

WATER PERMIT NO. 8682-3

Name of Applicant: **Thomas Dreesen**

Address: **31250 457th Ave, Meckling SD 57069**

Phone: **605 661-0715**

Amount of Water Claimed: **no add'l**

Total Acres: **21 add'l**

Source of Water Supply: **groundwater (2 existing wells)**

Water to be used for: **irrigation**

County: **Clay**

Type of Waste Disposal System:

Location: **8 miles northwest of Vermillion**

PRIORITY

Date Received: **12-12-22**

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

Corrected Application Received:

Period of Annual Use: **April 1 – October 31**

Remarks: **additional acres to Water Right No. 6901B-3**

Diversion Point: **NW 1/4 SE 1/4 and SW 1/4 NE
1/4 Sec 13-T93N-R53W**

Land to be Irrigated: **S 1/2 NE 1/4 Sec 13-T93N-
R53W**

Depth of Well: **100 feet deep**

Well Driller:

Remarks:

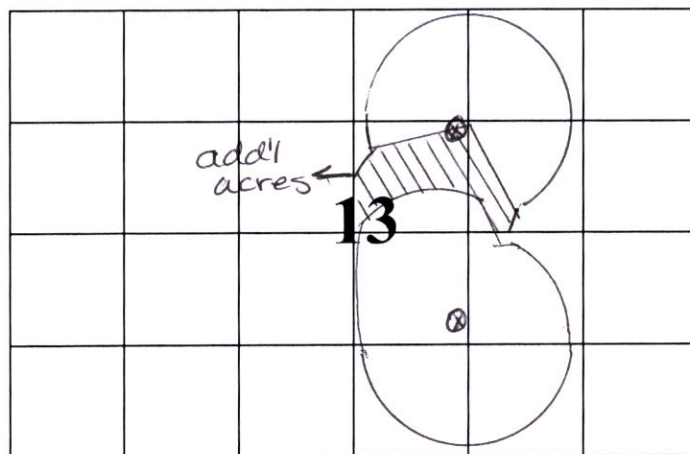
Type of Map: **aerial**

Prepared by:

Reviewed and the Number Assigned on: **12-12-22**

By: **Karen Schlaak**

Notice of Hearing - date to intervene: _____



SOUTH DAKOTA
WATER PERMIT NO. 8682-3

Date of first receipt of application December 12, 2022.

The Chief Engineer, on behalf of the Water Management Board, issues Water Permit No. 8682-3 to Thomas Dreesen, 31250 457th Ave, Meckling SD 57069 authorizing the construction of the water use system and the placing of water to beneficial use subject to the following limitations, conditions and qualifications:

1. Water Permit No. 8682-3 authorizes irrigation of an additional 21 acres. Water Right No. 6901B-3 authorizes 3.12 cubic feet of water per second (cfs) from two wells completed into the Missouri Elk Point Aquifer located in the SW 1/4 NE 1/4 and the NW 1/4 SE 1/4 Section 13 for irrigation of 265 acres located in the E 1/2 Section 13-T93N-R53W. This permit authorizes irrigation of an additional 21 acres located in the S 1/2 NE 1/4 Section 13-T93N-R53W from the existing wells described above. This permit and Water Right No. 6901B-3 will authorize a total of 3.12 cfs for irrigation of 286 acres. This site is located approximately 8 miles northwest of Vermillion SD.
2. The amount of the appropriation may not exceed 2 acre feet annually for each acre of land to which water is actually and beneficially applied for irrigation. The water is to be used during the following described annual period: April 1 – October 31.
3. The date from which applicant may claim right is December 12, 2022 (21 acres).
4. The date of approval of Permit No. 8682-3 is February 6, 2023.
5. One-fifth of the construction is to be completed on or before August 6, 2025.
6. All construction is to be completed on or before February 6, 2028.
7. Water is to be put to beneficial use on or before February 6, 2032.
8. Water rights obtained in compliance with the laws of the State of South Dakota may not be unlawfully impaired by this appropriation.

QUALIFICATIONS

1. The wells approved under Water Right No. 6901B-3 and Water Permit No. 8682-3 are located near domestic wells and other wells which may obtain water from the same aquifer. Water withdrawals shall be controlled so there is not a reduction of needed water supplies in adequate domestic wells or in adequate wells having prior water rights.
2. This Permit is approved subject to the irrigation water use questionnaire being submitted each year.

WATER MANAGEMENT BOARD

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

FEB 21 2023
date



RECEIVED

DEC 12 2022

PAID

DEC 12 2022

Ck# 7755

Rec't#

Mail to: SD DANR, Water Rights 523 E Capitol Ave Pierre, SD 57501-3182 ph. (605) 773-3352	No. <u>8682-3</u> Hydrologic Unit <u>10170102</u>	OFFICE OF WATER
	Basin <u>Vermillion River</u>	
	Newspaper <u>Plain talk</u>	
	<u>Press & Dakotan</u> (office use only)	

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.)

Add'l Acres to 6901B-3

1. Name to Appear on Irrigation Permit Thomas Dreesen

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

Mailing Address 31250 457th Ave Meckling SD 57069
(Address) (City) (State) (Zip Code)

Phone _____ Mobile 605-661-0715 Email tedreesen@live.com

2. Amount of water claimed No add'l *CFS or _____ **GPM _____ ***AF Total Acreage 21 add'l
(*Cubic Feet per Second) (**Gallons per Minute) (***)Acre Feet - storage capacity of dam/dugout or annual use if applicable)

3. Source of water supply Two existing wells

4. Location of point of diversion NW1/4 SE1/4 and SW1/4 NE1/4 section 13-T93N-R53W
(example - 3 wells in SW1/4 NE1/4 section 12-T104N-R53W)

County Clay

5. County or counties where water will be used Clay

6. Annual period during which water is to be used April 1 - October 31

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
S1/2 NE1/4 sec 13-T93N-R53W	21		

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

The center pivot in the SE1/4 has an extension that is being replaced with another pivot and the area covered by the extension will be covered by another pivot which will cover the same area plus an additional 21 acres.

I, Thomas Dreesen, 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)

SEE WATER RIGHT NO. 6901B-3

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) _____ Depth to Top of Water Bearing Material _____ Depth to Water from Surface _____
- d) Distance to nearest domestic well on applicant's property _____ Property owned by others _____

2. Wastewater Disposal System Information

- a) Type of System (i.e. septic tank, drain field) _____
- b) System Capacity (gallons) _____ Year Constructed _____
- c) Connected to the City of _____ Sanitary System

3. Dugout Information

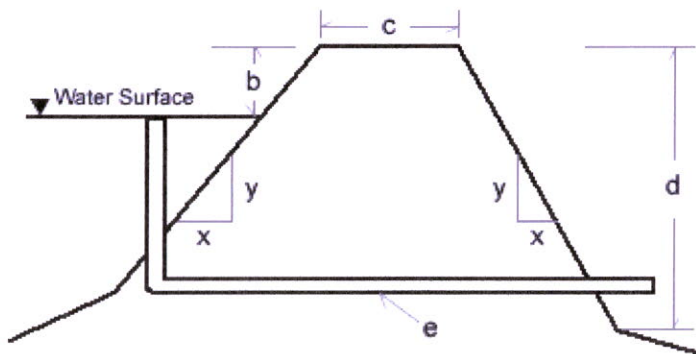
- a) Surface Dimensions _____ Depth _____
- b) Depth to water (ground surface to water level) _____

4. Water Storage Dams

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

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

- b) Freeboard _____
- c) Crest Width _____
Crest Length _____
- d) Height _____
- e) Primary Outlet Capacity _____

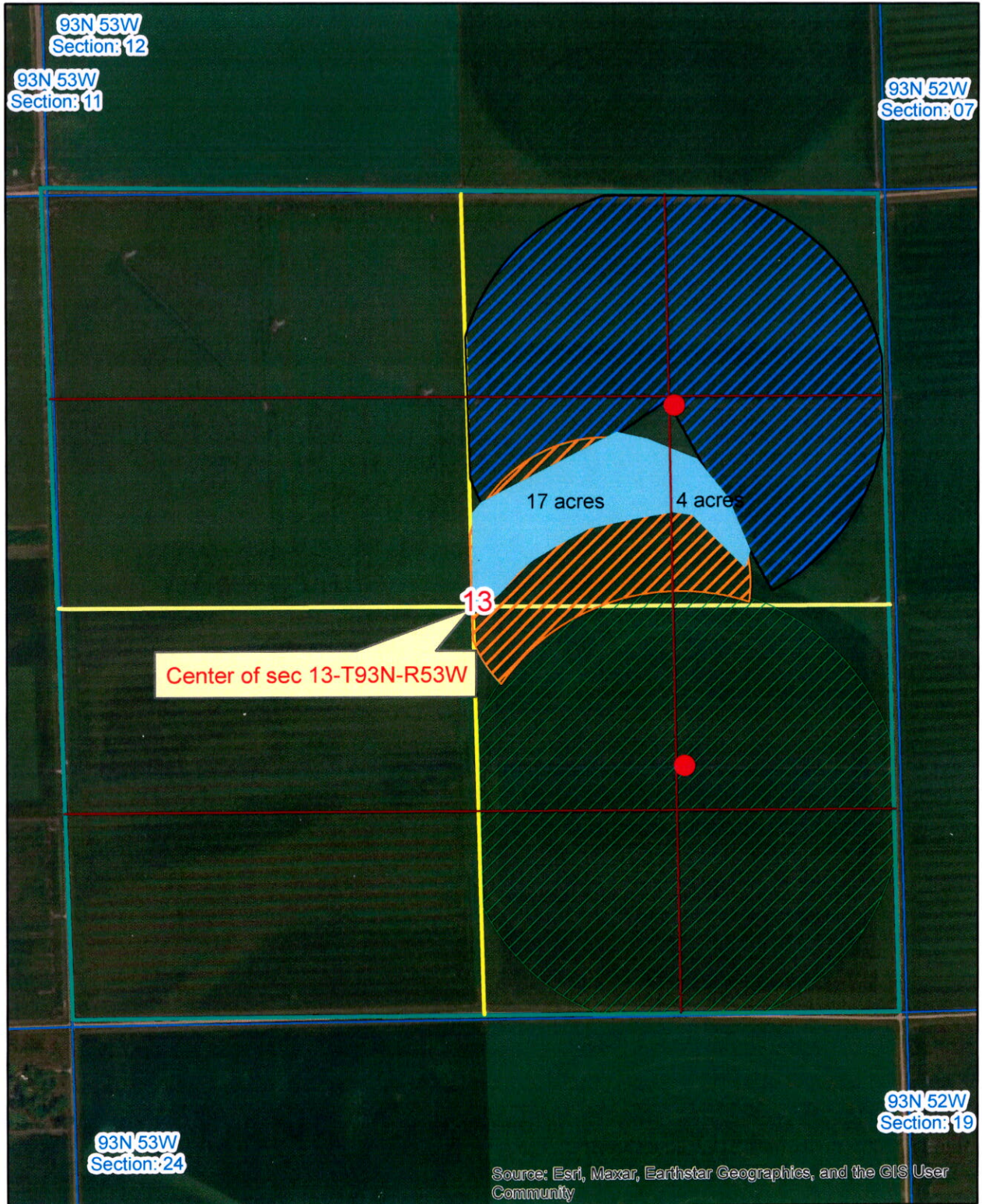


- If pipe, diameter _____
- f) Secondary Spillway Capacity _____
Spillway Width _____
- g) X & Y Slope (e.g. 3 to 1 is a typical slope)
Upstream _____
Downstream _____
- h) Area of Impoundment _____
- i) Storage _____ Acre Feet
- j) Drainage Area Above Dam _____ Acres

Scale: 1 inch = 956 feet

1,300

Feet



DANR
SOUTH DAKOTA

Completed by:

Ron Duvall
Ron Duvall, W.R. Permitting Administrator
SD DANR, Water Rights Program

Date:

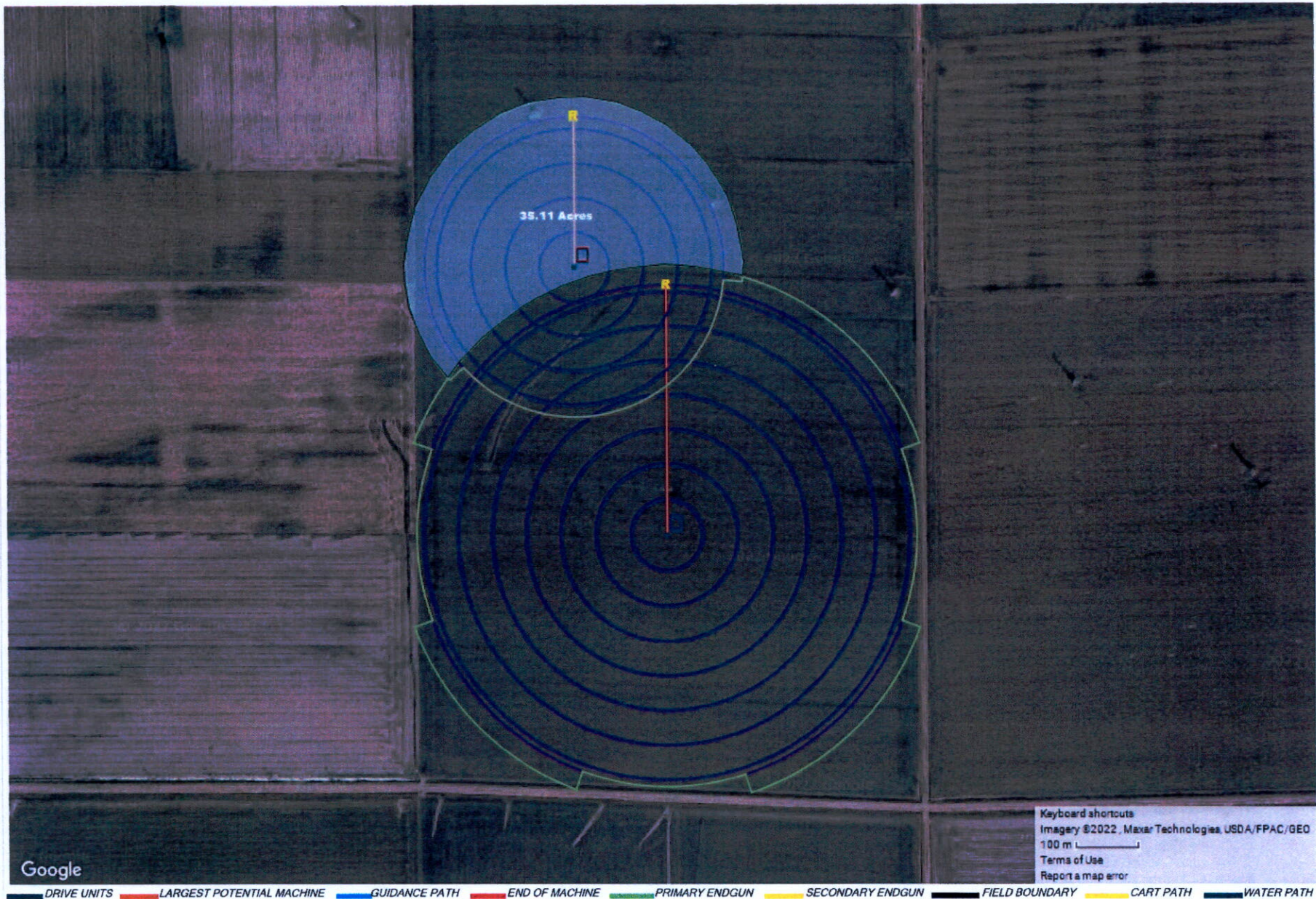
12/13/22



21 additional acres

Application No.

