8566-3 is for up to five years to collect more observation well data to determine whether water is available for appropriation. After that time, a review will take place and the application brought back before the Water Management Board for consideration. The applicant can request the application be brought before the Board prior to five years if they can meet the burden of proof that unappropriated water is available.

See report on application for additional information.


Eric Gronlund, Chief Engineer
April 8, 2024

Report to the Chief Engineer
On Deferred Water Permit Application No. 8566-3
Dustin Haase
April 8, 2024

Water Permit Application No. 8566-3 filed by Dustin Haase proposes to appropriate water at a maximum diversion rate of 1.78 cubic feet per second (cfs) from one well (approximately 236 feet deep) to be completed into the Pleistocene Series: Unknown aquifer for irrigation use. The proposed well location is in the SW $\frac{1}{4}$ NW $\frac{1}{4}$ Section 15-T99N-R54W. The proposed land to be irrigated is 132 acres located in the NW $\frac{1}{4}$ Section 16-T99N-R54W. This site is in Turner County approximately three miles west of Parker, SD.

This application was initially reviewed in January 2022 and was deferred for a period of two years at the March 2022 Water Management Board Meeting. Two other applications for Water Permit Nos. 8565-3 and 8567-3 were filed by the applicant alongside this application also requesting to irrigate out of the same aquifer. In total, the three applications requested the irrigation of 522 acres. Steen (2022) reviewed the three applications and concluded based on the information available at that time, water was only available for the irrigation of 350 acres. Therefore, Water Permit Nos. 8565-3 and 8567-3 were approved and Water Permit Application No. 8566-3 was deferred.

The ultimate recommendation of this report is to continue the deferral of this application. The reasoning and analysis behind this recommendation is covered in detail in the report. Throughout this report, the target aquifer for this application is referred to as a Pleistocene Series: Unknown aquifer to be consistent with the initial public notice for this application. However, as discussed later in this report, continuing to use this designation might not be the naming convention most consistent with the aquifer and management unit framework laid out in Hedges et al (1982) which is consistently used by the Water Rights Program and accepted by the Water Management Board.

Aquifer: Pleistocene Series: unknown aquifer (PS:U) (per original report on 8566-3)

Hydrogeology and Aquifer Characteristics

Background and History

The applicant provided test hole information for this application which is summarized in Appendix B Table B1. Ground surface elevation was obtained from the state's one meter resolution bare earth digital elevation model and when available, the GPS coordinates provided on the well completion report by the well driller were used to determine well location. Unless indicated otherwise for the remainder of this report, all ground elevations were obtained from the state's one meter resolution bare earth digital elevation model. Based on the test hole report for this application in Section 15-T99N-R54W, the target aquifer for this application is a coarse sand or gravel deposit ranging in elevation from 1,232 to 1,275 feet above NAVD88 (depth below grade 193ft to 236 ft). The sand and gravels encountered in the test hole for this application range from 1,327 to 1,373 ft

(depth below grade 95ft to 141ft) and is unlikely to be the same aquifer as the aquifer identified in Water Permit Nos. 8565-3, 8567-3, and this application.

Based on the test hole information and other area hydrogeologic information, the target aquifer for this application has been interpreted as likely generally being of glacial origin (Water Rights, 2024a; SDGS, 2024; Steen, 2022). Hedges et al (1982) delineated major glacial aquifers in Eastern South Dakota, none of which corresponded with the submitted test hole information for this application. Lindgren and Hansen (1990) delineated eleven major glacial aquifers in Turner and Hutchinson Counties, none of these aquifers correspond to the target aquifer for this application. The aquifer name Pleistocene Series: Unknown is a generic name used by the DNR Water Rights Program for a category of aquifer materials that were deposited by glaciation during the Pleistocene geologic epoch that are not part of a named glacial aquifer and are not located on the Coteau des Prairies in northeastern South Dakota (Water Rights, 2024b). So, the aquifer naming convention utilized by Steen (2022), the original reviewer of this application, was Pleistocene Series: Unknown.

After the Lindgren and Hansen (1990) report, additional geologic or hydrogeologic studies in the vicinity of the well site for this application include Tomhave and Schulz (2004), Jensen (2015), and Holmes and Filipovic (2015). Tomhave and Schulz (2004) examined the first occurrence of bedrock material in South Dakota east of the Missouri River with surface contours, which were revisited on a more localized scale for this area as a part of the study by Holmes and Filipovic (2015). Jensen (2015) mapped the first occurrence of aquifer materials for Turner County. A first occurrence of aquifer materials map is typically not a map that identifies individual glacial aquifers. Rather, it is a map of the approximate depth to geologic materials of a mappable extent that have the potential to produce water. After these publications, updates to the hydrogeologic understanding of this area are primarily based on additional test hole and observation well drilling by the South Dakota Geological Survey (SDGS) or test hole and well drilling that have occurred in relation to water permit application reviews (SDGS, 2024; Water Rights, 2024a and 2024b).

Between 2004 and 2015, the first water permit application (No. 7495-3, priority date November 1, 2012), post assignment of aquifers to groundwater permit applications, was submitted to the Water Rights Program (Mathiowetz, 2013). No. 7495-3 targeted a sand deposit at a similar elevation (1,244 ft to 1,272 ft above NAVD88) and vicinity (approximately 0.9 miles southeast of the well site for this application) (Mathiowetz, 2013). The best available information at the time of the review of Water Permit No. 7495-3 indicated that there was likely no glacial aquifer present at the proposed well location. Therefore, Mathiowetz (2013) concluded the sand and gravel described in the test hole for Water Permit No. 7495-3 likely corresponded to the Niobrara Formation. The Niobrara aquifer is primarily composed of a fractured chalk and calcareous marl that can be interbedded with calcareous claystone (Lindgren and Hansen, 1990). At the time, the best available information indicated the Niobrara Formation was at a similar elevation to the target sand and gravel and acted as an aquifer in this area (Lindgren and Hansen, 1990; Tomhave and Schulz, 2004). The lithologic information from the well completion report for Water Permit No. 7495-3 is summarized in Appendix B Table B2.

The first recognition of a glacial aquifer in the area that could sustain some level of appropriative use was Water Permit No. 7930-3 (priority date December 2, 2013, approximately 2.4 miles southeast of the well site for this application). The sand of the target aquifer for the

production well was at elevation 1,238 ft to 1,261 ft above NAVD88. Mathiowetz's (2014a) initial review of the application indicated the presence of a glacial aquifer in the area, but there was not sufficient information to delineate the aquifer. Therefore, Mathiowetz (2014a) recommended an aquifer performance test. The aquifer performance test supported the approval of Water Permit No. 7930-3, which occurred in January 2015 (Peschong, 2014; Mathiowetz, 2014b). However, the performance test indicated a negative aquifer boundary approximately 3,500 feet from the pumping well for the test (Peschong, 2014). A negative aquifer boundary indicates a change in geologic material to a lower permeability material than the material the pumping well is completed into. The information from the well completion report for Water Permit No. 7930-3 is summarized in Appendix B Table B3.

Jensen (2015) indicated a small glacial deposit in the area of this application, shown in Figure 1. As previously stated, a first occurrence of aquifer materials map is typically not a map that identifies individual glacial aquifers. Holmes and Filipovic (2015) updated bedrock surface contours and type of bedrock first encountered in most of Turner County and portions of Hutchinson, Lincoln, and Clay Counties. Of particular relation to this application, Holmes and Filipovic (2015) indicates a slight valley (elevation 1,250 feet and lower) in the Niobrara Formation in the vicinity of the well location for this application. This valley area is indicated in Figure 2. The drilling work that contributed to Jensen (2015) and Holmes and Filipovic (2015) was completed in 2014. In the summer of 2015, the observation wells the Water Rights Program started monitoring in 2016 as TU-2016C, TU-2016D, and TU-2016E were drilled (Water Rights, 2024c). TU-2016D indicates that the bedrock valley extends to the vicinity of TU-2016D (Water Rights, 2023c). Geologic information on these observation wells is summarized in Appendix B, Tables B4, B5, and B6. Staff from the Water Rights Program surveyed the measuring point for these observation wells in June 2023, so location and ground surface elevation in Tables B4, B5, and B6 have been updated from the location and elevations from SDGS (2024) to incorporate the survey information. The water rights/permits shown in Figures 1 and 2 are summarized in Table 1. Recent work (and this report) indicates that the official aquifer designation of several of the water rights/permits in Table 1 are in need of updating (noted in table).

Permit No.	Name	Priority Date	Status	Use	Aquifer	Rate (cfs)	Acres
3550-3	LARRY L SCHMIDT	01/11/1977	LC	IRR	VWF*	1.87	132
4562-3	LAWRENCE R STRAWBRIDGE LIVING TRUST	09/12/1980	LC	IRR	VWF	0.89	74
7457-3	LARRY L SCHMIDT	10/09/2012	PE	IRR	VWF*	2.22	207
7495-3	DENNIS HERLYN	11/01/2012	PE	IRR	NBRR*	1.11	160
7648-3	PAR MAR VALLEY CNTY CLB	01/17/2013	PE	IRR	VWF	0.89	50
7930-3	JAMES M RAND	12/02/2013	PE	IRR	PS:U*	1.89	162
8221-3	SONSTEGARD FOOD COMPANY	08/01/2016	PE	COM	VWF	1.11	n/a
8466-3	LEBER BROS LLC	12/23/2020	PE	IRR	PAC*	1.78	120
8467-3	LEBER BROS LLC	12/23/2020	PE	IRR	PAC*	1.78	140
8565-3	DUSTIN HAASE	12/02/2021	PE	IRR	PS:U*	1.11	124
8567-3	DUSTIN HAASE	12/02/2021	PE	IRR	PS:U*	2.22	226
8742-3	LARRY SCHMIDT	03/09/2023	PE	IRR	PAC	1.78	160

LC-water right, PE- water permit, IRR-irrigation, COM-commercial, VWF-Vermillion West Fork, NBRR-Niobrara, PAC-Parker Centerville, PS:U-Pleistocene Series: unknown, *aquifer update likely needed

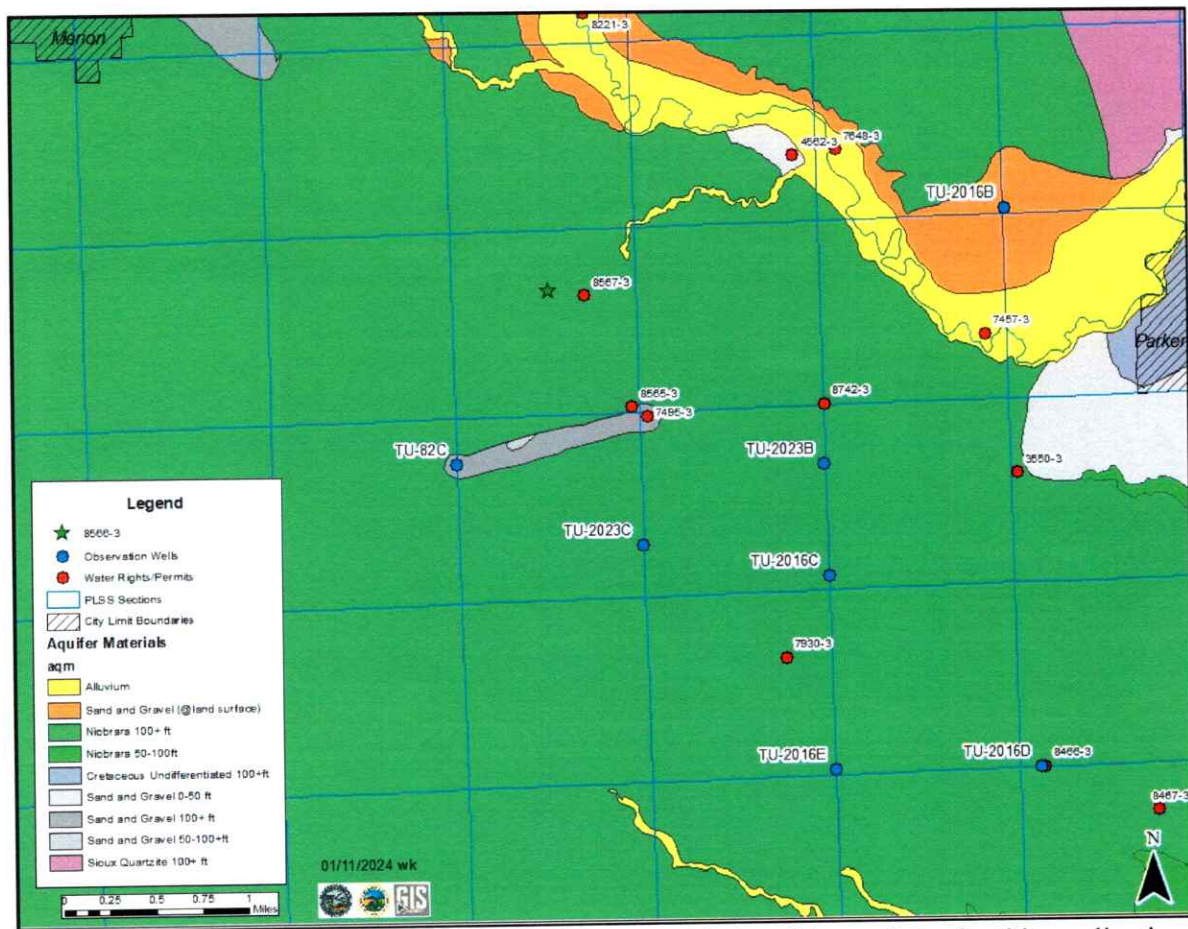


Figure 1: First occurrence of aquifer materials in the vicinity of the wellsite for this application (modified from Jensen, 2015), Water Rights observation wells, and water rights/permits (Water, 2024b and 2024c)

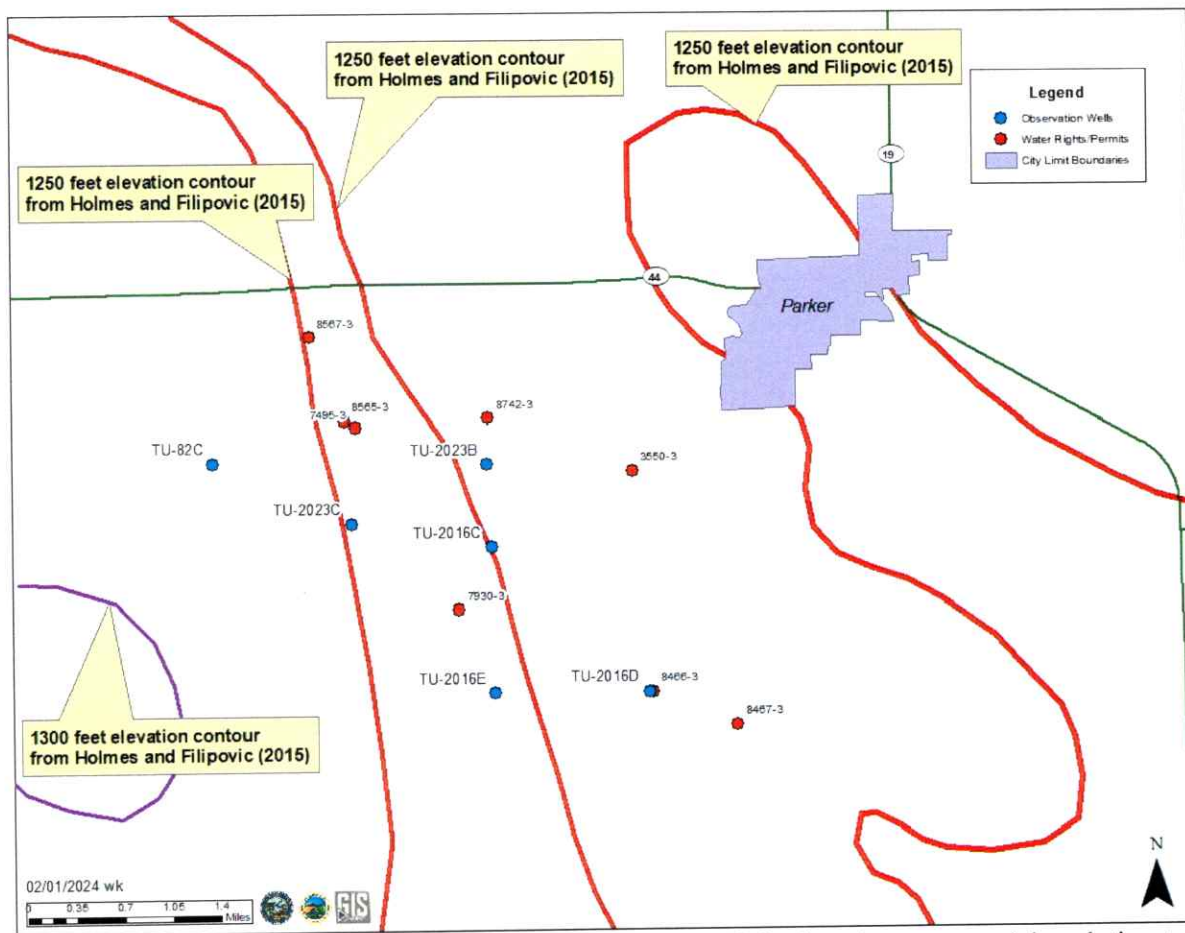


Figure 2: Location of bedrock valley (bounded by the 1250 ft elevation contours) in relation to select observation wells and water rights/permits (Water Rights, 2024b and 2024c, SDGS, 2024 and modified from Holmes and Filipovic, 2015)

