

**WATER PERMIT NO. 8746-3**

Name of Applicant: **Mark D Nelson**

Address: **31079 467<sup>th</sup> Ave, Vermillion SD 57069**

Phone: **605-670-1256**

Amount of Water Claimed: **1.78 cfs**

Total Acres: **115.89**

Source of Water Supply: **Groundwater**

Water to be used for: **Irrigation**

County: **Clay**

Type of Waste Disposal System:

Location: **Approximately 7 miles from Vermillion SD**

**PRIORITY**

Date Received: **3-13-2023**

Application/License Fee: **\$950.00**

Corrected Application Received: **4-6-2023**

Period of Annual Use: **May 1 – Oct 31**

Remarks:

Diversion Point: **SE 1/4 Sec 9 - T93N-R51W**

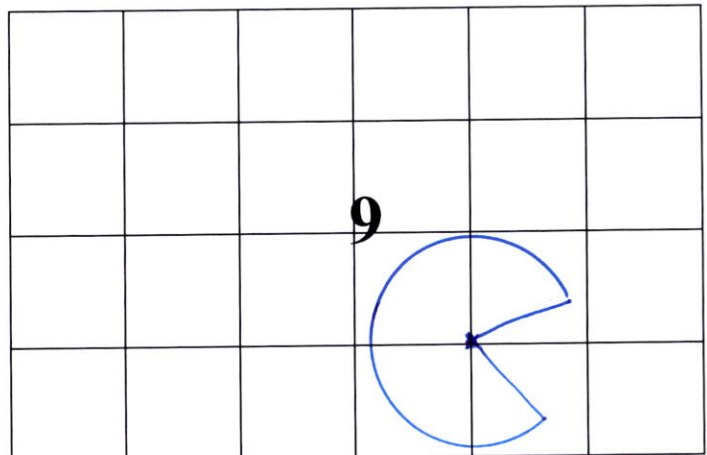
Land to be Irrigated: **SE 1/4 Sec 9 -T93N-R51W**

Depth of Well: **125**

Well Driller:

Remarks:

Type of Map: **aerial**



Reviewed and the Number Assigned on: **4-11-2023**

By: **Rachel Rodriguez**

Notice of Hearing - date to intervene: \_\_\_\_\_

**SOUTH DAKOTA  
WATER PERMIT NO. 8746-3**

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Date of first receipt of application March 13, 2023.

Date of return to applicant for corrections, amendments or changes March 14, 2023.

Date of receipt of corrected application April 12, 2023.

The Chief Engineer, on behalf of the Water Management Board, issues Water Permit No. 8746-3 to Mark D. Nelson, 31079 467<sup>th</sup> Avenue, Vermillion 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. 8746-3 appropriates 1.78 cubic feet of water per second (cfs) from one well to be completed into the Lower Vermillion Missouri Aquifer (approximately 125 feet deep) located near the center of the SE 1/4 Section 9 for irrigation of 115.89 acres located in the SE 1/4 Section 9; all in T93N-R51W. This site is located approximately 7 miles north 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: May 1 – October 31.
3. The date from which applicant may claim right is March 13, 2023.
4. The date of approval of Permit No. 8746-3 is July 3, 2023.
5. One-fifth of the construction is to be completed on or before January 3, 2026.
6. All construction is to be completed on or before July 3, 2028.
7. Water is to be put to beneficial use on or before July 3, 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 well approved under Water Permit No. 8746-3 is 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. The well authorized by Permit No. 8746-3 shall be constructed by a licensed well driller and construction of the well and installation of the pump shall comply with Water Management Board Well Construction Rules, Chapter 74:02:04 with the well casing pressure grouted (bottom to top) pursuant to Section 74:02:04:28.
3. Pursuant to SDCL 46-5-6 which allows a greater diversion rate if the method of irrigation, time constraints, or type of soils so requires, Permit No. 8746-3 authorizes a maximum diversion rate of 1.78 cfs for the irrigation of 115.89 acres with an annual volume not to exceed 2 acre feet of water per acre per year.
4. This Permit is approved subject to the irrigation water use questionnaire being submitted each year.

**WATER MANAGEMENT BOARD**

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

JUL 26 2023  
date



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

|                                                                                                       |                                                                                                                                                                                                |
|-------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Mail to:<br>SD DANR, Water Rights<br>523 E Capitol Ave<br>Pierre, SD 57501-3182<br>ph. (605) 773-3352 | No. <u>8746-3</u> Hydrologic Unit <u>10170102</u><br>Basin <u>Vermillion River</u><br>Newspaper <u>Vermillion Plain Talk</u><br><u>Press &amp; Dakotan</u><br><small>(office use only)</small> |
|-------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|

PAID  
MAR 13 2023  
Ck# 14682  
Rec't# \_\_\_\_\_

Application for Permit to Appropriate Water for Irrigation

RECEIVED

Type of Application: ☒ New ☐ Vested Right ☐ Amendment/Correction to Permit No. \_\_\_\_\_  
(Use predates Mar 2, 1955)

MAR 13 2023

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

OFFICE OF  
WATER

1. Name to Appear on Irrigation Permit MARK D NELSON

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

Mailing Address 310799 467th AVE VERMILION SD 57069  
(Address) (City) (State) (Zip Code)

Phone \_\_\_\_\_ Mobile 1-605-670-1256 Email MONELSON71@gmail.com

2. Amount of water claimed 1.78\*CFS or 800\*\*GPM \_\_\_\_\_\*\*\*AF Total Acreage 115.89  
(\*Cubic Feet per Second) (\*\*Gallons per Minute) (\*\*\*)Acre Feet - storage capacity of dam/dugout or annual use if applicable)

3. Source of water supply WELL

4. Location of point of diversion SE 1/4 SEC 9 T93N R51W  
(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 IRRIGATION SEASON May 1 - Oct 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 |
|----------------------------|--------|------------------|-------|
| SE 1/4 Sec 9 - T93N - R51W | 115.89 |                  |       |
|                            |        |                  |       |
|                            |        |                  |       |
|                            |        |                  |       |

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

I, Mark D. Nelson OWNER, the applicant, certify under  
Name of Person Title (if applicable)

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

2021-08

Attachments: Attach Form 2A if diversion is from a well or dugout, or if storage of water is proposed. Also, attach map and any other technical information. (see instructions)

## Supplemental Information

(type or print)

### 1. Well Information (check one or both as applicable)

☒ Drilling new well(s) ☐ Using existing well(s)

- a) If new wells, how many 1 Have test holes been drilled? ☐ Yes ☒ No Drilled by \_\_\_\_\_  
(if yes, please provide copies of logs)
- b) If existing wells, how many \_\_\_\_\_ Provide copy of log(s), if available. Drilled by \_\_\_\_\_

#### For either existing or proposed wells:

- c) Well Depth (required) 125 FT Depth to Top of Water Bearing Material \_\_\_\_\_ Depth to Water from Surface \_\_\_\_\_
- d) Distance to nearest domestic well on applicant's property RURAL WATER 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

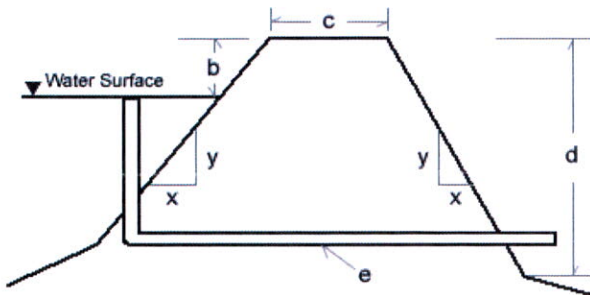
- a) Surface Dimensions \_\_\_\_\_ Depth \_\_\_\_\_
- b) Depth to water (ground surface to water level) \_\_\_\_\_

### 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.

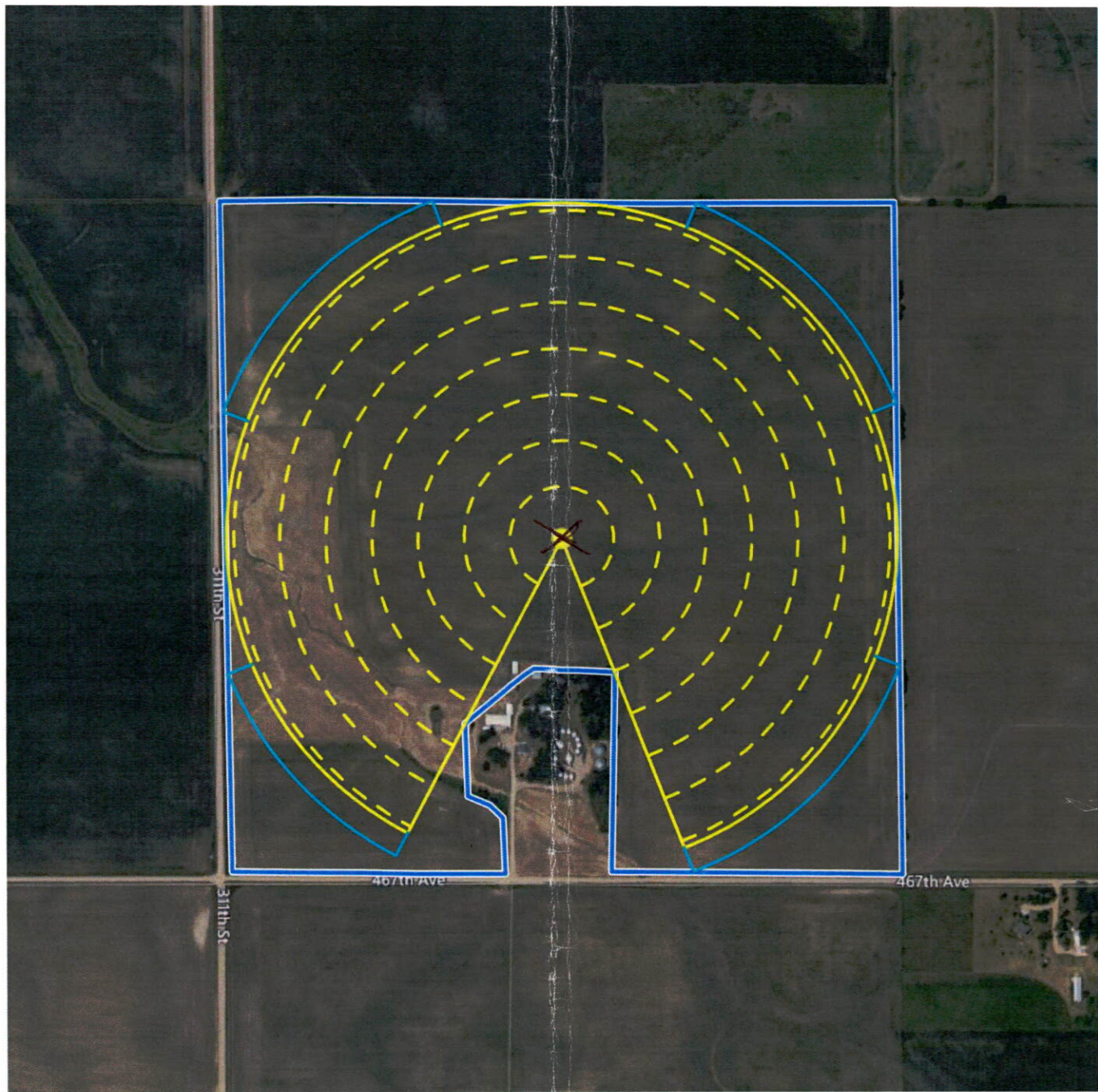
- a) If a private engineering firm or government agency was involved in the design of this dam, please give their name and address:

- 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





## Design Detail & Summary



Prepared For:

Mark Nelson

Mark Nelson



Nombre del sistema: Pivot 1

| Tramo n.º    | Diámetro           | Longitud  | Longitud acumulada y total |
|--------------|--------------------|-----------|----------------------------|
| 1            | 6 - 5/8" (168 mm)  | 202.25 ft | 202.25 ft                  |
| 2            | 6 - 5/8" (168 mm)  | 178.92 ft | 381.17 ft                  |
| 3            | 6 - 5/8" (168 mm)  | 178.92 ft | 560.08 ft                  |
| 4            | 6 - 5/8" (168 mm)  | 178.92 ft | 739.00 ft                  |
| 5            | 6 - 5/8" (168 mm)  | 178.92 ft | 917.92 ft                  |
| 6            | 6 - 5/8" (168 mm)  | 178.92 ft | 1096.83 ft                 |
| 7            | 6 - 5/8" (168 mm)  | 178.92 ft | 1275.75 ft                 |
| Voladizo:    | 5 - 9/16" (141 mm) | 25.00 ft  | 1300.75 ft                 |
| Cañón final: | -                  | 3.00 ft   | 1303.75 ft                 |

