

WATER PERMIT NO. 2784-2

Name of Applicant: Fall River Water Users District

Address: PO Box 321~~7~~, Oral SD 57766 Phone: 605 424-7648

Amount of Water Claimed: 1.5 cfs (~~1080~~ AF) Total Acres: NA

Source of Water Supply: groundwater (one well)

Water to be used for: rural water system use County: Custer

Type of Waste Disposal System:

Location: approximately 13 miles southwest of Hermosa

PRIORITY Date Received: 2-20-18 Application/License Fee: \$ 1650

Corrected Application Received: _____ Period of Annual Use: Jan 1 - Dec 31

Remarks:

Diversion Point: N 1/2 Sec 28-T4S-R7E

Land to be Irrigated:

Depth of Well: 2350 feet deep

Well Driller:

Remarks:

Type of Map: topo

Prepared by:

			⊗		
			28		

Reviewed and the Number Assigned on: 2-20-18

By: **Karen Schlaak**

Notice of Hearing - date to intervene: _____

**SOUTH DAKOTA
WATER PERMIT NO. 2784-2**

Date of first receipt of application February 20, 2018.

The Chief Engineer, on behalf of the Water Management Board, issues Water Permit No. 2784-2 to Fall River Water Users District, c/o Keith Neugebauer, Manager, PO Box 321, Oral SD 57766 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. 2784-2 appropriates 600 acre-feet of water annually at a maximum pump rate of 1.5 cubic feet of water per second from one well to be completed into the Madison Aquifer (approximately 2,350 feet deep) located in the NW 1/4 NE 1/4 Section 28-T4S-R7E which is approximately 12 miles southwest of Hermosa SD.
2. The water appropriated shall be used for the purpose of rural water system use serving users in Custer and Fall River Counties and may not exceed the amount of water needed for beneficial use.
3. The water is to be used during the following described annual period: January 1 – December 31.
4. The date of approval of Permit No. 2784-2 is June 11, 2018.
5. The date from which applicant may claim right is February 20, 2018.
6. One-fifth of the construction is to be completed on or before December 11, 2020.
7. All construction is to be completed on or before June 11, 2023.
8. Water is to be put to beneficial use on or before June 11, 2027.
9. Water rights obtained in compliance with the laws of the State of South Dakota may not be unlawfully impaired by this appropriation.

QUALIFICATIONS

1. In accordance with SDCL 46-1-14 and 46-2A-20, Permit No. 2784-2 is issued for a twenty year term. Pursuant to SDCL 46-2A-21, the twenty year term may be deleted at any time during the twenty year period or following its expiration. If the twenty year term is not deleted at the end of the term, the permit may either be cancelled or amended with a new term limitation of up to twenty years. Permit No. 2784-2 may also be cancelled for nonconstruction, forfeiture, abandonment or three permit violations pursuant to SDCL 46-1-12, 46-5-37.1 and ARSD 74:02:01:37.
2. The well will be located near domestic wells and other wells which may obtain water from the same aquifer and is in the vicinity of Grace Coolidge Spring, Battle Creek Spring and Beaver Creek Spring. The well owner, under these Permits shall control withdrawals so there is not a reduction of needed water supplies in adequate domestic wells or in adequate wells having prior water rights or a significant reduction of water flows from Grace Coolidge Spring, Battle Creek Spring and Beaver Creek Spring.

(continued)

3. The well authorized by Permit No. 2784-2 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.
4. Fall River Water Users District shall report to the Chief Engineer annually the amount of water withdrawn from the Madison aquifer.
5. Water Permit No. 2784-2 appropriates up to 600 acre feet of water annually.