8682-3





Project Name - Tom Dreesen - 2022
Version Name - Tom Dreesen - 2022_Version
Map Summary Report



Field Name	Design Name	Machine Category	Machine Area (ac)	No. of Towers	Total Machine Length (ft)	Total Irrigated Area (ac)
 Pivot_1_114202284734626	South Circle - TD	Large Field Electrical Pivot 8000	124.78	7	1312.52	138.04

Total Project Irrigated Area (ac): 190.45

(South Circle - TD)	Spans and Overhang	Corner	Endgun*	Bender / DropSpan	Polygon
Irrigated Area using (ac)	124.77	0	13.27	0	0.00

* Estimated

Total Span Length (ft) 1274.40

Overhang Length (ft) 36.00

Flex/Transition/Other Lengths (ft) 2.12

S.No	Diameter	Length (ft)	Cable Size	Motor Options	Tire Size	Bender / DropSpan	Profile
1	6 5/8	184.80	12 ga cable / 11 cond shielded	34 RPM Baldor Helical	14.9 x 24 Non-Directional Tubeless	None	Standard
2	6 5/8	184.80	12 ga cable / 11 cond shielded	34 RPM Baldor Helical	14.9 x 24 Non-Directional Tubeless	None	Standard
3	6 5/8	184.80	12 ga cable / 11 cond shielded	34 RPM Baldor Helical	14.9 x 24 Non-Directional Tubeless	None	Standard
4	6 5/8	180.00	12 ga cable / 11 cond shielded	34 RPM Baldor Helical	14.9 x 24 Non-Directional Tubeless	None	Standard
5	6 5/8	180.00	12 ga cable / 11 cond shielded	34 RPM Baldor Helical	14.9 x 24 Non-Directional Tubeless	None	Standard
6	6 5/8	180.00	12 ga cable / 11 cond shielded	34 RPM Baldor Helical	14.9 x 24 Non-Directional Tubeless	None	Standard
7	6 5/8	180.00	12 ga cable / 11 cond shielded	34 RPM Baldor Helical	14.9 x 24 Non-Directional Tubeless	None	Standard

Primary Endgun

Endgun Angles (South Circle - TD)	Endgun 1	Endgun 2	Endgun 3
Start Angle	290.00 deg	110.00 deg	200.00 deg
End Angle	70.00 deg	162.00 deg	250.00 deg

Field Name	Latitude	Longitude	Pivot Road Angle	Pivot Road Offset	Start Angle	End Angle
Pivot_1_114202284734626	42.870137537057	-97.047620448172	-	-	0 deg	360 deg



Project Name - Tom Dreesen - 2022
Version Name - Tom Dreesen - 2022_Version



Map Summary Report

Field Name	Design Name	Machine Category	Machine Area (ac)	No. of Towers	Total Machine Length (ft)	Total Irrigated Area (ac)
 Pivot_2_114202291025455	North Circle - TD	Large Field Electrical Pivot 8000	44.85	4	786.12	52.41

Total Project Irrigated Area (ac): 190.45

(North Circle - TD)	Spans and Overhang	Corner	Endgun*	Bender / DropSpan	Polygon
Irrigated Area using (ac)	44.77	0	7.64	0	0.00

* Estimated

Total Span Length (ft) 720.00

Overhang Length (ft) 64.00

Flex/Transition/Other Lengths (ft) 2.12

S.No	Diameter	Length (ft)	Cable Size	Motor Options	Tire Size	Bender / DropSpan	Profile
1	6 5/8	180.00	12 ga cable / 11 cond shielded	34 RPM Baldor Helical	14.9 x 24 Non-Directional Tubeless	None	Standard
2	6 5/8	180.00	12 ga cable / 11 cond shielded	34 RPM Baldor Helical	14.9 x 24 Non-Directional Tubeless	None	Standard
3	6 5/8	180.00	12 ga cable / 11 cond shielded	34 RPM Baldor Helical	14.9 x 24 Non-Directional Tubeless	None	Standard
4	6 5/8	180.00	12 ga cable / 11 cond shielded	34 RPM Baldor Helical	14.9 x 24 Non-Directional Tubeless	None	Standard

Primary Endgun

Endgun Angles (North Circle - TD)	Endgun 1
Start Angle	228.00 deg
End Angle	95.00 deg

Field Name	Latitude	Longitude	Pivot Road Angle	Pivot Road Offset	Start Angle	End Angle
Pivot_2_114202291025455	42.87399234507951	-97.0494198235936	-	-	0 deg	360 deg

Schlaak, Karen

From: Duvall, Ron
Sent: Tuesday, December 6, 2022 2:42 PM
To: Tom Dreesen
Cc: Schlaak, Karen
Subject: RE: [EXT] Scanned image from Heine Electric & Irrigation INC - Hartington, NE
Attachments: Dreesen_App.pdf

Thomas,

Please look over the attached application and map. If it looks accurate you can print it and put your name on the bottom and return the application, map and fee (\$700.00) to get the ball rolling. On the map, the area in orange is acreage covered by the new pivot and the area in blue represents the additional acres covered by the new pivot. I also put both wells down as a water source so as to not limit your options on supplying the new pivot. Please note I indicated that there would be no increase in the gallons per minute being pumped.

Please let me know if you have any questions.

Thank you,

Ron Duvall
Dept. of Agriculture & Natural Resources
Office of Water, Water Rights Program
605.773.3352
danr.sd.gov



DANR
SOUTH DAKOTA

From: Tom Dreesen <tedreesen@live.com>
Sent: Friday, December 2, 2022 9:44 AM
To: Duvall, Ron <Ron.Duvall@state.sd.us>
Subject: Fwd: [EXT] Scanned image from Heine Electric & Irrigation INC - Hartington, NE

Sent from my iPhone

Begin forwarded message:

From: Heine Electric <heineelectric@hartel.net>
Date: December 1, 2022 at 9:08:41 AM CST
To: TEDREESEN@live.com
Subject: Scanned image from Heine Electric & Irrigation INC - Hartington, NE
Reply-To: heineelectric@hartel.net

RECEIPT

WATER RIGHTS PROGRAM

South Dakota Department of Agriculture and Natural Resources

Date December 12, 2022

RECEIVED OF Thomas Dreesen 31250 457th Ave., Meckling SD 57069

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

Fee for Application for Permit No. <u>8682-3</u> to Appropriate Water, to construct and to put water to beneficial use	\$ <u>500.00</u>
Fee for Application for Permit No. _____ to Appropriate Water for Future use	\$ _____
Fee to retain Future Use Permit No. _____ after period of seven years.	\$ _____
Fee for Inspecting Constructed Works, confirming beneficial use and issuing Water License No. <u>8682-3</u>	\$ <u>200.00</u>
Fee for Filing Transfer Form _____	\$ _____
Fee for _____	\$ _____
Fee for Issuing New Well Driller's License No. _____	\$ _____
Fee for Renewal of Well Driller's License No. _____	\$ _____
Fee for Issuing Well Pump Installer's License No. _____	\$ _____
Fee for Renewal of Well Pump Installer's License No. _____	\$ _____
(Any Other Work Provided by Law)	
TOTAL	\$ <u>700.00</u>

By Eric Gronlund
Chief Engineer *em*



**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. 8682-3, Thomas Dreesen**

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. 8682-3, Thomas Dreesen, 31250 457th Avenue, Meckling SD 57069.

The Chief Engineer is recommending APPROVAL of Application No. 8682-3 because 1) there is reasonable probability that there is unappropriated water available for the applicant's proposed use, 2) the proposed diversion can be developed without unlawful impairment of existing domestic water uses and water rights, 3) the proposed use is a beneficial use and 4) it is in the public interest as it pertains to matters of public interest within the regulatory authority of the Water Management Board with the following qualifications:

1. The wells approved under Water Right No. 6901B-3 and Water Permit No. 8682-3 are located near domestic wells and other wells which may obtain water from the same aquifer. Water withdrawals shall be controlled so there is not a reduction of needed water supplies in adequate domestic wells or in adequate wells having prior water rights.
2. This Permit is approved subject to the irrigation water use questionnaire being submitted each year.

See report on application for additional information.

Eric Gronlund, Chief Engineer
January 17, 2023

Report to the Chief Engineer
On Water Permit Application No. 8682-3

Thomas Dreesen

January 17, 2023

Water Permit Application No. 8682-3 proposes to irrigate 21 acres using two existing wells authorized by Water Right No. 6901B-3. Water Right No. 6901B-3 authorizes a maximum instantaneous diversion rate of 3.12 cubic feet of water per second (cfs) from two existing wells completed into the Missouri: Elk Point aquifer (70 and 110 feet deep) located in the SW $\frac{1}{4}$ NE $\frac{1}{4}$ and NW $\frac{1}{4}$ SE $\frac{1}{4}$ of Section 13 for the irrigation of 265 acres located in the E $\frac{1}{2}$ of Section 13; all in T93N-R53W.

Water Permit Application No. 8682-3 proposes to irrigate an additional 21 acres located in the S $\frac{1}{2}$ NE $\frac{1}{4}$ of Section 13-T93N-R53W from the two existing wells described above. If approved, Water Permit Application No. 8682-3 and Water Right No. 6901B-3 will collectively authorize a total of 3.12 cfs for the irrigation of 286 acres. The site of interest is located in Clay County approximately eight miles northwest of Vermillion, SD.

AQUIFER: Missouri: Elk Point (M: EP)

HYDROGEOLOGY:

The Missouri: Elk Point aquifer is a glacial outwash deposit consisting of fine sand to very coarse gravel (Niehus, 1997). The Missouri: Elk Point aquifer underlies approximately 219,100 acres in Clay, Union, and Yankton Counties in South Dakota, and the aquifer contains approximately 3,287,100 acre-feet of recoverable water in storage (Hedges et al., 1982). The Missouri: Elk Point aquifer is hydraulically connected to the Lower Vermillion Missouri and Lower James Missouri aquifers, and the Big Sioux, James, Missouri, and Vermillion Rivers (Niehus, 1994; Stephens, 1967).

The Missouri: Elk Point aquifer is generally under confined conditions in the northwestern part of the aquifer, and generally under unconfined conditions in the southern part of the aquifer, and the direction of groundwater movement in the aquifer is generally from the northwest to the southeast (Niehus, 1994 and 1997).

There are water well completion reports on file for the two existing wells authorized by Water Right No. 6901B-3 and proposed to be used by Water Permit Application No. 8682-3 (Water Rights, 2023c and 2023d). The first report lists, "clay, brown silty" from 0 to 7 feet below the ground surface, "silt, gray, sandy" from 7 to 32 feet, and "sand, coarse, pebbly" from 32 to 70 feet below the ground surface (Water Rights, 2023d). The well was screened from 34 to 64 feet below the ground surface in "sand, coarse, pebbly" and had a static water level of approximately 16 feet at the time of well completion (May 11, 2008) (Water Rights, 2023d). The second report lists, "clay, brown silty, pebbly" from 0 to 7 feet below the ground surface, "silt, gray, sandy" from 7 to 42 feet, "sand, fine to medium" from 42 to 59 feet, and "gravel, fine, sandy" from 59 to 110 feet below the ground surface (Water Rights, 2023d). The well was screened from 66 to 106

feet below the ground surface in “gravel, fine, sandy” and had a static water level of approximately 19 feet at the time of well completion (May 12, 2008) (Water Rights, 2023d). Based on the well completion reports on file for the existing wells proposed to be used, and the well completion reports and lithologic logs on file for nearby observation wells, the Missouri: Elk Point Aquifer is confined at the existing well locations (SDGS, 2023; Water Rights, 2023b and 2023d).

Figure 1 displays a map of the approximate Missouri: Elk Point aquifer boundary (modified from Hedges et al., 1982) and the location of the existing wells proposed to be used by Water Permit Application No. 8682-3 (Water Rights, 2023c).

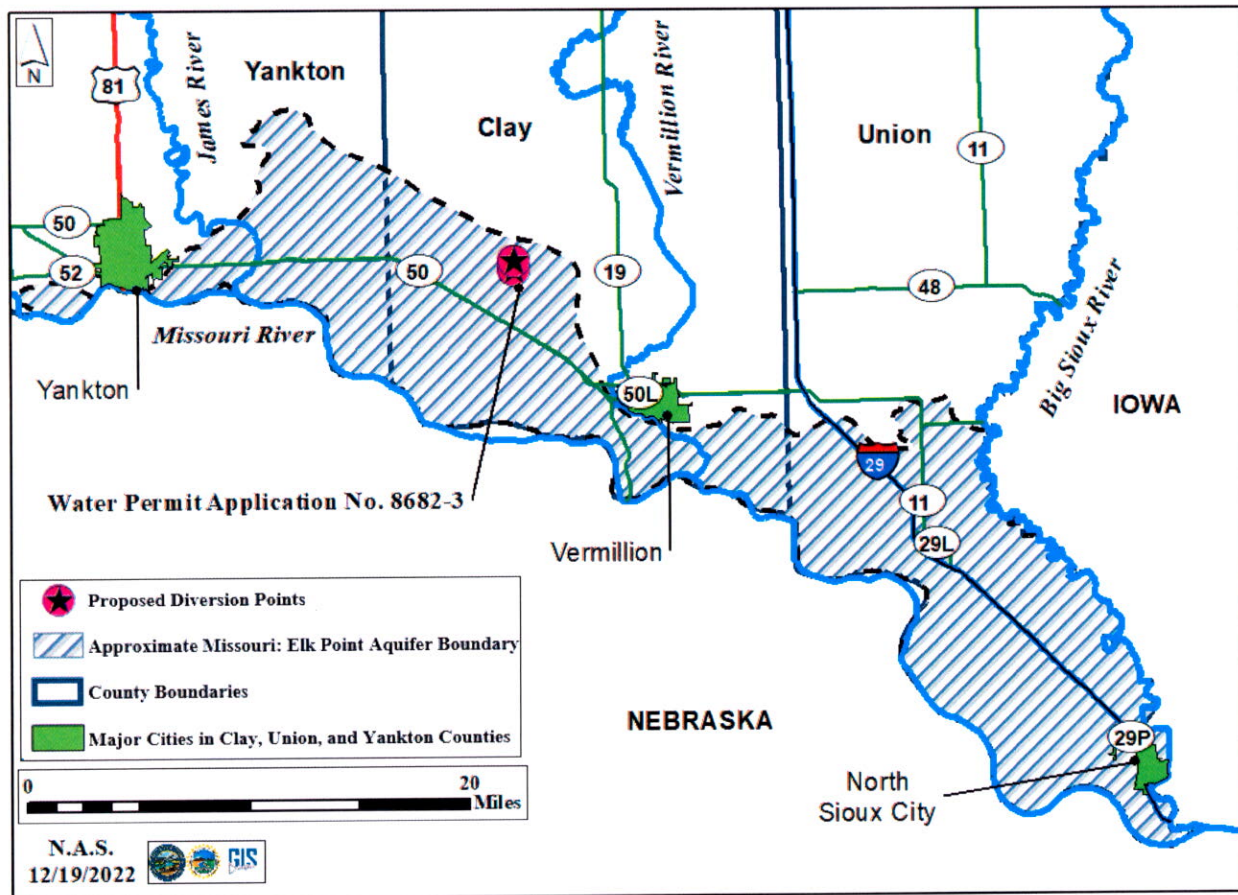


Figure 1. Map of the approximate Missouri: Elk Point aquifer boundary modified from Hedges and others (1982) with the location of the existing wells proposed to be used by Water Permit Application No. 8682-3 (Water Rights, 2023c)

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

Pursuant to SDCL 46-2A-9, “A permit to appropriate water may be issued only if there is a reasonable probability that there is unappropriated water available for the applicant’s proposed use, that the diversion point can be developed without unlawful impairment of existing domestic water uses and water rights, and that the proposed use is a beneficial use and in the public interest as it pertains to matters of public interest within the regulatory authority of the Water

Management Board as defined by SDCL 46-2-9 and 46-2-11.” This report will address the availability of unappropriated water and the potential for unlawful impairment of existing domestic water uses and water rights within the Missouri: Elk Point aquifer.