Longitud del sistema total: 1303.75 ft

Cantidad de tramos: 7

Available Outlet Count: 181

Degree of Sweep: 311 Grados

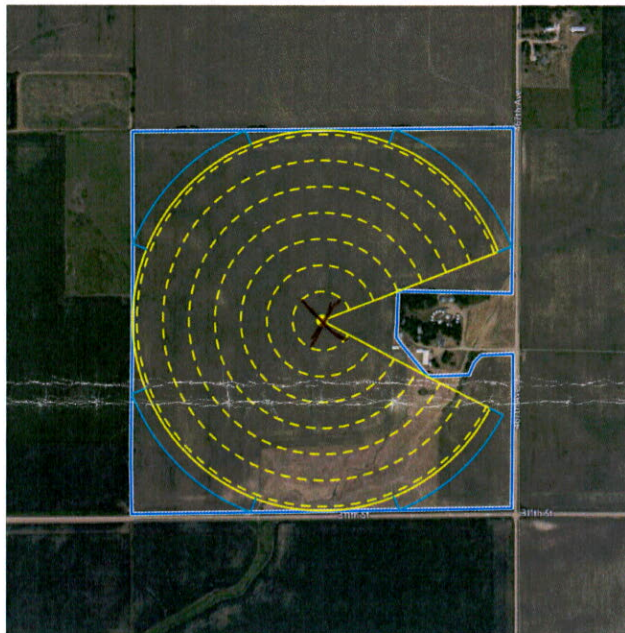
Endgun Throw: 100.00 ft

System Wetted Area: 105.99 acres

Corner Wetted Area: NC

Área cubierta del cañón final: 9.90 acres

**Área cubierta total: 115.89 acres**



### Center, Start, Stop Positions

| Center Position |             | Start Position |            | Stop Position |             | Angle Degree From North |       |
|-----------------|-------------|----------------|------------|---------------|-------------|-------------------------|-------|
| Lat             | Long        | Lat            | Long       | Lat           | Long        | Start                   | Stop  |
| 42.884550°      | -96.870108° | 42.882899°     | 42.882899° | 42.885847°    | -96.865574° | 117.5°                  | 68.7° |

### Endgun Coverage Area

| Primary Endgun | Angle Degree From North |        | Angle Degree From Start |        | Start Position |             | Stop Position |             | Total Coverage Area |
|----------------|-------------------------|--------|-------------------------|--------|----------------|-------------|---------------|-------------|---------------------|
|                | Start                   | Stop   | Start                   | Stop   | Lat            | Long        | Lat           | Long        |                     |
| Area 1         | 117.5°                  | 157.6° | 0.0°                    | 40.1°  | 42.882899°     | -96.865793° | 42.881242°    | -96.868257° | 2.18                |
| Area 2         | 200.5°                  | 249.0° | 83.0°                   | 131.5° | 42.881199°     | -96.871810° | 42.883270°    | -96.874650° | 2.63                |
| Area 3         | 291.9°                  | 337.9° | 174.4°                  | 220.4° | 42.885886°     | -96.874620° | 42.887864°    | -96.871941° | 2.49                |
| Area 4         | 20.8°                   | 68.7°  | 263.3°                  | 311.2° | 42.887894°     | -96.868378° | 42.885847°    | -96.865574° | 2.60                |

| Second Endgun | Angle Degree From North |      | Angle Degree From Start |      | Start Position |      | Stop Position |      | Total Coverage Area |
|---------------|-------------------------|------|-------------------------|------|----------------|------|---------------|------|---------------------|
|               | Start                   | Stop | Start                   | Stop | Lat            | Long | Lat           | Long |                     |

### KEISER AG & IRRIGATION, LLC

301 West South Street; Hartington, 68739  
 Oficina: (402) 254-9557; Móvil: (605) 661-6941  
 juddkeiser@outlook.com  
 www.Lindsay.com

3/8/2023

1 of 2

Confidential

# RECEIPT

## WATER RIGHTS PROGRAM South Dakota Department of Agriculture and Natural Resources

Date March 13, 2023

RECEIVED OF Mark/Debralee Nelson 31079 467<sup>th</sup> Ave., Vermillion SD 57069

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

|                                                                                                                        |                  |
|------------------------------------------------------------------------------------------------------------------------|------------------|
| Fee for Application for Permit No. <u>8746-3</u> to Appropriate Water, to construct and to put water to beneficial use | <u>\$850.00</u>  |
| Fee for Application for Permit No. _____ to Appropriate Water for Future use                                           | \$ _____         |
| Fee to retain Future Use Permit No. _____ after period of seven years.                                                 | \$ _____         |
| Fee for Inspecting Constructed Works, confirming beneficial use and issuing Water License No. <u>8746-3</u>            | <u>\$200.00</u>  |
| Fee for Filing Transfer Form _____                                                                                     | \$ _____         |
| Fee for _____                                                                                                          | \$ _____         |
| Fee for Issuing New Well Driller's License No. _____                                                                   | \$ _____         |
| Fee for Renewal of Well Driller's License No. _____                                                                    | \$ _____         |
| Fee for Issuing Well Pump Installer's License No. _____                                                                | \$ _____         |
| Fee for Renewal of Well Pump Installer's License No. _____                                                             | \$ _____         |
| (Any Other Work Provided by Law) TOTAL                                                                                 | <u>\$1050.00</u> |

By Eric Gronlund  
Chief Engineer  
Em

Refund  
\$100

July 26, 2023

**PAYMENT REQUEST FORM**

**PAYEE:** Mark D. Nelson  
31079 467<sup>th</sup> Avenue  
Vermillion SD 57069

**FROM:** DANR-Water Rights Program  
523 E. Capitol Ave  
Pierre, SD 57501-3181

**DESCRIPTION OF SERVICE, PRODUCE OR TRANSFER**

Over payment of Application Fee

**AMOUNT:** \$200.00

**FUNDING SOURCE:** WR Fees

**GENERAL:**

**FEDERAL:**

**OTHER:**

**COMMENTS:**

**AUTHORIZATION:**

*Eric Hundert* 7/26/2023

I declare and affirm under the penalties of perjury that this claim is in all things, true and correct.  
I further agree to comply with the provisions of the Civil Rights Act of 1964 and regulations issued thereunder relating to nondiscrimination in federal assisted programs.



**DEPARTMENT of AGRICULTURE  
and NATURAL RESOURCES**

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

March 14, 2023

Mark D Nelson  
31079 467<sup>th</sup> Ave  
Vermillion SD 57069

Dear Mr. Nelson:

Thank you for submitting your two *Application for a Permit to Appropriate Water* for irrigation in Clay County. To complete the applications, the following is required.

- Enclosed are the aerial photo maps you submitted for the location of the irrigation. On the maps, please mark the well location on each map with an "X".
- On Item No. 6, Annual period during which water is to be used. We suggest changing the "irrigation season" to May 1- October 31. Do you agree?

If you have any questions, please contact me.

Sincerely,

*Karen Schlaak*

Karen Schlaak  
Water Rights Program  
605 773-3352  
[karen.schlaak@state.sd.us](mailto:karen.schlaak@state.sd.us)

enclosures

## **Water Rights Program - File Documentation**

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**NAME:** Mark Nelson

**ADDRESS:** Vermillion SD

**DATE:** 4-6-23

**RE:** Pending Applications

**COMMENTS:**

Mark Nelson called and said he would be returning the maps with the proposed well locations marked. He also indicated the period of annual use should be May 1 – October 31.



Karen Schlaak  
Water Rights Program



**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. 8746-3, Mark D. Nelson**

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. 8746-3, Mark D. Nelson, 31079 467th Avenue, Vermillion SD 57069.

The Chief Engineer is recommending APPROVAL of Application No. 8746-3 because 1) there is reasonable probability that there is unappropriated water available for the applicant's proposed use, 2) the proposed diversion can be developed without unlawful impairment of existing domestic water uses and water rights, 3) the proposed use is a beneficial use and 4) it is in the public interest as it pertains to matters of public interest within the regulatory authority of the Water Management Board with the following qualifications:

1. The well approved under Water Permit No. 8746-3 is 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. The well authorized by Permit No. 8746-3 shall be constructed by a licensed well driller and construction of the well and installation of the pump shall comply with Water Management Board Well Construction Rules, Chapter 74:02:04 with the well casing pressure grouted (bottom to top) pursuant to Section 74:02:04:28.
3. Pursuant to SDCL 46-5-6 which allows a greater diversion rate if the method of irrigation, time constraints, or type of soils so requires, Permit No. 8746-3 authorizes a maximum diversion rate of 1.78 cfs for the irrigation of 115.89 acres with an annual volume not to exceed 2 acre feet of water per acre per year.
4. This Permit is approved subject to the irrigation water use questionnaire being submitted each year.

See report on application for additional information.

Eric Gronlund, Chief Engineer  
June 12, 2023

Report to the Chief Engineer  
On Water Permit Application No. 8746-3

Mark D Nelson

May 26th, 2023

Water Permit Application No. 8746-3 proposes to appropriate 1.78 cubic feet of water per second (cfs) from one well to be completed into the Lower Vermillion Missouri aquifer (approximately 125 feet deep) located near the center of SE ¼ Section 9 for irrigation of 115.89 acres located in the SE ¼ Section 9; all in T93N-R51W. The applicant is requesting a diversion rate greater than the statutory limit of 1 cfs per 70 acres. The site of interest is located approximately 7 miles north of Vermillion, SD in Clay County.

**AQUIFER:** Lower Vermillion Missouri (LVM)

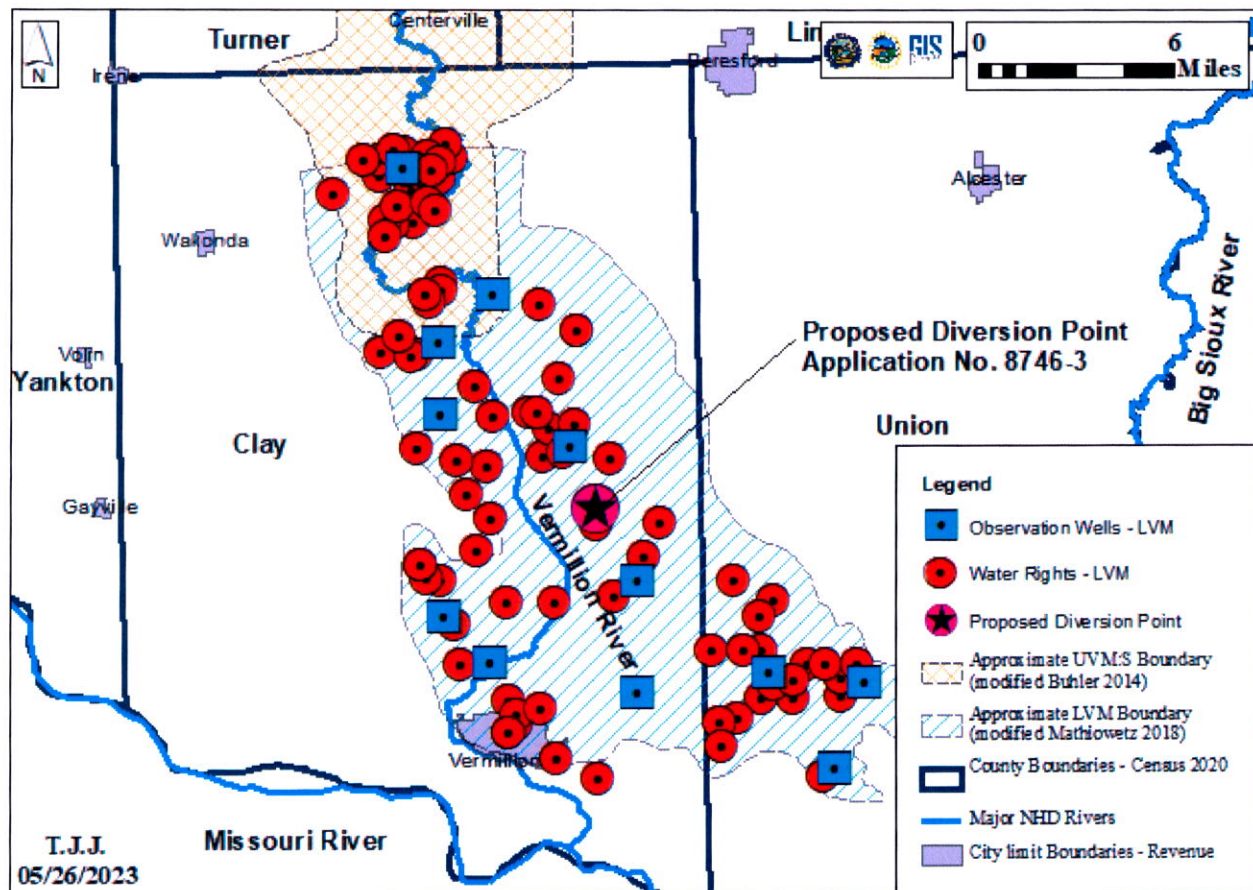
**HYDROGEOLOGY:**

The Lower Vermillion Missouri aquifer, referred to as the LVM aquifer for the remainder of this report, is a buried glacial outwash that was deposited by meltwater streams beyond the margin of active glacial ice (Stephens, 1967). The LVM aquifer materials range in size from a coarse sand to a coarse gravel (Niehus, 1994). The LVM aquifer is primarily confined but can be locally found under unconfined conditions such as in the flood plain of the Vermillion River (Niehus, 1994; Stephens, 1967). The LVM aquifer has an average thickness of approximately 100 feet in Clay County (Stephens, 1967). Table 1 shows the information related to the areal extent of the LVM aquifer, the area utilized for this report is approximately 106,000 acres (Mathiowetz, 2018).