WATER MANAGEMENT BOARD

By: *Jeanne Goodman*
Jeanne Goodman, Chief Engineer
Water Rights Program
Department of Environment and Natural Resources

JUN 15 2018
date



RECEIVED

FEB 20 2018

WATER RIGHTS
PROGRAM

Mail to: DENR - Water Rights 523 E Capitol Ave Pierre, SD 57501-3182 ph. (605) 773-3352	No. <u>2784-2</u> (office use only) Hydrologic Unit <u>10120109</u>
	Basin <u>Upper Cheyenne</u>
	Newspaper <u>Custer Co. Chronicle</u> <u>Hot Springs Star, Rapid City Journal</u>

Application For Permit To Appropriate Water Within The State Of South Dakota

Check use(s) of water:

- | | | | |
|---|--|--|--|
| ☒ Municipal | ☐ Water Distribution System | ☐ Recreational | ☐ Institutional |
| ☐ Rural Water System | ☐ Commercial | ☐ Fish & Wildlife | ☐ Geothermal |
| ☐ Domestic (over 18 gpm) | ☐ Industrial | ☐ Other | |

Type of Application:
(check one)

- ☒ New ☐ Vested Right (Use predates Mar 2, 1955) ☐ Future Use Reservation
- ☐ Place to Beneficial Use Water Reserved by Future Use Permit No. _____
- ☐ Amendment/Correction to Permit No. _____

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

1. Name to Appear on Water Permit Fall River Water Users DistrictMailing Address PO Box 321X (Address) Oral _____ SD 57766 (State) (Zip Code)Phone (605)424-7648 Mobile _____ Email keith.frwud@goldenwest.net2. Amount of water claimed 1.5 *CFS or 673 **GPM and 600 ***AF or _____ Gallons
Flow rate and volume are both required. (*Cubic Feet per Second) (**Gallons per Minute) (***)Acre Feet - storage capacity of dam/dugout or annual use)3. Source of water supply Madison Formation4. Location of point of diversion N 1/2 Sec 28, T 4S, R 7E (NW 1/4 NE 1/4) County Custer

(example - 3 wells in SW1/4 NE1/4 section 12-T104N-R53W)

If not a public water supply (e.g. municipal), will water be used outside of the area described above? ☒ Yes ☐ NoIf "Yes," where will water be used? Within Fall River Water Users District Boundaries

(example - NW1/4 section 12-T104N-R53W)

5. County or counties where water will be used Custer and Fall River Counties6. Annual period during which water is to be used Year Round January- December

7. Give a description of the project. When available include any preliminary engineering report or other reports or information that will help explain the project. (Attach sheet if more space is needed)

(See Attached)

I, Keith Neugebauer Manager, the applicant, certify under
Name of Person Title (if applicable)

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

Supplemental Information

(type or print)

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

- a) If new wells, how many 1 Have test holes been drilled ☐ Yes ☒ No Drilled by _____
(if yes, please provide copies of logs)
- b) If existing wells, how many 0 Provide copy of log(s), if available. Drilled by _____

For either Existing or Proposed Wells:

- c) Well Depth (required) 2350 Depth to Top of Water Bearing Material 2000 Depth to Water from Surface 200
- d) Distance to nearest domestic well on applicant's property 300' Property owned by others 1500'