WATER AVAILABILITY:

Water Permit Application No. 8682-3 proposes to appropriate water from the Missouri: Elk Point aquifer. The probability of unappropriated water being available from the 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. An application may be approved, however, for withdrawals of groundwater from any groundwater formation older than or stratigraphically lower than the greenhorn formation in excess of the average estimated annual recharge for use by water distribution systems.” The Missouri: Elk Point aquifer is not older than or stratigraphically lower than the Greenhorn Formation (Fahrenbach et al., 2010), and the applicant’s proposed use is not for use in a water distribution system as defined by SDCL 46-1-6(17). Therefore, the average annual recharge and average annual withdrawal rates to and from the Missouri: Elk Point aquifer must be considered.

HYDROLOGIC BUDGET:

Recharge

Recharge to the Missouri: Elk Point aquifer is primarily through the infiltration of precipitation where the aquifer is at or near the ground surface, seepage from the Big Sioux, James, Missouri, and Vermillion Rivers, inflow from the Lower Vermillion-Missouri aquifer at the northern boundary of the Missouri aquifer and inflow from the Big Sioux aquifer at the extreme northeastern boundary of the Missouri aquifer, and from the underlying Dakota aquifer in Union County (Condley and Lamkey, 2022; Niehus, 1994 and 1997).

Using observation well analysis, Hedges and others (1985) estimated a recharge rate to the Missouri: Elk Point aquifer of approximately 3.8 inches per year. The Elk Point management unit is estimated to underly approximately 219,100 acres (Hedges et al, 1982); therefore, the average annual recharge rate of the Missouri: Elk Point aquifer is approximately 69,382 acre-feet per year. The data used for observation well analysis represents both withdrawals from and recharge to the aquifer simultaneously. When recharge is greater than discharge, this method produces a lower than actual recharge rate. And when discharge is greater than recharge, the calculated discharge rate is lower than the actual discharge rate.

Stephens (1967) noted that pumping of the Missouri: Elk Point aquifer will induce recharge from the Missouri River. Stonesifer (2013) estimated that the Missouri River contributed 22,582 acre-feet per year of recharge induced from the pumping operation at Lewis and Clark Regional Water System (RWS). This estimate is based off inducing at least 50% recharge of the water pumped at full development of the existing and future use permits held by Lewis and Clark RWS.

Recently, the South Dakota Geological Survey (SDGS) conducted a study to more accurately quantify the percentage of induced recharge from the Lewis and Clark RWS wellfield (Condley and Lamkey, 2022). A numerical model was created to determine the source water, either groundwater or induced river water, for each well of the 11 wells in existence during the model period (Condley and Lamkey, 2022). A 31-day and a 365-day model run were conducted. During the 31-day model run, it was determined 71.1% of the water that would be pumped from the wells is river water. During the 365-day run, it was determined 84.6% of the water pumped from the well field was river water. The capture zone for the 365-day model run did not extend more than one mile from the river. Currently, Lewis and Clark RWS is permitted to pump 45,165 acre-feet per year and has a pending application (No. 8614-3) proposing to authorize pumping 8,277 acre-feet per year for a total of 53,442 acre-feet per year (Water Rights, 2023c). Assuming the 84.6% capture, that equates to 45,211.9 acre-feet per year captured as induced recharge from the Missouri River (Mathiowetz, 2022).

Furthermore, the City of Yankton contracted with HDR Engineering to conduct a study for siting a collector well to be authorized under Water Right No. 8212-3 (Water Rights, 2023c). Part of the study was determining the water quality which included trying to determine the source water supply, induced Missouri River water or groundwater from the Missouri: Elk Point aquifer. While the amount of induced surface water was not modeled, it was estimated that induced surface water to the well would be in the range of 40% to 90% (HDR, 2014). This estimate is supported by Condley and Lamkey's (2022) study on the Lewis and Clark RWS wellfield. Additionally, there are municipal and irrigation water rights/permits that are authorized to divert water from the Missouri: Elk Point aquifer within approximately one mile of the Missouri River that are likely inducing recharge from the river (Water Rights, 2023c). There may also be induced recharge from the James, Vermillion, and Big Sioux Rivers. These have yet to be quantified and would likely be very small compared to the induced recharge from the Missouri River (Mathiowetz, 2022).

Combining, the recharge rate from Hedges and others (1985) determined through observation well analysis (69,382 acre-feet per year) and the induced recharge from the Lewis and Clark RWS well field (Condley and Lamkey, 2022; Water Rights, 2023c), assuming full development of the Lewis and Clark RWS current water rights/permits, future use permits, and their pending Application No. 8614-3, (all totaling 45,211.9 acre-feet per year), equates to an estimated average annual recharge rate of 114,593.9 acre-feet per year (Mathiowetz, 2022).

Discharge

Discharge from the Missouri: Elk Point aquifer is primarily through well withdrawals, evapotranspiration where the aquifer is at or near the ground surface, outflow to the Big Sioux and Missouri Rivers during periods of low flow and stage, and leakage to the underlying Dakota aquifer (Niehus, 1994 and 1997; Water Rights, 2023c).

Currently, there are 629 water rights/permits authorized to appropriate water from Missouri: Elk Point aquifer, plus three pending applications – Water Permit Application No. 8673-3 requesting to irrigate 132 acres in Clay County, Water Permit Application No. 8674-3 requesting to irrigate

58.14 acres in Union County, and Water Permit Application No. 8614-3, applied for by Lewis & Clark RWS, requesting to appropriate up to 8,277 acre-feet per year (Water Rights, 2023c).

Additionally, there are five future use permits (Nos. 5832-3, 6237-3, 6869-3, 6869A-3, and 7208-3) reserving 1,900 acre-feet of water annually from the Missouri: Elk Point aquifer (Water Rights, 2023c). For the purpose of estimating average annual withdrawals, the future use permits are assumed to be fully developable for a total of 1,900 acre-feet per year.

Table 1 summarizes the 42 non-irrigation water rights/permits (including two irrigation water permits, see paragraph below) authorized to appropriate water from the Missouri: Elk Point aquifer with the estimated annual use for each water right/permit as determined by their limiting diversion rate or annual volume. Historically, average water use by non-irrigation appropriations limited by an instantaneous diversion rate have been assumed to be pumping 60% of full time at the respective permitted diversion rate. Water rights/permits limited by an annual volume are assumed to withdraw their entire respective annual volume limitation. This is a standard method used by the DANR-Water Rights Program for estimating annual withdrawals by non-irrigation appropriations from an aquifer (Water Rights, 2023c).

Water Permit No. 5998-3 is permitted for turf irrigation and Water Permit No. 5998A-3 extends the amount of time allowed for water to be put to beneficial use as authorized by Water Permit No. 5998-3 (Water Rights, 2023c). The estimated use for these two irrigation permits is included with the non-irrigation water rights/permits listed on Table 1, as the permit holder is not required to submit an annual irrigation questionnaire. However, Water Permit No. 5998-3 is authorized for use in a rural water system and the permit holder reports the annual use by Water Permit No. 5998-3 with their other rural water system Missouri: Elk Point aquifer permits, listed on Table 2 (Water Rights, 2023c).

Three municipal water rights were identified as being connected to a rural water system and likely maintain their wells for standby purposes (Drinking Water Program, 2023; Water Rights, 2023c); as such, the average annual water use for these water rights has been estimated to be zero acre-feet per year on Table 1.

Water Permit No. 7059-3 is permitted for recreational use for maintaining the water level of a small lake with a surface area of 17.6 acres (Water Rights, 2023c). It is assumed that the only consumptive use of this water is due to evaporation (Water Rights, 2023c). Annual evaporation of water from shallow lakes is estimated to be approximately 42 inches per year at the location of the authorized diversion point for Water Permit No. 7059-3 (NOAA, 1982), and average annual total precipitation at the Sioux City, Iowa airport was determined to be approximately 29.27 inches over the 30-year period of record (1991 to 2020) (Arguez et al., 2020), which results in the lake to fluctuate approximately 12.73 inches per year. To maintain the water level of the small lake, the estimated use of Water Permit No. 7059-3 is approximately 18.7 acre-feet per year.

Overall, the average annual withdrawal rate for the 42 non-irrigation water rights/permits (including the two irrigation permits not required to submit an annual irrigation questionnaire)

authorized to appropriate water from the Missouri: Elk Point aquifer is approximately 62,371 acre-feet per year (Table 1) (Water Rights, 2023c and 2023f).

Table 1. Estimated annual use for the non-irrigation water rights/permits (plus two irrigation water permits) authorized to divert water from the Missouri: Elk Point aquifer (Drinking Water Program, 2023; Water Rights, 2023c and 2023f)

Permit No.	Name	Status	Priority Date	Use	Authorized Diversion Rate (cfs)	Authorized Annual Volume (acre-feet/year)	Total Estimated Use (acre-feet/year)
4501-3	Eddie Wohl	LC	03/27/1980	COM	0.05		21.7
5616-3	Cimpls Inc	LC	01/31/1992	COM	0.44		191.3
5827-3	Don Lantis	LC	06/08/1994	COM	0.022		9.6
5953-3	H & K Oil Co	LC	08/19/1996	COM	0.037		16.1
6151-3	Vernon & Norma Vakoc	LC	10/04/1999	COM	0.67		291.2
6580-3	West Shores Acres LLC	LC	01/28/2005	COM	0.10		43.5
8031-3	Dakota Protein Conversion Inc	PE	06/18/2014	COM	0.22		96
8147-3	Doug Lafleur	PE	04/06/2015	COM, LCO	1.0	160	160
8381-3	RP Constructors	PE	11/19/2018	COM	0.04	1	1
8403-3	Stockmen's Livestock Inc	PE	06/27/2019	COM	2.0	40	40
8415-3	RC Investments Inc	PE	11/14/2019	COM	0.10	25	25
8435-3	Sioux City Insulation	PE	07/30/2012	COM	0.33	1	1
6744-3	Judith I Grant	PE	07/24/2006	DOM, COM	0.78		339
7388-3	Clay RWS Inc	PE	07/30/2012	DOM, IRR	2.0		346.2
5998-3	Clay RWS Inc	PE	04/21/1997	IRR, DOM	2.2		
5998A-3	Clay RWS Inc	PE	04/21/1997	IRR, DOM	0.0		
5490-3	USGS CERC Field Research Station	LC	11/15/1990	FWP	0.09		39.1
5907-3	US Fish and Wildlife Service	LC	01/26/1996	FWP	3.78		1,643
6733-3	US Fish and Wildlife Service	LC	06/07/2006	FWP	1.11		482.5
7094-3	US Fish and Wildlife Service	LC	12/01/2008	FWP	2.67		1,160.6
5021-3	Vishay-Dale Electronics Inc	LC	05/04/1984	IND	0.10		43.5
5388-3	LG Everist Inc	LC	01/30/1990	IND	0.45		195.6
5453-3	AaLadin Industries Inc	LC	05/24/1990	IND	0.05		21.7
5593-3	Vishay-Dale Electronics Inc	LC	10/31/1991	IND	0.056		24.3
6170-3	Concrete Materials	LC	01/03/2000	IND	0.222		96.5
1255-3	City of Elk Point	LC	01/01/1914	MUN	1.13		491.2
143-3	City of Vermillion	LC	01/21/1956	MUN	1.78		773.7
147-3	City of Vermillion	LC	01/01/1935	MUN	2.66		1,237
6236-3	City of Vermillion	LC	11/06/2000	MUN	2.6	1,161	
6354-3	City of Vermillion	LC	08/12/2002	MUN	0.022		9.6
1965-3	Town of Gayville	LC	01/01/1914	MUN	0.37		0*
4207-3	Town of Jefferson	LC	01/01/1916	MUN	0.90		391.2
5118-3	Town of Gayville	LC	01/28/1987	MUN	0.33		0*
5437-3	Dakota Dunes Community Improvement District	LC	04/12/1990	MUN	3.33		2,412
5782-3	City of North Sioux City	LC	08/12/1993	MUN	1.14		495.5
8212-3	City of Yankton	LC	03/25/2016	MUN	20.12	6,050	6,050
7059-3	WE Investments LLC	PE	08/28/2008	REC	3.11		18.7
6736-3	Lewis and Clark RWS	PE	07/08/1994	RWS	27.85	20,165	45,165
7207-3	Lewis and Clark RWS	PE	07/08/1994	RWS	20	12,000	
8613-3	Lewis and Clark RWS	PE	07/16/2007	WDS	29.8	13,000	
5581-3	Larson's Landing	LC	07/30/1991	SHD	0.089		38.7
5592-3	East Winds Court Inc	LC	10/09/1991	SHD	0.11		0*
						TOTAL:	62,371

*Identified as being connected to a RWS

COM: Commercial; DOM: Domestic; FWP: Fish and Wildlife Propagation; IND: Industrial; IRR: Irrigation; LCO: Livestock Confinement Operation; MUN: Municipal; REC: Recreation; RWS: Rural Water System; SHD: Suburban Housing Development

Of the 42 non-irrigation water rights/permits (including the two irrigation permits not required to submit an annual irrigation questionnaire), there are 15 non-irrigation water rights/permits that are required to report their annual usage from the Missouri: Elk Point aquifer (Water Rights, 2023c and 2023f).

Three of the non-irrigation water rights/permits that are required to report (Nos. 8031-3, 8415-3, and 8435-3) are currently under development and have not reported any withdrawals from the Missouri: Elk Point aquifer to the DANR-Water Rights Program (Water Rights, 2023c). The remaining twelve non-irrigation water rights/permits that are required to report their annual usage from the Missouri: Elk Point aquifer are shown on Table 2 (Water Rights, 2023c and 2023f). The reported usage (as shown on Table 2) for Permit Nos. 8381-3 and 8403-3 (approved in 2018 and 2019) is not necessarily reflective of the future usage of these permits based on information within their respective water permit files (Water Rights, 2023c), and only three years of reported withdrawals (Water Rights, 2023f). Therefore, the estimated use for Permit Nos. 8031-3, 8415-3, 8435-3, 8381-3, and 8403-3 will be based on the method used above: water rights/permits limited by an instantaneous diversion rate have been assumed to be pumping 60% of full time at the respective permitted diversion rate; water rights/permits limited by an annual volume are assumed to withdraw their entire respective annual volume limitation. The estimated average annual withdrawal rate for these permits is listed on Table 1.

Next, the reported use for the City of Yankton (8212-3) and Lewis and Clark RWS (6736-3, 7207-3, and 8613-3) (as shown on Table 2) is steadily increasing (Water Rights, 2023f), as these water users are continually undergoing development (Water Rights, 2023c). It is likely these water users will use up to their entire respective annual volume limitation in the future; therefore, the average annual withdrawal rate for these water rights/permits is assumed to be their entire respective annual volume listed on Table 1 (Water Rights, 2023c).

The annual withdrawal rate for Clay RWS Inc (Permit Nos. 5998-3, 5998A-3, and 7388-3) averaged over the last ten years (approximately 346 acre-feet per year) is more reflective of current usage than the entire period of record of reported withdrawals because the first few years the permit holder reported values were during a construction period. The average annual withdrawal rate based off the reported annual withdrawal rates averaged from 2012 to 2021 on Table 2 for these water permits will be used in this analysis.

Lastly, the annual withdrawal rates for Doug Lafleur (8147-3) and City of Vermillion (147-3, 6236-3) on Table 2 are relatively steady over their respective periods of record (Water Rights, 2023c and 2023f); therefore, the average annual withdrawal rate based on the reported values from each of these water users (as shown on Table 2) is reasonably reflective of the future withdrawals likely to be made by these appropriative users. The average annual withdrawal rate based off the reported annual withdrawal rates averaged over the period of record on Table 2 for these water rights/permits will be used in this analysis.