Farmer (2021) reviewed two additional applications for Water Permit Nos. 8466-3 and 8467-3 in the vicinity of the target aquifer for this application. Farmer (2021) interpreted this area as an extension of the Parker-Centerville aquifer, shown in Figure 3. Water Permit Nos. 8466-3 and 8467-3 were issued on April 5, 2021. Geologic information on these wells is summarized in Appendix B, Tables B7 and B8. In the summer of 2021, several additional test holes and test wells were drilled in the area by the South Dakota Geological Survey (SDGS, 2024). In January 2022, Steen (2022) reviewed the applications for Water Permit Nos. 8565-3 and 8567-3 and Deferred Application No. 8566-3 (this application). Steen (2022) delineated the target aquifer for Water Permit Nos. 8565-3 and 8567-3 and Deferred Application No. 8566-3 as a hydraulically distinct portion of the Pleistocene Series: Unknown aquifer. Steen's (2022) delineation of this Pleistocene Series: Unknown aquifer is also shown in Figure 3.

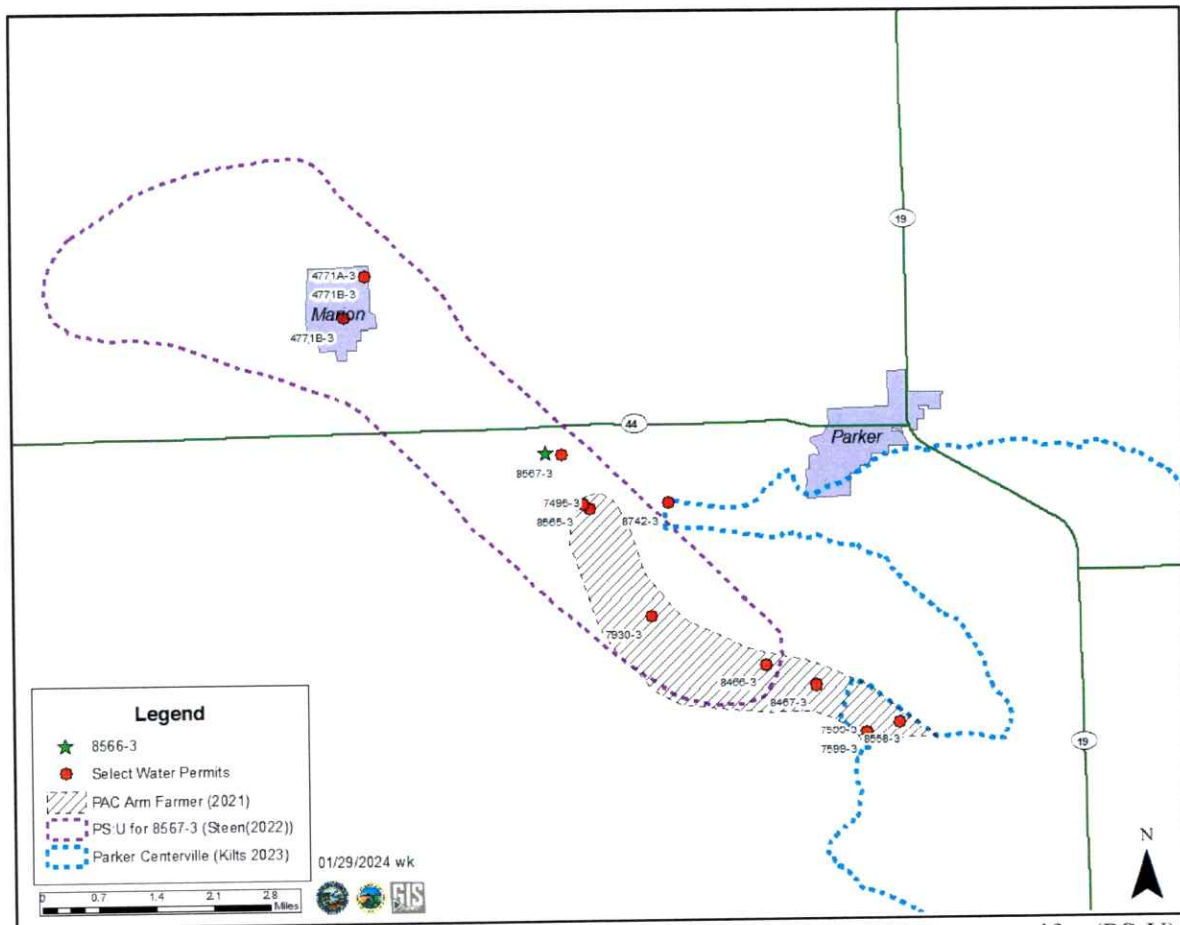


Figure 3: Approximate extent of Steen's (2022) Pleistocene Series: Unknown aquifer (PS:U), Kilts' (2023) main body of the Parker Centerville (PAC) aquifer, Farmer's (2021) Parker Centerville arm (Water Rights, 2024b)

Additional information has become available for the area since Steen (2022). The production wells for Water Permit Nos. 8565-3 and 8567-3 were completed in March 2022 and are located in the SW $\frac{1}{4}$ NE $\frac{1}{4}$ Section 15 (8567-3) and SE $\frac{1}{4}$ SE $\frac{1}{4}$ Section 15 (8565-3) all in T99N-R54W. Unlike test holes, wells are screened into the target production aquifer, grouted, and cased off from other geologic deposits. This allows for the collection of water level measurements specific to the target production aquifer. These measurements are useful for interpreting the potential for water bearing sands and gravels encountered during drilling activities in the vicinity (both horizontally and vertically) to be directly connected. Both of the well completion reports for Water Permit Nos. 8565-3 and 8567-3 provided static water level information. The lithologic information for the wells for Water Permit Nos. 8565-3 and 8567-3 are summarized in Appendix B, Table B9 and Table B10. The well for Permit No. 8565-3 was screened into gravel at 1,247 to 1,271 ft above NAVD88 and the well for Permit No. 8567-3 was screened into gravel at 1,219 to 1,238 ft above NAVD88. Additionally, two of the reports for five test holes drilled in relation to Application Nos. 8565-3, 8566-3, and 8567-3 were not received by the Water Rights Program until July 2022 (Water Rights, 2024a), which is after the completion (January 2022) of the Steen (2022)

report. The test hole report information for these two test holes (Haase 2021 Test hole #1 and Haase 2021 Test hole #2) is summarized in Appendix B, Table B11 and Table B12. These two test holes were located in the northwest of the northwest quarter of the section whereas the test holes for Application Nos. 8565-3, 8566-3, and 8567-3 were located further east and south in the section (Section 15-T99N-R54W) (Water Rights, 2024a). Test hole #1 (approximately 0.31 miles west of the well site for this application) indicated chalk was encountered at an elevation of 1,293 ft above NAVD88 and Test hole #2 (approximately 0.55 miles northwest of the well site for this application) indicated chalk was encountered at an elevation of 1,291 ft above NAVD88. These test holes also encountered very limited sand and gravel.

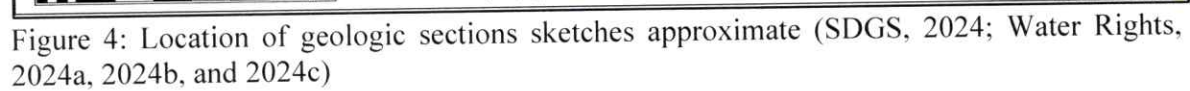
As part of normal Water Rights Program operations, water level measurements on the Water Rights Program's observation wells were collected in the summers of 2022 and 2023. Additional years of irrigation water use data has been collected as part the Water Rights Program's annual collection of irrigation data. As part of Kilts (2023) work, the reference measuring point for water measurement collection (top of casing) for select Water Rights Program observation wells in the vicinity were surveyed. Two South Dakota Geological Survey (SDGS) test wells (M51-2021-09 and M51-2021-10) had the measuring point surveyed and water level measurements taken in June 2023. The lithologic information for the wells for M51-2021-09 and M51-2021-10 is summarized in Appendix B, Table B13 and Table B14. In November 2023, these observation wells were measured again and added to the Water Rights Observation Well network as TU-2023B (M51-2021-10) and TU-2023C (M51-2021-09) (Water Rights, 2024c). In Appendix B, Table B13 and Table B14 ground surface elevation has been updated to reflect the June 2023 survey rather than the SDGS lithologic log. The remainder of this report will refer to these wells as TU-2023B and TU-2023C.

Kilts (2023) reviewed an application targeting aquifer materials from 1,321 to 1,340 ft NAVD88 to the north of the aquifer from Steen (2021) to determine if the target aquifer for Kilts (2023) was the same as Steen (2022). Kilts (2023) determined that Water Permit No. 8742-3 was completed into an extension of the main body of the Parker Centerville aquifer. The information for the well for Water Permit No. 8742-3 is summarized in Appendix B, Table B15. The updates to the extent of the main body of the Parker Centerville aquifer by Mathiowetz and Kilts (2023) and Kilts (2023) are shown in Figure 3.

Aquifer Characteristics and Hydrogeology

Hedges et al. (1982) established general guidance for the creation of aquifer and management unit boundaries that coincide with hydrogeologic boundaries based on six criteria. The six criteria from Hedges et al. (1982) are (1) thinning and/or constriction of the aquifer or management unit, (2) facies change from high to low permeability of aquifer material, (3) change from water-table to artesian conditions and vice versa, (4) ground-water divide, (5) ground-water discharge point such as stream or lake, and (6) presence of a streamflow gaging station. In reviewing the aquifer and management unit boundaries presented by Hedges et al. (1982), it is clear that overlaying geographic features like the boundaries of flood plains were used to aid in the identification of these six criteria. Several hydrogeologic boundaries can be identified in relation to the target aquifer for this application based on the currently available information.

When it comes to understanding an aquifer, the first major factor is understanding the underlying geology since the geology creates the framework for groundwater to move within the aquifer. Appendix C has several hand sketches of the sand and gravel elevations for wells and test holes along select cross-section lines looking at the elevation range 1,100 to 1,450 feet. The location of these cross-section lines is also shown in Figure 4 along with the approximate locations of SDGS test holes, the Water Rights Program's observation wells, and well completion reports used to examine the geology of the area. The sketches in Appendix C support that this aquifer is located within a relatively narrow, steep-sided valley in the bedrock. These sketches also indicate that the sand and gravel of this aquifer is directly connected with the sand and gravels of the main body of the Parker-Centerville aquifer. The geologic information along the B to B' line also indicates just to the west of the proposed well site for this application is a side of the bedrock valley that the target aquifer for this application lies in. This indicates that the target aquifer for this application likely does not extend much farther directly west of the proposed wellsite for this application. The western portion of Steen's (2021) mapped extent is unlikely to be that same aquifer as this application based on the elevation difference in the aquifer materials. This can be seen in the geology along the D to D' and B to B' lines. Based on the available information, the sand and gravels encountered in the test hole for this application from 1,327 to 1,373 ft match up to the western portion of Steen's (2021) mapped extent rather than the target aquifer for this application, sands and gravels from 1,232 to 1,275 feet above NAVD88.



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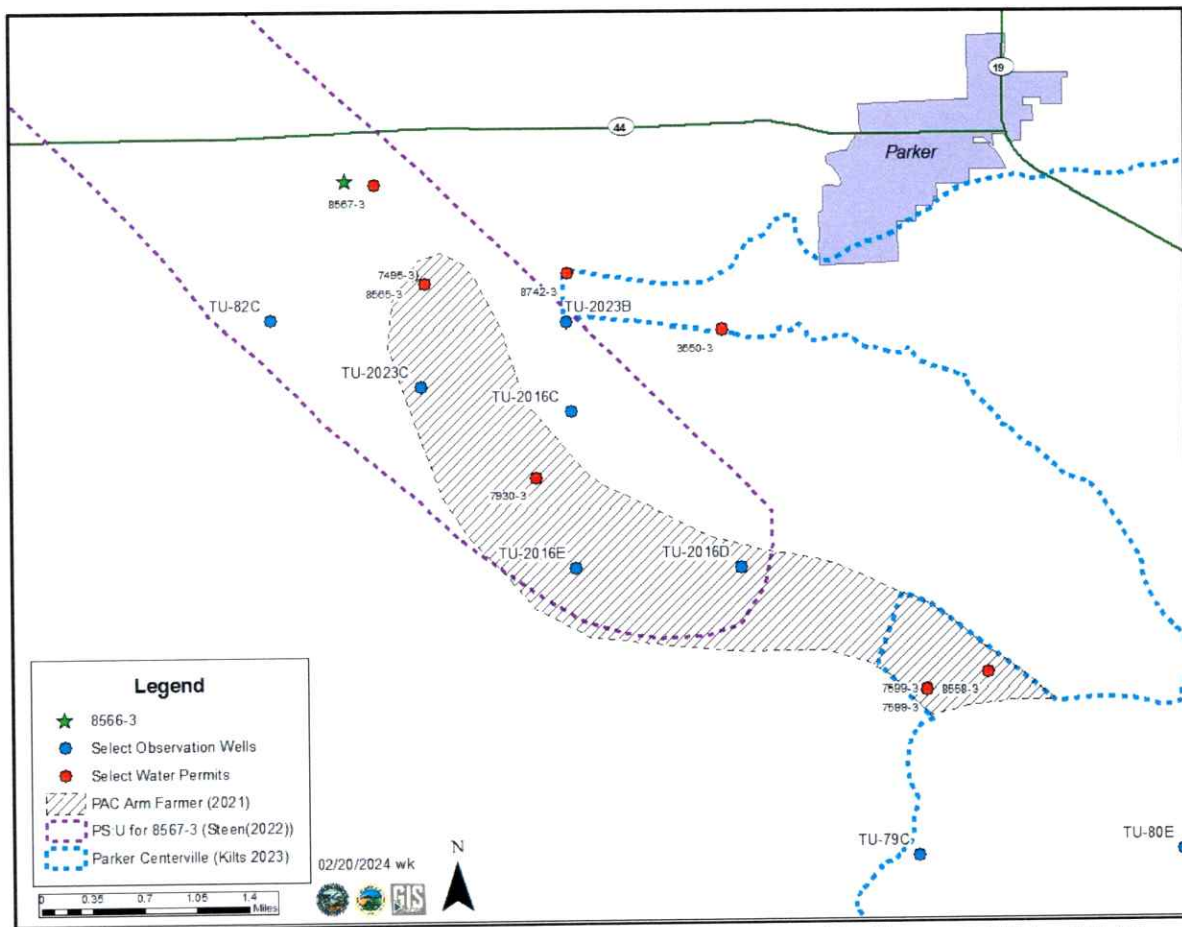