2. Wastewater Disposal System Information

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

3. Dugout Information

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

4. Water Storage Dams

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

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

b) Freeboard _____

c) Crest Width _____

Crest Length _____

d) Height _____

e) Primary Outlet Capacity _____

If pipe, diameter _____

f) Secondary Spillway Capacity _____

Spillway Width _____

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

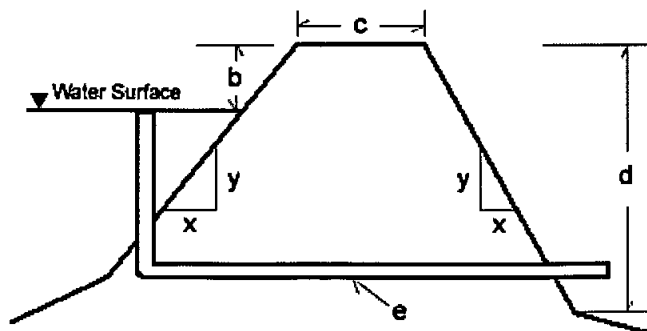
Upstream _____

Downstream _____

h) Surface Area of Impoundment _____

i) Storage _____ Acre Feet

j) Drainage Area Above Dam _____ Acres



RECEIPT

WATER RIGHTS PROGRAM

South Dakota Department of Environment and Natural Resources

Date February 20, 20 18

RECEIVED OF Fall River Water Users Dist. 27600 W Oral Road Oral, SD 57766

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

Fee for Application for Permit No. <u>2784-2</u> to Appropriate Water, to construct and to put water to beneficial use	1450	00
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>2784-2</u>	200	00
Fee for Filing Transfer Form _____		
Fee for _____		
Fee for Issuing New Well Driller's License No. _____ for C.Y. _____		
Fee for Renewal of Well Driller's License No. _____ for C.Y. _____		
Fee for Issuing Well Pump Installer's License No. _____ for C.Y. _____		
Fee for Renewal of Well Pump Installer's License No. _____ for C.Y. _____		
(Any Other Work Provided by Law)	TOTAL	1650 00

No. **08664**

By

Jeanne Goodman
Chief Engineer

vm



RECEIVED

FEB 20 2018

WATER RIGHTS
PROGRAM

ENGINEERING ASSOCIATES
CONSULTING ENGINEERS & SURVEYORS

July 7, 2009

Fall River Water User's District
P.O. Box 321
27600 West Oral Road
Oral, SD 57766

RE: Hydrogeologic Study Report
Fairburn and Angostura Area
Project No. 17109.00

Gentlemen:

Keith Neugebauer asked if I would review the potential for drilling another Madison well for the Fall River Water User's District. The two primary areas that he expressed interest in were near Fairburn, South Dakota (Sections 20 or 28, Township 4 South, Range 7 East) and near the Angostura Reservoir (Section 21, Township 9 South, Range 5 East). I concentrated on these two areas, but also performed a very cursory review of the general south and east flanks of the Black Hills.

From my review, the Fairburn area identified by Keith appears to be the most favorable and I spent significantly more time reviewing this area for that reason. I will briefly discuss my review of the potential for developing a Madison well at the Angostura site.

Angostura Reservoir Site (Section 21, Township 9 South, Range 5 East)

As you are aware, production from the Madison Aquifer is greatly dependent upon the presence of secondary permeability features (fractures, voids, caverns). Structural deformation (folding and faulting) are the two primary mechanisms for enhancing the Madison Aquifer's secondary permeability. In the proposed Angostura Reservoir location, structurally, it appears to be very favorable. The proposed well location in Section 21, T9S, R5E is shown in Figure 1. This well would be located just to the west of the mapped axis of the Cascade Anticline. The structural deformation in this area with the sharply folded syncline and the bifurcated plunging nose of the Cascade Anticline appears favorable for the development of fractures in the brittle Madison Formation.

The depth to the top of the Madison at the proposed well site shown in Figure 1 would be approximately 2,900 feet with a total depth to fully penetrate the Madison Formation of 3,200 feet. Of the three wells sites reviewed (two in the Fairburn area and this one) this is the deepest of the three. The potentiometric surface of the Madison Aquifer is estimated to be approximately 3,400 feet, and therefore at a depth of approximately 100 feet below ground level.

Page 1



The primary negative feature associated with this location is the estimated temperature of the produced groundwater from the Madison Aquifer. It is estimated that the temperature of the groundwater at this location would be greater than 50° C (>122° F) (Carter, et.al., 2003)