Table 2. Non-irrigation water rights/permits required to report their respective annual use from the Missouri: Elk Point aquifer (Water Rights, 2023c and 2023f)

	RP Constructors	Stockmen's Livestock Inc	Clay RWS Inc	Doug Lafleur	City of Vermillion	City of Yankton	Lewis and Clark RWS
	8381-3	8403-3	5998-3, 5998A-3, 7388-3	8147-3	147-3, 6236-3	8212-3	6736-3, 7207-3, 8613-3
2003			238		1,363		
2004			483		1,226		
2005			21		1,247		
2006			170		1,252		
2007			217		1,344		0
2008			213		1,199		0
2009			215		1,140		0
2010			183		1,071		0
2011			137		1,127		92
2012			525		1,317		3,836
2013			301		1,183		9,368
2014			307		1,121		11,532
2015			278	202	1,161		15,591
2016			231	202	1,175	66	17,091
2017			276	202	1,215	531	18,051
2018			305	98	1,168	504	18,143
2019	0.0171	1	292	135	1,440	1,370	20,397
2020	0.0224	4.2	461	121	1,373	2,923	21,039
2021	0.2332	5.5	486	170	1,378	3,065	23,537
Max	0.2	5.5	525	202	1,440	3,065	23,537
Min	0.0171	1	21	98	1,071	66	0
Avg	0.091	3.57	281	162	1,237	1,410	14,425*
RWS: Rural Water System *Excluded reported zero values							

Currently, there are 589 irrigation water rights/permits authorized to appropriate water from the Missouri: Elk Point aquifer, plus two pending applications – Water Permit Application No. 8673-3 requesting to irrigate 132 acres in Clay County and Water Permit Application No. 8674-3 requesting to irrigate 58.14 acres in Union County (Water Rights, 2023c). Irrigation water rights/permits have been typically required to report their annual usage on an irrigation questionnaire since 1979. The estimated average annual withdrawal rate for the Missouri: Elk Point aquifer irrigation water rights/permits that have reported over the period of record is approximately 18,703 acre-feet per year (Table 3) (Water Rights, 2023a). To reflect the current development of irrigation water rights/permits more accurately, the average annual withdrawal rate for irrigation appropriations that have reported from 2012 to 2021 is approximately 27,247 acre-feet per year (Table 3) (Water Rights, 2023a).

The usage for two irrigation water permits (Nos. 5998-3 and 5998A-3) was accounted for on Table 1 with the non-irrigation water rights/permits, as the permit holder is not required to submit an annual irrigation questionnaire (Water Rights, 2023c), resulting in only 587 of the Missouri: Elk Point aquifer irrigation water rights/permits being currently required to submit an annual irrigation questionnaire (Water Rights, 2023c).

Additionally, Water Right No. 6110-3 is authorized to divert water from a well completed into the Dakota aquifer and pump the water into two ponds that receive incidental surface runoff and possible groundwater inflow from the Missouri: Elk Point aquifer (Water Rights, 2023c). Water Right No. 6110-3 is included in the 589 irrigation water rights/permits authorized to appropriate water from the Missouri: Elk Point aquifer; however, the estimated use for this permit is assumed to be negligible to the overall hydrologic budget due to the minimal amount of water from the Missouri: Elk Point aquifer the permit holder is expected to withdraw. When omitting Water Right No. 6110-3 and Water Permit Nos. 5998-3 and 5998A-3 from this analysis of Missouri: Elk Point aquifer irrigation water rights/permits, 586 water rights/permits remain.

Table 3 lists only 572 water rights/permits as reporting in 2021 (Water Rights, 2023a and 2023c). These 572 water rights/permits listed as reporting in 2021 includes eight water rights/permits (Nos. 3722-3, 5658A-3, 6940-3, 6941-3, 7066-3, 7447-3, 7663-3, and 7800-3) that were incorporated into another water right or cancelled in 2022 (Water Rights, 2023c), resulting in only 564 of the water rights/permits listed as reporting in 2021 being currently active.

Twenty-two water permits/rights did not submit an irrigation questionnaire form in 2021 that are currently active, accounting for the difference between the 564 currently active water rights/permits listed as reporting in 2021 and the 586 irrigation water rights/permits currently required to submit an annual irrigation questionnaire and annual use being estimated in this analysis (Water Rights, 2023a and 2023c). Of these 22 permits, 19 were issued in 2021 or 2022 and have not submitted an irrigation questionnaire at this time. Of the remaining three water rights (Nos. 3154-3, 4745-3, and 5935-3), Water Right No. 5935-3 is not required to submit an irrigation questionnaire and Water Right Nos. 3154-3 and 4745-3 did not submit an irrigation questionnaire in 2021 for an unknown reason. Overall, these 22 water permits/rights are authorized to irrigate approximately 2,405 acres (Water Rights, 2023c).

Table 3. Reported historic irrigation use from Missouri: Elk Point aquifer (Water Rights, 2023a)

Year	No. of Permits Reporting	Reported Pumpage (acre-feet)
1979	259	10,258
1980	263	14,937
1981	297	13,931
1982	269	19,143.1
1983	273	11,081
1984	281	9,605.5
1985	282	14,020.7
1986	286	6,324.8
1987	281	13,369
1988	282	28,558.1
1989	292	25,904.3
1990	297	19,508
1991	300	18,877.7
1992	295	1,895
1993	298	1,475.2
1994	295	10,314.9
1995	292	18,761.3
1996	296	9,473.6
1997	305	17,236
1998	313	11,079.5
1999	308	14,877
2000	309	26,551
2001	313	19,115.2
2002	315	23,326.9
2003	314	27,007
2004	322	24,309
2005	335	24,206.1
2006	353	27,943.3
2007	366	30,652
2008	396	16,439
2009	410	6,346
2010	419	2,906.9
2011	431	12,330
2012	445	56,994.7
2013	543	35,090.5
2014	557	12,423.5
2015	563	17,884.1
2016	564	27,869.3
2017	567	37,209.9
2018	570	9,160.7
2019	575	8,736.3
2020	570	26,601
2021	572	40,503.4
Min	259	1,475.2
Max	575	56,994.7
Avg (1979 to 2021)	369	18,703
Avg (2012 to 2021)	553	27,247

Farmer (2018a, 2018b, and 2021) analyzed the amount of water pumped per permitted acre for the period from 1979 to 2005. This period was chosen due to the relatively stable number of permitted acres across the entire period. There was a continual annual increase in the number of permitted acres from 2006 to 2013/2014. Since 2013/2014 the total number of permitted acres has been relatively stable (Mathiowetz, 2022; Water Rights, 2023c). Farmer (2021) determined that it would be best to separate the review of pumpage per permitted acres between crops, such as corn and soybeans, and turf, such as golf courses and lawn irrigation, to describe the pumpage more accurately per permitted acres. Turf irrigation typically requires more water per acre annual than crop irrigation. Mathiowetz (2022) determined over the entire period of record (1979 through 2021), the crop application rate per permitted acre is 0.331 feet per year (3.97 inches per year), and 0.908 feet per year for turf (10.9 inches per year) (Water Rights, 2023a and 2023c).

Currently, there are approximately 82,086.46 acres authorized to be irrigated from the Missouri: Elk Point aquifer (plus two pending irrigation applications – Water Permit Application No. 8673-3 requesting to crop irrigate 132 acres and Water Permit Application No. 8674-3 requesting to crop irrigate 58.14 acres), with approximately 809.6 of those acres authorized for turf irrigation (Water Rights, 2023c). Table 4 contains the turf irrigation permits with their respective authorized permitted acres and an estimated average annual use based on Mathiowetz’s (2022) application rate (Water Rights, 2023c). By multiplying the application rate of 0.908 feet per year (Mathiowetz, 2022) by the 809.6 acres being turf irrigated (Water Rights, 2023c), the annual use for turf irrigation yields approximately 735.1 acre-feet per year (Table 4). By multiplying the application rate of 0.331 feet per year (Mathiowetz, 2022) by the 81,276.86 (total acres minus turf irrigated acres) acres being crop irrigated (Water Rights, 2023c), plus the pending applications – Water Permit Application No. 8673-3 requesting to crop irrigate 132 acres and Water Permit Application No. 8674-3 requesting to crop irrigate 58.14 acres, the annual use for crop irrigation yields approximately 26,966 acre-feet per year. Collectively, the average annual use from the Missouri: Elk Point aquifer for both crop and turf irrigation water rights/permits utilizing Mathiowetz’s (2022) application rate is approximately 27,701 acre-feet per year.

Table 4. Water rights/permits authorized for irrigation of turf (Water Rights, 2023c)

Permit No.	Name	Status	County	Acres	Total Estimated Use (acre-feet/year)
1294-3	Recreation Development Assn. Inc.	LC	Union	102	92.6
2011-3	TR Golf LLC	LC	Union	95	86.3
5786-3	Dakota Dunes Golf Course	LC	Union	173	157.1
5998-3	Clay Rural Water System Inc	PE	Union	300	272.4
5998A-3	Clay Rural Water System Inc	PE	Union	0	0
5935-3	Ted Waitt	LC	Union	1	0.908
5936-3	Applied Engineering	LC	Yankton	1.8	1.6
8010-3	Ryan Rusher	LC	Yankton	2.5	2.3
8029-3	Dakota Dunes Comm Improvement District	PE	Union	17.8	16.2
8040-3	Heine Electric & Irrigation Inc	LC	Clay	1	0.908
8354-3	TR Golf LLC	PE	Union	30	27.24
8407-3	Gayville-Volin School District 63-1	LC	Yankton	4.5	4.1
8530-3	National Field Archery Association Foundation	LC	Yankton	16	14.5
8560-3	TR Golf LLC	PE	Union	65	59
TOTAL:				809.6	735.1

There are domestic wells completed into the Missouri: Elk Point aquifer that do not require a water right/permit, so the withdrawal amount from those wells is unknown (Water Rights, 2023d). Due to their relatively low diversion rates, withdrawals from domestic wells are not considered to be a significant portion of the hydrologic budget. Additionally, with the development of rural water systems in areas where the Missouri: Elk Point aquifer is the uppermost aquifer available; it is likely some domestic users may have transitioned to rural water. Therefore, the quantity of water withdrawn by domestic wells is estimated to be negligible to the hydrologic budget for the Missouri: Elk Point aquifer.

Hydrologic Budget Summary

The average annual recharge rate to the Missouri: Elk Point aquifer is approximately 114,593.9 acre-feet per year. The average annual withdrawal rate for the water rights/permits authorized to appropriate water from the Missouri: Elk Point aquifer totals approximately 100,256 acre-feet per year (including the estimated use for Water Permit Application No. 8682-3, if approved) (listed on Table 5). Based on the hydrologic budget, there is a reasonable probability unappropriated water is available from the Missouri: Elk Point aquifer for the proposed appropriation.

Table 5. Estimated use from Missouri: Elk Point aquifer (Water Rights, 2023a, 2023c, and 2023f)

Type of Water Right/Permit	Estimated Use (acre-feet/year)
Future Use Reservations	1,900
Non-Irrigation	62,371
Pending Application No. 8614-3 (Lewis and Clark Regional Water System)	8,277
Irrigation (Mathiowetz's (2022) turf and crop application rates) including pending applications: No. 8673-3 and 8674-3	27,701
Application No. 8682-3 (if approved, assuming Mathiowetz's (2022) crop application rate of 0.331 per acre)	7.0
TOTAL:	100,256

OBSERVATION WELL DATA:

Administrative Rule of South Dakota (ARSD) 74:02:05:07 requires that the Water Management Board shall rely upon 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 average annual recharge of the aquifer.

Observation wells provide data on how the aquifer reacts to regional climatic conditions and local pumping. The DANR-Water Rights Program monitors 36 observation wells completed into the Missouri: Elk Point aquifer (Water Rights, 2023b). The three closest observation wells to the wells the applicant proposes to use are CL-80A (approximately 0.4 miles northeast), CL-80B (approximately 6.4 miles southwest), and YA-80KA (approximately 7.6 miles southwest) (Water Rights, 2023b). The hydrographs for these observation wells are displayed in Figures 2 to 4 (Water Rights, 2023b). The data points utilized to construct the hydrographs are measurements of the static water level in the observation wells from the top of the well casing. It is worth noting the hydrograph titles display DENR Water Rights Observation Well on the hydrographs when the titles should display DANR Water Rights Observation Well on the hydrographs.

The hydrographs for the observation wells display generally stable water levels over their respective periods of record. The hydrographs for the Missouri: Elk Point aquifer indicate that the aquifer responds well to climatic conditions because water levels are rising during wetter periods (early spring snowmelt and precipitation) and declining to a stable water level during drier periods. Additionally, the water levels in the observation wells display that the amount of recharge to and natural discharge from the aquifer greatly exceeds pumping with the aquifer returning to pre-pumping conditions between irrigation seasons. Aquifer recovery indicates that climatic conditions and therefore, the effects of recharge to and natural discharges from the aquifer govern the long-term fluctuations of water levels in the aquifer rather than the impacts of pumping from the Missouri: Elk Point aquifer. By recognizing that both recharge to and natural discharge from an aquifer can be captured for pumping, the observation well hydrographs demonstrate unappropriated water is available for the proposed appropriation.

Several of the Missouri: Elk Point aquifer observation well hydrographs show a gradual long-term downward trend especially those close to the Missouri River. This downward trend is caused by entrenchment of the Missouri River riverbed and in some places a widening of the channel leading to lower water levels despite the river having the same rate of flow (Elliott and Jacobson, 2022). The lowering of the water level in the Missouri River downstream of the Gavins Point dam and the subsequent lowering of the water level of Missouri: Elk Point aquifer observation wells in close proximity to the river show the strong hydrologic connection between the Missouri River and the Missouri: Elk Point aquifer. This is demonstrated by the very similar water levels between the aquifer and river as shown in the hydrographs in Figures 2 to 7. The lowering of the water levels in the aquifer, especially in close proximity to the Missouri River, is not a sign of over appropriation of the Missouri: Elk Point aquifer. The observation well water levels simply show the connection between the river and the aquifer and how the aquifer reacts to climatic conditions without showing any long-term effects from pumping. Therefore, there is a reasonable probability unappropriated water is available for this proposed appropriation.