**Table 1.** Estimated areal extent for the historic LVM aquifer boundary (Hedges and others, 1982), the portion of the UVM:S aquifer that overlies the historic LVM aquifer boundary (Buhler, 2014). The current LVM aquifer boundary (Mathiowetz, 2018), and the unconfined portion of the LVM aquifer along the Vermillion River (modified from Jensen, 2000; modified from Stonesifer, 2013).

| <b>Delineation</b>                                                                                                                                                      | <b>Estimated<br/>Areal Extent<br/>(acres)</b> |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------|
| <b>Historic Lower Vermillion Missouri Aquifer</b> (modified from Hedges and others, 1982)                                                                               | 124,000                                       |
| <b>Upper Vermillion Missouri: South Aquifer (UVM:S)</b> (modified from Buhler, 2014) - Portion that overlies LVM aquifer boundary estimated by Hedges and others, 1982. | 18,000                                        |
| <b>Current Lower Vermillion Missouri Aquifer*</b> (Mathiowetz, 2018)                                                                                                    | 106,000                                       |
| <b>Unconfined Portion of Lower Vermillion Missouri Aquifer - not enclosed in UVM:S</b> (Buhler, 2014) (modified from Jensen, 2000; modified from Stonesifer, 2013)      | 12,000                                        |
| *Estimated by subtracting UVM:S aquifer boundary (Buhler, 2014) from historic boundary (Hedges and others, 1982)                                                        |                                               |

The LVM aquifer is hydrologically connected to the Upper Vermillion Missouri: South (UVM:S) aquifer to the north, the Missouri: Elk Point aquifer to the south, the underlying Dakota aquifer, and the Vermillion River (Buhler, 2014; Mathiowetz, 2018; Niehus, 1994; Stephens, 1967). Hedges and others (1982) delineated a boundary between the Upper Vermillion Missouri aquifer and LVM aquifer with portions of each boundary being modified by Buhler (2014) and Mathiowetz (2018) in response to additional study of the Upper Vermillion Missouri aquifer, as shown on Figure 1.



**Figure 1.** Map of the approximate LVM aquifer boundary delineated by Hedges and others (1982) with a portion of the UVM:S and LVM aquifer boundary estimated by Buhler (2014) and Mathiowetz (2018) respectively, and the location of proposed diversion point for Water Permit Application No. 8746-3, and LVM aquifer observation wells and Water Rights (Water Rights, 2023b and 2023c).

A water well completion report was not submitted with the application. The closest water well completion report is located 0.8 miles south of this application's proposed diversion point, the well was completed into the LVM aquifer on January 15<sup>th</sup>, 2013 (Water Rights, 2023b). The depth to the top of aquifer material is 73 feet below the ground surface, static water level is approximately 72 feet below the ground surface, and a saturated aquifer thickness of at least 85 feet at the day of completion (SDGS, 2023; Water Rights, 2023b). Based on water well completion reports near the proposed diversion point and this water well completion report, the LVM aquifer is expected to be confined at the diversion point but may become unconfined

during drier conditions due to the limited artesian head (SDGS, 2023; Water Rights, 2023b and 2023d).

### **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 unappropriated water is available for the applicant’s proposed use, the proposed diversion can be developed without unlawful impairment of existing domestic water uses and water rights, the proposed use is a beneficial use, and the permit is in the public interest as it pertains to matters of public interest within the regulatory authority of the Water Management Board as defined by §§ 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 uses and water rights within the LVM aquifer.

### **WATER AVAILABILITY:**

Water Permit Application No. 8746-3 proposes to appropriate water from the LVM 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 LVM aquifer is not older than or stratigraphically lower than the Greenhorn Formation, 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 LVM aquifer must be considered.

### **HYDROLOGIC BUDGET:**

#### **Recharge**

Recharge to the LVM aquifer is received primarily through infiltration of precipitation where the aquifer is at or near land surface, groundwater inflow from the Upper Vermillion Missouri: South aquifer, seepage from Vermillion River, and leakage from the underlying Dakota aquifer (Nichus, 1994; Stephens, 1967). Using observation well analysis, Hedges and others (1985) estimated a recharge rate of 3.8 inches per year for the unconfined portion of the LVM aquifer. However, Stonesifer (2013) recalculated the recharge rate to be an estimated 4.58 inches per year using the same method but with additional observation well data. The unconfined area for this primarily confined aquifer is approximately 12,000 acres (Table 1; modified from Jensen, 2000; modified from Stonesifer, 2013). Therefore, the estimated average annual recharge rate for the unconfined portion of the LVM aquifer is approximately 4,580 acre-feet/year (based on Stonesifer, 2013 and modified from Jensen, 2000).

It is assumed that the confined portion of the LVM aquifer is hydrologically similar to the confined portion of the Upper Vermillion Missouri aquifer and recharges at a similar rate.

However, further study conducted on the Upper Vermillion Missouri aquifer concluded the Hedges and others (1985) recharge rate estimate to the confined portion of the Upper Vermillion Missouri aquifer is likely underestimated (Holmes & Filipovic, 2015; Buhler, 2014). Using regional flow-net analysis, Hedges and others (1985) estimated the recharge rate of the, primarily confined, Upper Vermillion Missouri aquifer to be approximately 0.25 inches per year. The confined portion of the LVM aquifer is approximately 94,000 acres, this was found by subtracting the unconfined area from the current total area on Table 1. Using the Hedges and others (1985) confined recharge rate multiplied by the confined portion areal extent, the average annual recharge rate for the confined portion of the LVM aquifer is approximately 1,960 acre-feet per year; keeping in mind that this estimate is likely lower than the actual rate based on Holmes & Filipovic (2015) investigation and Buhler's (2014) report. Combining average annual recharge rate for both the confined and unconfined portions of the LVM aquifer (within the LVM aquifer within Hedges and others (1982) historical aquifer boundary minus Buhler (2014) delineation of the UVM:S aquifer boundary), the average annual recharge rate is approximately 6,540 acre-feet per year.

### **Discharge**

Discharge from the LVM aquifer in South Dakota primarily occurs through well withdrawals, seepage to surface water features, and evapotranspiration in areas where the aquifer is at or near land surface. There are 97 water rights/permits authorized to appropriate water from the LVM aquifer within the historical aquifer boundary delineated by Hedges and others (1982) (Water Rights, 2023c). However, 61 water rights/permits are in both the LVM aquifer boundary delineated by Hedges and others (1982) and the Upper Vermillion Missouri: South aquifer boundary delineated by Buhler (2014). Of the 61 water rights/permits, 29 are currently withdrawing water from the Upper Vermillion Missouri: South aquifer and are still labeled as withdrawing water from the LVM aquifer. Therefore, by excluding the 29 water rights/permits that are withdrawing from the Upper Vermillion Missouri: South aquifer from the 97 water rights/permits, there are 68 water rights/permits authorized to appropriate water from the LVM aquifer within the current aquifer boundary delineated by Mathiowetz (2018). There are three other pending applications (Application Nos. 8731-3, 8745-3, and 8747-3) for the LVM aquifer beside this application. There are no future use permits reserving water from the LVM aquifer (Water Rights, 2023c).

Table 2 summarizes the 7 non-irrigation water rights/permits authorized to appropriate water from the LVM aquifer with the estimated annual use for each water right/permit as determined by their limiting diversion rate or annual volume. The data on Table 2 is broken up into two sets of water rights/permits: 1) those that are located in the historic aquifer boundary by Hedges and others (1982) but not in the Upper Vermillion Missouri: South aquifer boundary delineated by Buhler (2014) and 2) water rights/permits that are located within both boundaries. The amount of water withdrawn was estimated by assuming the non-irrigation water rights/permits limited by an annual volume will withdraw their entire appropriated volume every year. It is estimated that the non-irrigation water rights/permits limited only by a diversion rate will pump at their maximum permitted diversion rate for 60 percent of the time. This is a standard method developed by the

DANR-Water Rights Program for estimating average annual withdrawals by non-irrigation appropriations limited solely by diversion rate. It is likely an overestimate of water withdrawn by water rights/permits only limited by diversion rate. Application No. 8745-3 is requesting 564 acre-feet of water to be appropriated for a one-time use with the following years of water use being non-consumptive by re-injecting the pumped water back into the aquifer (Water Rights, 2023c). Therefore, the average annual use for this application that will be accounted for in the hydrologic budget for the LVM aquifer will be 0 ac-ft/yr. Overall, the estimated average annual withdrawal rate for the LVM aquifer non-irrigation water rights/permits within the historic aquifer boundary (Hedges and others, 1982) is approximately 1,224.4 acre-feet/year, and approximately 48.6 acre-feet/year excluding water rights/permits that are in the Upper Vermillion Missouri: South delineation by Buhler (2014) (Table 2) (Water Rights, 2023c).

**Table 2.** Estimated average annual use for non-irrigation water rights/permits authorized to appropriate water from the LVM aquifer within the historic aquifer boundary by Hedges and others (1982) but not the UVM:S aquifer delineation by Buhler (2014), and non-irrigation water rights within aquifer boundary delineated by Hedges and others (1982) and Buhler's (2014) UVM:S boundary (Water Rights, 2023c).

| Permit No.                                                                                          | Name                        | Uses | Status | Authorized Diversion Rate (cfs) | Authorized Annual Volume (acre-feet) | Estimated Use (acre-feet/year) |
|-----------------------------------------------------------------------------------------------------|-----------------------------|------|--------|---------------------------------|--------------------------------------|--------------------------------|
| 1870-3                                                                                              | USD FACILITIES MGMT         | INS  | LC     | 0.03                            | NA                                   | 13.0                           |
| 6397-3                                                                                              | SD DEPT OF TRANSPORTATION   | INS  | LC     | 0.033                           | NA                                   | 14.3                           |
| 8222-3                                                                                              | SOUTHEAST FARMERS COOP      | COM  | PE     | 0.167                           | 18.4                                 | 18.4                           |
| 8257-3                                                                                              | THEIN WELL CO INC           | COM  | PE     | 0.089                           | 1                                    | 1                              |
| 8479-3                                                                                              | KNIFE RIVER                 | IND  | PE     | 0.133                           | 1.84                                 | 1.84                           |
|                                                                                                     |                             |      |        |                                 | <b>Total:</b>                        | <b>48.6</b>                    |
| 3905-3*                                                                                             | CLAY RURAL WATER SYSTEM INC | RWS  | LC     | 2                               | NA                                   | 868.8                          |
| 5979-3*                                                                                             | CLAY RURAL WATER SYSTEM INC | RWS  | LC     | 2                               | 307                                  | 307                            |
|                                                                                                     |                             |      |        |                                 | <b>Total:</b>                        | <b>1175.8</b>                  |
| *Within aquifer boundary delineated by Hedges and others (1982) and Buhler's (2014) UVM:S boundary  |                             |      |        |                                 |                                      |                                |
| LC Licensed Water Right, PE Water Permit, INS Institutional, COM Commercial, RWS Rural Water System |                             |      |        |                                 |                                      |                                |

There are 90 irrigation water rights/permits appropriating water from the LVM aquifer within Hedges and others (1982) historical aquifer boundary (Water Rights, 2023c). Irrigation water rights/permits have been typically required to report their annual usage on an irrigation questionnaire since 1979. However, due to changes in farming practices, new equipment, and an increase in the number of permits from 43 in 2006 to 71 in 2013, the average over the entire period of record may not be an accurate reflection of average annual irrigation withdrawal at the present time. The average annual withdrawal rate for the LVM aquifer within Hedges and others (1982) historical boundary for irrigation water rights/permits that have reported over the past ten

years of record (2012 to 2021) is approximately 3,015 acre-feet per year (Table 3) (Water Rights, 2023a).

There are 61 irrigation water rights/permits appropriating water from the LVM aquifer within Hedges and others (1982) historical aquifer boundary excluding rights/permits within delineation UVM:S aquifer by Buhler (2014) (Water Rights, 2023c). However, due to changes in farming practices and an increase in the number of permits from 27 in 2006 to 45 in 2013, the average over the entire period of record may not be an accurate reflection of actual average annual withdrawal at the present time. The average annual withdrawal rate for the LVM aquifer irrigation water rights/permits that have reported over the past ten years of record (2012 to 2021) is approximately 1,866 acre-feet per year (Table 3) (Water Rights, 2023a).