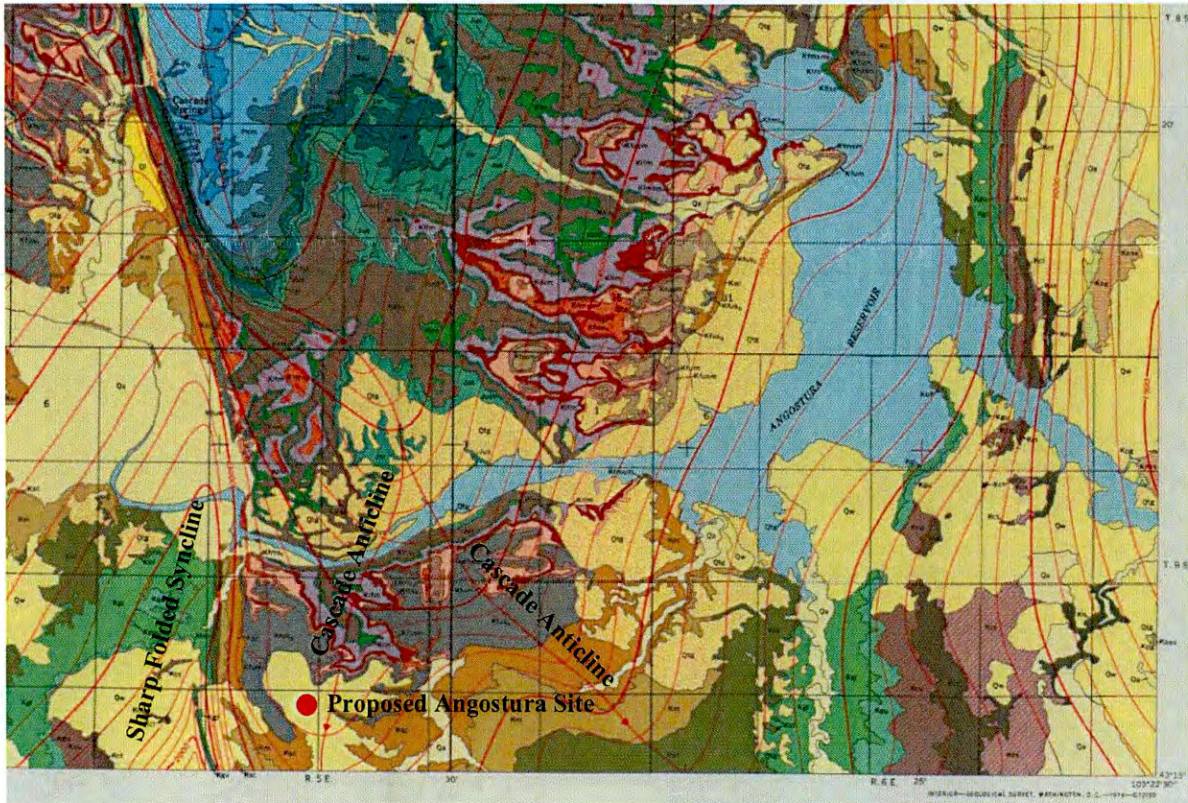


FIGURE 1
Modified From: Gott, et. all, 1974

Fairburn Site (Section 20 or 28, Township 4 South, Range 7 East)

The structural deformation of the Madison Aquifer in the location of the Fairburn well sites is less pronounced than that associated with the Angostura well location. However, because of the following reasons, the Fairburn site is favored:

- 1) Structural deformation appears to be present that will enhance the permeability of the Madison Aquifer;
- 2) The temperature of the groundwater produced from the Madison is estimated to be between 20° C and 30° C (68° F to 86° F); and



- The hypothesized structural deformation was based on several previously mapped features. The first is the mapped Red Hill Anticline that is located just to the northwest of the proposed well locations. Although this structural feature has not been mapped to extend beneath the two proposed well locations, it is reasonable to assume that some structural deformation is still present in the well areas due to the formation of the Red Hill Anticline (See Figure 2).





The second structural feature is a mapped lineament feature (Gott, et. al, 1974) that appears to be associated with a mapped gravity lineament. These are shown in figure 3.

The linear trend in the gravity map in association with the mapped lineament and the Pringle Fault, may indicate a zone of weakness where the Black Hills, in this area, has moved slightly disproportionately to that of the remainder of the east flank of the Black Hills structure. The presence and attitude of the Red Hill Anticline and the Dow Ridge Anticline, located to the south of the Red Hill Anticline may substantiate the differential movement theory. Most of the mountain front folds located at the toe of the east flank of the Black Hills generally trend along strike of the sedimentary beds, for example the Fairburn Anticline located immediately south of the Town of Fairburn (See Figure 2).