Figure 5: Location of wells with water level information presented in Figure 6 (Water Rights, 2024a and 2024c)

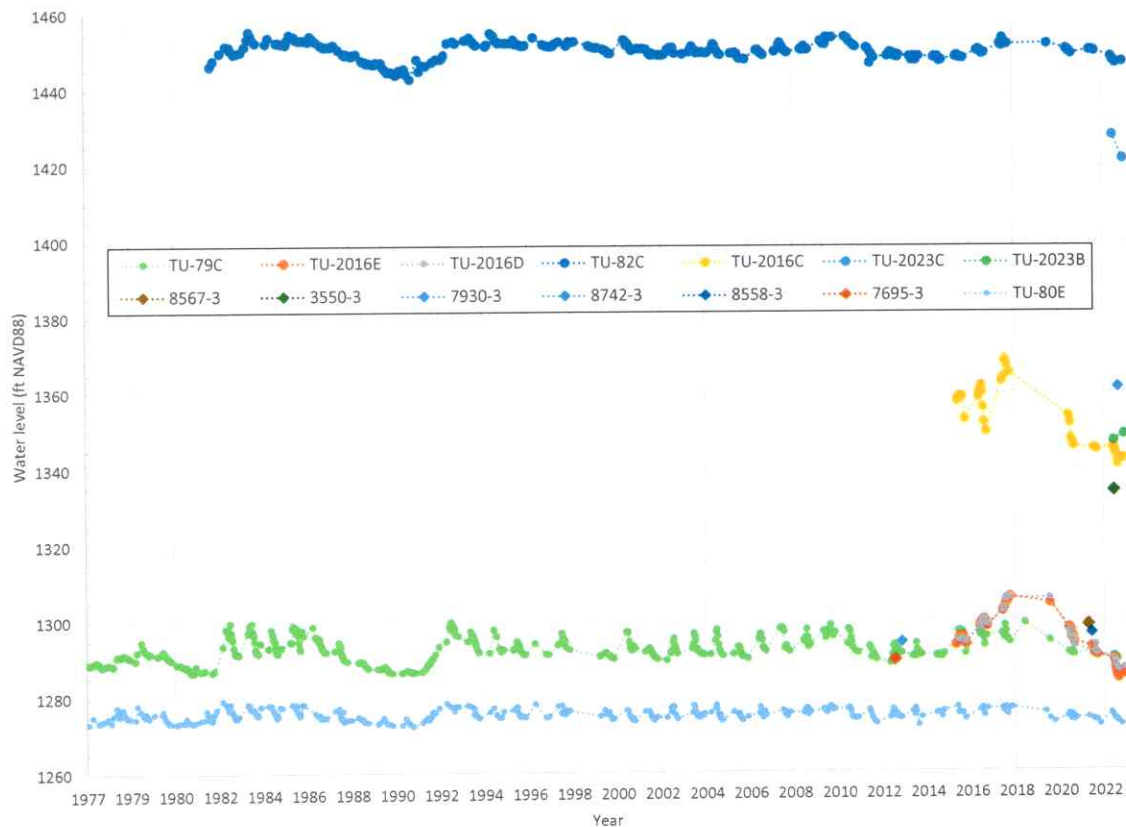


Figure 6: Water level data for the wells shown in Figure 5 (Water Rights, 2024a and 2024c)

Observation well TU-82C (approximately 1.1 miles to the south southwest of the well site for this application) was previously interpreted as being completed into the aquifer for this application. However, comparing the June 2022 water level for TU-82C to the static water levels from the well completion reports for Water Permit Nos. 8565-3 and 8567-3 (located 1.0 and 1.1 miles, respectively, from TU-82C), results in water level difference of approximately 158 ft and 159 ft, respectively. This water level difference over a mile indicates it is highly improbable that these wells are in the same aquifer. Geologic information on observation well TU-82C is summarized in Appendix B Table B16. The bottom of the aquifer materials at TU-82C is at elevation 1,337 ft and the top of the aquifer materials in the well for Water Permit No. 8565-3 is at elevation 1,271 ft, which further supports the water level indicating that observation well TU-82C is likely not completed into the same aquifer as this application. Additionally, based on the water level, observation well TU-2023C is likely not completed into the same aquifer as this application. Both the cross sections in Appendix C and the water levels in Figure 6, point to there being a separate shallower Pleistocene Series: Unknown aquifer in the area of those observation wells that should be considered a different aquifer than the target aquifer for this application.

Between observation well TU-2016C and observation well TU-2016E, there is a difference in elevation of 57.6 feet over a distance of one mile. The bottom of the aquifer materials for TU-2016C is at elevation 1,292 ft and the top of the aquifer materials for Permit No. 7930-3 is approximately 1,261 ft, which is a difference of 31 ft. Observation well TU-2016C is

approximately 0.49 miles (2,600 feet) from the well for Water Permit No. 7930-3. The well completion report for Water Permit No. 7930-3 indicates a static water level elevation of 1,294 ft at the date of completion (Nov 2013). Monitoring of observation well TU-2016C did not begin until May 2016. While the measurements are not in the same year, taking the lowest water level on record for TU-2016C, 1,340.87 ft on August 1, 2023, gives a difference in water level between the two wells of approximately 47 ft over 0.49 miles or approximately 96 ft over one mile. A hydraulic gradient like this typically suggests wells are unlikely to be in the same aquifer, even for outwash aquifer bodies in contact with each other, Hedges et al. (1982) has used large drops in the potentiometric surface over short distances as a dividing line between areas for water management (management units), for example the Choteau: Tyndall and the Lower James Missouri: Scotland aquifers. Based on the available information (especially water level differences) even if the target aquifer for this application and the aquifer for TU-2016C are in direct contact, there should be a boundary for the purposes of water management in the vicinity of observation well TU-2016C. This is in general agreement with the data from the aquifer performance test done as a part of the review for Water Permit No. 7930-3 which indicated a negative aquifer boundary approximately 3,500 feet from the pumping well for the test (Peschong, 2014). However, the target aquifer for this application is likely receiving recharge via seepage from the aquifer TU-2016C is completed into.

Based on the available information for this area, the target aquifer for this application is best interpreted as the northwestern additional area for Farmer's (2021) arm of the Parker Centerville aquifer. The updated delineation to include this area of Farmer's (2021) arm off the main body of the Parker Centerville aquifer is shown in Figure 7. The areal extent of the updated delineation in Figure 7 is 2,624 acres. Additionally, based on currently available information there is limited potential for additional aquifer area beyond what is mapped in Figure 7. This is due to the available information indicating that the target aquifer for this application lies within a relatively narrow bedrock valley. Given the direct connection between the aquifer for this application and the main body of the Parker Centerville aquifer and given the framework for aquifer and management unit naming conventions of Hedge et al. (1982), treating the target aquifer for this application as a currently unnamed management unit of the Parker Centerville aquifer rather than a Pleistocene Series: Unknown aquifer is more consistent with the Hedges et al. (1982) framework.

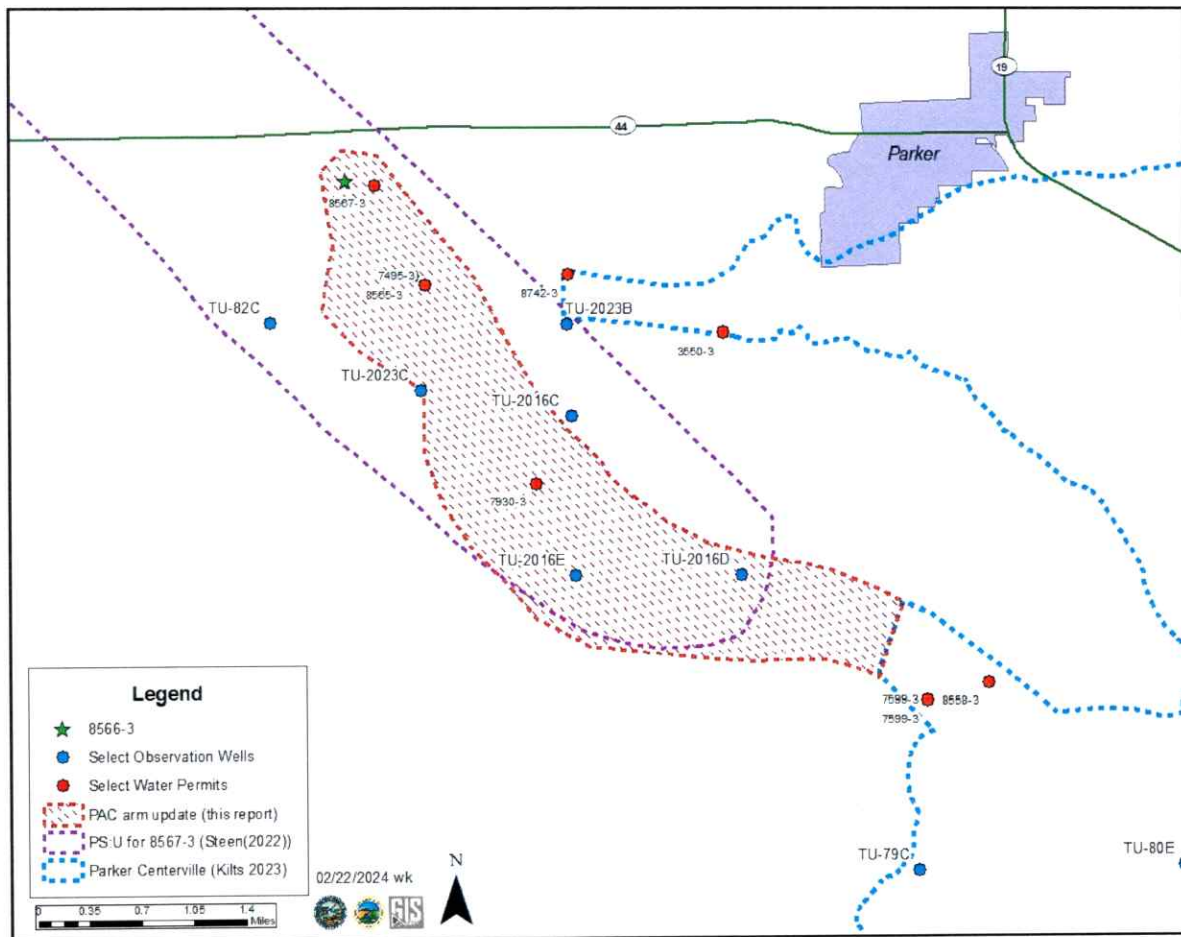


Figure 7: Update to Farmer's (2021) PAC arm for this report based on best available information, approximate extent of Steen's (2022) Pleistocene Series: Unknown aquifer (PS:U), Kilts' (2023) main body of the Parker-Centerville (PAC) aquifer (Water Rights, 2024b).

Mathiowetz and Kilts (2023) examined which of the water permits in Farmer's (2021) Parker-Centerville arm should be included in the budget for the main body of the Parker-Centerville aquifer. Water Permit Nos. 7599-3 and 8558-3 were tagged for inclusion in the budget for the main body of the Parker-Centerville aquifer. The well information for these permits is in Appendix B, Tables B17 and B18. Water Permit Nos. 7599-3 and 8558-3 both have approximately 33 feet of till overlaying the gravel and sands of the aquifer (Water Rights, 2024b). The main body of the Parker-Centerville aquifer is predominantly an unburied unconfined aquifer, however along the edges of the Parker-Centerville aquifer the gravel and sands of the aquifer can be overlain by till ranging from 10 to 40 feet (SDGS, 2024). Examples of this are the wells for Water Permit No. 8718-3, and their locations are shown in Figure 8 and well information summarized in Appendix B, Table B19. Therefore, Mathiowetz and Kilts (2023) interpreted Water Permit Nos. 7599-3 and 8558-3 as fitting into the main body of the Parker-Centerville aquifer since conditions were similar to other wells along the boundaries of the main body of the Parker-Centerville aquifer. The area interpreted into the main body of the Parker-Centerville aquifer by Mathiowetz and Kilts (2023) is shown in Figure 8. The well for Water Permit 8467-3 (Table B8, Appendix B) has 70 feet of

overlying till. Given the amount of overlying till in the well for Water Permit 8467-3, Mathiowetz and Kilts (2023) determined that this permit should not be treated as part of the main body of the Parker-Centerville aquifer for the purposes of water management. Due to lack of additional information, the line splitting the main body of the Parker-Centerville aquifer and the aquifer for this application was interpreted to be approximately halfway between Water Permit Nos. 7599-3 and 8467-3. The extent of this area interpreted in the main body of the Parker-Centerville aquifer by Mathiowetz and Kilts (2023) is approximately 300 acres. Since it could be argued that based on the Hedges et al. (1982) criteria of thinning and/or constriction of the aquifer or management unit, the Mathiowetz and Kilts (2023) area should be included in the extent of the aquifer for this application and the hydrologic budget for this application will also include calculations for this. However, it should also be noted that the test hole information for Water Permit No. 7695-3 located to the northeast indicates the presence of sand and gravel that was interpreted as corresponding to the Parker Centerville aquifer, so the Mathiowetz and Kilts (2023) area might not be as constricted as currently mapped (Water Rights, 2024b).

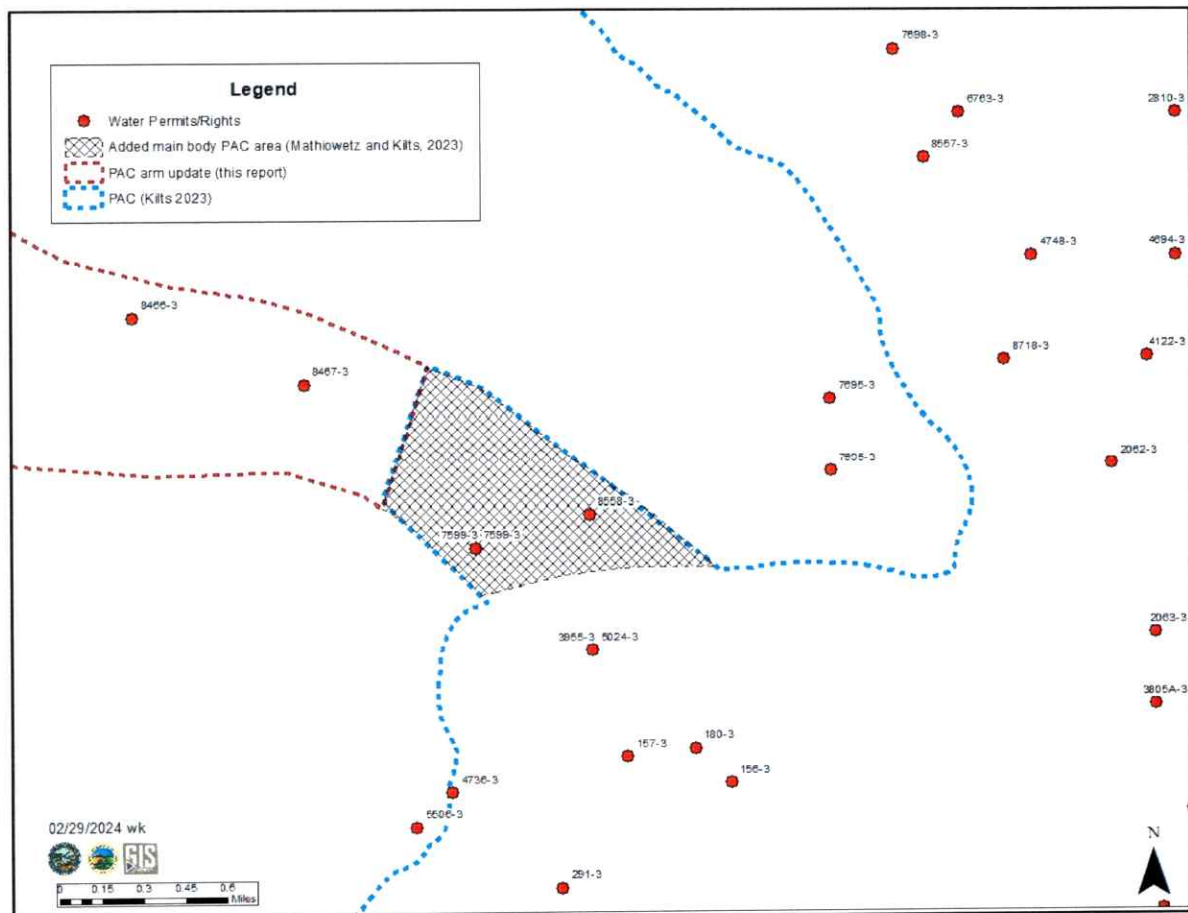


Figure 8: Kilts' (2023) main body of the Parker-Centerville (PAC) aquifer with the area interpreted into the main body by Mathiowetz and Kilts (2023) indicated by the hashed area, and this report's update to Farmer's (2021) PAC arm (Water Rights, 2024b)

A closer look at the 1,260 to 1,320 ft vertical portion of the hydrograph in Figure 6 is shown in Figure 9. The water level data in Figure 9 indicates, in general, the target aquifer for this application is discharging water to the main body of the Parker-Centerville aquifer.