There are ten irrigation water permits approved in 2022 and early 2023 (Nos. 8632-3, 8589-3, 8641-3, 8672-3, 8680-3, 8692-3, 8693-3, 8711-3, 8725-3, and 8726-3) and two other pending irrigation applications in 2023 (Nos. 8731-3 and 8747-3) that were not included in the irrigation questionnaire compilation and need to be accounted for. The new permits are authorized to irrigate 1,093 acres, while the pending irrigation applications (Nos. 8731-3, 8746-3, and 8747-3 (including this application)), propose to irrigate approximately 386 acres. All together a total of approximately 1,479 acres are planned to be irrigated (Water Rights, 2023c). Assuming one foot of water per acre per year, the withdrawal rate for these water permits/applications is approximately 1,479 acre-feet per year. The average annual withdrawal rate for irrigation appropriations from 2012 to 2021 combined with 2022 and 2023 permits and new applications within Hedges and others (1982) historical aquifer boundary, is approximately 4,494 acre-feet per year (Table 3) (Water Rights, 2023a). The average annual withdrawal rate for irrigation appropriations from 2012 to 2021 combined with 2022 and 2023 permits and new applications within Hedges and others (1982) historical aquifer boundary excluding water rights/permits within delineation UVM:S aquifer by Buhler (2014), is approximately 3,345 acre-feet per year (Table 3) (Water Rights, 2023a).

There are domestic wells completed into the LVM 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 LVM 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 LVM aquifer.

**Table 3.** Reported irrigation uses from the LVM aquifer for water right/permits within the historical boundary of LVM aquifer excluding delineation UVM:S aquifer (Buhler, 2014) (Water Rights, 2023a)

| <b>Historical Boundary of LVM aquifer (Hedges and others, 1982)</b> |                                 |                                  | <b>Historical Boundary of LVM aquifer (Hedges and others, 1982), Excluding UVM:S Aquifer Boundary (Buhler, 2014)</b> |                                 |                                  |
|---------------------------------------------------------------------|---------------------------------|----------------------------------|----------------------------------------------------------------------------------------------------------------------|---------------------------------|----------------------------------|
| <b>Year</b>                                                         | <b>Number of Permit/License</b> | <b>Annual Pumpage (ac-ft/yr)</b> | <b>Year</b>                                                                                                          | <b>Number of Permit/License</b> | <b>Annual Pumpage (ac-ft/yr)</b> |
| 1979                                                                | 49                              | 1163.0                           | 1979                                                                                                                 | 40                              | 810.5                            |
| 1980                                                                | 47                              | 2417.0                           | 1980                                                                                                                 | 38                              | 1995.0                           |
| 1981                                                                | 49                              | 1543.0                           | 1981                                                                                                                 | 39                              | 1205.4                           |
| 1982                                                                | 37                              | 870.0                            | 1982                                                                                                                 | 27                              | 758.3                            |
| 1983                                                                | 38                              | 716.3                            | 1983                                                                                                                 | 28                              | 644.7                            |
| 1984                                                                | 47                              | 691.0                            | 1984                                                                                                                 | 37                              | 549.0                            |
| 1985                                                                | 46                              | 1328.2                           | 1985                                                                                                                 | 36                              | 927.2                            |
| 1986                                                                | 45                              | 1047.5                           | 1986                                                                                                                 | 35                              | 807.5                            |
| 1987                                                                | 37                              | 1115.4                           | 1987                                                                                                                 | 27                              | 794.4                            |
| 1988                                                                | 38                              | 2083.8                           | 1988                                                                                                                 | 28                              | 1442.4                           |
| 1989                                                                | 38                              | 2301.2                           | 1989                                                                                                                 | 28                              | 1522.2                           |
| 1990                                                                | 38                              | 2113.2                           | 1990                                                                                                                 | 28                              | 1288.2                           |
| 1991                                                                | 39                              | 1670.1                           | 1991                                                                                                                 | 29                              | 1044.1                           |
| 1992                                                                | 39                              | 168.8                            | 1992                                                                                                                 | 29                              | 116.7                            |
| 1993                                                                | 39                              | 0.0                              | 1993                                                                                                                 | 29                              | 0.0                              |
| 1994                                                                | 39                              | 517.3                            | 1994                                                                                                                 | 29                              | 308.7                            |
| 1995                                                                | 37                              | 506.6                            | 1995                                                                                                                 | 28                              | 368.2                            |
| 1996                                                                | 36                              | 997.6                            | 1996                                                                                                                 | 27                              | 572.9                            |
| 1997                                                                | 36                              | 1085.0                           | 1997                                                                                                                 | 27                              | 645.0                            |
| 1998                                                                | 36                              | 1032.9                           | 1998                                                                                                                 | 26                              | 736.6                            |
| 1999                                                                | 38                              | 900.6                            | 1999                                                                                                                 | 27                              | 698.9                            |
| 2000                                                                | 38                              | 2041.7                           | 2000                                                                                                                 | 27                              | 1574.9                           |
| 2001                                                                | 38                              | 2037.0                           | 2001                                                                                                                 | 27                              | 1781.8                           |
| 2002                                                                | 40                              | 1762.3                           | 2002                                                                                                                 | 29                              | 1123.2                           |
| 2003                                                                | 40                              | 1800.6                           | 2003                                                                                                                 | 29                              | 1470.6                           |
| 2004                                                                | 39                              | 1747.5                           | 2004                                                                                                                 | 28                              | 1167.6                           |
| 2005                                                                | 45                              | 1410.2                           | 2005                                                                                                                 | 28                              | 1071.1                           |
| 2006                                                                | 43                              | 2674.5                           | 2006                                                                                                                 | 27                              | 1734.3                           |
| 2007                                                                | 50                              | 2909.1                           | 2007                                                                                                                 | 26                              | 1327.0                           |
| 2008                                                                | 55                              | 4301.3                           | 2008                                                                                                                 | 28                              | 911.9                            |
| 2009                                                                | 58                              | 482.6                            | 2009                                                                                                                 | 30                              | 460.8                            |
| 2010                                                                | 59                              | 144.6                            | 2010                                                                                                                 | 30                              | 134.0                            |
| 2011                                                                | 62                              | 2195.1                           | 2011                                                                                                                 | 33                              | 1219.4                           |
| 2012                                                                | 61                              | 7759.5                           | 2012                                                                                                                 | 33                              | 3355.3                           |
| 2013                                                                | 71                              | 4109.1                           | 2013                                                                                                                 | 45                              | 2856.5                           |
| 2014                                                                | 75                              | 1576.3                           | 2014                                                                                                                 | 48                              | 1006.4                           |
| 2015                                                                | 78                              | 1925.8                           | 2015                                                                                                                 | 50                              | 1473.5                           |
| 2016                                                                | 79                              | 2187.5                           | 2016                                                                                                                 | 51                              | 1779.0                           |
| 2017                                                                | 79                              | 3156.6                           | 2017                                                                                                                 | 52                              | 2439.3                           |
| 2018                                                                | 79                              | 427.7                            | 2018                                                                                                                 | 52                              | 419.4                            |
| 2019                                                                | 79                              | 339.6                            | 2019                                                                                                                 | 52                              | 333.0                            |
| 2020                                                                | 78                              | 3353.2                           | 2020                                                                                                                 | 51                              | 1972.5                           |
| 2021                                                                | 80                              | 5316.2                           | 2021                                                                                                                 | 54                              | 3026.7                           |
| <b>Average 1979-2021</b>                                            |                                 | 1812.2                           | <b>Average 1979-2021</b>                                                                                             |                                 | 1159.9                           |
| <b>Average 2012-2021</b>                                            |                                 | 3015.2                           | <b>Average 2012-2021</b>                                                                                             |                                 | 1866.2                           |

## Hydrologic Budget Summary

The average annual recharge rate for the unconfined portion of the LVM aquifer not enclosed in the UVM:S aquifer (Buhler, 2014) is approximately 4,580 acre-feet/year. The average annual recharge rate for the current confined portion LVM aquifer (Mathiowetz, 2018) is approximately 1,960 acre-feet/year. Combining average annual recharge rate for both the current confined and unconfined portions of the LVM aquifer not enclosed in the UVM:S aquifer, the average annual recharge rate is approximately 6,540 acre-feet per year.

The average annual withdrawal rate from the LVM aquifer within Hedges and others (1982) historical aquifer boundary (the non-irrigation appropriations (1,224 acre-feet/year); the average annual withdrawal rate for irrigation appropriations from 2012 to 2021, 2022-2023 water permits, and pending applications, including this one, (4,494 acre-feet/year)) is approximately 5,718 acre-feet per year, also shown on Table 4 (Water Rights, 2023a).

The average annual withdrawal rate from the LVM aquifer within Hedges and others (1982) historical aquifer boundary excluding rights/permits within delineation UVM:S aquifer by Buhler (2014) (the non-irrigation appropriations (49 acre-feet/year); the average annual withdrawal rate for irrigation appropriations from 2012 to 2021, 2022-2023 water permits, and pending applications, including this one, (3,345 acre-feet/year)) is approximately 3,394 acre-feet per year, also shown on Table 4 (Water Rights, 2023a).

Application No. 8745-3 proposes a one-time use of 564 acre-feet/year with an ongoing non-consumptive use of water due to reinjection of pumped water into the aquifer. Therefore, the one-time use is not included in the average annual use because the annual use will be 0 acre-feet/year.

Collectively, the average annual recharge rate for both the confined and unconfined portions of the LVM aquifer is greater than the average annual withdrawal rate from both the LVM aquifer within Hedges and others (1982) historical aquifer boundary and the LVM aquifer within Buhler (2014) and Mathiowetz (2018) boundary delineated portions of the UVM:S and LVM aquifers. Furthermore, the average annual recharge to the aquifer exceeds the average annual withdrawals plus the one-time use for Application No. 8745-3. Based on the hydrologic budget, there is a reasonable probability unappropriated water is available from the LVM aquifer for the proposed appropriation.

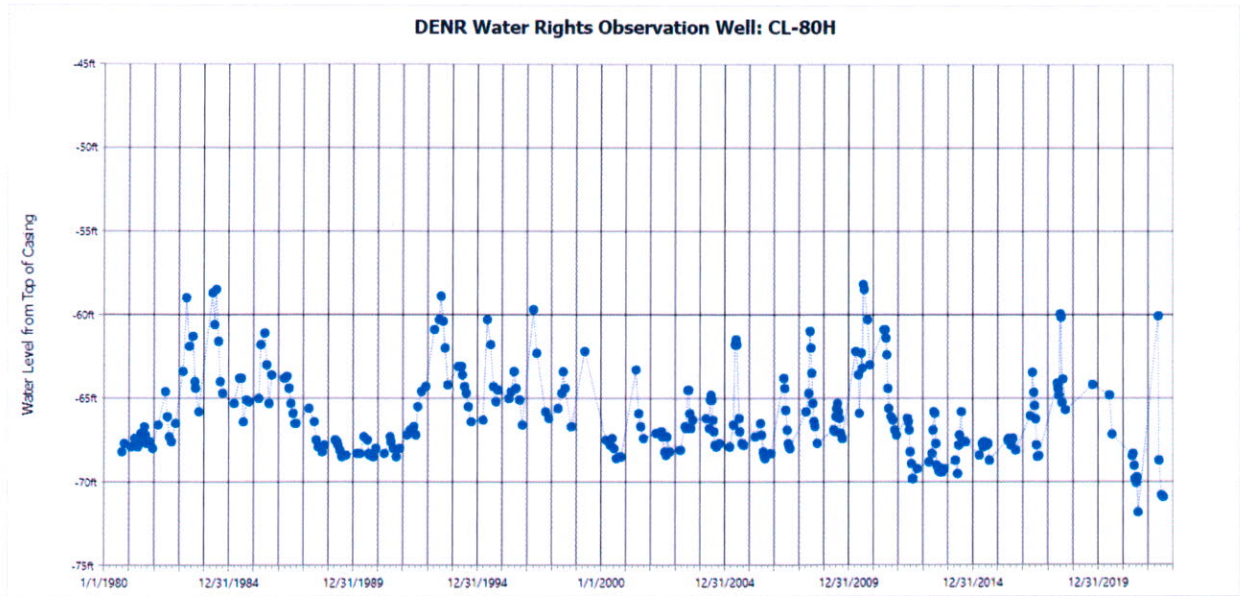
**Table 4.** List of water rights/permits withdrawals, new applications (if approved), and one-time use for application withdrawals from both the historic boundary of the LVM and current boundary of the LVM excluding the UVM:S delineated areas made by Buhler (2014) (Water Rights, 2023a)

|                                            | <b>Historical Boundary of the LVM Aquifer (Hedges and others, 1982) Pumpage (ac-ft/yr)</b> | <b>Historic Boundary of the LVM Aquifer (Hedges and others, 1982), Excluding UVM:S Aquifer Boundary (Buhler 2014) Pumpage (ac-ft/yr)</b> |
|--------------------------------------------|--------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------|
| Non-Irrigation Appropriation               | 1,224                                                                                      | 49                                                                                                                                       |
| Irrigation Appropriation (2012-2022)       | 3,015                                                                                      | 1,866                                                                                                                                    |
| New Permits (2022-2023)                    | 1,093                                                                                      | 1,093                                                                                                                                    |
| Pending Applications                       | 278                                                                                        | 278                                                                                                                                      |
| <b>Total</b>                               | <b>5,610</b>                                                                               | <b>3,386</b>                                                                                                                             |
| Application No. 8745-3 one-time use (2023) | 564                                                                                        | 564                                                                                                                                      |