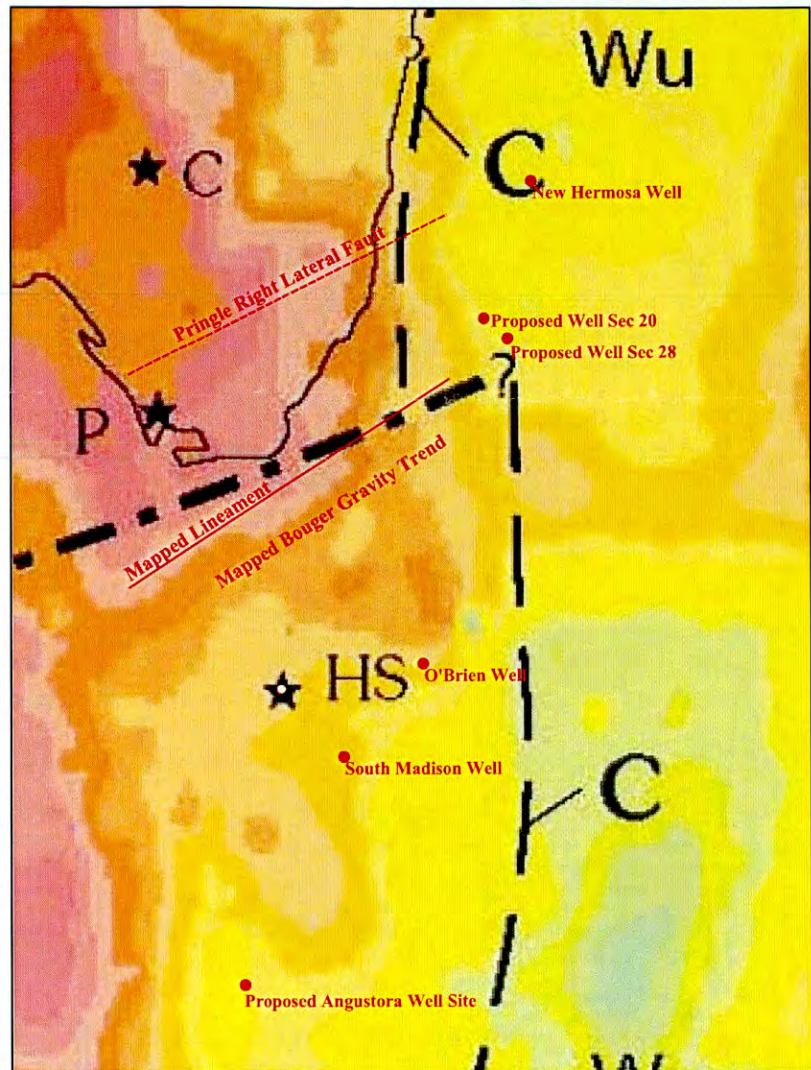


FIGURE 3
Modified From: Redden and DeWitt, 2008

The postulated differential movement along the lineament and Pringle Fault could have caused the northwest-southeast trending structures (Red Hill and Dow Ridge). The lineament feature is on trend with the proposed Fairburn site wells and may have deformed the Madison Formation and further enhanced the fracturing in the aquifer.

The Hermosa Water Users well, which was tested at over 600 gpm with approximately 500 feet of drawdown is located on trend with the mapped Pringle Fault. A review of the surface



geology in the area (Figure 4) shows that there are no mapped structures (faults or folds) in the immediate area of this well.

Due to the close proximity of the proposed Fairburn area wells to the outcrop, the temperature of the produced Madison Aquifer groundwater will be significantly lower than that of the Angostura Reservoir site. As mentioned previously, it is anticipated that the temperature of the water will be less than 86° F and possibly closer to 70° F. The cooler water will make it easier retain a chlorine residual level in the water supply.

Finally, the projected depths associated with these two well sites make the Fairburn site more appealing than the Angostura site. The well in Section 20, (see Figure 5) is estimated to require a well drilled to a depth of 1,950 feet to fully penetrate the Madison Aquifer. The projected depth to the top of the Madison Formation at this location is approximately 1,600 feet and the anticipated static water level of the Madison Aquifer in this well is estimated to be at a depth of 140 feet.

Based on the specific capacity associated with the Hermosa well, this well could be capable of producing over 500 gpm.

The proposed well in Section 28 is a little further down structure from the Section 20 well and will need to be slightly deeper and the produced water will be slightly warmer. The projected depth of a well fully penetrating the Madison Aquifer at this location is 2,350 feet with the anticipated top of the Madison at 2,000 feet. The static water level depth will be very close to that of the Section 20 well. Again, given the available drawdown with a cased well to a depth of 2,000 feet and a static water level of less than 200 feet, this well should also potentially be capable of producing over 500 gpm.