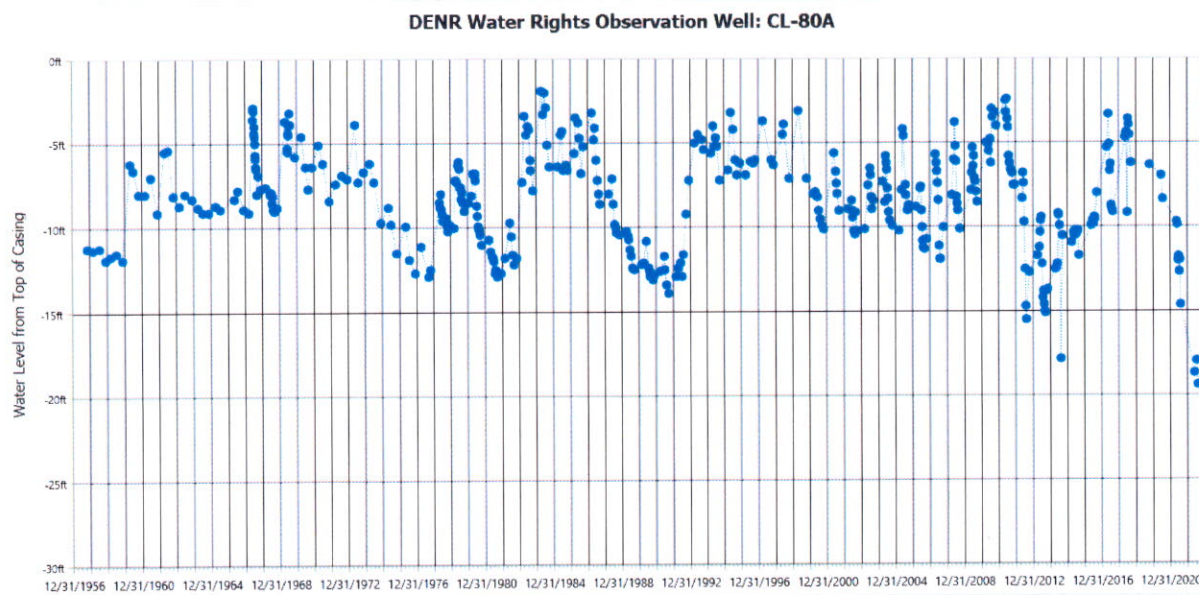


Figure 2. Hydrograph for observation well CL-80A (Water Rights, 2023b)

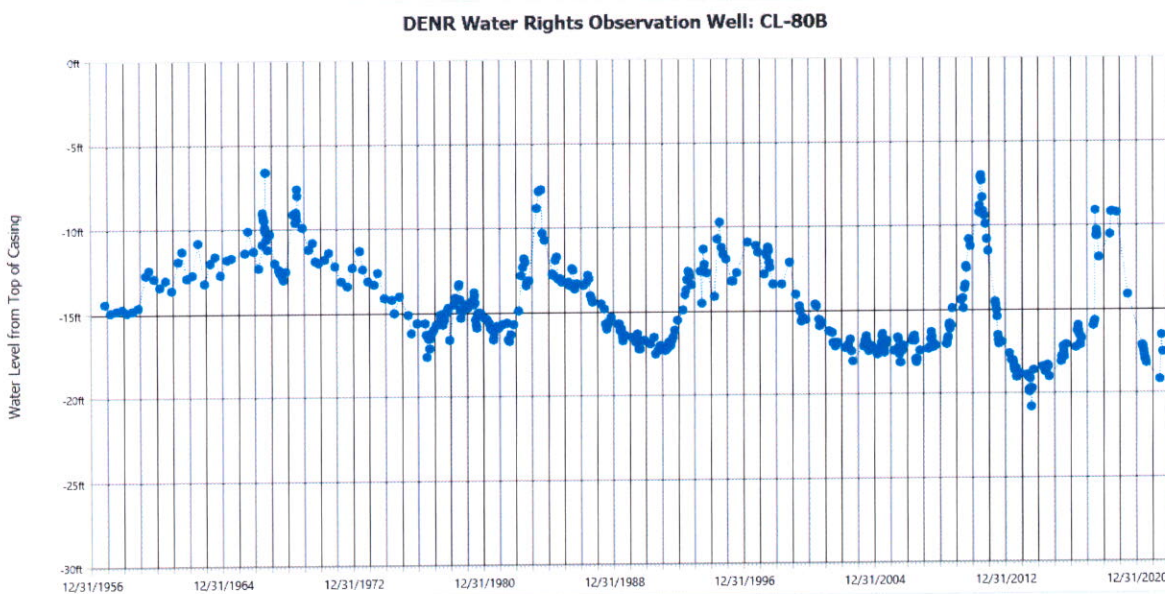


Figure 3. Hydrograph for observation well CL-80B (Water Rights, 2023b)

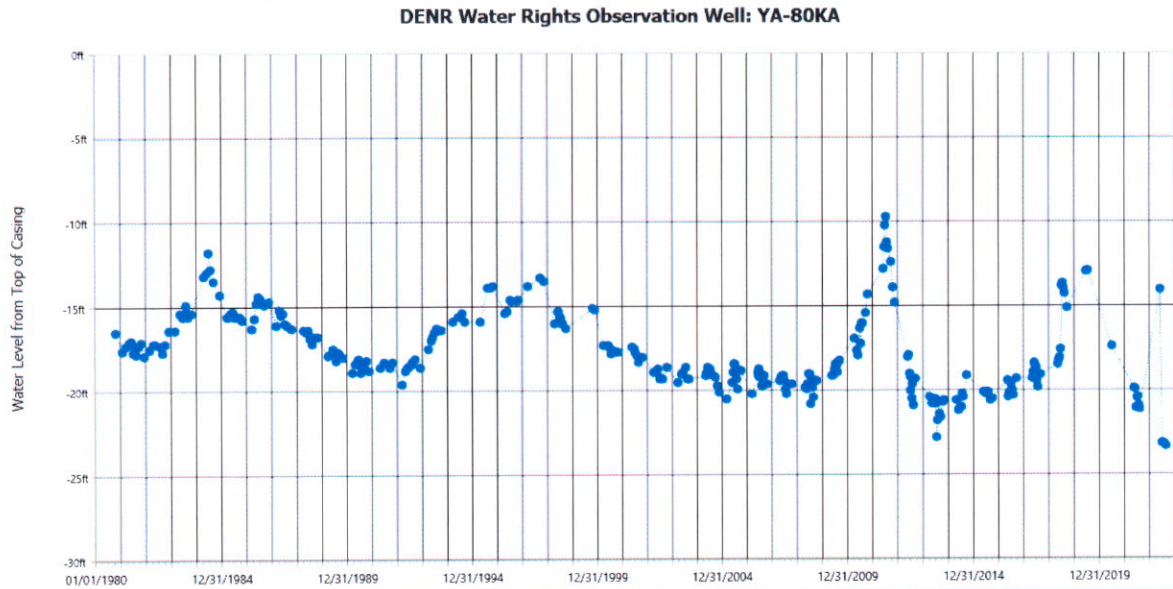


Figure 4. Hydrograph for observation well YA-80KA (Water Rights, 2023b)

The United States Geological Survey (USGS) maintains Stream Gage #06467500, located on the Missouri River at Yankton, SD, and the hydrographs for this gage are shown in Figures 5 to 7 (USGS, 2022). By comparing the hydrographs for Stream Gage #06467500 to the observation well hydrographs of the Missouri: Elk Point aquifer (Figures 2 to 4), both show the river and aquifer react to climatic conditions by rising and falling over similar trends (USGS, 2022; Water Rights, 2023b). Additionally, during flood events (such as, the years 2011 and 2019), the water level in the Missouri: Elk Point aquifer, especially where in closer proximity to the Missouri River, rises very quickly beyond what is typically seen for glacial outwash aquifers (Water Rights, 2023b). This indicates there is a hydraulic connection between the Missouri: Elk Point aquifer and the Missouri River. Therefore, when the elevation of the water in the Missouri River is higher than the elevation of water in the aquifer, the river will recharge the aquifer. In contrast, when the elevation of water is higher in the Missouri: Elk Point aquifer, the aquifer naturally discharges to the Missouri River.

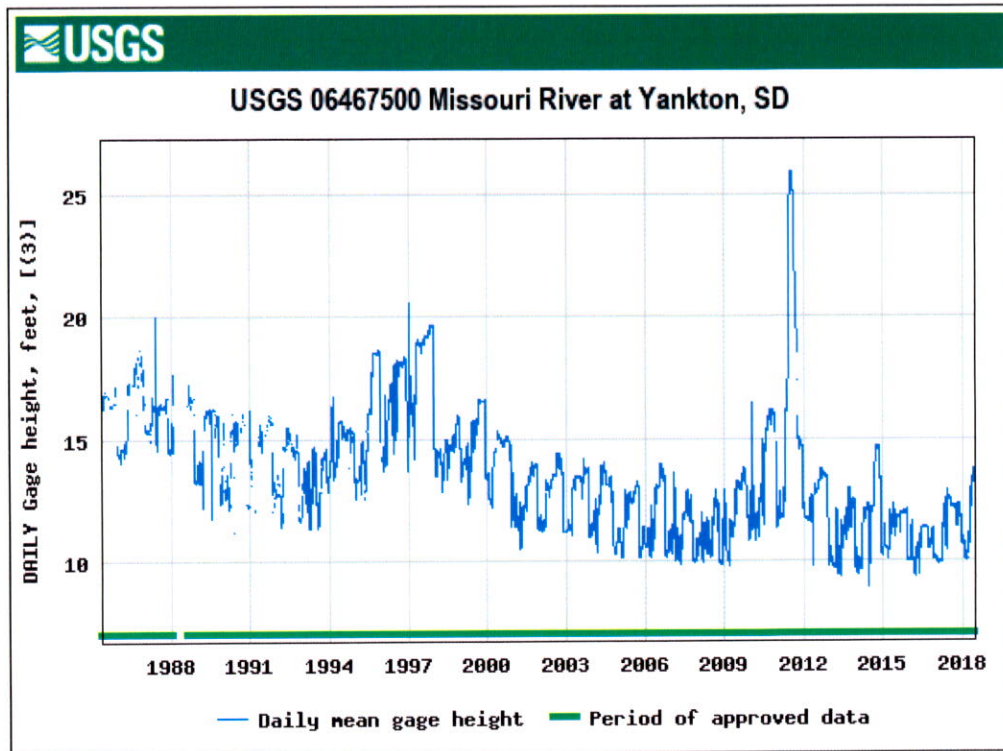


Figure 5. Hydrograph for USGS Stream Gage #06467500 Missouri River at Yankton, SD from 1985 to 2018 (USGS, 2022)

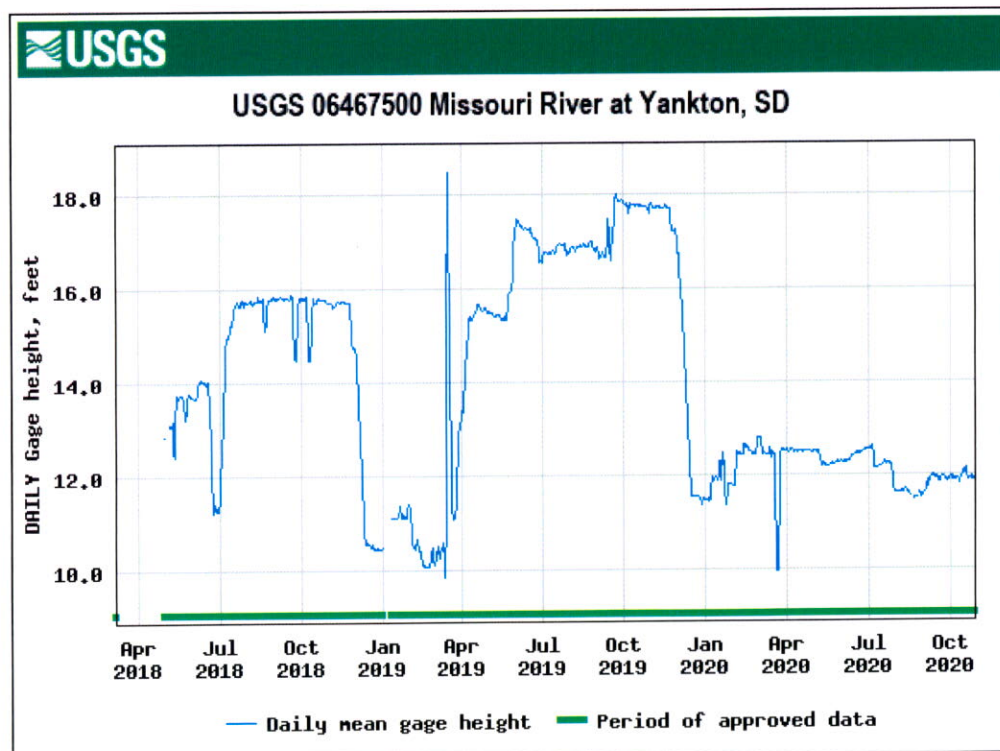


Figure 6. Hydrograph for USGS Stream Gage #06467500 Missouri River at Yankton, SD from 2018 to 2020 (USGS, 2022)

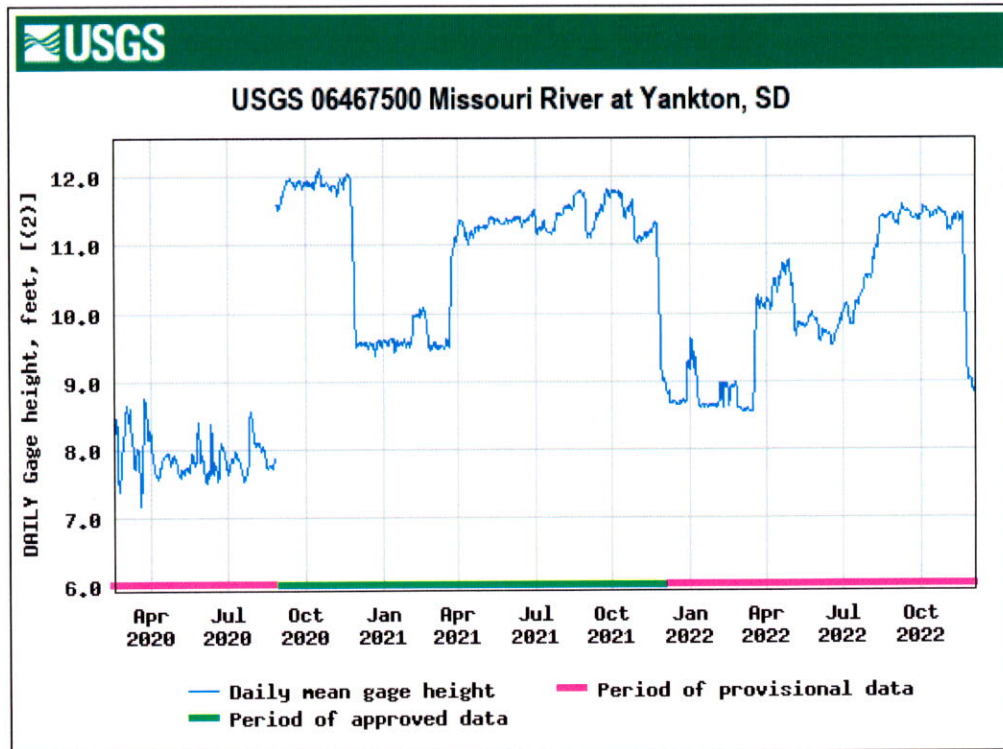


Figure 7. Hydrograph for USGS Stream Gage #06467500 Missouri River at Yankton, SD from 2020 to 2022 (USGS, 2022)

POTENTIAL FOR UNLAWFUL IMPAIRMENT OF EXISTING WATER RIGHTS:

Currently, there are 629 water rights/permits authorized to appropriate water from Missouri: Elk Point aquifer, plus three pending applications – Water Permit Application Nos. 8614-3, 8673-3 and 8674-3 (Water Rights, 2023c). The closest water rights/permits to the existing wells are Water Right Nos. 6901A-3, 6647-3, and 7899-3 which are held by Jeff Dreesen, Freeburg Limited Partnership, and Justin Orr (Water Rights, 2023c). The diversion points for Water Right Nos. 6901A-3, 6647-3, and 7899-3 are located approximately 0.5 miles north, south, and west (depending on which water right) of the existing wells proposed to be used by this application (Figure 8) (Table 6) (Water Rights, 2023c).

There are domestic wells on file with the DANR-Water Rights Program that are completed into the Missouri: Elk Point aquifer, with the closest domestic well on file (not held by the applicant) approximately 0.7 miles southwest of the existing wells (Water Rights, 2023d). There could potentially be other domestic wells completed into the Missouri: Elk Point aquifer near the existing wells the applicant proposes to use that are not on file with the DANR-Water Rights Program.