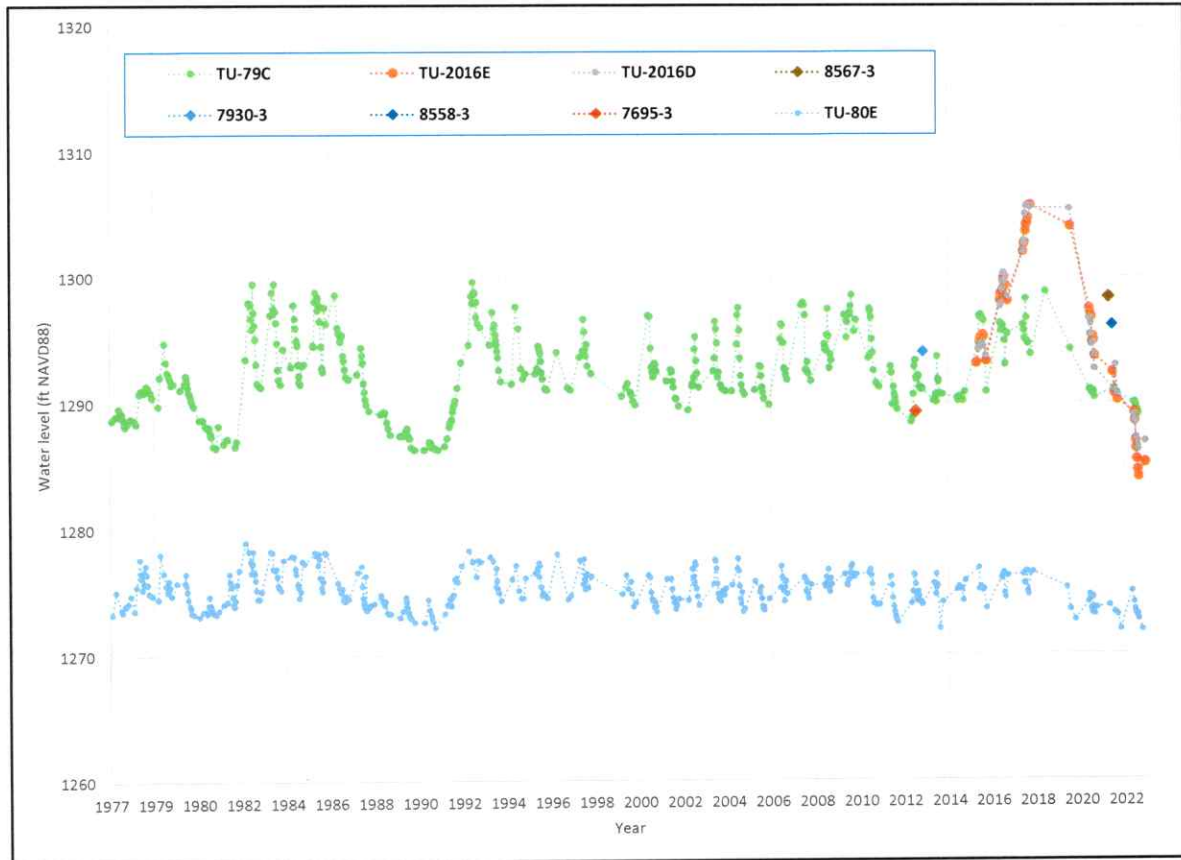


Figure 9: Hydrograph of observation wells TU-79C, TU-2016E, TU-2016D, and TU-80E and water levels at well completion for Water Permit Nos. 8567-3, 7930-3, 7665-3, and 7695-3 (Water Rights, 2024a and 2024b).

Several of the permitting reviews suggested potential that the target aquifer for this application might be directly connected to the Upper Vermillion Missouri aquifer (Mathiowetz, 2014a and Steen, 2022). Based on Buhler (2014), this would be more specifically the West management unit of the Upper Vermillion Missouri aquifer. Additionally, review of the West management unit of the Upper Vermillion Missouri aquifer by Mathiowetz (2023) and the review done of the target aquifer for this report, indicate that it is highly unlikely that this aquifer is directly connected to the Upper Vermillion Missouri aquifer.

A test hole was submitted with this application and is summarized in Table B1 in Appendix B. Based on the well completion report for Water Permit Application No. 8567-3 located approximately 0.2 miles away, the well for this application is expected to be under confined conditions (Water Rights, 2024b). The information for the well for Water Permit Application No. 8567-3 is presented in Table B10 in Appendix B. While the best available information and naming conventions historically used by the Water Rights Program suggest that the target aquifer for this

application should be named as a management unit of the Parker-Centerville aquifer, the remainder of report will also use the term Pleistocene Series: Unknown aquifer to refer to the target aquifer for this application since that was the name used in the original report for this application.

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 section will address the availability of unappropriated water and the potential for unlawful impairment of existing domestic water uses and water rights within this aquifer.

Water Availability

Water Permit Application No. 8566-3 proposes to appropriate water 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. This application is not for a water distribution system as defined in SDCL 46-1-6 (17) and the target aquifer for this application is not older and stratigraphically lower than the Greenhorn Formation. Therefore, the withdrawal/recharge issue must be considered.

Observation Wells

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 monitors 114 observation wells completed into different portions of the Pleistocene Series: Unknown aquifer. Of these, only two observation wells are completed into the aquifer that this application proposes to appropriate water from. These are TU-2016E (located 2.9 miles to the southeast of the wellsite for this application) and TU-2016D (located 3.6 miles to the southeast of the wellsite for this application). The hydrograph for these observation wells is shown in Figure 10. Additionally, the elevation for the top of the sands and gravels of the aquifer is also indicated on Figure 10. In the area of these observation wells, it can be seen that the aquifer fluctuates between confined and buried, and unconfined conditions.

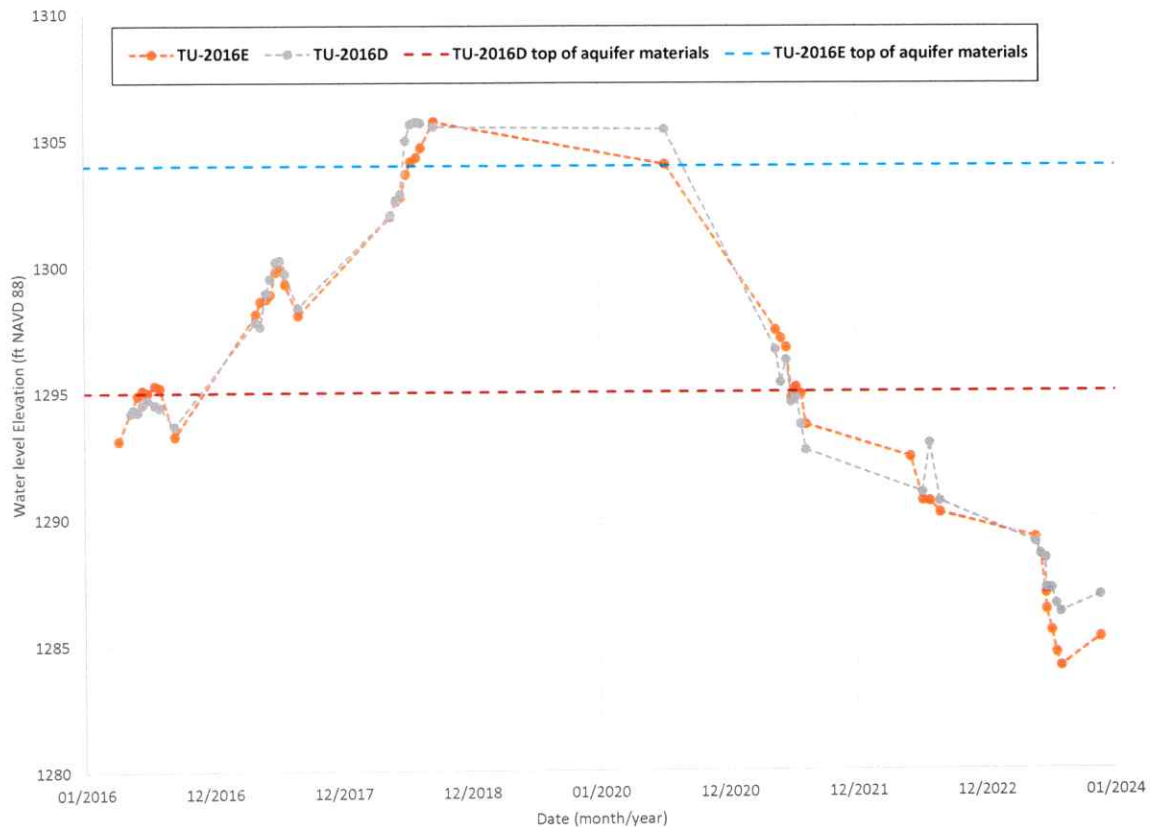


Figure 10: Hydrographs for Observation Wells TU-2016D and TU-2016E (Water Rights, 2024c)

The lack of readings in 2019 is due to a combination of access issues relating to the travel restrictions on gravel roads in Turner County and summer-long, extremely wet conditions limiting data collection. TU-2016D is located 0.05 miles west of Water Permit No. 8466-3, which has been reporting irrigation since 2021. TU-2016E is located 0.65 miles south of Water Permit No. 7930-3, which has been reporting irrigation since 2015. The observation wells show increasing water levels from 2016 to 2018 and decreasing water levels since 2020.

The period of record for these observation wells contains only two years' worth of readings at the current level of appropriative development. The acres permitted for irrigation from this aquifer have increased over time, going from 160 acres in 2013 to 582 acres in 2021 and to 932 acres in 2022. Yearly reported irrigation associated with these acres is presented in Table A1 in Appendix A. While the years of data are limited, the average annual application rate per permitted acre for irrigation is 5.8 inches per permitted acre. In total, 932 acres are permitted for irrigation out of this aquifer, which results in an estimated average annual irrigation withdrawal of 450 acre-feet per year at the 5.8 inches per permitted acre application rate. In 2022, total reported irrigation from this aquifer was 457 acre-feet and in 2023, 640 acre-feet (see Table A1 in Appendix A). Given, it is a short period of record for the observation wells, but the decreasing water levels in the aquifer indicate that water may not be available for the appropriation requested by this application.

The years for which pumping for the current level of permitted acres for irrigation has occurred coincides with a drier climatic period. This is indicated in Figure 11 by looking at the drought monitor data for Turner County. Based on this, deferral of this application is recommended to allow for the collection of water level data to determine if longer term water levels will stabilize in the aquifer or continue to decrease. In eastern South Dakota, a slight decrease of water levels in recent years coupled with dry climatic conditions and a recent increase in permitted acres typically has not resulted in a deferral recommendation. Other aquifers where those specific conditions occur are major aquifers in nature, typically ten plus times the size of this aquifer and with much longer observation well records to evaluate the aquifers' response to pumping and climatic conditions (Water Rights, 2024b).

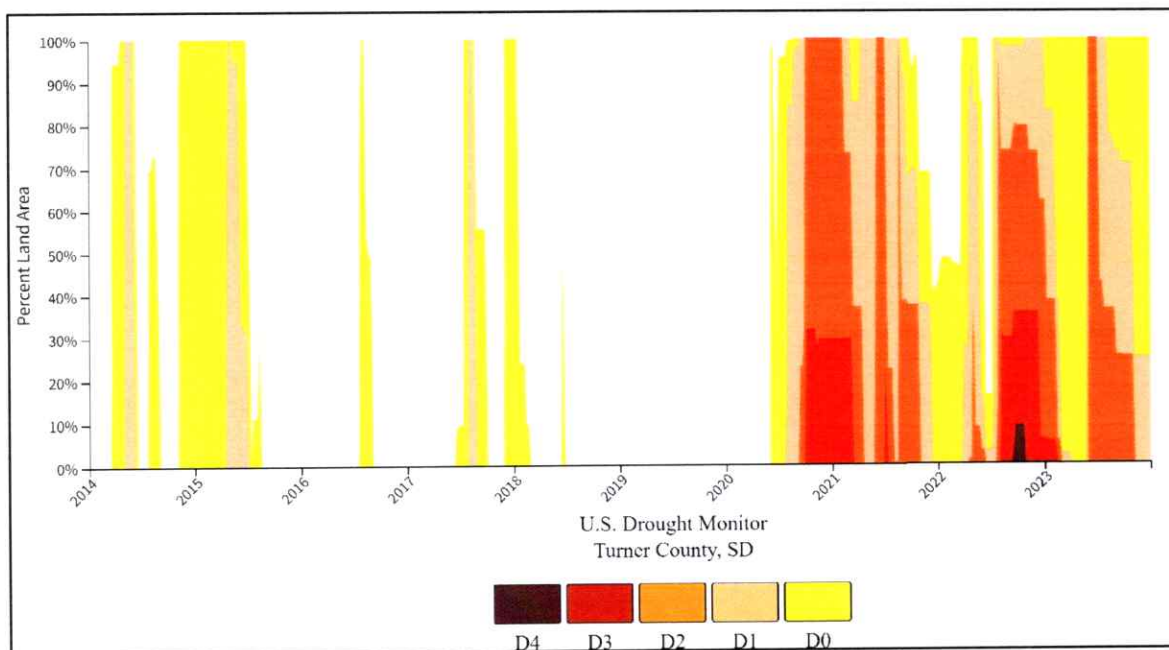


Figure 11: Drought Conditions for Turner County from Jan 2014 to Dec 2023 from the National Oceanic and Atmospheric Administration (NOAA) National Integrated Drought Information System (NOAA, 2024)

The Standard Precipitation Index indicates how observed precipitation deviates from the climatological average over a given time period (NOAA, 2024). Figure 12 shows the NOAA interpreted standard precipitation index using nine-month time periods for Turner County, SD from 1895 to 2023. Red hues indicate drier conditions, while blue hues indicate wetter conditions. Looking at Figure 12, it may take approximately five to ten years of additional monitoring to capture a period of record reflecting the current level of development during a wetter climatic period in Turner County.