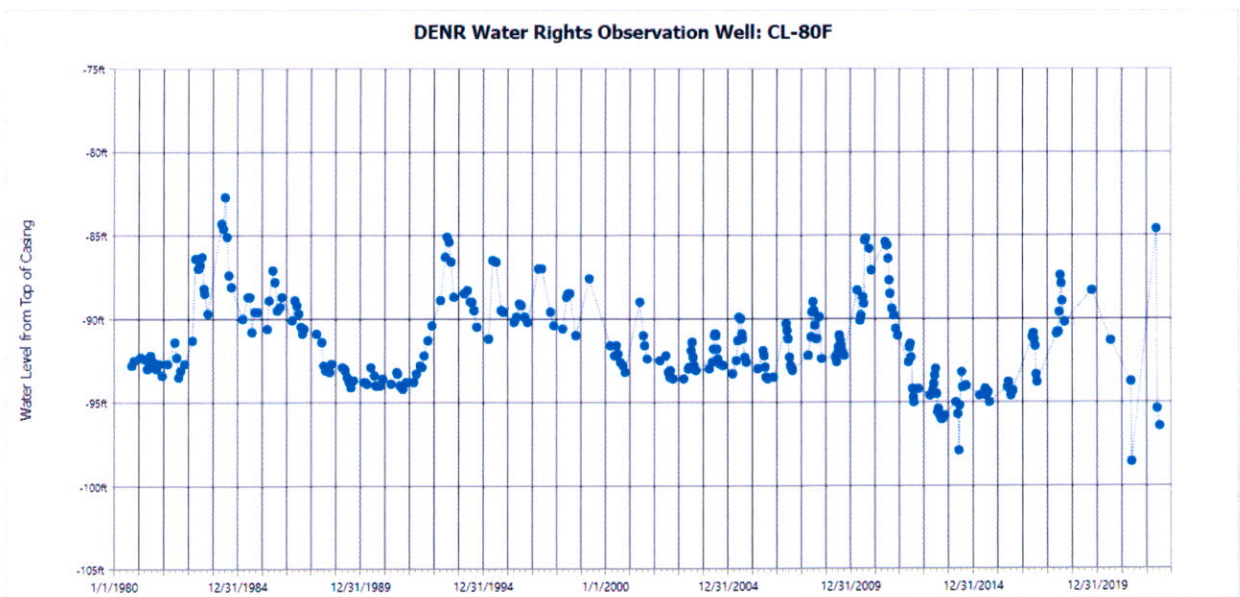
#### **OBSERVATION WELL DATA:**

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.

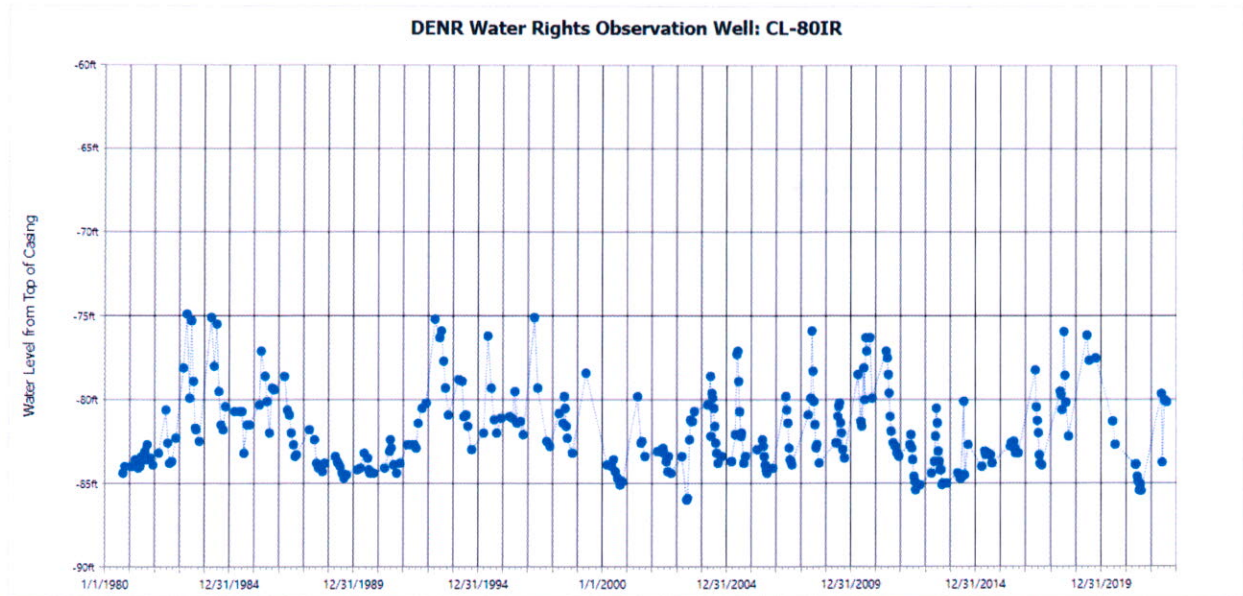
The DANR-Water Rights Program monitors ten observation wells completed into the LVM aquifer with two additional observation wells (CL-80J and CL-66AR) that are within both the historic aquifer boundary delineated by Hedges and others (1982) and Upper Vermillion Missouri: South aquifer boundary as defined by Buhler (2014), with observation wells in the area of this application shown on Figure 5 (Water Rights, 2023b). These observation wells provide data on how the aquifer reacts to regional climatic conditions and local pumping. The three closest observation wells to the diversion point are CL-80H (approximately 2.1 miles northwest), CL-80F (approximately 2.6 miles southeast), and CL-80IR (approximately 5.7 miles northwest) (Water Rights, 2023b). The hydrographs for these observation wells are displayed in Figures 2, 3, and 4 respectively (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.



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



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



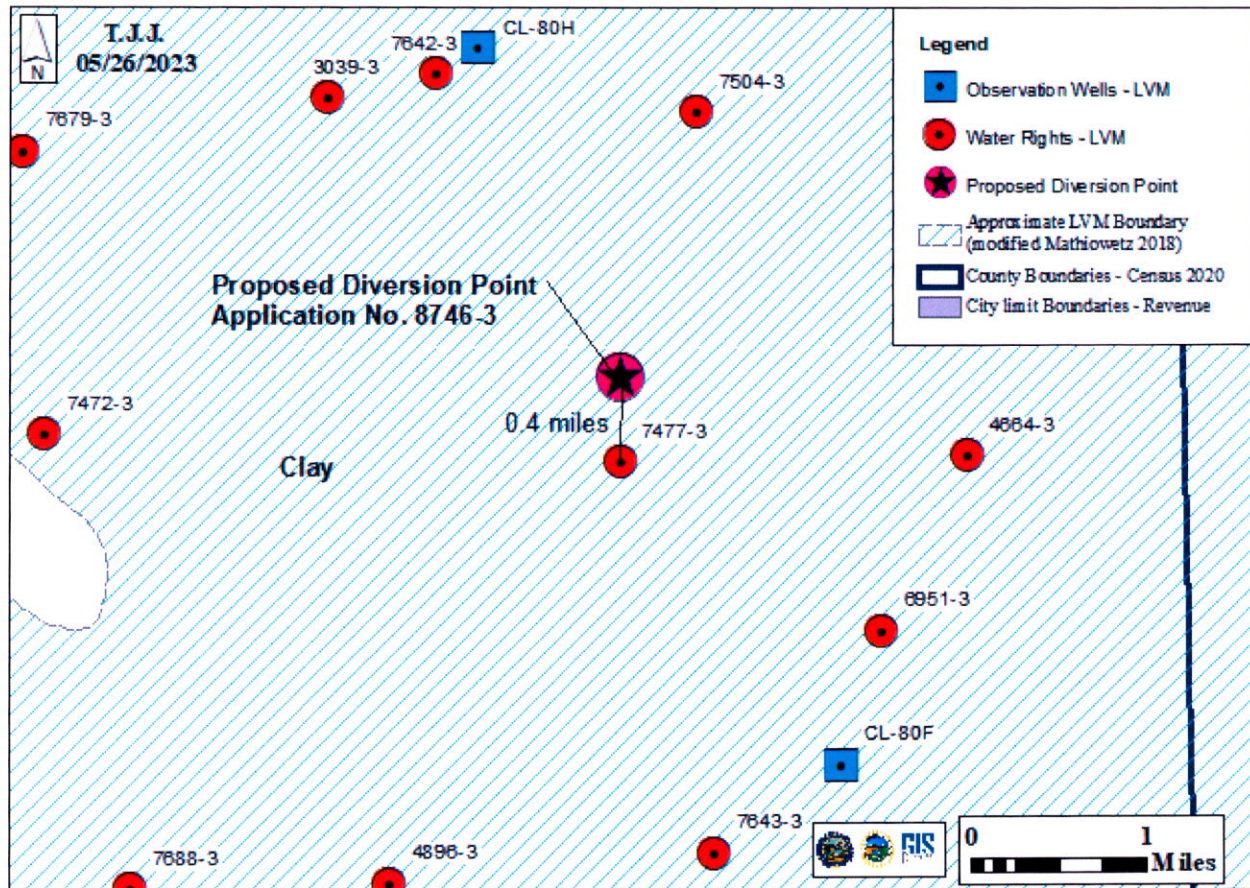
**Figure 4.** Hydrograph for observation well CL-80IR (Water Rights, 2023b)

A majority of the observation wells in the LVM aquifer have a stable trend in the water level, as seen in Figure 4. The data shown on Figures 2 and 3 shows a slight declining trend in recent years. There is a lot of localized pumping surrounding observation well CL-80H which could be the reason the water level was declining in recent years. Currently, there is no readily apparent reason for Figure 3 recent water level decline at this time. The hydrographs for the LVM aquifer observation wells 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 with water levels 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 waters levels in the aquifer rather than the impacts of pumping from the LVM 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.

#### **POTENTIAL FOR UNLAWFUL IMPAIRMENT OF EXISTING WATER RIGHTS:**

Water rights/permits in the general vicinity of the proposed well site for this application are shown in Figure 5 and summarized in Table 5. The closest water right/permit to the diversion point for this application, not held by the applicant, is Water Right No. 7477-3 which is held by Chad Heckathorn. The diversion point for Water Right No. 7477-3 is located approximately 0.4 miles south of the proposed diversion point for this application (Water Rights, 2023c). There are domestic wells on file with the DANR-Water Rights Program that are completed into the LVM aquifer, with the closest domestic well on file (not held by the applicant) approximately 1.5 miles south of the diversion point based on the legal description provided by the well driller on the

well completion report (Water Rights, 2023d). There could potentially be other domestic wells completed into the LVM aquifer near the diversion point that are not on file with the DANR-Water Rights Program. Another recent pending application (No. 8747-3), also held by the Mark D Nelson, is located approximately 0.5 mile southeast of this application's proposed diversion point.



**Figure 5.** Map of the proposed diversion point for Water Permit Application No. 8746-3 and nearby LVM aquifer water rights/permits and observation wells within 4 miles of the proposed diversion point (Water Rights, 2023b and 2023c).

**Table 5.** List of water rights/permits shown in Figure 5 (Water Rights, 2023c).

| Permit | Name/Business            | Priority   | Status  | Use Type   | CFS  | Acres |
|--------|--------------------------|------------|---------|------------|------|-------|
| 3039-3 | Ronald Alfred Johnson    | 09/01/1976 | License | Irrigation | 2.0  | 140   |
| 4664-3 | William O'Connor         | 03/05/1981 | License | Irrigation | 1.7  | 120   |
| 4896-3 | Margaret V Manning       | 03/31/1982 | License | Irrigation | 1.56 | 111   |
| 6951-3 | Verlyn Hybertson         | 01/22/2008 | License | Irrigation | 1.78 | 132   |
| 7472-3 | Paul Bremer              | 10/22/2012 | License | Irrigation | 1.78 | 134   |
| 7477-3 | Chad Heckathorn          | 10/22/2012 | License | Irrigation | 1.78 | 115   |
| 7504-3 | Steven Andrews           | 11/05/2012 | Permit  | Irrigation | 1.78 | 160   |
| 7642-3 | Tom Austin               | 01/16/2013 | License | Irrigation | 1.22 | 63    |
| 7643-3 | Thomas & Jaclyn Corio    | 01/16/2013 | License | Irrigation | 1.33 | 115   |
| 7679-3 | Scott Heritage Farms LLP | 02/04/2013 | Permit  | Irrigation | 1.67 | 125   |
| 7688-3 | Nicholas W Olson         | 02/06/2013 | License | Irrigation | 0.47 | 33    |

Based on the well completion reports near the proposed diversion point for this application, the LVM aquifer is expected to be under confined conditions at the proposed well site. In a confined aquifer, drawdown from a pumping well can extend some distance from the well. 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 LVM 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)), history of irrigation in the area without any recent complaints of well interference (Water Rights, 2023e), the lack of well interference complaints, the saturated aquifer thickness near the diversion point, any drawdown created from the diversion is not expected to cause an unlawful impairment on existing water right/permit holders or domestic users with adequate wells. Therefore, there is a reasonable probability that any interference from the proposed appropriation will not impose unlawful impairments on existing users with adequate wells.