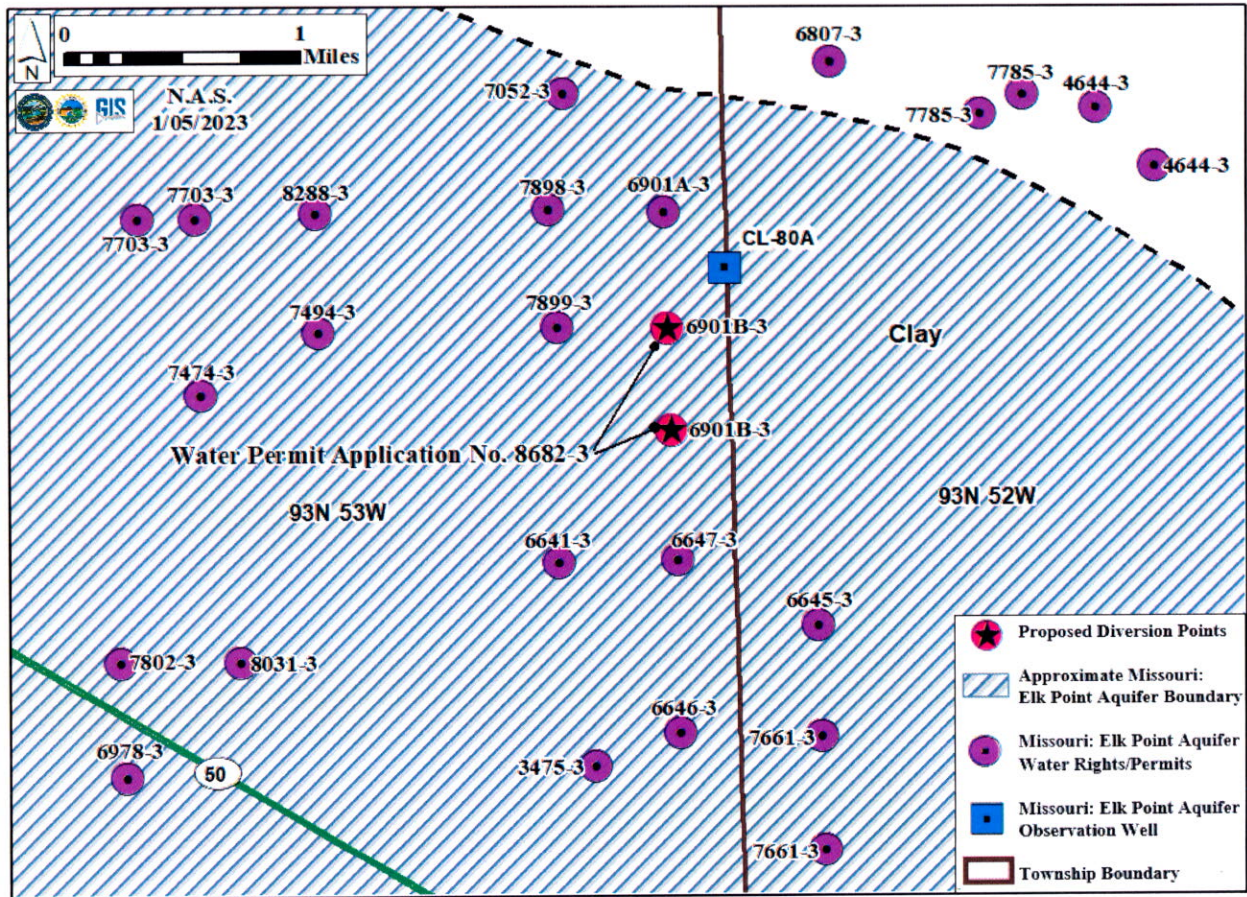


Figure 8. Location of the existing wells completed into the Missouri: Elk Point aquifer proposed to be used by Water Permit Application No. 8682-3, with the Missouri: Elk Point aquifer water rights/permits and observation well within approximately three miles (Water Rights, 2023b and 2023c)

Table 6. Water rights/permits authorized to withdraw water from the Missouri: Elk Point aquifer within approximately three miles of the existing wells, as shown in Figure 8 (Water Rights, 2023c)

Permit No.	Name	Status	Use	Authorized Acres if IRR	Authorized Diversion Rate (cfs)
3475-3	D A Olson & Sons	LC	IRR	72	1.03
4644-3	Clark Lewison	LC	IRR	206	2.94
6641-3	Thomas Dreesen	LC	IRR	125	1.56
6645-3	Freeburg Limited Partnership	LC	IRR	148	1.78
6646-3	Freeburg Limited Partnership	LC	IRR	271.2	1.9
6647-3	Freeburg Limited Partnership	LC	IRR	138	1.56
6807-3	James Orr	LC	IRR	132	1.78
6901A-3	Jeff Dreesen	LC	IRR	132	1.56
6901B-3	Thomas Dreesen	LC	IRR	265	3.12
6978-3	Marquardt Farms	LC	IRR	122	1.74
7052-3	J Robert Wardin	LC	IRR	216	1.56
7474-3	Justin Orr	LC	IRR	134	1.78
7494-3	Justin Orr	LC	IRR	115	1.56
7661-3	Freeburg Limited Partnership	LC	IRR	402	5.44
7703-3	J Robert Wardin	LC	IRR	534	3.9
7785-3	Gary Doppenberg	LC	IRR	339	4.9
7802-3	Ralph Marquardt	LC	IRR	251	3.56
7898-3	James Orr	LC	IRR	132	1.56
7899-3	Justin Orr	LC	IRR	97	1.56
8031-3	Dakota Protein Conversion, Inc	PE	COM		0.22
8288-3	Justin Orr	LC	IRR	97	1.78
LC: Licensed Water Right; PE: Water Permit; COM: Commercial; IRR: Irrigation					

The Missouri: Elk Point aquifer ranges from confined to unconfined aquifer conditions, but is primarily under unconfined conditions (Niehus, 1994 and 1997). Based on the water well completion reports on file for the existing wells proposed to be used, and lithologic logs on file for nearby observation wells, the Missouri: Elk Point aquifer is confined at the existing well locations (SDGS, 2023; Water Rights, 2023b and 2023d). Drawdown created by pumping a well generally does not extend far from the pumped well in an unconfined aquifer; however, in a confined aquifer, drawdown from pumping could extend a distance from the diversion point. The exact drawdown behavior of a well cannot be known without an aquifer performance test. Examination of the hydrographs for observation wells completed into the Missouri: Elk Point aquifer show no signs of being significantly impacted by drawdown caused by pumping, despite usually being located within a mile of several high-yield wells (assumed to be a well with an authorized diversion rate greater than 0.2 cfs) (Water Rights, 2023b and 2023c).

Within approximately one-half mile of the existing well locations, the Missouri: Elk Point aquifer has a saturated aquifer thickness of approximately 30 to 60 feet (Water Rights, 2023d).

This would generally allow for enough thickness for a pump to be placed 20 feet below the top of the aquifer, which is required for the well to be considered adequate under ARSD 74:02:04:20(6). Any drawdown as a result of the proposed diversion for this application is not expected to unlawfully impair nearby adequate wells. In Clay, Union, and Yankton Counties, there are no substantiated complaints on file with the DNR-Water Rights Program regarding well interference for adequate wells completed into the Missouri: Elk Point aquifer (Water Rights, 2023e).

The Water Management Board recognizes that putting water to beneficial use requires a certain amount of 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 Missouri: Elk Point aquifer at their location. However, when considering the statutes (SDCL 46-1-4 and 46-6-6.1), rules (ARSD 74:02:04:20(6) and (7)), the saturated thickness of the Missouri: Elk Point aquifer near the existing wells, and the lack of well interference complaints from the Missouri: Elk Point aquifer in the area, any drawdown created from the proposed diversion is not expected to cause an unlawful impairment on existing water right/permit holders or domestic users with adequate wells. Additionally, the wells proposed to be used are existing wells that have been in place and are presumed to have been in use since roughly 2008 without any reported well interference complaints on file with the DNR-Water Rights Program (Water Rights, 2023c, 2023d, and 2023e). Therefore, there is a reasonable probability that any interference from the proposed appropriation will not impose unlawful impairments on existing users with adequate wells.

CONCLUSIONS:

1. Water Permit Application No. 8682-3 proposes to irrigate 21 acres using two existing wells authorized by Water Right No. 6901B-3. Water Right No. 6901B-3 authorizes a maximum instantaneous diversion rate of 3.12 cfs from two wells completed into the Missouri: Elk Point aquifer (106 and 111 feet deep) for the irrigation of 265 acres.
2. If approved, Water Permit Application No. 8682-3 and Water Right No. 6901B-3 will collectively authorize a total of 3.12 cfs from two existing wells for the irrigation of 286 acres. The site of interest is located in Clay County approximately eight miles northwest of Vermillion, SD.
3. Based on observation well data and the hydrologic budget, there is a reasonable probability that unappropriated water is available from the Missouri: Elk Point aquifer to supply the proposed appropriation.
4. There is a reasonable probability that the proposed diversion by Water Permit Application No. 8682-3 will not unlawfully impair adequate wells for existing water rights/permits and domestic users.



Nakaila Steen
Natural Resources Engineer II
SD DANR - Water Rights Program

Reviewed by:



Adam Mathiowetz, PE
Natural Resources Engineer IV
SD DANR -Water Rights Program

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Schlaak, Karen

From: Schlaak, Karen
Sent: Tuesday, January 17, 2023 10:00 AM
To: Tom Dreesen
Subject: Water Permit Application No. 8682-3
Attachments: 4656.pdf

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

Karen Schlaak

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



AFFIDAVIT OF PUBLICATION

YANKTON DAILY PRESS AND DAKOTAN

RECEIVED

FEB 01 2023

OFFICE OF
WATER

THOMAS DREESEN
31250 457TH AVE
MECKLING SD 57069

STATE OF SOUTH DAKOTA
COUNTY OF YANKTON

KELLY HERTZ, BEING FIRST DULY SWORN ON OATH DEPOSES
AND SAYS THAT (S)HE IS THE MANAGING EDITOR OF YANKTON
MEDIA INC, A CORPORATION, THE PRINTER AND THE PUBLISHER OF THE
YANKTON DAILY PRESS AND DAKOTAN, A LEGAL DAILY NEWSPAPER
PUBLISHED AND CIRCULATED IN THE CITY OF YANKTON, SAID COUNTY
AND STATE, AND ONE OF THE OFFICIAL NEWSPAPERS OF THE SAID
COUNTY OF FACTS STATED IN THIS AFFIDAVIT; THAT THE ANNEXED
NOTICE OF APPLICATION NO.

TAKEN FROM THE PAPER, IN WHICH IT WAS LAST PUBLISHED IN THE
NEWSPAPER ON THE 27th DAY OF January, 2023
THAT THE FULL AMOUNT OF THE FEE CHARGED FOR THE PUBLICATION
OF SAID NOTICE TO WIT \$42.56 ENSURES TO THE
BENEFITS OF THE PUBLISHER OF SAID NEWSPAPER AND THAT NO
AGREEMENT AND UNDERSTANDING FOR THE DIVISION THEREOF HAS
BEEN MADE WITH ANY OTHER PERSON, AND THAT NO PART THEREOF
HAS BEEN AGREED TO BE PAID TO ANY PERSON WHOMSOEVER.

PUBLISHED ON: 01/27/2023

FILED ON: 01/27/2023


SUBSCRIBED AND SWORN TO BEFORE ME THIS 27th DAY OF January, 2023


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

Ad text : NOTICE OF APPLICATION
NO. 8682-3 to Appropriate Water

Notice is given that Thomas Dreesen, 31250 457th Ave, Meckling SD 57069 has filed an application for a water permit to irrigate an additional 21 acres. Water Right No. 6901B-3 authorizes 3.12 cubic feet of water per second (cfs) from two wells completed into the Missouri Elk Point Aquifer located in the SW 1/4 NE 1/4 and the NW 1/4 SE 1/4 Section 13 for irrigation of 265 acres located in the E 1/2 Section 13-T93N-R53W. This application proposes to irrigate an additional 21 acres located in the S 1/2 NE 1/4 Section 13-T93N-R53W from the existing wells described above. This application, if approved, and Water Right No. 6901B-3 will authorize a total of 3.12 cfs for irrigation of 286 acres. This site is located approximately 8 miles northwest of Vermillion SD.

Pursuant to SDCL 46-2A-2, the Chief Engineer recommends APPROVAL of Application No. 8682-3 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. The Chief Engineers recommendation with qualifications, the application, and staff report are available at <https://danr.sd.gov/public> or contact Ron Duvall for this information, or other information, at the Water Rights Program address provided below.

Any person interested in opposing this application or recommendation shall allege that the application, upon approval, will cause injury to the person that is unique from any injury suffered by the public in general. The injury must concern a matter either within the regulatory authority found in SDCL 46-2A-9 for approval or denial of the application, or other matter concerning the application within the regulatory authority of the board to act upon as defined by SDCL 46-2-9 and 46-2-11, or both. Any person meeting the petitioner requirements and wishing to be a party of record in a contested case hearing shall file a written petition to oppose the application with BOTH the applicant and Chief Engineer. A petition opposing the application shall be filed on a form provided by the Chief Engineer. The petition form is available online at <https://danr.sd.gov/public> or by contacting the Chief Engineer. The Chief Engineer's address is "Water Rights Program, Foss Building, 523 E Capitol, Pierre SD 57501 or call (605) 773-3352. The applicant's mailing address is given above. If contesting the Chief Engineer's recommendation, the applicant shall also file a petition. A petition filed by either an interested person or the applicant must be filed by February 6, 2023.

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

Any interested person may file a comment on the application with the Chief Engineer. The comment shall be filed on a form provided by the Chief Engineer and is available online at <https://danr.sd.gov/public> or by calling (605) 773-3352 or writing the Chief Engineer at the address provided above. Filing a comment does not make the commenter a party of record or a participant in any hearing that may be held. Any comment must be filed by February 6, 2023.

If the applicant does not contest the recommendation of the Chief Engineer and no petition to oppose the application is received, the Chief Engineer shall act on the application pursuant to the recommendation with no hearing held before the Water Management Board. If a petition opposing the application or contesting the recommendation is filed, then a hearing will be scheduled, and the Water Management Board will consider this application. Notice of the hearing will be given to the applicant and any person filing a petition.

Published once at the total approximate cost of \$42.56 and can be viewed free of charge at www.sdpublicnotices.com.

Published January 27, 2023.

AFFIDAVIT OF PUBLICATION

PLAIN TALK

THOMAS DREESEN
31250 457TH AVE
MECKLING SD 57069

RECEIVED

FEB 01 2023

OFFICE OF
WATER

STATE OF SOUTH DAKOTA
COUNTY OF CLAY

BETH RYE, BEING FIRST DULY SWORN ON OATH DEPOSES
AND SAYS THAT (S)HE IS THE ADVERTISING DIRECTOR OF YANKTON
MEDIA INC, A CORPORATION, THE PRINTER AND THE PUBLISHER OF THE
PLAIN TALK, A LEGAL WEEKLY NEWSPAPER PUBLISHED AND CIRCULATED
IN THE CITY OF VERMILLION, SAID COUNTY AND STATE, AND ONE OF
THE OFFICIAL NEWSPAPERS OF THE SAID COUNTY OF FACTS STATED IN
THIS AFFIDAVIT; THAT THE ANNEXED
NOTICE OF APPLICATION NO.

TAKEN FROM THE PAPER, IN WHICH IT WAS LAST PUBLISHED IN THE
NEWSPAPER ON THE 27th DAY OF January, 2023
THAT THE FULL AMOUNT OF THE FEE CHARGED FOR THE PUBLICATION
OF SAID NOTICE TO WIT \$42.56 ENSURES TO THE
BENEFITS OF THE PUBLISHER OF SAID NEWSPAPER AND THAT NO
AGREEMENT AND UNDERSTANDING FOR THE DIVISION THEREOF HAS
BEEN MADE WITH ANY OTHER PERSON, AND THAT NO PART THEREOF
HAS BEEN AGREED TO BE PAID TO ANY PERSON WHOMSOEVER.

PUBLISHED ON: 01/27/2023

FILED ON: 01/27/2023


SUBSCRIBED AND SWORN TO BEFORE ME THIS 27th DAY OF January, 2023


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

Notice is given that Thomas Dreesen, 31250 457th Ave, Meckling SD 57069 has filed an application for a water permit to irrigate an additional 21 acres. Water Right No. 6901B-3 authorizes 3.12 cubic feet of water per second (cfs) from two wells completed into the Missouri Elk Point Aquifer located in the SW 1/4 NE 1/4 and the NW 1/4 SE 1/4 Section 13 for irrigation of 265 acres located in the E 1/2 Section 13-T93N-R53W. This application proposes to irrigate an additional 21 acres located in the S 1/2 NE 1/4 Section 13-T93N-R53W from the existing wells described above. This application, if approved, and Water Right No. 6901B-3 will authorize a total of 3.12 cfs for irrigation of 286 acres. This site is located approximately 8 miles northwest of Vermillion SD.