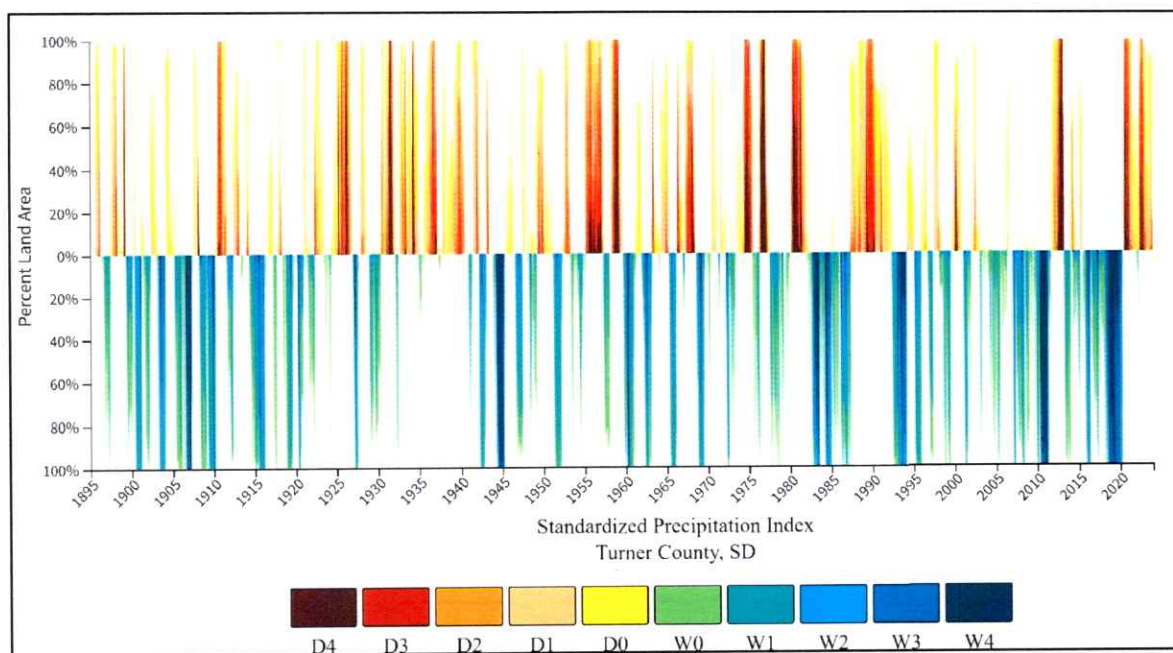


Figure 12: Standardized Precipitation Index for Turner County 1895 to 2023 from the National Oceanic and Atmospheric Administration (NOAA) National Integrated Drought Information System (NOAA, 2024). Red hues indicate drier conditions, while blue hues indicate wetter conditions.

Hydrologic Budget

Discharge

Discharge from this aquifer is through well withdrawals and groundwater outflow to the main body of the Parker Centerville aquifer. There are six appropriative water permits withdrawing water from this aquifer. All of these permits are for irrigation use.

Annual reported irrigation use for the appropriative water permits withdrawing water from this aquifer is presented in Table A1 in Appendix A. All six permits have been developed and have at least two years of irrigation use reporting data with the longest period of reporting being ten years. Since there are only two years of irrigation data with all six permits reporting, the average total annual irrigation use would not have enough years of data to be a good average. In eastern South Dakota the upper end of application rates for center pivot irrigation is ten inches per acre (Water Rights, 2024b). To get a more aquifer specific estimate of irrigation use, the average application rate per permitted acre was calculated for this aquifer. Again, note that while averaging is used here, several permits only have two years of reported data. The average application rate per permitted acre is 5.8 inches per year. There are 932 total acres permitted for irrigation out of this aquifer, which results in an estimated average annual appropriative withdrawal of 450 acre-feet per year.

Annual reported irrigation use for Water Permit Nos. 7599-3 and 8558-3 (the two water permits in the hashed area in Figure 8) is presented in Table A2 in Appendix A. These two permits collectively authorize the irrigation of 295 acres. Based on reported use, the estimated average annual withdrawal of these permits is 170 acre-feet per year.

There are ten building sites located within the areal extent of this aquifer, based on 2022 aerial imagery for Turner County. Of these at least one site has a domestic well completion report on file with the Water Rights Program for a well drilled in 1981 (Water Rights, 2024a). Average per capita water use for self-supplied domestic use for South Dakota in 2005 was 71 gallons per person per day (Neitzert and Carter, 2008). At an average household size of 2.5, water use is approximately 0.2 acre-feet per household per year. For a conservative estimate of ten households, estimated domestic water use from the aquifer is two acre-feet per year.

Recharge

Based on the available geohydrologic information the most likely major sources of recharge to this aquifer are groundwater inflow from the Niobrara aquifer and groundwater seepage from the Parker-Centerville aquifer from the north in the area of observation well TU-2016C (Water Rights, 2024a and 2024c).

Hedges et al. (1985) examined recharge to aquifers in eastern South Dakota. As a result of that examination Hedges et al. (1985) recommended that for confined glacial aquifers management and development programs use an average annual recharge range of 0.15 to 0.60 inches per year. Utilizing the recharge rates recommended by Hedges et al. (1985) and an area of 2,624 acres, the estimated annual recharge to this aquifer is 33 to 131 acre-feet per year.

As noted in the observation well section, portions of this aquifer can shift from confined to buried unconfined. Hedges et al. (1985), in general, considered an unconfined aquifer to be buried if ten feet or more of relatively impermeable till material overlies the aquifer. In the case of the observation wells for this aquifer, the overlaying material is approximately 90 feet (Tables B5 and B6 Appendix B). While this amount of overlaying material is closer to the confined end of the spectrum, Hedges et al. (1985) does present recharge data from buried, unconfined aquifer that in areas have approximately 100 feet of overlying till (Water Rights, 2024c). Hedges et al (1985) calculated recharge rates to buried, unconfined glacial aquifers of 0.9 to 3.2 inches per acre with an average of 2.0 inches per acre and notes that in general buried, unconfined aquifers receive about half of the amount of recharge that non-buried, unconfined glacial aquifers do. The nearest non-buried, unconfined glacial aquifer to this one is the main body of the Parker-Centerville aquifer which has an estimated average annual recharge rate of 4.9 inches per acre (half of which would be 2.45 inches per acre) (Hedges et al., 1985). The period of record for the observation wells and other water level data for the aquifer are not sufficiently long enough to determine if this aquifer should be considered is predominantly confined or buried, unconfined (Water Rights, 2024a, 2024b and 2024c). However, it is likely that some portion of the southeastern part of this aquifer could recharge at a rate closer to the range seen of buried, unconfined aquifers.

Estimated average annual withdrawal for this aquifer is 452 acre-feet per year. To get at least that amount of water from an aquifer with an extent of 2,624 acres, an average annual recharge rate of 2.07 inches per acre is required. The 132 acres proposed for irrigation by this application would add an additional estimated 63.8 acre-feet of water to average annual withdrawals. So, this application, if approved, would raise the recharge rate needed to support estimated withdrawals to 2.36 inches per acre.

If the area of Mathiowetz and Kilts (2023) (the hashed area in Figure 8) were included in the aquifer area, the aquifer would increase by 300 acres to 2,924 acres and estimated average

annual withdrawals would increase by 170 acre-feet per year to 622 acre-feet per year (not including this application). The average annual recharge rate needed to supply 622 acre-feet per year over an area of 2,924 acres is 2.55 inches per acre. Inclusion of estimated average annual withdrawal for this application would raise that to 2.81 inches per acre.

Hedges et al. (1985) additionally noted in regard to the recharge rate for confined aquifers, that each confined aquifer should be separately evaluated to determine the magnitude of the surface connection, which is especially true of confined aquifers that intermittently go unconfined. The sand and gravel of this aquifer is in a bedrock valley in the Niobrara Formation which acts as an aquifer in this area and this aquifer has portions of its extent that could potentially recharge more like a buried, unconfined aquifer (Water Rights, 2024a). Therefore, there is potential for the recharge to this aquifer to be on the upper end of the confined aquifer range or possibly exceed it. However, a recharge rate of 2.36 inches per acre exceeds the upper estimates of recharge for eastern South Dakota confined glacial aquifers presented in Hedges et al. (1985). This also exceeds the average recharge rate to buried, unconfined glacial aquifers of 2.0 inches per acre and is fairly close to half of the recharge rate to the main body of the Parker-Centerville aquifer, which is 2.45 inches per acre.

The best reasonable available way to collect additional data on the aquifer is further collection of observation well readings over time and irrigation water use data. The observation well data being reviewed in relation to climatic conditions and withdrawals from the aquifer is currently the best reasonable available information source for evaluating water availability in this aquifer. As noted in the observation well section of this report, additional years of data are needed to determine if the water levels in the aquifer are likely to stabilize relative to currently permitted appropriative pumping or continue to decline. To collect this additional data, the continued deferral of this application is suggested for a period of at least five years with the option to revisit it sooner if the on-going data collection indicates the application should be reconsidered sooner.

Balance

The recharge rate to this aquifer needed to support estimated average annual withdrawals including this application is 2.36 inches per acre. This is greater than the Hedges et al. (1985) recommendation for confined aquifer management and development programs which is an average annual recharge range of 0.15 to 0.60 inches per year. This also exceeds the average recharge rate to buried, unconfined aquifers of 2.0 inches per acre and is fairly close to half of the recharge rate to the main body of the Parker-Centerville aquifer of 2.45 inches per acre. If the Mathiowetz and Kilts (2023) area were to be included in the extent of the target aquifer for this application the recharge rate to this aquifer needed to support estimated average annual withdrawals including this application would be 2.70 inches per acre.

The current observation well data combined with the hydrologic budget suggest that this aquifer is likely fully appropriated or near it. However, based on the very short period of record for the observation wells at the current level of pumping in relation to climatic conditions, it would be prudent to collect additional years of observation well data to confirm that.

Potential for Unlawful Impairment of Existing Water Rights

Water permits currently authorized to appropriate water from this aquifer are shown in Figure 13 and summarized in Table 1. The nearest water right/permit to the proposed well site for this application is Water Permit No. 8567-3 held by the applicant, located approximately 0.2 miles to the east (Water Rights, 2024b). The nearest water right/permit not belonging to the applicant to the proposed well site for this application is Water Permit No. 7495-3 held by Dennis Herlyn located approximately 0.9 miles to the southeast (Water Rights, 2024b). There are no domestic wells on file with the Water Rights Program within one mile of the well site for this application completed into this aquifer based on well locations identified on the report filed by the well driller. However, there could potentially be domestic wells completed into the aquifer not on file with the Water Rights Program.

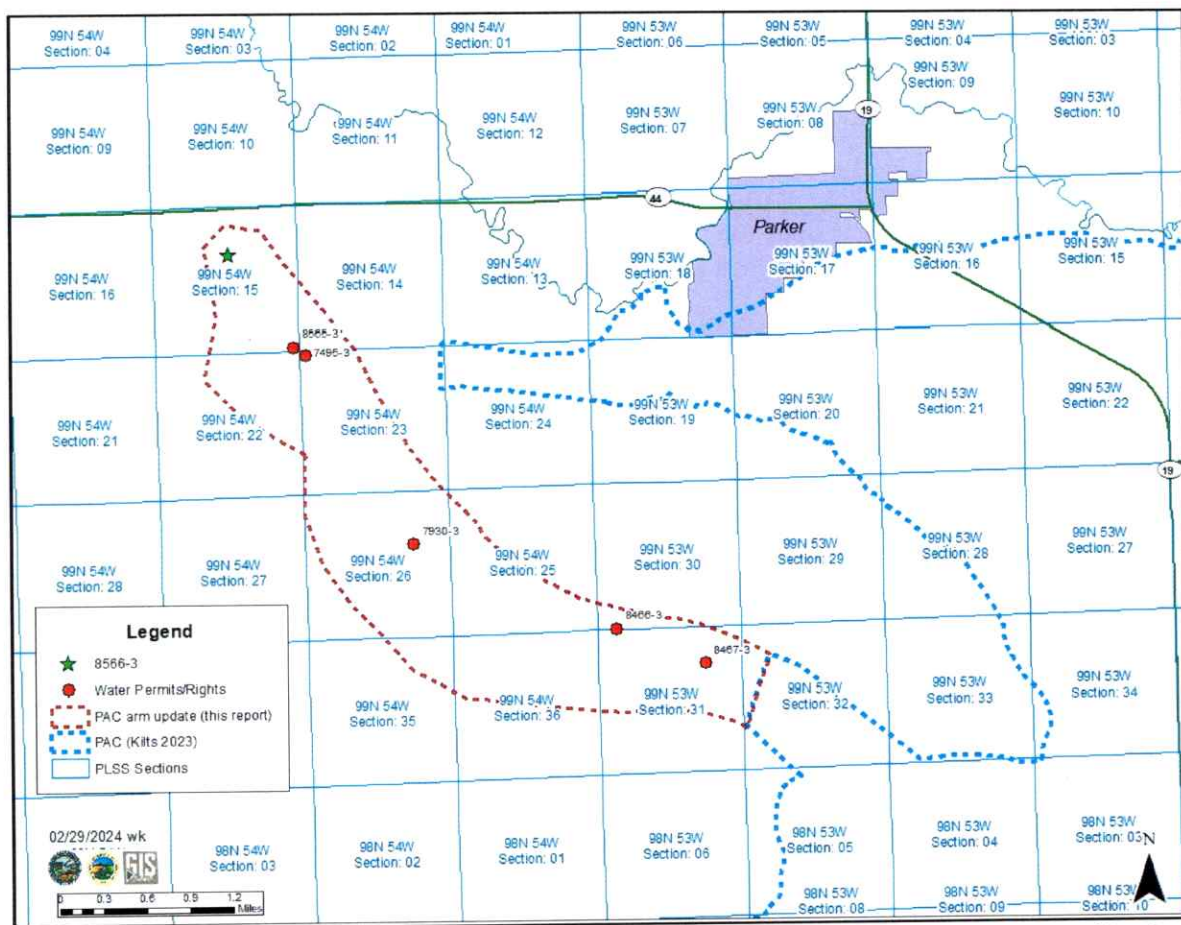


Figure 13: Water permits currently authorized to appropriate water from the target aquifer for this application (Water Rights, 2024b)

The Water Management Board recognizes that putting water to irrigation use in an confined aquifer requires the potential for seasonal drawdown to occur. The Board has developed rules to allow water to be placed to maximum beneficial use without the necessity of maintaining artesian

head pressure for domestic use. The Water Management Board defined an “adversely impacted domestic well” in 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.”

The Water Management Board considered the delivery of water by artesian head pressure versus maximum beneficial use during the issuance of Water Right No. 2313-2 for Coca-Cola Bottling Company of the Black Hills. The Board adopted the Findings of Facts and Conclusions of Law that noted the reservation of artesian head pressure for delivery of water would be inconsistent with SDCL 46-1-4 which states, “general welfare requires that the water resources of the state be put to beneficial use to the fullest extent of which they are capable...” (Water Rights, 1995). Furthermore, the Water Management Board found if increased cost or decreased production as a result of impacts on artesian head pressure by legitimate users is to be considered as an unlawful impairment, it would also conflict with SDCL 46-1-4 (Water Rights, 1995). With that in mind, some existing well owners may need to install or lower pumps depending on the specific characteristics of the aquifer at their location. A review of the complaints on file with the Water Rights Program indicate that there is not a recent history of unlawful impairment occurring with wells in this aquifer wells in Turner County (Water Rights, 2024d). Under current aquifer conditions, when considering the statutes (SDCL 46-1-4 and 46-6-6.1), rule (ARSD 74:02:04:20(7)), the artesian head pressure at the nearest observation well to the well site for this application at its lowest recorded water level, and the lack of recent well interference complaints from the aquifer, any drawdown created from the proposed diversion is not expected to cause an unlawful impairment to existing water right/permit holders or domestic users with adequate wells. Therefore, there is a reasonable probability that any interference from the proposed appropriation will not impose unlawful impairments on existing users with adequate wells. However, if in the long term the average annual withdrawals exceed average annual recharge to the aquifer, water levels will slowly continue to decrease over time. If this occurs, artesian head pressure and following that water stored in the aquifer could eventually decrease to the point that where drawdown specific to a single pumping well could potentially cause unlawful impairment.