**SDCL 46-5-6:**

Pursuant to SDCL 46-5-6, the diversion rate for an irrigation appropriation cannot be in excess of 1.0 cfs per 70 acres or “the equivalent thereof.” The statute does provide that: “The Water Management Board may allow a greater diversion, in volume or rate or both, if the method of irrigation, any time constraints on diversion of water, or the type of soil so requires...”

If approved, Water Permit Application No. 8746-3 would authorize a maximum instantaneous diversion rate of 1.78 cfs from one well for the irrigation of 115.89 acres. The map and application submitted by the applicant indicates the center pivot is only doing a partial rotation. A center pivot typically requires a certain diversion rate, 1.78 cfs in this case, to operate properly

regardless of swinging a partial or full circle, so the statutory rate limit might be exceeded when a pivot is not completing a full circle. This reasoning has been accepted by the Water Rights Program and the Water Management Board in the past.

## CONCLUSIONS:

1. Water Permit Application No. 8746-3 proposes to appropriate 1.78 cfs from one well to be completed into the Lower Vermillion Missouri aquifer (approximately 125 feet deep) located near the center of SE ¼ Section 9 for irrigation of 115.89 acres located in the SE ¼ Section 9; all in T93N-R51W. The site of interest is located approximately 7 miles north of Vermillion, SD in Clay County.
2. Based on observation well data and the hydrologic budget, there is a reasonable probability that unappropriated water is available from the LVM aquifer to supply the proposed appropriation.
3. There is a reasonable probability that the diversion by Water Permit Application No. 8746-3 will not unlawfully impair adequate wells for existing water rights/permits and domestic uses.
4. The applicant is requesting a diversion rate greater than statutory limit of 1 cfs per 70 acres to accommodate a center pivot doing a partial rotation. This is reasonable and has been accepted by the Water Management Board and the Water Rights Program in the past.



Tyler Jensen  
Natural Resources Engineer I  
SD DANR - Water Rights Program

Reviewed by:



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

## References

Buhler, K. A. 2014. Report to the Chief Engineer on 21 Water Permit Applications from the Upper Vermillion Missouri Aquifer. SD DANR – Water Rights Program, Joe Foss Bldg. Pierre, SD.

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- Water Rights, 2023e. County Files, SD DANR-Water Rights Program, Joe Foss Bldg, Pierre, SD.



**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.**

June 13, 2023

Mark D Nelson  
31079 467<sup>th</sup> Ave  
Vermillion SD 57069

Dear Mr. Nelson:

Water Permit Application Nos. 8746-3 and 8747-3 for irrigation use have been examined and found to comply with the South Dakota Water Laws and applicable rules. A notice has been sent to the Plain Talk printed at Vermillion SD (Ph # 605 624-2695) and the Daily Press & Dakotan printed at Yankton SD (Ph # 605 665-7811). You will need to contact the newspapers and authorize publication of this notice. For your information, a copy of the notice, the recommendation of the Chief Engineer and report on the application are enclosed. Please review the notice prior to publication and notify this office, if you have any corrections or questions.

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

Sincerely,

*Rachel Rodriguez*

Rachel Rodriguez  
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 NOS. 8746-3 & 8747-3 to Appropriate Water

Notice is given that Mark D. Nelson, 31079 467<sup>th</sup> Ave, Vermillion SD 57069 has filed the following applications for a water permit. Application No. 8746-3 proposes to appropriate 1.78 cubic feet of water per second (cfs) from one well to be completed into the Lower Vermillion Missouri Aquifer (approximately 125 feet deep) located near the center of the SE 1/4 Section 9 for irrigation of 115.89 acres located in the SE 1/4 Section 9; all in T93N-R51W. The applicant is requesting a diversion rate greater than the statutory limit of 1 cfs per 70 acres. This site is located approximately 7 miles north of Vermillion SD.

Application No. 8747-3 proposes to appropriate 1.78 cubic feet of water per second (cfs) from one well to be completed into the Lower Vermillion Missouri Aquifer (approximately 125 feet deep) located near the center of the NW 1/4 Section 16 for irrigation of 108.32 acres located in the NW 1/4 Section 16; all in T93N-51W. The applicant is requesting a diversion rate greater than the statutory limit of 1 cfs per 70 acres. This site is located approximately 6 miles north of Vermillion SD.

Pursuant to SDCL 46-2A-2, the Chief Engineer recommends APPROVAL of Application Nos. 8746-3 and 8747-3 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 recommendations with qualifications, the applications, and staff report are available at <https://danr.sd.gov/public> or contact Ron Duvall for this information, or other information, at the Water Rights Program address provided below.

Any person interested in opposing these applications or recommendations shall allege that the applications, upon approval, will cause injury to the person that is unique from any injury suffered by the public in general. The injury must concern a matter either within the regulatory authority found in SDCL 46-2A-9 for approval or denial of the applications, or other matter concerning the applications within the regulatory authority of the board to act upon as defined by SDCL 46-2-9 and 46-2-11, or both. Any person meeting the petitioner requirements and wishing to be a party of record in a contested case hearing shall file a written petition to oppose the applications with BOTH the applicant and Chief Engineer. A petition opposing the applications shall be filed on a form provided by the Chief Engineer. The petition form is available online at <https://danr.sd.gov/public> or by contacting the Chief Engineer. The Chief Engineer's address is "Water Rights Program, Foss Building, 523 E Capitol, Pierre SD 57501" or call (605) 773-3352. The applicant's mailing address is given above. If contesting the Chief Engineer's recommendations, the applicant shall also file a petition. A petition filed by either an interested person or the applicant must be filed by July 3, 2023.

The petition shall include a statement describing the unique injury upon approval of the applications on the petitioner, the petitioner's reasons for opposing the applications, 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 applications 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 July 3, 2023.

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

Published once at the total approximate cost of\_

**From:** Rodriguez, Rachel  
**Sent:** Tuesday, June 13, 2023 2:27 PM  
**To:** Kelly Kronaizl  
**Subject:** 8746-3 & 8747-3 Mark D Nelson - Public Notice  
**Attachments:** 8746-3 & 8747-3 public.short\_final.docx; FORM8.FRM.doc

Attached is a notice to be published on June 23, 2023.

Mark D. Nelson, 31079 467th Ave, Vermillion SD 57069, (605-670-1256) 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.

Thank you,

Rachel Rodriguez  
DANR | Program Assistant  
Rachel.Rodriguez@state.sd.us



**From:** Rodriguez, Rachel  
**Sent:** Tuesday, June 13, 2023 2:28 PM  
**To:** Michael Pietz  
**Subject:** 8746-3 & 8747-3 Mark D Nelson - Public Notice  
**Attachments:** 8746-3 & 8747-3 public.short\_final.docx; FORM8.FRM.doc

Attached is a notice to be published on June 23, 2023.

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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.

Thank you,

Rachel Rodriguez  
DANR | Program Assistant  
[Rachel.Rodriguez@state.sd.us](mailto:Rachel.Rodriguez@state.sd.us)



# AFFIDAVIT OF PUBLICATION

RECEIVED

JUL 05 2023

OFFICE OF  
WATER

PLAIN TALK

MARK NELSON  
31079 467TH AVE  
VERMILLION SD 57069

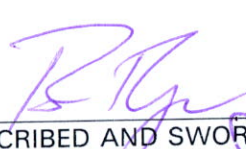
STATE OF SOUTH DAKOTA  
COUNTY OF CLAY

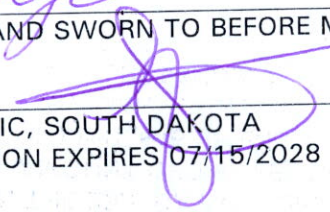
BETH RYE, BEING FIRST DULY SWORN ON OATH DEPOSES  
AND SAYS THAT (S)HE IS THE ADVERTISING DIRECTOR OF YANKTON  
MEDIA INC, A CORPORATION, THE PRINTER AND THE PUBLISHER OF THE  
PLAIN TALK, A LEGAL WEEKLY NEWSPAPER PUBLISHED AND CIRCULATED  
IN THE CITY OF VERMILLION, SAID COUNTY AND STATE, AND ONE OF  
THE OFFICIAL NEWSPAPERS OF THE SAID COUNTY OF FACTS STATED IN  
THIS AFFIDAVIT; THAT THE ANNEXED  
NOTICE OF APPLICATION NOS

TAKEN FROM THE PAPER, IN WHICH IT WAS LAST PUBLISHED IN THE  
NEWSPAPER ON THE 23rd DAY OF June, 2023  
THAT THE FULL AMOUNT OF THE FEE CHARGED FOR THE PUBLICATION  
OF SAID NOTICE TO WIT \$46.88 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: 06/23/2023

FILED ON: 06/23/2023

  
SUBSCRIBED AND SWORN TO BEFORE ME THIS 23rd DAY OF June, 2023

  
NOTARY PUBLIC, SOUTH DAKOTA  
MY COMMISSION EXPIRES 07/15/2028

Notice is given that Mark D. Nelson, 31079 467th Ave, Vermillion SD 57069 has filed the following applications for a water permit. Application No. 8746-3 proposes to appropriate 1.78 cubic feet of water per second (cfs) from one well to be completed into the Lower Vermillion Missouri Aquifer (approximately 125 feet deep) located near the center of the SE 1/4 Section 9 for irrigation of 115.89 acres located in the SE 1/4 Section 9; all in T93N-R51W. The applicant is requesting a diversion rate greater than the statutory limit of 1 cfs per 70 acres. This site is located approximately 7 miles north of Vermillion SD.

Application No. 8747-3 proposes to appropriate 1.78 cubic feet of water per second (cfs) from one well to be completed into the Lower Vermillion Missouri Aquifer (approximately 125 feet deep) located near the center of the NW 1/4 Section 16 for irrigation of 108.32 acres located in the NW 1/4 Section 16; all in T93N-51W. The applicant is requesting a diversion rate greater than the statutory limit of 1 cfs per 70 acres. This site is located approximately 6 miles north of Vermillion SD.

Pursuant to SDCL 46-2A-2, the Chief Engineer recommends APPROVAL of Application Nos. 8746-3 and 8747-3 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 recommendations with qualifications, the applications, and staff report are available at <https://danr.sd.gov/public> or contact Ron Duvall for this information, or other information, at the Water Rights Program address provided below.

Any person interested in opposing these applications or recommendations shall allege that the applications, upon approval, will cause injury to the person that is unique from any injury suffered by the public in general. The injury must concern a matter either within the regulatory authority found in SDCL 46-2A-9 for approval or denial of the applications, or other matter concerning the applications within the regulatory authority of the board to act upon as defined by SDCL 46-2-9 and 46-2-11, or both. Any person meeting the petitioner requirements and wishing to be a party of record in a contested case hearing shall file a written petition to oppose the applications with BOTH the applicant and Chief Engineer. A petition opposing the applications shall be filed on a form provided by the Chief Engineer. The petition form is available online at <https://danr.sd.gov/public> or by contacting the Chief Engineer. The Chief Engineer's address is "Water Rights Program, Foss Building, 523 E Capitol, Pierre SD 57501" or call (605) 773-3352. The applicant's mailing address is given above. If contesting the Chief Engineer's recommendations, the applicant shall also file a petition. A petition filed by either an interested person or the applicant must be filed by July 3, 2023.

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

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Published June 23, 2023.

# AFFIDAVIT OF PUBLICATION

RECEIVED

JUN 26 2023

OFFICE OF  
WATER

YANKTON DAILY PRESS AND DAKOTAN

MARK NELSON  
31079 467TH AVE  
VERMILLION 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  
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HAS BEEN AGREED TO BE PAID TO ANY PERSON WHOMSOEVER.

PUBLISHED ON: 06/23/2023

FILED ON: 06/23/2023

  
SUBSCRIBED AND SWORN TO BEFORE ME THIS 23rd DAY OF June, 2023

\_\_\_\_\_  
NOTARY PUBLIC, SOUTH DAKOTA  
MY COMMISSION EXPIRES 07/15/2028

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Published on June 23, 2023.

## Rodriguez, Rachel

---

**From:** Rodriguez, Rachel  
**Sent:** Tuesday, June 13, 2023 2:34 PM  
**To:** 'mdnelson71@gmail.com'  
**Subject:** 8746-3 & 8747-3 Mark D Nelson - Public Notice  
**Attachments:** 8746-3rec.pdf; 8747-3rec.pdf; Letter&Public Notice.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.

Thank you,

Rachel Rodriguez  
DANR | Program Assistant  
Rachel.Rodriguez@state.sd.us





**DEPARTMENT of AGRICULTURE  
and NATURAL RESOURCES**

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

JUL 26 2023

Mark D. Nelson  
31079 467<sup>th</sup> Avenue  
Vermillion SD 57069

Dear Mr. Nelson:

Enclosed are Water Permit Nos. 8746-3 and 8747-3 authorizing construction of your water diversion systems and beneficial use of the water, not exceeding the limits as specified in the Water Permits.