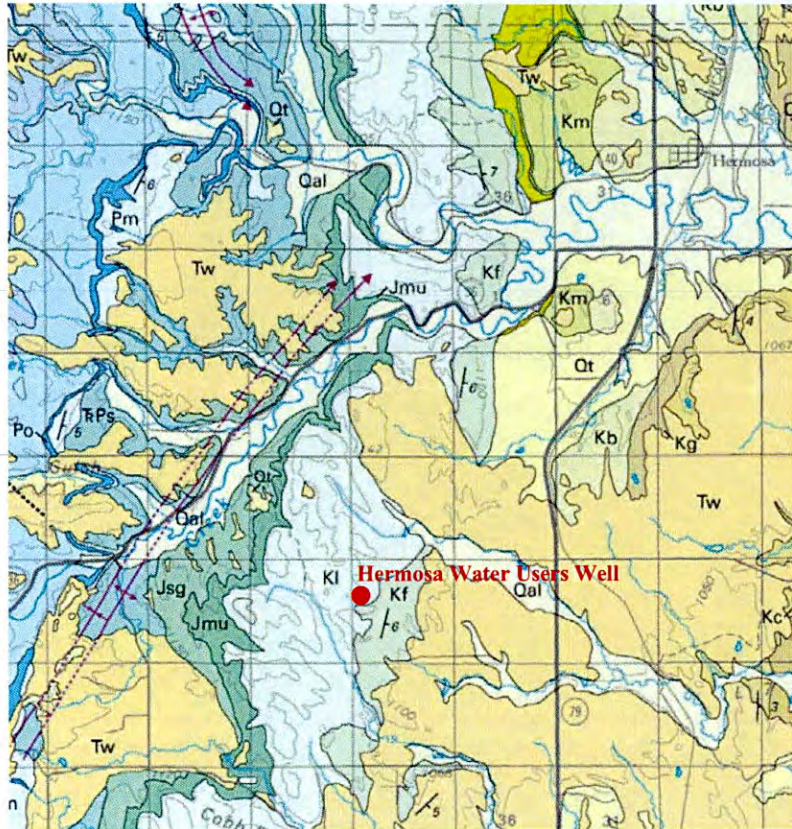


FIGURE 4

Modified From: Redden and DeWitt, 2008

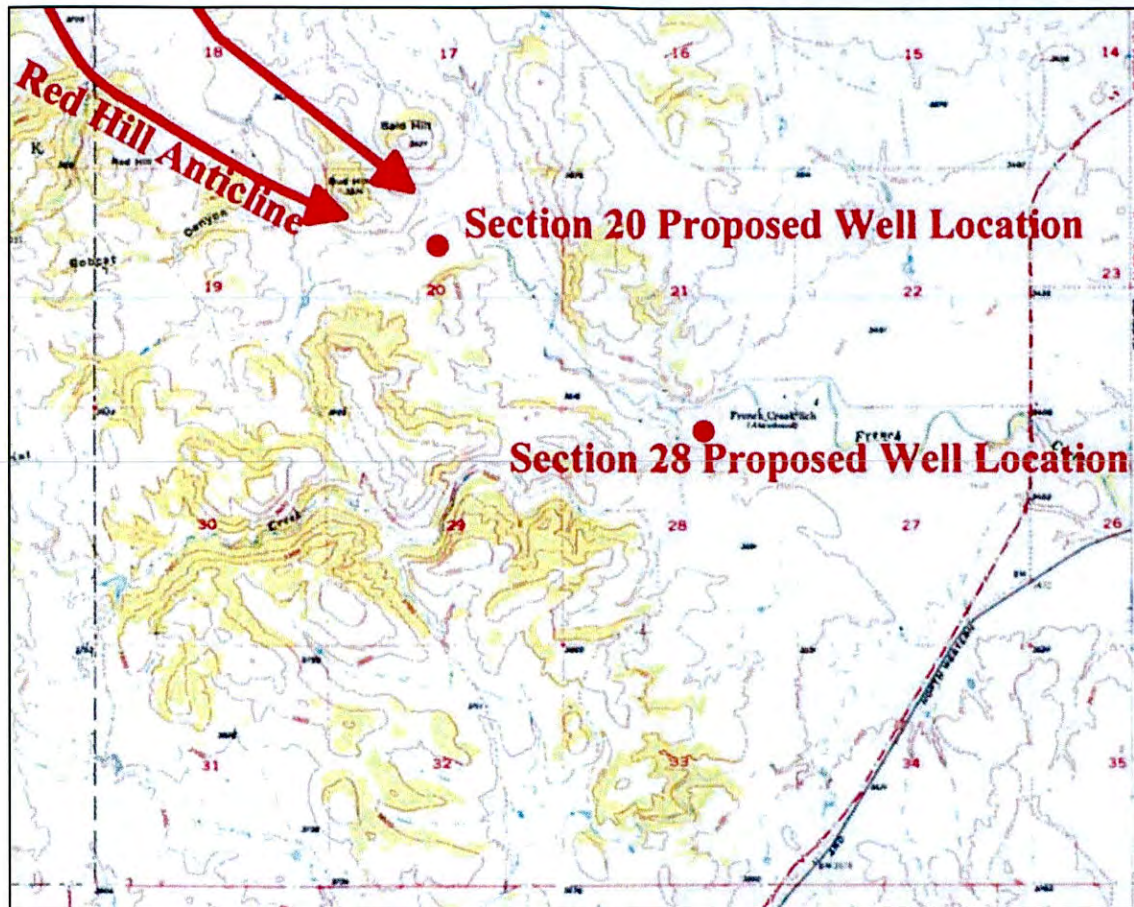


FIGURE 5

Proposed Well Design and Cost Estimate

The Fairburn site wells will not flow; therefore, the well casing should be sized large enough to allow the appropriate size pump to be installed. This could be as large as a 150 Hp pump. The drilling program will consist of drilling for and setting approximately 100 feet of surface casing. After the surface casing has been set and cemented in place, a 12¼-inch diameter borehole will be advanced to the top of the Madison Formation and will penetrate approximately 10-feet into the Madison Formation. After drilling the 12¼-inch borehole, a series of geophysical logs will be run to verify the top of the Madison Formation. At the conclusion of the logging runs, approximately 9⅝-inch O.D., API J- or K-55, 36 lb/ft casing will be run in and set and cemented in place. After the cement has been allowed to cure, an 8¾-inch borehole will be advanced through the entire section of the Madison. If a cavernous