Conclusions

1. Water Permit Application No. 8566-3 filed by Dustin Haase proposes to appropriate water at a maximum diversion rate of 1.78 cfs from one well to be completed into the Pleistocene Series: Unknown aquifer for irrigation use. The proposed well location is SW ¼ NW ¼ Section 15-T99N-R54W. The proposed land to be irrigated is 132 acres located in the NW ¼ Section 16-T99N-R54W.
2. This application was initially reviewed in January 2022 and was deferred for a period of two years at the March 2022 Water Management Board Meeting.

3. Best available information and the naming conventions historically used by the Water Rights Program suggest the target aquifer for this application, should be named as a management unit of the Parker-Centerville aquifer. Regardless of the final naming convention adopted, the water permits appropriating water from this aquifer should eventually be updated to all be under the same aquifer name and water managed separately from the main body of the Parker-Centerville aquifer.
4. The hydrologic budget currently does not support further appropriations from this aquifer.
5. The observation well data currently does not support further appropriations from this aquifer.
6. Continued deferral of this application for a period of five to ten years is recommended to collect the observation well data needed to determine if this aquifer has reached full appropriation.
7. Under current aquifer conditions, there is a reasonable probability that the diversion by Water Permit Application No. 8566-3 will not unlawfully impair adequate wells for existing water rights /permits (not belonging to the applicant) or domestic uses as a direct result of the drawdown generated by the well for this application when pumping.
8. Additional information is needed to determine if pumping under this application could, in the long-term, deplete the water stored in this aquifer to the point where adequate wells for existing water rights/permits or domestic users become unlawfully impaired.



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Natural Resources Engineer III
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Appendix A: Irrigation Data

Table A1: Reported Irrigation Data and Application Rate per Permitted Acre (Water Rights, 2024e)

Permit No.	7495-3		7930-3		8466-3		8467-3		8565-3		8567-3		Total (acres)
Permitted Acres	160		162		120		140		124		226		932
Priority Date	11/01/2012		12/02/2013		12/23/2020		12/23/2020		12/02/2021		12/02/2021		
	Reported Withdrawal (acre-feet)	Application Rate (in/acre)	Reported Withdrawal (acre-feet)	Application Rate (in/acre)	Reported Withdrawal (acre-feet)	Application Rate (in/acre)	Reported Withdrawal (acre-feet)	Application Rate (in/acre)	Reported Withdrawal (acre-feet)	Application Rate (in/acre)	Reported Withdrawal (acre-feet)	Application Rate (in/acre)	Total Yearly Reported Withdrawal (acre- feet)
Year													
2023	116.5	8.7	145.2	10.8	111.4	11.1	112.5	9.6	42.0	4.1	111.8	5.9	639.4
2022	4.0	0.3	93.1	6.9	110.5	11.0	103.9	8.9	39.6	3.8	105.9	5.6	457
2021	35.2	2.6	44.1	3.3	79.3	7.9	53.3	4.6	n/a	n/a	n/a	n/a	211.88
2020	78.4	5.9	83.5	6.2	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	161.96
2019	0.0	0.0	0.0	0.0	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	0
2018	8.8	0.7	18.7	1.4	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	27.55
2017	50.8	3.8	40.3	3.0	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	91.12
2016	38.9	2.9	81.3	6.0	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	120.25
2015	18.2	1.4	76.6	5.7	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	94.83
2014	16.2	1.2	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	16.2
2013	not con	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
Average reported	36.7		64.8		100.4		89.9		40.8		108.9		182.0
Average rate		2.8		4.8		10.0		7.7		3.9		5.8	5.8

Note: not con in Table A1 indicates permitted and received an irrigation questionnaire but the system was not constructed.

Table A2: Reported Irrigation Data and Application Rate per Permitted Acre for Water Permit Nos 7599-3 and 8558-3 (Water Rights, 2024e)					
Permit No.	7599-3		8558-3		Total (acres)
Permitted Acres	155		140		295
Priority Date	12/28/2012		11/04/2021		
	Reported Withdrawal (acre-feet)	Application Rate (in/acre)	Reported Withdrawal (acre-feet)	Application Rate (in/acre)	Total Yearly Reported Withdrawal (acre-feet)
Year					
2023	128.9	9.7	122.4	9.1	251.3
2022	70.4	5.3	86.9	6.4	157.3
2021	103.0	7.7	n/a	n/a	103.0
2020	37.1	2.8	n/a	n/a	37.1
2019	0.0	0.0	n/a	n/a	0.0
2018	39.3	2.9	n/a	n/a	39.3
2017	37.5	2.8	n/a	n/a	37.5
2016	84.6	6.3	n/a	n/a	84.6
2015	69.2	5.2	n/a	n/a	69.2
2014	68.9	5.2	n/a	n/a	68.9
2013	76.6	n/a	n/a	n/a	76.6
Average reported	65.0		104.7		169.7
Average rate		4.8		7.8	6.3

Appendix B: Summarized Geologic Information from Select Well Completion Reports

Table B1: Test hole information submitted for Application No. 8566-3 (Water Rights, 2024a)					
Latitude	43.3965	well log	Surface elevation (m)	447.481	1 meter DEM
Longitude	-97.210517	well log	Surface elevation (ft)	1468.11	
Material Description	From (ft)	To (ft)	From (ft NAVD 88)	To (ft NAVD 88)	Thickness (ft)
top soil	0	2	1468	1466	2
clay brown	2	11	1466	1457	9
gravel	11	12	1457	1456	1
clay brown gravelly	12	35	1456	1433	23
gravel	35	38	1433	1430	3
clay brown	38	49	1430	1419	11
clay brown gravelly	49	51	1419	1417	2
gravel	51	53	1417	1415	2
clay gray	53	95	1415	1373	42
gravel coarse, clay layer @ 130	95	131	1373	1337	36
gravel medium	131	141	1337	1327	10
clay gray	141	149	1327	1319	8
sand & coal	149	155	1319	1313	6
clay gray, some sand layers & coal	155	193	1313	1275	38
coarse (author note: typical only sand or gravel is referred to as coarse)	193	236	1275	1232	43
quartzite (author note: this is being interpreted as bedrock rather than strictly as quartzite)	236		1232		0

Table B2: Well completion report information submitted for Water Permit No. 7495-3 (Water Rights, 2024b)					
Latitude	43.386389	well log	Surface elevation (m)	442.663	1 meter DEM
Longitude	-97.200333	well log	Surface elevation (ft)	1452.31	
Material Description	From (ft)	To (ft)	From (ft NAVD 88)	To (ft NAVD 88)	Thickness (ft)
top soil	0	1	1452	1451	20
tan clay	1	20	1451	1432	79
blue clay	20	80	1432	1372	80
blue clay (wood)	80	100	1372	1352	100
blue clay	100	180	1352	1272	108
sand	180	208	1272	1244	22
screened interval	182	202	1270	1250	
static water level (below grade), Nov 2013	150	ft	1302	ft NAVD 88	

Table B3: Well completion report information submitted for Water Permit No. 7930-3 (Water Rights, 2024b)					
Latitude	43.367222	well log	Surface elevation (m)	428.427	1 meter DEM
Longitude	-97.186194	well log	Surface elevation (ft)	1405.60	
Material Description	From (ft)	To (ft)	From (ft NAVD 88)	To (ft NAVD 88)	Thickness (ft)
top soil	0	1	1406	1405	1
yellow clay	1	32	1405	1374	31
blue clay	32	145	1374	1261	113
sand	145	168	1261	1238	23
screened interval	147	168	1259	1238	
static water level (below grade), Nov 2013	112	ft	1294	ft NAVD 88	

Table B4: Summarized well completion report information for observation well TU-2016C (Water Rights, 2024c)					
Latitude	43.373582	surveyed	Surface elevation (m)	n/a	1 meter DEM
Longitude	-97.181275	surveyed	Surface elevation (ft)	1424.33	surveyed
Material Description	From (ft)	To (ft)	From (ft NAVD 88)	To (ft NAVD 88)	Thickness (ft)
top soil	0	1	1424	1423	1
clay	1	38	1423	1386	37
rock	38	39	1386	1385	1
clay	39	43	1385	1381	4
sand & gravel with clay	43	52	1381	1372	9
clay	52	116	1372	1308	64
gravel	116	130	1308	1294	14
rocks and coarse gravel	130	132	1294	1292	2
clay (till)	132	142	1292	1282	10
clay (Niobrara)	142	155	1282	1269	13
screened interval	122	132	1302	1292	

Table B5: Summarized well completion report information for observation well TU-2016D (Water Rights, 2024c)					
Latitude	43.358143	surveyed	Surface elevation (m)	n/a	1 meter DEM
Longitude	-97.159191	surveyed	Surface elevation (ft)	1388.02	surveyed
Material Description	From (ft)	To (ft)	From (ft NAVD 88)	To (ft NAVD 88)	Thickness (ft)
clay	0	75	1388	1313	75
clay with sand and gravel	75	93	1313	1295	18
gravel and sand	93	150	1295	1238	57
gravel and sand, some fine quartz gravel	150	162	1238	1226	12
rock (drills like quartzite)	162	163	1226	1225	1
screened interval	145.5	155.5	1243	1233	

Table B6: Summarized well completion report information for observation well TU-2016E (Water Rights, 2024c)					
Latitude	43.35844	surveyed	Surface elevation (m)	n/a	1 meter DEM
Longitude	-97.18129	surveyed	Surface elevation (ft)	1393.91	surveyed
Material Description	From (ft)	To (ft)	From (ft NAVD 88)	To (ft NAVD 88)	Thickness (ft)
top soil	0	2	1394	1392	2
clay	2	85	1392	1309	83
clay with sand and gravel	85	90	1309	1304	5
sand and gravel	90	117	1304	1277	27
clay	117	123	1277	1271	6
sand and gravel	123	130	1271	1264	7
gravel and sand	130	145	1264	1249	15
gravel and sand with shale and chalk pebbles	145	155	1249	1239	10
screened interval	132	142	1262	1252	

Table B7: Well completion report information submitted for Water Permit No. 8466-3 (Water Rights, 2024b)					
Latitude	43.358147	well log	Surface elevation (m)	422.912	1 meter DEM
Longitude	-97.158789	well log	Surface elevation (ft)	1387.51	
Material Description	From (ft)	To (ft)	From (ft NAVD 88)	To (ft NAVD 88)	Thickness (ft)
top soil	0	3	1388	1385	3
tan sandy clay	3	40	1385	1348	37
grey sandy clay	40	75	1348	1313	35
sand gravel mix with clay	75	93	1313	1295	18
fine-medium sand with coarse gravel	93	160	1295	1228	67
screened interval	100	160	1288	1228	
static water level (below grade)	not provided	ft		ft NAVD 88	

Table B8: Well completion report information submitted for Water Permit No. 8467-3 (Water Rights, 2024b)					
Latitude	43.354431	well log	Surface elevation (m)	416.001	1 meter DEM
Longitude	-97.146761	well log	Surface elevation (ft)	1364.83	
Description	From (ft)	To (ft)	From (ft NAVD 88)	To (ft NAVD 88)	Thickness (ft)
top soil	0	3	1365	1362	3
tan sandy clay	3	46	1362	1319	43
grey sandy clay	46	70	1319	1295	24
medium-coarse sand/gravel	70	150	1295	1215	80
grey chalk	150	160	1215	1205	10
screened interval	90	150	1275	1215	
static water level (below grade)	not provided	ft		ft NAVD 88	

Table B9: Well completion report information submitted for Water Permit No. 8565-3 (Water Rights, 2024b)					
Latitude	43.3872	well log	Surface elevation (m)	440.565	1 meter DEM
Longitude	-97.20195	well log	Surface elevation (ft)	1445.42	
Material Description	From (ft)	To (ft)	From (ft NAVD 88)	To (ft NAVD 88)	Thickness (ft)
top soil	0	2	1445	1443	2
clay brown	2	27	1443	1418	25
clay gray	27	44	1418	1401	17
sand & coal	44	47	1401	1398	3
clay gray w/ sand layers	47	52	1398	1393	5
clay gray pebbly	52	77	1393	1368	25
gravel med w/ clay layers	77	83	1368	1362	6
clay gray w/ some sand layers	83	144	1362	1301	61
clay gray pebbly	144	174	1301	1271	30
gravel coarse-rock @ 197, coarser @ bottom	174	198	1271	1247	24
clay grey	198	208	1247	1237	10
screened interval	179	199	1266	1246	
static water level (below grade), March 2022	152	ft	1293	ft NAVD 88	

Table B10: Well completion report information submitted for Water Permit No. 8567-3 (Water Rights, 2024b)					
Latitude	43.396	well log	Surface elevation (m)	434.97	1 meter DEM
Longitude	-97.20665	well log	Surface elevation (ft)	1427.07	
Material Description	From (ft)	To (ft)	From (ft NAVD 88)	To (ft NAVD 88)	Thickness (ft)
top soil	0	3	1427	1424	3
clay brown	3	7	1424	1420	4
sand	7	18	1420	1409	11
clay grey	18	103	1409	1324	85
gravel	103	111	1324	1316	8
sand	111	115	1316	1312	4
clay w/ sand layers	115	129	1312	1298	14
clay gray with gravel layers- very mixed	129	135	1298	1292	6
gravel coarse	135	144	1292	1283	9
clay gray	144	146	1283	1281	2
gravel med coarse	146	150	1281	1277	4
clay	150	151	1277	1276	1
gravel coarse rocky	151	181	1276	1246	30
clay w/gravel layers 1-2" layers of gravel w/ 1" layers of clay	181	189	1246	1238	8
gravel	189	208	1238	1219	19
screened interval	186	206	1241	1221	
static water level (below grade), March 2022	135	ft	1292	ft NAVD 88	

Table B11: Test hole information for Haase 2021 Test hole #1 (Water Rights, 2024a)					
Latitude	43.3973	well log	Surface elevation (m)	447.785	1 meter DEM
Longitude	-97.216533	well log	Surface elevation (ft)	1469.11	
Material Description	From (ft)	To (ft)	From (ft NAVD 88)	To (ft NAVD 88)	Thickness (ft)
sandy clay brown	To (ft)	4	1469	1465	4
clay brown	4	26	1465	1443	22
sand fine clayey	26	36	1443	1433	10
clay brown	36	38	1433	1431	2
clay gray	38	50	1431	1419	12
clay gray w/sand & wood & sand layers	50	150	1419	1319	100
wood	150	151	1319	1318	1
gravel and wood	151	153	1318	1316	2
clay gray	153	164	1316	1305	11
clay brown w/ sand & coal	164	167	1305	1302	3
clay gray w/ sand & coal	167	176	1302	1293	9
soft gray chalk	176	182	1293	1287	6
chalk brown firm w/gravel	182	188	1287	1281	6
chalk gray firm w/sand	188	190	1281	1279	2
chalk gray hard	190	194	1279	1275	4
shale	194	199	1275	1270	5
chalk	190	200	1279	1269	10