An application/license filing fee of \$1,050.00 was submitted per application. The correct fee for each permit is \$950.00. Therefore, 200.00 will be refunded to you. The refund check should be received within the next couple of weeks.

Form 10's, *Notice of Completion of Works and Application of Water to Beneficial Use*, are enclosed. Please return the completed forms after you have finished the systems and have put the water to beneficial use. An investigation can then be scheduled so the water licenses 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 Gonlund, Chief Engineer  
Water Rights Program  
(605) 773-3352

enclosures



**DEPARTMENT of AGRICULTURE  
and NATURAL RESOURCES**

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

STATE OF SOUTH DAKOTA       )  
                                              ) SS  
COUNTY OF HUGHES        )

**Affidavit of Public Notice  
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.:** 8746-3

**Name of Applicant:** Mark D. Nelson

**Date of Posting:** 6/21/2023

**Date of Removal:** 7/26/2023

Ron Duvall, Water Rights Permitting Administrator

7/21/23  
Date

Subscribed and sworn to before me, a notary public, this 31 day of July, 2023.

Notary Public - South Dakota

My commission expires:

**Rachel Rodriguez**  
**My Commission Expires**  
**May 16, 2029**

(SEAL)



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

---

Date Sept. 13, 2024

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

FROM:

Mark D. Nelson  
(name)  
31079 467<sup>th</sup> Ave.  
(address)  
Vermillion, SD 57069 1-605-670-1256  
(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. 8746-3 states that the water use system is to be constructed by  
July 3, 2028, and water is to be put to beneficial use by July 3, 2032.  
(date) (date)

The water use system was completed on Sept. 12, 2024.  
(date)

Applying the water to beneficial use was completed on Sept. 12, 2024.  
(date)

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

Mark D. Nelson  
(signature)





**DEPARTMENT of AGRICULTURE  
and NATURAL RESOURCES**

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

September 20, 2024

8746-3

Mark D Nelson  
31079 467<sup>th</sup> Ave  
Vermillion SD 57069

Dear Mr. Nelson:

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

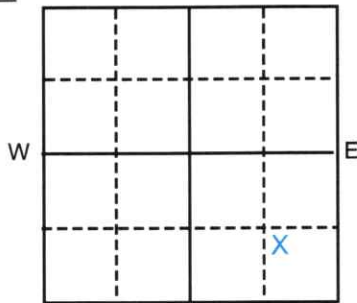
8746-3

## SOUTH DAKOTA WATER WELL COMPLETION REPORT

11-02

Location SE 1/4 SE 1/4 Sec 9 Twp 93 Rg 51County CLAY

North

Please mark well  
location with an "X"

Well Completion Date

08/22/2024

1 Mile

Well Owner: MARK NELSON

Business Name:

Address: 31079 467TH AVECity, State, Zip: VERMILLION ☒ SD ☒ 57069

## WELL LOG:

| FORMATION                    | DEPTH |     |
|------------------------------|-------|-----|
|                              | FROM  | TO  |
| TOP SOIL                     | 0     | 2   |
| CLAY BROWN /BLUE             | 2     | 71  |
| CLAY GRAY/WHITE- THIN GRAVEL | 71    | 78  |
| GRAVEL AND SAND LAYERS       | 78    | 102 |
| SAND-ORANGE/ THIN GRAVEL LAY | 102   | 151 |
| FINE GR. & SAND/ CLAY - COAL | 151   | 162 |
| GRAVEL MED/ COARSE           | 162   | 202 |
| SAND AND GRAVEL              | 202   | 229 |

STATIC WATER LEVEL 76 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: AIRLIFTED☐ Bailed☒ Other

Pumping Level Below Land Surface

103 Ft. After 2 Hrs. pumped 662 GPM

\_\_\_\_\_ Ft. After \_\_\_\_\_ Hrs. pumped \_\_\_\_\_ GPM

If pump installed, pump rate: \_\_\_\_\_ GPM

## REMARKS

GPS :N 42 53.0690 W 96 52.2040 12" IRR WELL SEC 9

This well was drilled under license # 475 and this  
report is true and accurate.Drilling firm: THEIN WELL COMPANY, INCORPORATED

Signature of License Representative:

Signature of Well Owner or Equitable Property Holder:

RECEIVED

OCT 21 2024

Date: \_\_\_\_\_

OFFICE OF  
WATER

## PROPOSED USE:

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

## METHOD OF DRILLING:

MUD ROTARY

## CASING DATA:

☐ Steel ☒ Plastic ☐ Other

If other describe \_\_\_\_\_

| PIPEWEIGHT  | DIAMETER     | FROM        | TO            | HOLE DIAMETER   |
|-------------|--------------|-------------|---------------|-----------------|
| _____ LB/FT | <u>12</u> IN | <u>0</u> FT | <u>140</u> FT | <u>18.75</u> IN |
| _____ LB/FT | _____ IN     | _____ FT    | _____ FT      | _____ IN        |
| _____ LB/FT | _____ IN     | _____ FT    | _____ FT      | _____ IN        |

## GROUTING DATA:

| Grout Type       | No. of Sacks | Grout Weight | From        | To            |
|------------------|--------------|--------------|-------------|---------------|
| <u>BENTONITE</u> | <u>33</u>    | _____ Lb/gal | <u>0</u> Ft | <u>135</u> Ft |
| _____            | _____        | _____ Lb/gal | _____ Ft    | _____ Ft      |

Describe grouting procedure \_\_\_\_\_

## SCREEN:

☐ Perforated pipe ☒ ManufacturedDiameter 12 Inches Length 40 FeetMaterial PVC SLOTTEDSlot Size .050 Set From 140 Feet to 180 FeetOther information STAINLESS STEEL 12" 20' .080 SLOT SET  
FROM 180 TO 200

## WAS A PACKER OR SEAL USED?

☐ Yes ☒ No

If so, what material? \_\_\_\_\_

Describe packer(s) and location \_\_\_\_\_

## DISINFECTION: Was well disinfected upon completion?

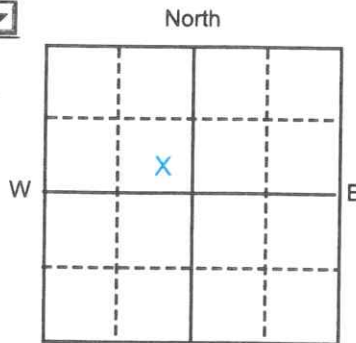
☐ Yes, How? \_\_\_\_\_☒ No, Why Not? \_\_\_\_\_Lab to which water  
quality sample sent for analysisIRRIGATION WELL

## SOUTH DAKOTA WATER WELL COMPLETION REPORT

11-02

Location SE 1/4 NW 1/4 Sec 16 Twp 93 Rg 51County CLAY

Please mark well location with an "X"



Well Completion Date

7/18/2024

1 Mile

Distance to nearest potential pollution source (septic tank, abandoned well, feed lot, etc.)?  
ft. from TEST HOLE ONLY (identify source)

## PROPOSED USE:

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

## METHOD OF DRILLING:

MUD ROTARY

## CASING DATA:

☐ Steel ☐ Plastic ☐ Other  
 If other describe \_\_\_\_\_

| PIPEWEIGHT | DIAMETER | FROM | TO | HOLE DIAMETER |
|------------|----------|------|----|---------------|
| LB/FT      | IN       | FT   | FT | 6.25 IN       |
| LB/FT      | IN       | FT   | FT | IN            |
| LB/FT      | IN       | FT   | FT | IN            |

## GROUTING DATA:

| Grout Type       | No. of Sacks | Grout Weight | From        | To            |
|------------------|--------------|--------------|-------------|---------------|
| <u>BENTONITE</u> | <u>16</u>    | Lb/gal       | <u>0</u> Ft | <u>200</u> Ft |
|                  |              | Lb/gal       | Ft          | Ft            |

Describe grouting procedure

## SCREEN:

☐ Perforated pipe ☐ Manufactured  
 Diameter \_\_\_\_\_ Inches Length \_\_\_\_\_ Feet  
 Material \_\_\_\_\_  
 Slot Size \_\_\_\_\_ Set From \_\_\_\_\_ Feet to \_\_\_\_\_ Feet  
 Other information \_\_\_\_\_
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?  
☒ No, Why Not? TEST HOLE  
 Lab to which water quality sample sent for analysis
Well Owner: MARK NELSON

Business Name:

Address: 31079 467TH AVECity, State, Zip: VERMILLION ☒ SD ☒ 57069

## WELL LOG:

| FORMATION        | DEPTH |     |
|------------------|-------|-----|
|                  | FROM  | TO  |
| SEE ATTACHED LOG | 0     | 200 |
|                  |       |     |
|                  |       |     |
|                  |       |     |
|                  |       |     |
|                  |       |     |
|                  |       |     |
|                  |       |     |
|                  |       |     |
|                  |       |     |
|                  |       |     |
|                  |       |     |
|                  |       |     |
|                  |       |     |

## STATIC WATER LEVEL

 If flowing: closed in pressure \_\_\_\_\_ FEET  
 GPM flow \_\_\_\_\_ through \_\_\_\_\_ PSI  
 Controlled by ☐ Valve ☐ Reducers ☐ Other \_\_\_\_\_ Inch pipe

Reduced flow rate \_\_\_\_\_ GPM

Can well be completely shut in?

## WELL TEST DATA:

☐ Pumped Describe:  
☐ Bailed  
☐ Other

Pumping Level Below Land Surface

\_\_\_\_\_ Ft. After \_\_\_\_\_ Hrs. pumped \_\_\_\_\_ GPM

\_\_\_\_\_ Ft. After \_\_\_\_\_ Hrs. pumped \_\_\_\_\_ GPM

If pump installed, pump rate: \_\_\_\_\_ GPM

## REMARKS

GPS : N 42 52.6520 W 96 52.7890 TH # 1 SEC 16

This well was drilled under license # 475 and this report is true and accurate.Drilling firm: THEIN WELL COMPANY, INCORPORATED

Signature of License Representative:

*Michael Thein*

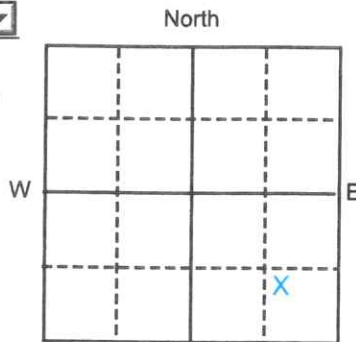
Signature of Well Owner or Equitable Property Holder:

RECEIVED

Date: OCT 21 2024OFFICE OF  
WATER

## SOUTH DAKOTA WATER WELL COMPLETION REPORT

11-02

Location SE 1/4 SE 1/4 Sec 9 Twp 93 Rg 51County CLAYPlease mark well  
location with an "X"

Well Completion Date

3/18/2024

1 Mile

Distance to nearest potential pollution source (septic tank, abandoned well, feed lot, etc.)?  
ft. from TEST HOLE ONLY (identify source)

## PROPOSED USE:

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

## METHOD OF DRILLING:

MUD ROTARY

## CASING DATA:

☐ Steel ☐ Plastic ☐ Other

If other describe

| PIPEWEIGHT | DIAMETER | FROM | TO | HOLE DIAMETER |
|------------|----------|------|----|---------------|
| LB/FT      | IN       | FT   | FT | IN            |
|            |          |      |    | <u>6.25</u>   |
| LB/FT      | IN       | FT   | FT | IN            |
| LB/FT      | IN       | FT   | FT | IN            |

## GROUTING DATA:

| Grout Type       | No. of Sacks | Grout Weight | From        | To            |
|------------------|--------------|--------------|-------------|---------------|
| <u>BENTONITE</u> | <u>19.5</u>  | Lb/gal       | <u>0</u> Ft | <u>240</u> Ft |
|                  |              | Lb/gal       | Ft          | Ft            |

Describe grouting procedure

## SCREEN:

☐ Perforated pipe ☐ Manufactured  
 Diameter \_\_\_\_\_ Inches Length \_\_\_\_\_ Feet  
 Material \_\_\_\_\_  
 Slot Size \_\_\_\_\_ Set From \_\_\_\_\_ Feet to \_\_\_\_\_ Feet  
 Other information
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?  
☒ No, Why Not? TEST HOLE  
 Lab to which water quality sample sent for analysis
Well Owner: MARK NELSON

Business Name:

Address: 31079 467TH AVECity, State, Zip: VERMILLION ☒ SD ☒ 57069

## WELL LOG:

| FORMATION                    | DEPTH |     |
|------------------------------|-------|-----|
|                              | FROM  | TO  |
| TOP SOIL                     | 0     | 2   |
| CLAY BROWN /BLUE             | 2     | 71  |
| CLAY GRAY/WHITE- THIN GRAVEL | 71    | 78  |
| GRAVEL AND SAND LAYERS       | 78    | 102 |
| SAND-ORANGE/ THIN GRAVEL LAY | 102   | 151 |
| FINE GR. & SAND/ CLAY - COAL | 151   | 162 |
| GRAVEL MED/ COARSE           | 162   | 202 |
| SAND AND GRAVEL              | 202   | 229 |
| CLAY AND SAND LAYERS         | 229   | 240 |

## STATIC WATER LEVEL

 If flowing: closed in pressure \_\_\_\_\_ FEET  
 GPM flow \_\_\_\_\_ through \_\_\_\_\_ PSI  
 Controlled by ☐ Valve ☐ Reducers ☐ Other \_\_\_\_\_ Inch pipe

Reduced flow rate \_\_\_\_\_ GPM

Can well be completely shut in?