Pursuant to SDCL 46-2A-2, the Chief Engineer recommends APPROVAL of Application No. 8682-3 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. The Chief Engineer's recommendation with qualifications, the application, and staff report are available at <https://danr.sd.gov/public> or contact Ron Duvall for this information, or other information, at the Water Rights Program address provided below.

Any person interested in opposing this application or recommendation shall allege that the application, upon approval, will cause injury to the person that is unique from any injury suffered by the public in general. The injury must concern a matter either within the regulatory authority found in SDCL 46-2A-9 for approval or denial of the application, or other matter concerning the application within the regulatory authority of the board to act upon as defined by SDCL 46-2-9 and 46-2-11, or both. Any person meeting the petitioner requirements and wishing to be a party of record in a contested case hearing shall file a written petition to oppose the application with BOTH the applicant and Chief Engineer. A petition opposing the application shall be filed on a form provided by the Chief Engineer. The petition form is available online at <https://danr.sd.gov/public> or by contacting the Chief Engineer. The Chief Engineer's address is "Water Rights Program, Foss Building, 523 E Capitol, Pierre SD 57501" or call (605) 773-3352. The applicant's mailing address is given above. If contesting the Chief Engineer's recommendation, the applicant shall also file a petition. A petition filed by either an interested person or the applicant must be filed by February 6, 2023.

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Any interested person may file a comment on the application with the Chief Engineer. The comment shall be filed on a form provided by the Chief Engineer and is available online at <https://danr.sd.gov/public> or by calling (605) 773-3352 or writing the Chief Engineer at the address provided above. Filing a comment does not make the commenter a party of record or a participant in any hearing that may be held. Any comment must be filed by February 6, 2023.

If the applicant does not contest the recommendation of the Chief Engineer and no petition to oppose the application is received, the Chief Engineer shall act on the application pursuant to the recommendation with no hearing held before the Water Management Board. If a petition opposing the application or contesting the recommendation is filed, then a hearing will be scheduled, and the Water Management Board will consider this application. Notice of the hearing will be given to the applicant and any person filing a petition.

Published once at the total approximate cost of \$42.56 and can be viewed free of charge at www.sdpublicnotices.com

Published January 27, 2023.

Schlaak, Karen

From: Schlaak, Karen
Sent: Tuesday, January 17, 2023 9:57 AM
To: Kelly Kronaizl
Subject: 8682-3, Thomas Dreesen
Attachments: 8682-3public.short_final.docx; FORM8.FRM.doc

Attached is a notice to be published on January 27, 2023.

Thomas Dreesen, 31250 457th Ave, Meckling SD 57069 (605 661-0715) has been notified to contact you to authorize publication and arrange for payment.

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

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

Karen Schlaak

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



Schlaak, Karen

From: Schlaak, Karen
Sent: Tuesday, January 17, 2023 9:57 AM
To: Cassandra Brockmoller
Subject: 8682-3, Thomas Dreesen
Attachments: 8682-3public.short_final.docx; FORM8.FRM.doc

Attached is a notice to be published on January 27, 2023.

Thomas Dreesen, 31250 457th Ave, Meckling SD 57069 (605 661-0715) has been notified to contact you to authorize publication and arrange for payment.

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

Karen Schlaak

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





**DEPARTMENT of AGRICULTURE
and NATURAL RESOURCES**

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

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

January 17, 2023

Thomas Dreesen
31250 457th Ave
Meckling SD 57069

Dear Mr. Dreesen:

Water Permit Application No. 8682-3 for irrigation use has been examined and found to comply with the South Dakota Water Laws and applicable rules. A notice has been sent to the Plain Talk printed at Vermillion SD (Ph # 605 624-2695) and the Press & Dakotan printed at Yankton SD (Ph # 605 665-7811) (see attachment for contact number). You will need to contact the newspapers and authorize publication of this notice. For your information, a copy of the notice, the recommendation of the Chief Engineer and report on the application are enclosed. Please review the notice prior to publication and notify this office, if you have any corrections or questions.

Be sure to contact the above newspapers to authorize publication of your Notice and to arrange for payment. Early contact with the papers can eliminate delays. Upon receiving authorization from you, the publisher has 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
Water Rights Program
(605) 773-3352

enclosures

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

NOTICE OF APPLICATION NO. 8682-3 to Appropriate Water

Notice is given that Thomas Dreesen, 31250 457th Ave, Meckling SD 57069 has filed an application for a water permit to irrigate an additional 21 acres. Water Right No. 6901B-3 authorizes 3.12 cubic feet of water per second (cfs) from two wells completed into the Missouri Elk Point Aquifer located in the SW 1/4 NE 1/4 and the NW 1/4 SE 1/4 Section 13 for irrigation of 265 acres located in the E 1/2 Section 13-T93N-R53W. This application proposes to irrigate an additional 21 acres located in the S 1/2 NE 1/4 Section 13-T93N-R53W from the existing wells described above. This application, if approved, and Water Right No. 6901B-3 will authorize a total of 3.12 cfs for irrigation of 286 acres. This site is located approximately 8 miles northwest of Vermillion SD.

Pursuant to SDCL 46-2A-2, the Chief Engineer recommends APPROVAL of Application No. 8682-3 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. The Chief Engineer's recommendation with qualifications, the application, and staff report are available at <https://danr.sd.gov/public> or contact Ron Duvall for this information, or other information, at the Water Rights Program address provided below.

Any person interested in opposing this application or recommendation shall allege that the application, upon approval, will cause injury to the person that is unique from any injury suffered by the public in general. The injury must concern a matter either within the regulatory authority found in SDCL 46-2A-9 for approval or denial of the application, or other matter concerning the application within the regulatory authority of the board to act upon as defined by SDCL 46-2-9 and 46-2-11, or both. Any person meeting the petitioner requirements and wishing to be a party of record in a contested case hearing shall file a written petition to oppose the application with BOTH the applicant and Chief Engineer. A petition opposing the application shall be filed on a form provided by the Chief Engineer. The petition form is available online at <https://danr.sd.gov/public> or by contacting the Chief Engineer. The Chief Engineer's address is "Water Rights Program, Foss Building, 523 E Capitol, Pierre SD 57501" or call (605) 773-3352. The applicant's mailing address is given above. If contesting the Chief Engineer's recommendation, the applicant shall also file a petition. A petition filed by either an interested person or the applicant must be filed by February 6, 2023.

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

Any interested person may file a comment on the application with the Chief Engineer. The comment shall be filed on a form provided by the Chief Engineer and is available online at <https://danr.sd.gov/public> or by calling (605) 773-3352 or writing the Chief Engineer at the address provided above. Filing a comment does not make the commenter a party of record or a participant in any hearing that may be held. Any comment must be filed by February 6, 2023.

If the applicant does not contest the recommendation of the Chief Engineer and no petition to oppose the application is received, the Chief Engineer shall act on the application pursuant to the recommendation with no hearing held before the Water Management Board. If a petition opposing the application or contesting the recommendation is filed, then a hearing will be scheduled, and the Water Management Board will consider this application. Notice of the hearing will be given to the applicant and any person filing a petition.

Published once at the total approximate cost of_



**DEPARTMENT of AGRICULTURE
and NATURAL RESOURCES**

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

FEB 21 2023

Thomas Dressen
31250 457th Ave
Meckling SD 57069

Dear Mr. Dressen:

Enclosed is Water Permit No. 8682-3 authorizing construction of the water diversion system and beneficial use of the water, not exceeding the limits as specified in the Water Permit.

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

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

Sincerely,

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

enclosures



**DEPARTMENT of AGRICULTURE
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PIERRE SD 57501-3182
danr.sd.gov

STATE OF SOUTH DAKOTA)
) SS
COUNTY OF HUGHES)

**Affidavit of Public Notice
on DANR Website**

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

Application No.: 8682-3

Name of Applicant: Thomas Dreesen

Date of Posting: 1/23/2023

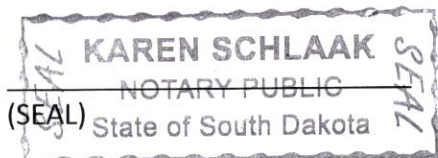
Date of Removal: 2/21/2023

Ron Duvall, Water Rights Permitting Administrator

2/22/23
Date

Subscribed and sworn to before me, a notary public, this 22nd day of February, 2023.

Notary Public - South Dakota
My commission expires:





8682-3

**DEPARTMENT of AGRICULTURE
and NATURAL RESOURCES**

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

June 16, 2023

Thomas Dreesen
31250 457th Ave
Meckling SD 57069

8682-3

Dear Mr. Dreesen:

I am writing to acknowledge receipt of the "Notice of Completion of Works" form that you sent in to let us know that you are completed with your water use system.

The system is now ready for inspection. Inspections are done on a county-by-county basis as staff time permits. You have done everything you need to do and the intervening time between the completion of your project and the staff inspection has no bearing on your water permit.

Someone from our office will contact you prior to the inspection to set up a time that is convenient for you. If you have any questions, please contact me.

Sincerely,

Amanda Dewell
Water Rights Program
(605) 773-3352
email: Amanda.Dewell@state.sd.us

NOTICE OF COMPLETION OF WORKS AND
APPLICATION OF WATER TO BENEFICIAL USE

Date 6-14-2023

TO: Water Rights Program, DANR
523 E. Capitol
Pierre, SD 57501-3181

FROM:

Thomas Dreessen
(name)

31250 457th Ave.
(address)

Meckling, SD 57069
(city, state, zip)

(phone)

I have completed the construction of the water use system and I have put the water to beneficial use to the maximum extent it is going to be used.

Water Permit No. 8682.3 states that the water use system is to be constructed by

(date)

, and water is to be put to beneficial use by

(date)

The water use system was completed on

6-8-2023

(date)

Applying the water to beneficial use was completed on

6-8-2023

(date)

You may schedule an investigation so that the water license may be issued.

Thomas Dreessen
(signature)

RECEIVED

JUN 16 2023

OFFICE OF
WATER



Report of Examination of Works and/or Application of Water to Beneficial Use For Permit No. 8682-3

I have this day, August 31, 2023, made a thorough examination of the water use system owned by Thomas Dreesen, 31250 457th Ave., Meckling, SD 57069, holder of Permit No. 8682-3, bearing the priority date of December 12, 2022. This permit authorizes the diversion of 0.00 cu. ft. per second of the waters of groundwater (Missouri: Elk Point Aquifer) authorizing the irrigation of 21 additional acres to the area irrigated by Water Right No. 6901B-3 located in Clay County.

Inspection contacts: Thomas Dreesen

A. Works used to divert the water:

Well Info. (N. Well of WR No. 6901B-3)

- 1) Well Drilling Firm: Hammond Wetmore Drilling
- 2) No. of Wells: 1
- 3) Depth(s): 70 feet
- 4) Well log is available: Yes

Casing:

- 1) Diameter: 16 inches
- 2) Length: 34 feet
- 3) Type: Plastic

Screen:

- 1) Diameter: 16 inches
- 2) Length: 30 feet
- 3) Type: PVC
- 4) Static water level: 16 feet

Pump:

- 1) Make: Unknown
- 2) Model: Unknown
- 3) Capacity: 700 GPM

Motor:

- 1) Make: Unknown
- 2) Model No.: Unknown
- 3) Horsepower rating: Unknown hp

Well Info. (S Well of WR No. 6901B-3)

- 1) Well Drilling Firm: Hammond Wetmore Drilling
- 2) No. of Wells: 1
- 3) Depth(s): 110 feet
- 4) Well log is available: Yes

Casing:

- 1) Diameter: 16 inches
- 2) Length: 66 feet
- 3) Type: Plastic

Screen:

- 1) Diameter: 16 inches
- 2) Length: 40 feet
- 3) Type: PVC
- 4) Static water level: 19 feet

Pump:

- 1) Make: Unknown
- 2) Model: Unknown
- 3) Capacity: 700 GPM

Motor:

- 1) Make: Unknown
- 2) Model No.: Unknown
- 3) Horsepower rating: Unknown hp

B. Works used to transport water to place of use:

- | | | |
|---------------------|-----------------------|---|
| 1) Type: <u>PVC</u> | Size: <u>8</u> inches | Length: <u>10</u> feet (<u>north well to the north pivot</u>) |
| 2) Type: <u>PVC</u> | Size: <u>8</u> inches | Length: <u>1,270</u> feet (<u>south well to the middle pivot</u>) |
| 3) Type: <u>PVC</u> | Size: <u>8</u> inches | Length: <u>230</u> feet (<u>south well to the south pivot</u>) |

C. Works used to apply water to beneficial use:**North Center Pivot: (WR No. 6901B-3)**

- 1) Make: Valley
- 2) Overall length: 1,300 feet
- 3) Number of towers: 7
- 4) End gun: Yes
- 5) Capacity: 700 GPM

South Center Pivot: (WR No. 6901B-3 Replaced)

- 1) Make: Valley
- 2) Overall length: 1,313 feet
- 3) Number of towers: 7
- 4) End gun: Yes
- 5) Capacity: 700 GPM

Chemigation Equipment:

- 1) Does chemigate: No

Middle Center Pivot: (WP No. 8682-3)

- 1) Make: Valley
- 2) Overall length: 785 feet
- 3) Number of towers: 4
- 4) End gun: Yes
- 5) Capacity: 700 GPM

D. Compliance with Permit Requirements:

- 1) Permit qualifications being abided by: Yes
- 2) Irrigation Questionnaires checked to determine if permit owner started irrigation by the end of construction period: Began using the middle pivot in 2023.
- 3) Exceptions to compliance are: None

E. Condition and Location:

- 1) The systems are in good condition with the point(s) of diversion located as follows:
The north well of Water Right No. 6901B-3 is 1,380 feet west and 3,930 feet north of the southeast corner of Section 13-T93N-R53W (Latitude 42.87715, Longitude -97.04765– SW1/4 of the NE1/4).
The south well of Water Right No. 6901B-3 is 1,380 feet west and 1,600 feet north of the southeast corner of Section 13-T93N-R53W (Latitude 42.87080, Longitude -97.04760– NW1/4 of the SE1/4).
- 2) The works are capable of diverting and conveying to the places of use 3.12 cu. ft. per second of water from the well which is to be used for irrigation purposes. Water has been put to beneficial use to the maximum extent as follows:

Section 13-T93N-R53W

<u>NW1/4NE1/4</u>	<u>33 acres</u>	<u>NW1/4SE1/4</u>	<u>40 acres</u>
<u>NE1/4NE1/4</u>	<u>32 acres</u>	<u>NE1/4SE1/4</u>	<u>34 acres</u>
<u>SW1/4NE1/4</u>	<u>37 acres</u>	<u>SW1/4SE1/4</u>	<u>35 acres</u>
<u>SE1/4NE1/4</u>	<u>30 acres</u>	<u>SE1/4SE1/4</u>	<u>31 acres</u>

comprising a total of 272 acres of land and the combined license should be issued for 3.12 cfs (no additional diversion).

- 3) All structures, wells and lands on map: Yes

F. Comments or other permit(s) associated with the project: The north and south wells, and the land irrigated by the north and south pivots, was authorized by Water Right No. 6901B-3. The land irrigated by the middle pivot was authorized by Water Permit No. 8682-3. No additional diversion was authorized by Water Permit No. 8682-3. The middle pivot gets water only from the south well.

As a part of the project, Mr. Dreesen replaced the existing south pivot with a new pivot. The new pivot base was moved south from the existing base because the new pivot is 237 feet shorter than the old pivot. The new south pivot does not have a cornering tower like the old pivot did.

Portions of the replaced south pivot were used to construct the middle pivot. This pivot irrigates the land between the existing north pivot and the replaced south pivot. There is a large overhead power line diagonally crossing the property which requires the unusual configuration of the pivots.