Table B12: Test hole information for Haase 2021 Test hole #2 (Water Rights, 2024a)					
Latitude	43.40065	well log	Surface elevation (m)	450.352	1 meter DEM
Longitude	-97.2199	well log	Surface elevation (ft)	1477.53	
Material Description	From (ft)	To (ft)	From (ft NAVD 88)	To (ft NAVD 88)	Thickness (ft)
top soil	0	2	1478	1476	2
clay brown	2	4	1476	1474	2
gravel	4	8	1474	1470	4
clay brown	8	22	1470	1456	14
gravel	22	24	1456	1454	2
sand and clay layers	24	36	1454	1442	12
clay brown	36	38	1442	1440	2
clay gray silty & sandy	38	62	1440	1416	24
gravel	62	63	1416	1415	1
clay gray- very layered with sand & coal	63	82	1415	1396	19
clay gray silty pebbly w/coal layer as 102'	82	145	1396	1333	63
gravel and clay layers	145	153	1333	1325	8
gravel	153	159	1325	1319	6
clay gray w/coal & wood	159	187	1319	1291	28
chalk gray soft	187	194	1291	1284	7
chalk gray w/ hard layers	194	202	1284	1276	8
chalk brown soft	202	218	1276	1260	16

Table B13: Summarized well completion report information for observation well TU-2023B (M51-2021-10) (Water Rights, 2024c)					
Latitude	43.38226	surveyed	Surface elevation (m)	n/a	1 meter DEM
Longitude	-97.18158	surveyed	Surface elevation (ft)	1413.73	surveyed
Material Description	From (ft)	To (ft)	From (ft NAVD 88)	To (ft NAVD 88)	Thickness (ft)
medium brown clay, small sand and gravel lens at 45 ft	0	48	1414	1366	48
dark gray clay, sand and gravel lens at 75 ft	48	89	1366	1325	41
gravel	89	100	1325	1314	11
screened interval	86	96	1328	1318	
static water level (below grade), June 2023	66.7	ft	1347	ft NAVD 88	

Table B14: Summarized well completion report information for observation well TU-2023C (M51-2021-09) (Water Rights, 2024c)					
Latitude	43.37641	surveyed	Surface elevation (m)	n/a	1 meter DEM
Longitude	-97.201224	surveyed	Surface elevation (ft)	1445.96	surveyed
Material Description	From (ft)	To (ft)	From (ft NAVD 88)	To (ft NAVD 88)	Thickness (ft)
light brown clay	0	35	1446	1411	35
medium grey clay, small gravel lens at 55 and 65 ft	35	73	1411	1373	38
dark gray clay, thin sand and gravel lens at 74 ft	73	82	1373	1364	9
sand and gravel	82	96	1364	1350	14
dark gray clay	96	100	1350	1346	4
screened interval	84.8	94.8	1361	1351	
static water level (below grade), June 2023	17.9	ft	1428	ft NAVD 88	

Table B15: Well completion report information submitted for Water Permit No. 8742-3 (Water Rights, 2024b)					
Latitude	43.387033	well log	Surface elevation (m)	424.301	1 meter DEM
Longitude	-97.181283	well log	Surface elevation (ft)	1392.06	
Material Description	From (ft)	To (ft)	From (ft NAVD 88)	To (ft NAVD 88)	Thickness (ft)
top soil	0	3	1392	1389	3
clay-brown	3	29	1389	1363	26
clay-blue	29	52	1363	1340	23
gravel	52	71	1340	1321	19
clay-blue	71	81	1321	1311	10
screened interval	51	71	1341	1321	
static water level (below grade), Aug 2023	31	ft	1361	ft NAVD 88	

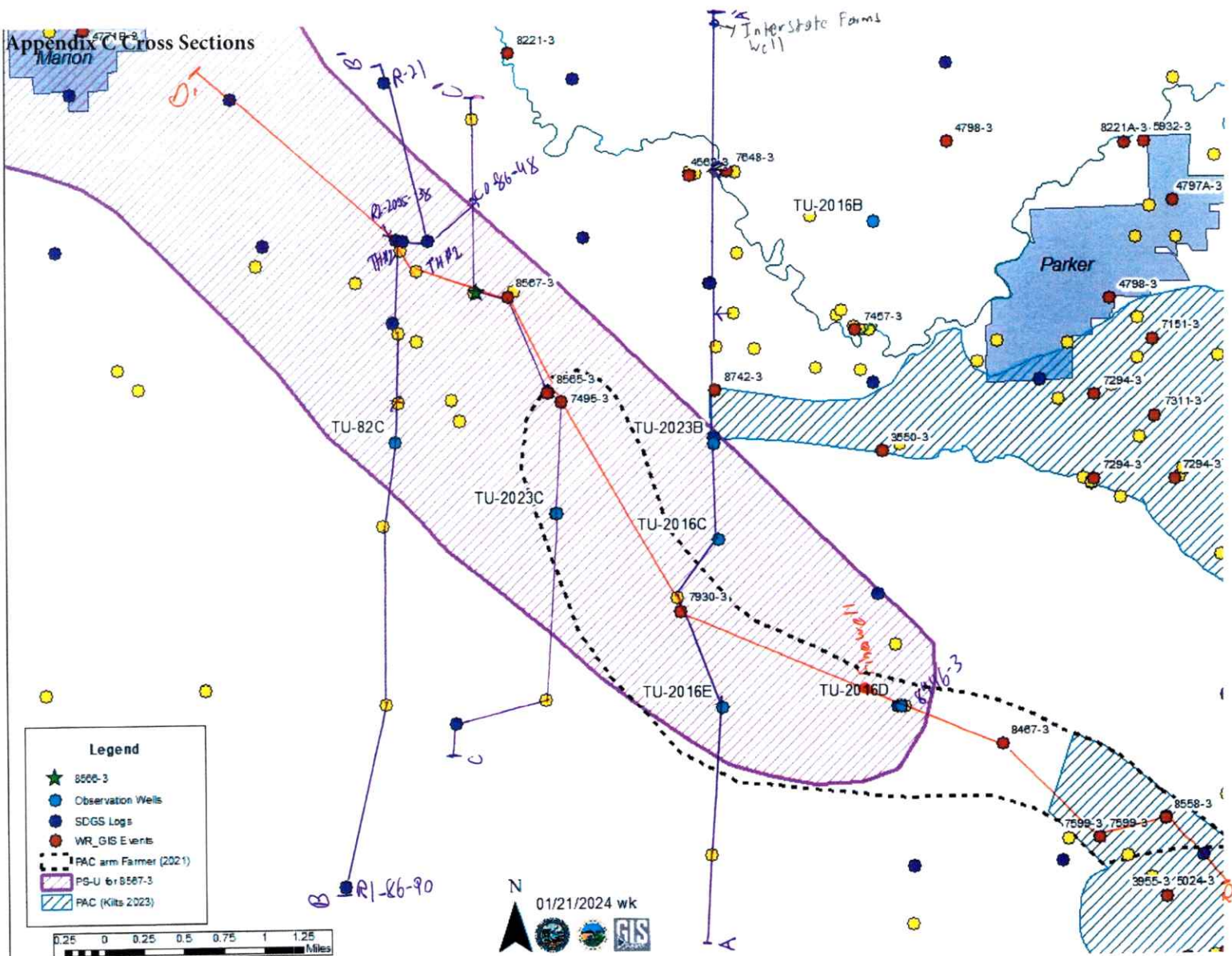
Table B16: Summarized well completion report information for observation well TU-82C (Water Rights, 2024c)					
Latitude	43.383111	surveyed	Surface elevation (m)	n/a	1 meter DEM
Longitude	-97.220978	surveyed	Surface elevation (ft)	1470.57	surveyed
Material Description	From (ft)	To (ft)	From (ft NAVD 88)	To (ft NAVD 88)	Thickness (ft)
top soil & sand and gravel	0	5	1471	1466	5
clay (till) (various colors noted)	5	38	1466	1433	33
sand and gravel	38	44	1433	1427	6
clay	44	121	1427	1350	77
sand and gravel, coarse, with coal	121	134	1350	1337	13
clay (till)	134	190	1337	1281	56
clay (Niobrara)	190	200	1281	1271	10
screened interval	122	135	1349	1336	
static water level (below grade), June 2023	24.8	ft	1446	ft NAVD 88	

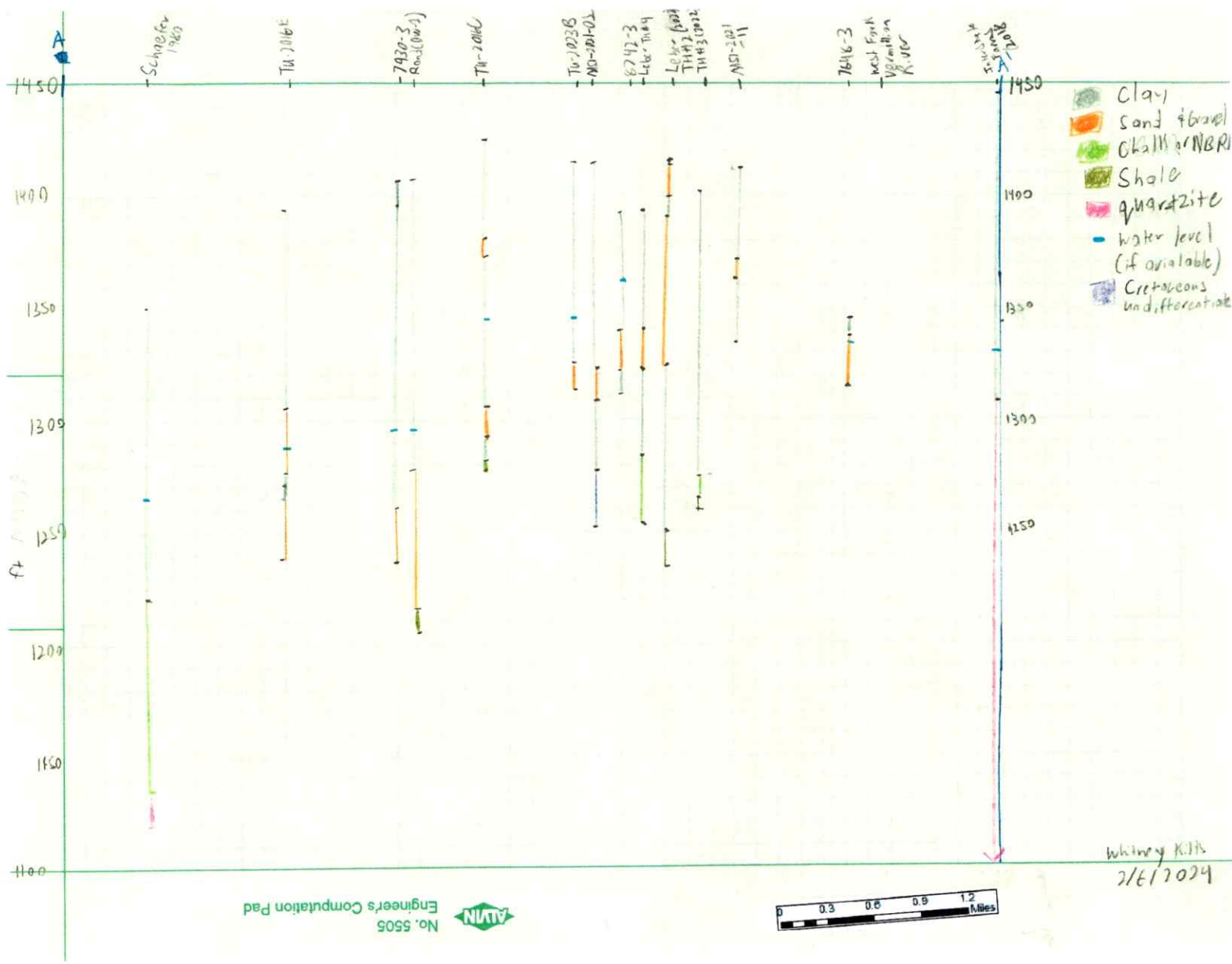
Table B17: Summary of well completion report information submitted for Water Permit No. 7599-3 (Water Rights, 2024b)					
Latitude	43.345694	well log	Surface elevation (m)	404.798	1 meter DEM
Longitude	-97.134833	well log	Surface elevation (ft)	1328.08	
Description	From (ft)	To (ft)	From (ft NAVD 88)	To (ft NAVD 88)	Thickness (ft)
top soil	0	1	1328	1327	1
clay tan	1	33	1327	1295	32
sand	33	106	1295	1222	73
screened interval	80	106	1248	1339	
static water level (below grade), March 2022	30	ft	1298	ft NAVD 88	

Table B18: Summary of well completion report information submitted for Water Permit No. 8558-3 (Water Rights, 2024b)					
Latitude	43.34725	well log	Surface elevation (m)	403.21	1 meter DEM
Longitude	-97.1268	well log	Surface elevation (ft)	1322.87	
Description	From (ft)	To (ft)	From (ft NAVD 88)	To (ft NAVD 88)	Thickness (ft)
top soil	0	4	1323	1319	4
clay dark brown	4	11	1319	1312	7
clay brown/tan	11	29	1312	1294	18
clay tan w/gravel	29	33	1294	1290	4
gravel	33	59	1290	1264	26
gravel med sand	59	96	1264	1227	37
clay gray	96	97	1227	1226	1
gravel w/ fine sand	97	122	1226	1201	25
clay blue	122	137	1201	1186	15
quartzite	137		1186		
screened interval	82	120	1241	1325	
static water level (below grade), March 2022	27	ft	1296	ft NAVD 88	

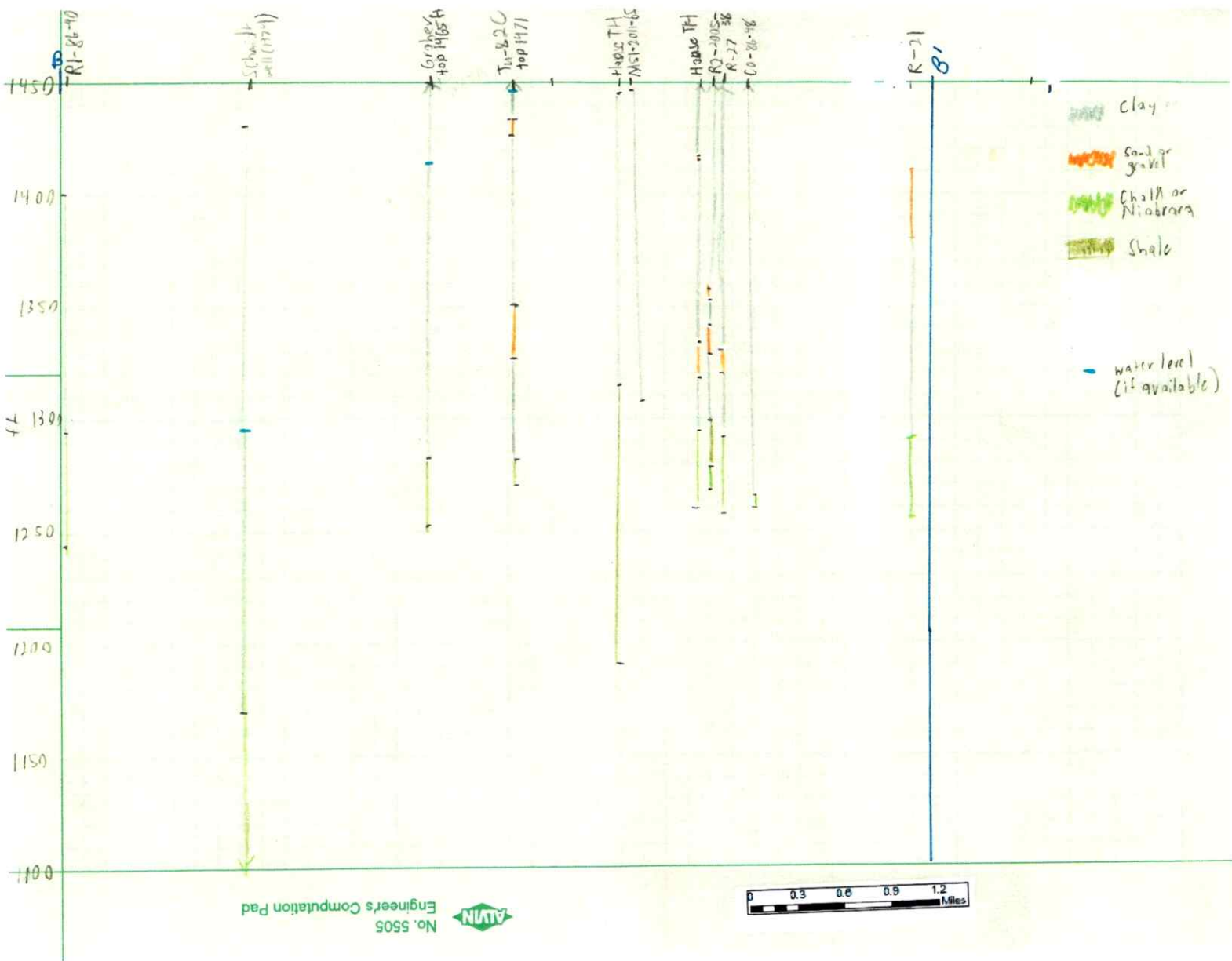
Table B19: Summary of well completion report information submitted for Water Permit No. 8719-3 (Water Rights, 2024b)					
Summary of well completion report information submitted for Water Permit No. 8719-3 -well 1 (Water Rights, 2024b)					
Latitude	43.354454	well log	Surface elevation (m)	398.643	1 meter DEM
Longitude	-97.096844	well log	Surface elevation (ft)	1307.88	
Description	From (ft)	To (ft)	From (ft NAVD 88)	To (ft NAVD 88)	Thickness (ft)
top soil	0	3	1308	1305	3
brown clay	3	17	1305	1291	14
sand	17	29	1291	1279	12
gray clay	29	55	1279	1253	26
Medium gravel-few clay layers	55	95	1253	1213	40
screened interval	55	95	1253	1213	
static water level (below grade), June 2023	41	ft	1267	ft NAVD 88	
Summary of well completion report information submitted for Water Permit No. 8719-3 -well 2 (Water Rights, 2024b)					
Latitude	43.35441	well log	Surface elevation (m)	398.436	1 meter DEM
Longitude	-97.095962	well log	Surface elevation (ft)	1307.20	
Description	From (ft)	To (ft)	From (ft NAVD 88)	To (ft NAVD 88)	Thickness (ft)
top soil	0	3	1307	1304	3
brown clay	3	17	1304	1290	14
gray clay	17	40	1290	1267	23
gray clay with sand layers	40	60	1267	1247	20
sand with clay layers	60	71	1247	1236	11
Medium-fine gravel some rocks	71	91	1236	1216	20
fine sand	91	93	1216	1214	2
screened interval	71	93	1236	1352	
static water level (below grade), November 2023	37.56	ft	1270	ft NAVD 88	