## WELL TEST DATA:

☐ Pumped Describe:  
☐ Bailed  
☐ Other

Pumping Level Below Land Surface

\_\_\_\_\_ Ft. After \_\_\_\_\_ Hrs. pumped \_\_\_\_\_ GPM

\_\_\_\_\_ Ft. After \_\_\_\_\_ Hrs. pumped \_\_\_\_\_ GPM

If pump installed, pump rate: \_\_\_\_\_ GPM

## REMARKS

GPS :N 42 53.0690 W 96 52.2040 TH # 1 SEC 9This well was drilled under license # 475 and this report is true and accurate.Drilling firm: THEIN WELL COMPANY, INCORPORATED

Signature of License Representative:

*Michael Thein*

Signature of Well Owner or Equitable Property Holder:

RECEIVED

OCT 21 2024

Date:

OFFICE OF  
WATER

# Mark Nelson Vermillion SD Sec 9 & Sec 16

Legend

Mark Nelson TH 240' 3/18/2024 200' 12" Irr Well July 2024  
n 42 53.0690 w 96 52.2040

More test holes in this area Mark Nelson Fall 2024

Mark Nelson TH # 1 200' 7/18/2024

Google Earth

2000 ft



**Report of Examination of Works and/or Application of Water to Beneficial Use  
For Permit No. 8746-3**

I have this day, November 3, 2025, made a thorough examination of the water use systems owned by Mark Nelson, 31079 467<sup>th</sup> Ave., Vermillion, SD 57069, holder of Permit No. 8746-3, bearing the priority date of March 13, 2023. This permit authorizes the diversion of 1.78 cu. ft. per second of the waters of groundwater (Lower Vermillion Missouri Aquifer) authorizing the irrigation of 115.89 acres located in Clay County.

Inspection contacts: Mark Nelson

**A. Works used to divert the water:**

**Well Information**

- 1) Well Drilling Firm: Thein Well Company, Inc.
- 2) No. of Wells: 1
- 3) Depth(s): 200 feet
- 4) Well log is available: Yes

**Casing:**

- 1) Diameter: 12 inches
- 2) Length: 140 feet
- 3) Type: Plastic

**Screen:**

- 1) Diameter: 12 inches
- 2) Length: 40 feet
- 3) Type: PVC
- 4) Diameter: 12 inches
- 5) Length: 20 feet
- 6) Type: Stainless Steel
- 7) Static water level: 76 feet

**Pump:**

- 1) Make: Grundfos
- 2) Model: 800S600-3AA
- 3) Capacity: 800 GPM

**Motor:**

- 1) Make: Franklin
- 2) Model No.: 2366198125
- 3) Horsepower rating: 60 hp

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

- 1) Type: Aluminum      Size: 8 inches      Length: 15 feet

**C. Works used to apply water to beneficial use:****Center Pivot:**

- 1) Make: Zimmatic
- 2) Overall length: 1,300 feet
- 3) Number of towers: 7
- 4) End gun: Yes Range: 109 feet
- 5) Capacity: 810 GPM

**Chemigation Equipment:**

- 1) Does chemigate: No

**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: New in 2024
- 3) Exceptions to compliance are: None

**E. Condition and Location:**

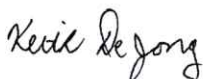
- 1) The system is in good condition with the point(s) of diversion located as follows:  
The well is 1,340 feet west and 1,340 feet north of the southeast corner of Section 9-T93N-R51W (Latitude 42.88451, Longitude -96.87009– NW1/4 of the SE1/4).
- 2) The works are capable of diverting and conveying to the places of use 1.80 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 9-T93N-R51W

|                   |                 |
|-------------------|-----------------|
| <u>NW1/4SE1/4</u> | <u>34 acres</u> |
| <u>NE1/4SE1/4</u> | <u>25 acres</u> |
| <u>SW1/4SE1/4</u> | <u>33 acres</u> |
| <u>SE1/4SE1/4</u> | <u>23 acres</u> |

comprising a total of 115 acres of land and the license should be issued for 1.78 cfs.

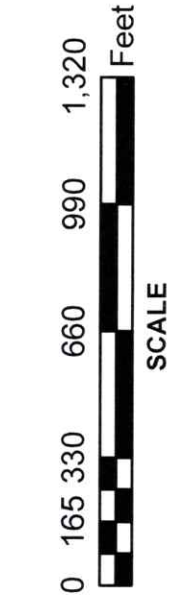
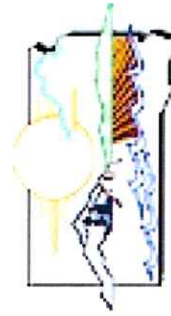
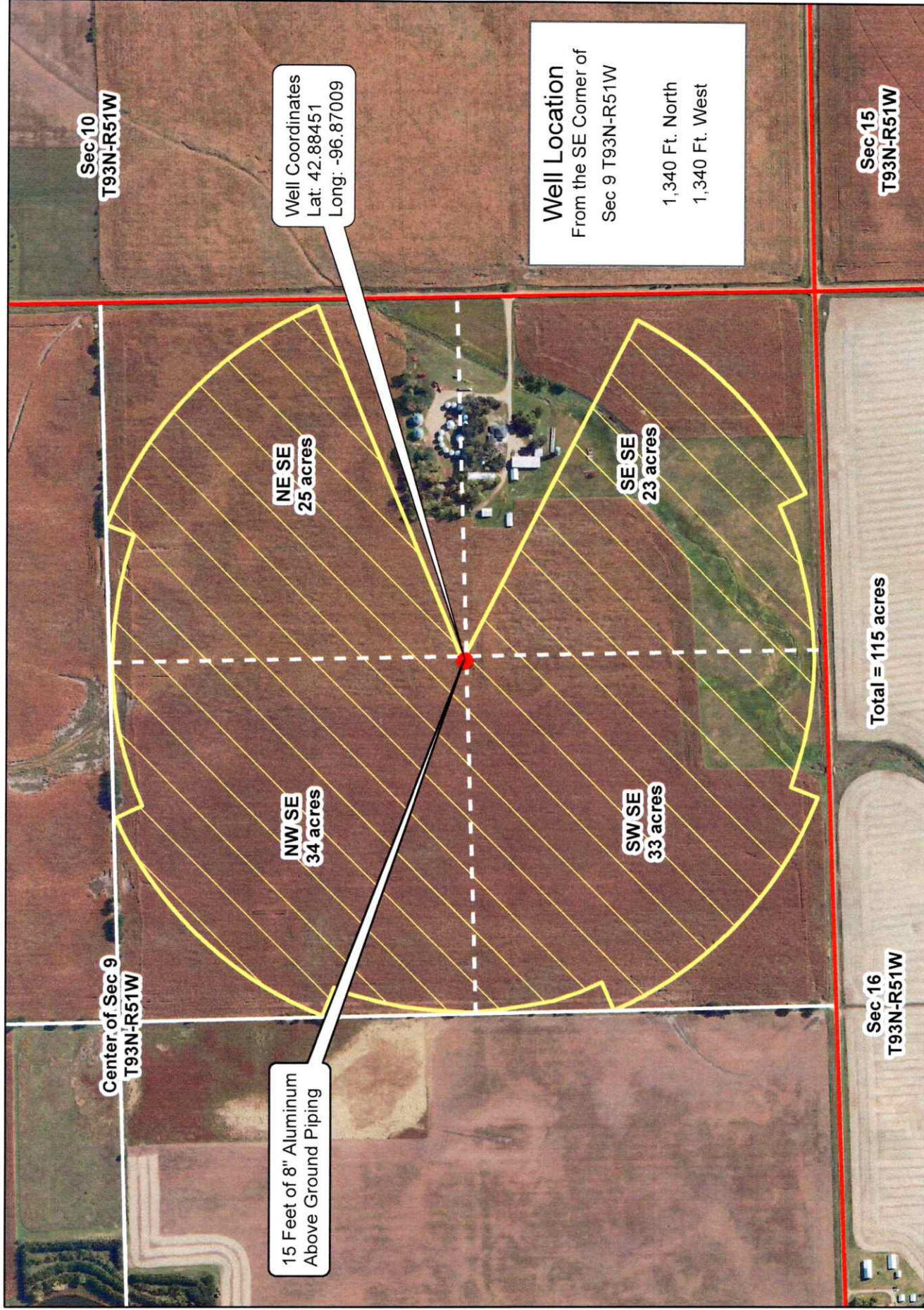
- 3) All structures, wells and lands on map: Yes

**F. Comments or other permit(s) associated with the project: The pump and motor information was obtained from Thein Well Company, Inc.**

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

Date report completed: November 4, 2025

# Water Permit No. 8746-3



*Keith DeJong*  
Keith DeJong, PE Ret.  
Staff Engineer  
November 3, 2025



**DEPARTMENT of AGRICULTURE  
and NATURAL RESOURCES**

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

**MAR 31 2026**

8746-3

Mark D Nelson  
31079 467<sup>th</sup> Ave  
Vermillion, SD 57069

Dear Mr. Nelson:

Enclosed is Water License No.8746-3. 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.

So 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 Amanda Dewell, Permitting Administrator (605) 773-3352.

Sincerely,

Adam Mathiowetz, PE  
Acting Chief Engineer  
Water Rights Program

enclosures

**STATE OF SOUTH DAKOTA**  
**WATER LICENSE NO. 8746-3**

---

(1) Mark D Nelson, 31079 467<sup>th</sup> Ave, Vermillion, SD 57069, made Application No. 8746-3, March 13, 2023, for a water permit to divert 1.78 cubic feet of water per second from groundwater, one well (Lower Vermillion Missouri Aquifer), Clay County, for irrigation purposes. Permit No. 8746-3, with a priority date of March 13, 2023, was approved on July 3, 2023, and issued to the applicant for diversion of water with construction of the described water supply system to be completed on or before July 3, 2028, and for the application to beneficial use of water on or before July 3, 2032.

The permit holder submitted a Notice of Completion of Works and Application of Water to Beneficial Use form on September 19, 2024. The Notice stated the diversion system was completed and water was placed to beneficial use on September 12, 2024.

(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 1.78 cubic feet of water per second for beneficial use. The location of the diversion point is:

- 1340 ft N & 1340 ft W of the SE corner Section 9-T93N-R51W (approx. center SE  $\frac{1}{4}$ )  
(Latitude 42.88451 & Longitude -96.87009)

(3) The amount of appropriation may not exceed 2 acre-feet annually for each acre of land to which water is actually and beneficially applied for irrigation purposes. The water is to be used during the following described annual period: May 1 – October 31.

(4) 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 9-T93N-R51W  
NW  $\frac{1}{4}$  SE  $\frac{1}{4}$  - 34 acres  
NE  $\frac{1}{4}$  SE  $\frac{1}{4}$  - 25 acres  
SW  $\frac{1}{4}$  SE  $\frac{1}{4}$  - 33 acres  
SE  $\frac{1}{4}$  SE  $\frac{1}{4}$  - 23 acres  
TOTAL: 115 acres

(5) Pursuant to South Dakota Water Law 46-5-30.1 Mark D Nelson, the holder and/or owner of Water Right No. 8746-3 is issued a license to appropriate water, the right to use 1.78 cubic feet of water per second from groundwater, one well (Lower Vermillion Missouri Aquifer), with a priority date of March 13, 2023, from the location 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. 8746-3 and subject to the following qualifications:

1. The well approved under Water Permit No. 8746-3 is 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.

*continued*

2. The well authorized by Permit No. 8746-3 shall be constructed by a licensed well driller and construction of the well and installation of the pump shall comply with Water Management Board Well Construction Rules, Chapter 74:02:04 with the well casing pressure grouted (bottom to top) pursuant to Section 74:02:04:28. *(The well was drilled in 2024 by Thein Well Co. Inc. A copy of the Well Completion Report is on file with the Water Rights Program.)*
3. Pursuant to SDCL 46-5-6 which allows a greater diversion rate if the method of irrigation, time constraints, or type of soils so requires, Permit No. 8746-3 authorizes a maximum diversion rate of 1.78 cfs for the irrigation of 115.89 acres with an annual volume not to exceed 2 acre feet of water per acre per year. *(The number of irrigated acres has been reduced to 115, based on the system as constructed.)*
4. This Permit is approved subject to the irrigation water use questionnaire being submitted each year.



---

Adam Mathiowetz, PE  
Acting Chief Engineer  
Department of Agriculture and Natural Resources

MAR 31 2026

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date