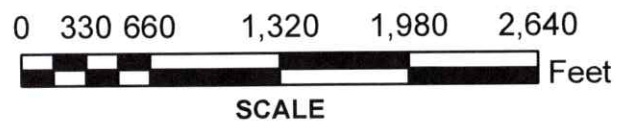
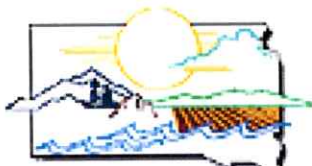
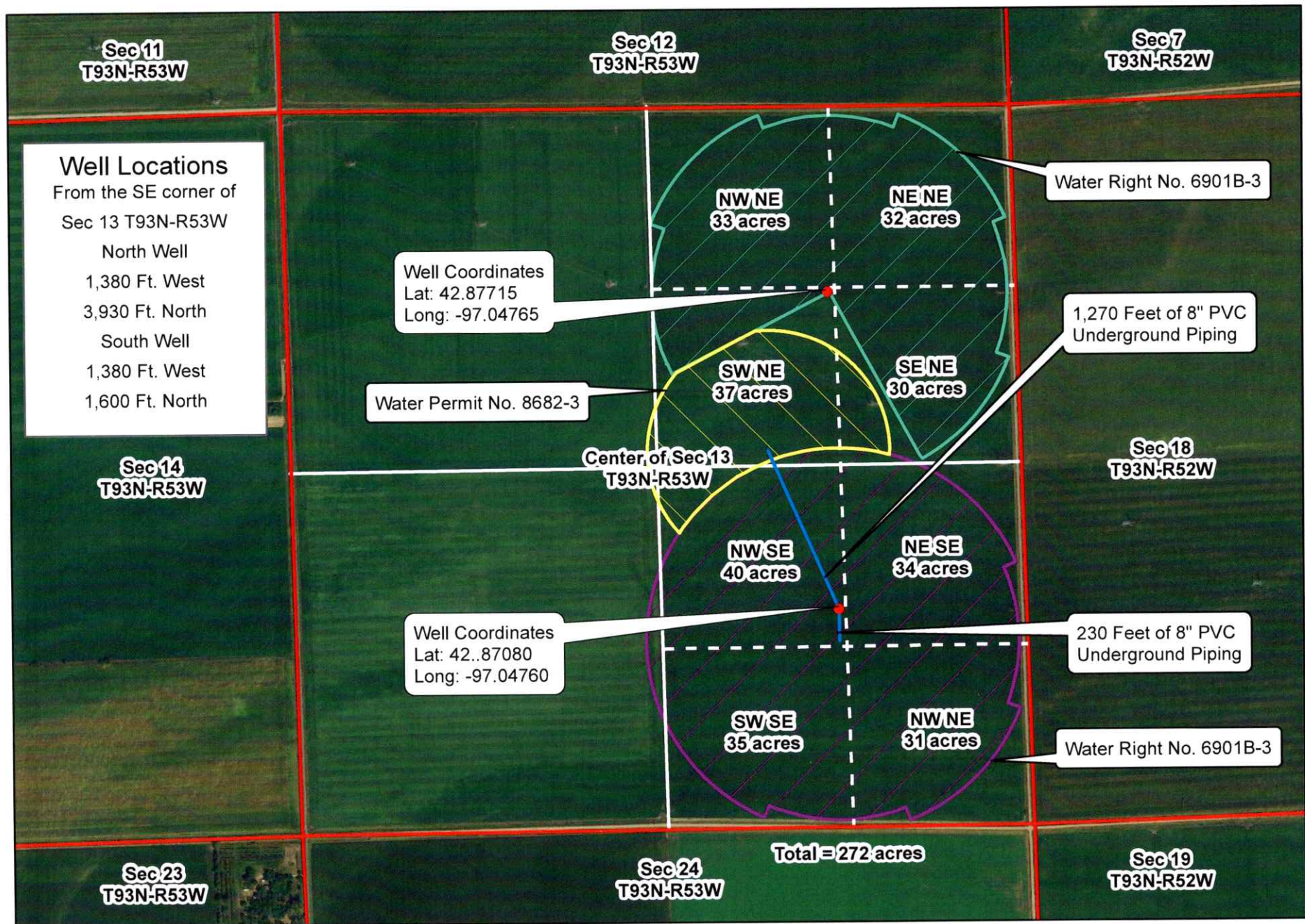
Since the middle pivot irrigates some land that was not previously irrigated, along with some land that was previously irrigated by the south pivot, I have combined all of the irrigated land into one map (see attached map titled "Water Permit No. 8682-3"). All of the land is owned by Mr. Dreesen and it would be appropriate to combine Water Right No. 6901B-3 and Water Permit No. 8682-3 into one license.



Keith DeJong, PE Ret.
Water Rights Inspector
DANR, Water Rights Program

Date report completed: September 1, 2023

Water Permit No. 8682-3



Keith DeJong
Keith DeJong, PE Ret.
Staff Engineer
August 31, 2023



DEPARTMENT of AGRICULTURE
and NATURAL RESOURCES
JOE FOSS BUILDING
523 E. CAPITOL AVE
PIERRE SD 57501-3182
danr.sd.gov

SEP 06 2023

Thomas Dreesen
31250 457th Ave
Meckling SD 57069

8682-3
6901B-3

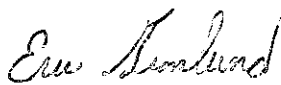
Dear Mr. Dreesen:

Enclosed is Water License No. 8682-3. This is the final water right document completing your process of obtaining a Water Right. Included with your license is a map prepared by the staff engineer who conducted the field investigation.

For your information SDCL 46-6-27 requires that if in the future, the owner of an existing well, constructs a replacement well and does not plan to use the old well, the old well is considered abandoned and must be plugged. Also, any well that is being used or is not considered abandoned must be valved and controlled, if flowing, or sealed and capped so that no leaking occurs either underground or at the surface.

Sp long as you use the water beneficially, as stated in the Water License, State Water Laws provide that you have a continuing right to use the water. If you have any questions, please contact our office.

Sincerely,


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

enclosures

NOTE: The applicable portions of Water Right No. 6901B-3 have been incorporated into Water Right No. 8682-3.

**STATE OF SOUTH DAKOTA
WATER LICENSE NO. 8682-3**

(1) Thomas Dreesen; 31250 457th Ave, Meckling SD 57069, made Application No. 8682-3, December 12, 2022 for a water permit to authorize the irrigation of an additional 21 acres. Permit No. 8682-3, with a priority date of December 12, 2022, was approved February 6, 2023, and issued to the applicant with construction of the described water supply system to be completed on or before February 6, 2028, and for the application to beneficial use of water on or before February 6, 2032.

The permit holder submitted a Notice of Completion of Works and Application of Water to Beneficial Use form on June 14, 2023. The Notice stated the diversion system was completed and the water was placed to beneficial use on June 8, 2023.

Water Right No. 6901B-3 authorizes the diversion of 3.12 cubic feet of water per second (cfs) from groundwater, two wells (Missouri: Elk Point Aquifer), Clay County South Dakota for the irrigation of 265 acres within the E ½ of Section 13, T93N, R53W. The applicable portions of Water Right No. 6901B-3 have been incorporated into Water Right No. 8682-3.

(2) It is certified that the permit holder has complied with the provisions of South Dakota State Law relating to completion of the construction of the water supply system and is entitled to divert 3.12 cubic feet of water per second for beneficial use. The locations of the diversion points are:

- North Well: 1,380 ft W & 3,930 ft N of the SE corner of Section 13, T93N, R53W (SW ¼ NE ¼) (Latitude 42.87715 & Longitude -97.04765)
- South Well: 1,380 ft W & 1,600 ft N of the SE corner of Section 13, T93N, R53W (NW ¼ SE ¼) (Latitude 42.87080 & Longitude -97.04760)

(3) The permit holder has complied with the provisions of South Dakota State Law relating to the application of water to beneficial use to irrigate the following land:

Section 13, T93N, R53W			
NE ¼ NE ¼	32 acres	NE ¼ SE ¼	34 acres
NW ¼ NE ¼	33 acres	NW ¼ SE ¼	40 acres
SW ¼ NE ¼	37 acres	SW ¼ SE ¼	35 acres
SE ¼ NE ¼	30 acres	SE ¼ SE ¼	31 acres
TOTAL: 272 acres			

(4) Pursuant to South Dakota Water Law 46-5-30.1 Thomas Dreesen, the holder and/or owner of Water Right No. 8682-3 is issued a license to appropriate water, the right to use 3.12 cubic feet of water per second from groundwater, two wells (Missouri: Elk Point Aquifer), with priority dates of October 4, 2007 for 3.12 cfs and 265 acres and December 12, 2022 for 7 acres, from the locations specified in (2) of this license for irrigation purposes.

This license is subject to South Dakota Water Law, any limitations or conditions listed in Water Right No. 8682-3 and subject to the following qualifications:

continued

Qualifications

1. The wells approved under Water Right No. 6901B-3 and Water Right No. 8682-3 are located near domestic wells and other adequate wells which may obtain water from the same aquifer. Water withdrawals shall be controlled so there is not a reduction of needed water supplies in adequate domestic wells or in adequate wells having prior water rights.
2. This Water Right is approved subject to the irrigation water use questionnaire being submitted each year.



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

SEP 06 2023

date



SOUTH DAKOTA WATER WELL COMPLETION REPORT

11-02

Location sw ¼ ne ¼ Sec 13 Twp 93n Rg 53w

County

Clay

North

Please mark well location with an "X"

W

E

Well Completion Date

5/11/2008

1 Mile

Distance to nearest potential pollution source (Septic tank, abandoned well, feed lot, etc.)

5,000.0 ft from septic tank (identify source)

PROPOSED USE:

☐ Domestic/Stock Irrigation
 ☐ Municipal Industrial
 ☐ Business Institutional
 ☐ Test Holes Monitoring well

METHOD OF DRILLING:

Direct Rotary

CASING DATA:

If other describe

PIPEWEIGHT LB/FT	DIAMETER IN	FROM FT	TO FT	HOLE DIAMETER IN
	16.00	0.0	34.0	22.00

GROUTING DATA:

Grout Type	No. of Sacks	Grout Weight Lb/gal	From FT	To FT
bent grt	11	9.5	0.0	30.0

Describe grouting procedure
tremie

SCREEN:

☐ Perforated pipe
 ☒ Manufactured
Diameter 16.00 Inches Length 30.0 FeetMaterial PVCSlot Size 0.080 Set From 34.0 Feet to 64.0 Feet

Other information

WAS A PACKER OR SEAL USED?

If so, what material?

Describe packer(s) and location

DISINFECTION: Was well disinfected upon completion?

☒ Yes, How? HTH tablets☐ No, Why Not?Lab sample sent to for
water quality analysisWell Owner: Wade Larson

Business Name:

Address: 501 Oakmont DriveCity, State, Zip: Vermillion SD 57069

WELL LOG:

FORMATION	DEPTH	
	FROM	TO
Clay, brown silty,	0	7
silt, gray, sandy	7	32
Sand, coarse, pebbly	32	70

STATIC WATER LEVEL 16.0 FEET

If flowing: closed in pressure _____ PSI

GPM flow _____ through _____ inch pipe

Controlled by ☐ Valve ☐ Reducers ☐ Other _____

Reduced flow rate _____ GPM

Can well be completely shut in?

WELL TEST DATA:

☒ Pumped Describe:☐ Bailed☐ Other

Pumping Level Below Land Surface

27.0 FL After 1.0 Hrs. pumped 700.0 GPM

_____ FL After _____ Hrs. pumped _____ GPM

If pump installed, pump rate: _____ GPM

REMARKS

RECEIVED

FEB - 2 2009

WATER RIGHTS
PROGRAMThis well was drilled under license # 666

And this report is true and accurate.

Drilling firm: Hammond Wetmore Drilling

Signature of License Representative:

Signature of Well Owner or Equitable Property Holder:

Date:

12/10/08

6901-3

SOUTH DAKOTA WATER WELL COMPLETION REPORT

11-02

Location <u>nw</u> <u>¼</u> <u>se</u> <u>¼</u> Sec <u>13</u> Twp <u>93n</u> Rg <u>53w</u>				Well Owner: <u>Wade Larson</u>																															
County <u>Clay</u>				Business Name: _____																															
Please mark well location with an "X"				Address: <u>501 Oakmont Drive</u>																															
Well Completion Date <u>5/12/2008</u>				City, State, Zip: <u>Vermillion SD 57069</u>																															
Distance to nearest potential pollution source (Septic tank, abandoned well, feed lot, etc.) <u>2,300.0</u> ft. from <u>septic tank</u> (identify source)				WELL LOG:																															
PROPOSED USE: ☐ Domestic/Stock Irrigation ☐ Municipal Industrial ☐ Business Institutional ☐ Test Holes Monitoring well				<table border="1" style="width:100%; border-collapse: collapse;"> <thead> <tr> <th style="text-align: center;">FORMATION</th> <th style="text-align: center;">FROM</th> <th style="text-align: center;">TO</th> </tr> </thead> <tbody> <tr> <td>Clay, brown silty, pebbly</td> <td style="text-align: center;">0</td> <td style="text-align: center;">7</td> </tr> <tr> <td>silt, gray, sandy</td> <td style="text-align: center;">7</td> <td style="text-align: center;">42</td> </tr> <tr> <td>sand, fine to medium</td> <td style="text-align: center;">42</td> <td style="text-align: center;">59</td> </tr> <tr> <td>Gravel, fine, sandy</td> <td style="text-align: center;">59</td> <td style="text-align: center;">110</td> </tr> <tr><td> </td><td> </td><td> </td></tr> <tr><td> </td><td> </td><td> </td></tr> <tr><td> </td><td> </td><td> </td></tr> <tr><td> </td><td> </td><td> </td></tr> <tr><td> </td><td> </td><td> </td></tr> </tbody> </table>		FORMATION	FROM	TO	Clay, brown silty, pebbly	0	7	silt, gray, sandy	7	42	sand, fine to medium	42	59	Gravel, fine, sandy	59	110															
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METHOD OF DRILLING: Direct Rotary				STATIC WATER LEVEL <u>19.0</u> FEET If flowing: closed in pressure _____ PSI GPM flow _____ through _____ Inch pipe Controlled by ☐ Valve ☐ Reducers ☐ Other _____ Reduced flow rate _____ GPM Can well be completely shut in? _____																															
CASING DATA: ☐ Steel ☒ Plastic ☐ Other If other describe _____				WELL TEST DATA: ☒ Pumped Describe: _____ ☐ Bailed ☐ Other Pumping Level Below Land Surface <u>31.0</u> Ft. After <u>1.0</u> Hrs. pumped <u>700.0</u> GPM _____ Ft. After _____ Hrs. pumped _____ GPM If pump installed, pump rate: _____ GPM																															
PIPEWEIGHT DIAMETER FROM TO HOLE DIAMETER LB/FT 16.00 IN 0.0 FT 66.0 FT 22.00 IN LB/FT IN FT FT IN LB/FT IN FT FT IN				REMARKS RECEIVED FEB - 2 2009 WATER RIGHTS PROGRAM																															
GROUTING DATA: Grout Type No. of Sacks Grout Weight From To bent grt 18 9.5 Lb/gal 0.0 Ft 60.0 Ft Lb/gal Ft Ft				This well was drilled under license # <u>666</u> And this report is true and accurate. Drilling firm: <u>Hammond Wetmore Drilling</u> Signature of License Representative: _____																															
Describe grouting procedure <u>tremie</u>				Signature of Well Owner or Equitable Property Holder: 																															
SCREEN: ☐ Perforated pipe ☒ Manufactured Diameter <u>16.00</u> Inches Length <u>40.0</u> Feet Material <u>pvc</u> Slot Size <u>0.080</u> Set From <u>66.0</u> Feet to <u>106.0</u> Feet Other information _____				Date: <u>12/10/08</u>																															
WAS A PACKER OR SEAL USED? ☐ Yes ☒ No If so, what material? _____ Describe packer(s) and location _____				DISINFECTION: Was well disinfected upon completion? ☒ Yes, How? <u>HTH tablets</u> ☐ No, Why Not? _____																															
Lab sample sent to for water quality analysis _____				_____																															