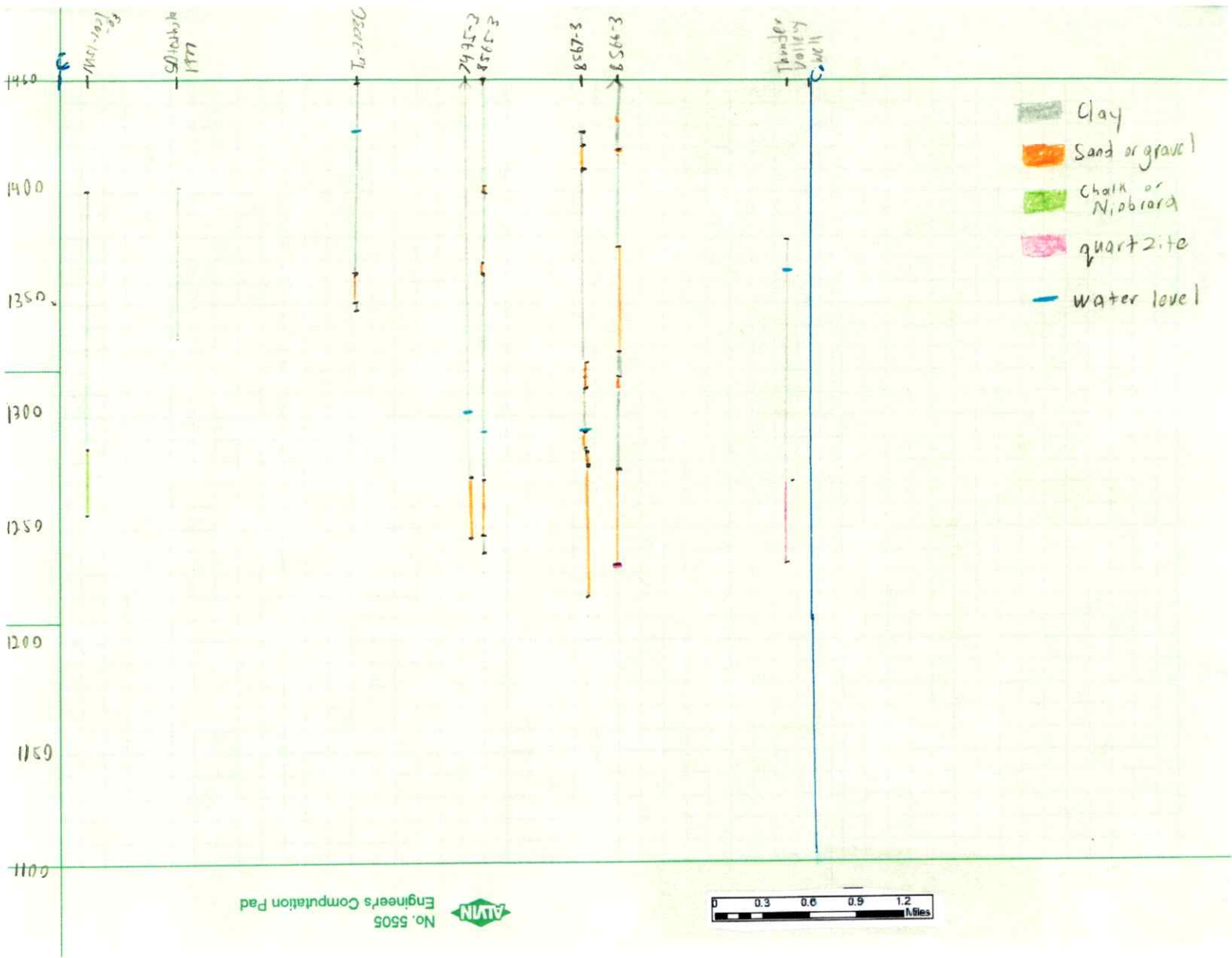
Appendix C Cross Sections

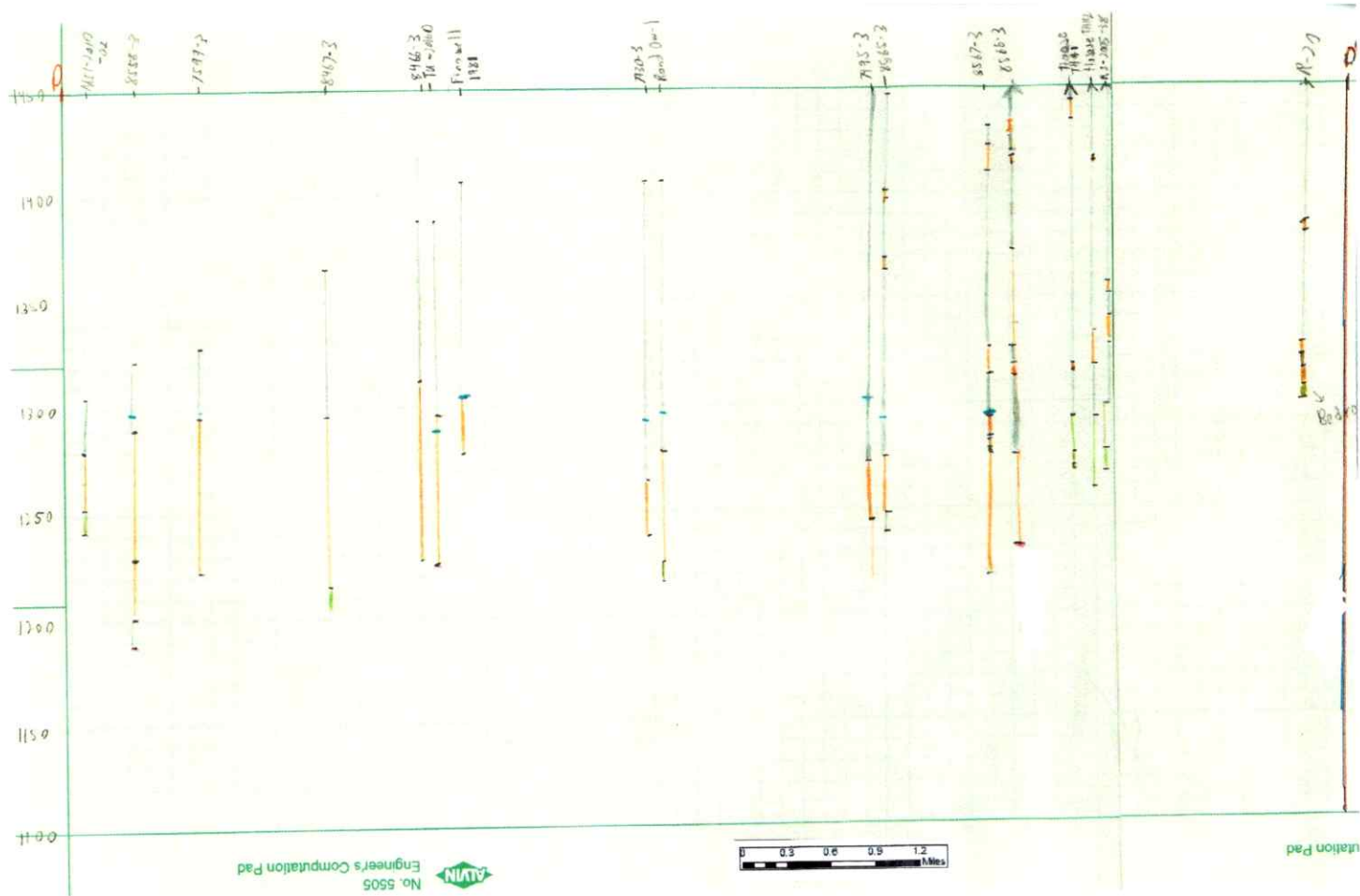




Whitney K.H.
2/6/79







Form 8

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FEB 14 2022

WATER RIGHTS
PROGRAM

PROOF OF PUBLICATION

STATE OF SOUTH DAKOTA)
County of Turner) SS

I, Melissa Schultz

certify that the attached printed Notice was taken
from the New Era Newspaper

printed and published in Parker, SD

County of Turner and

state of South Dakota. The notice was published

in the newspaper on the following date:

February 10th, 2022

Cost of Printing

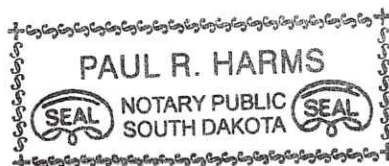
\$108.40

Paul R. Harms

(Signature)

Office Manager
(Title)

February 10th, 2022
(Date Signed)



Aquifer (approximately 236 feet deep) located in the SW 1/4 NE 1/4 Section 15 to irrigate 132 acres located in the NW 1/4 Section 16; both in T99N-R54W.

Application No. 8567-3 proposes to appropriate 2.22 cfs from one well to be completed into the Pleistocene Series:Unknown Aquifer (approximately 210 feet deep) located in the S 1/2 NE 1/4 Section 15 to irrigate 226 acres located in the N 1/2 Section 15; all in T99N-R54W.

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Pursuant to SDCL 46-2A-2, the Chief Engineer recommends Approval of Application Nos. 8565-3 and 8567-3 with qualifications because 1) unappropriated water is available; 2) existing domestic water uses and water rights will not be unlawfully impaired; 3) it is a beneficial use of water; and 4) it is in the public interest as it pertains to matters within the regulatory authority of the Water Management Board.

Pursuant to SDCL 46-2A-2, the Chief Engineer recommends Deferral of Application No. 8566-3 because at this time it is not possible to conclude that unappropriated water is available to support this application in addition to Water Permit Application Nos. 8565-3 and 8567-3. Three of the four observation wells completed into this portion of the aquifer were completed in 2016 and; therefore, the period of record is limited. Based on the best information available, the hydrologic budget only supports enough unappropriated water available to recommend approval of Application Nos. 8565-3 and 8567-3.

The Chief Engineer's recommendations with qualifications, the applications, 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 these applications at 10:00 am (Central Time) on March 2, 2022 in the Matthew Training Center, Joe Foss Bldg, 523 E. Capitol Ave., Pierre, SD. The Chief Engineer's recommendations are

presented at the public hearing.

Any person who intends to participate in the hearing shall allege that the applications, 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 applications, or other matter concerning the applications 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 applications with BOTH the applicant and Chief Engineer. A petition opposing the applications 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 February 22, 2022.

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February 22, 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.

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Published once at the total approximate cost of \$108.40 (N0210-1)

NOTICE OF HEARINGS TO APPROPRIATE WATER

Notice is given that Dustin Haase, 44881 SD Hwy 44, Parker, SD 57053 has filed the following applications for water permits. These sites are located approximately 3 miles west of Parker SD.

Application No. 8565-3 proposes to appropriate 1.11 cubic feet of water per second (cfs) from one well to be completed into the Pleistocene Series:Unknown Aquifer (approximately 210 feet deep) located in the SE 1/4 SE 1/4 Section 15 for irrigation of 124 acres located in the SE 1/4 Section 15; all in T99N-R54W.

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Argus Leader

P.O. Box 677349, Dallas, TX 75267-7349

Account No.: SFA-078306

Ad No.: 0005115182

PO #: Dustin Haas

Lines : 316

Ad Total: \$91.94

WATER RIGHTS PROGRAM
523 E CAPITOL JOE FOSS BLDG
PIERRE, SD 57501

This is not an invoice

of Affidavits 1

Account No.: SFA-078306

Ad No.: 0005115182

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FEB 15 2022

WATER RIGHTS
PROGRAM

Argus Leader AFFIDAVIT OF PUBLICATION

State of Wisconsin

County of Brown

I being duly sworn, says: That The Argus Leader is, and during all the times hereinafter mentioned was, a daily legal newspaper published at Sioux Falls, Minnehaha County, South Dakota; that affiant is and during all of said times, was an employee of the publisher of such newspaper and has personal knowledge of the facts stated in this affidavit; that the notice, order or advertisement, a printed copy of which is hereto attached, was published in said newspaper issue(s) :

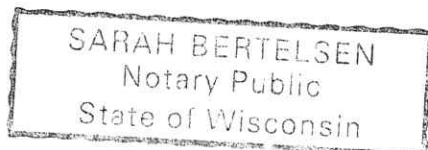
Thursday, February 10, 2022

Sworn to and subscribed before me this 10 day of February, 2022.

Legal Clerk

Notary Public, State of Wisconsin, County of Brown

My Commission expires



NOTICE OF HEARINGS to

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Published once at an approximate cost of \$91.94.
5115182 Feb 10, 2022

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WATER RIGHTS
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**DEPARTMENT of AGRICULTURE
and NATURAL RESOURCES**

JOE FOSS BUILDING
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PIERRE SD 57501-3182
danr.sd.gov

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

February 1, 2022

Dustin Haase
44881 SD Hwy 44
Parker SD 57053

Dear Mr. Haase:

Water Permit Application Nos. 8565-3, 8566-3, 8567-3 use have been examined and found to comply with the South Dakota Water Laws and applicable rules. A notice has been sent to the The New Era printed at Parker (Ph # 605 297-4419) and the Argus Leader printed at Sioux Falls (Ph # 605 331-2200). You will need to contact the newspapers and authorize publication of this notice. For your information, a copy of the notice, the recommendations of the Chief Engineer and report on the applications 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.

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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 February 22, 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 the applications: 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.

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