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section is encountered, drilling may need to be curtailed prior to drilling the entire Madison section due to loss circulation concerns.

The presented costs in Table 1 and 2 were based on the cost for the recently drilled and completed well in Newcastle, Wyoming.

TABLE 1

Fairburn Section 20 Well Estimated Drilling Costs					
ITEM NO.	PAY ITEM	QUANTITY	UNIT	ENGINEER ESTIMATE	
				UNIT PRICE	ITEM TOTAL
1	Mobilization/Demobilization	1	LS	\$90,000.00	\$90,000.00
2	Bonds and Insurance	1	LS	\$20,000.00	\$20,000.00
3	Drill For, Furnish and Install Surface Casing	100	LF	\$225.00	\$22,500.00
4	Drill 12 1/4-inch Diameter Borehole	1510	LF	\$95.00	\$143,450.00
5	Conduct Geophysical Logging	1	LS	\$12,500.00	\$12,500.00
6	Furnish and Install 9 5/8-inch O.D. Casing	1602	LF	\$28.50	\$45,657.00
7	Cement 9 5/8-inch Casing in Place	1	LS	\$61,634.00	\$61,634.00
9	Drill 8 1/2-inch Diameter Borehole	350	LF	\$85.00	\$29,750.00
10	Conduct Geophysical Logging	1	LS	\$9,500.00	\$9,500.00
11	Well Development and Rig Time	24	HR	\$500.00	\$12,000.00
12	Air Development	16	HR	\$600.00	\$9,600.00
13	Standby Time	16	HR	\$350.00	\$5,600.00
14	Furnish, Install and Remove Pump Test Equipment	1	LS	\$20,000.00	\$20,000.00
15	Run Pump Test	80	HR	\$200.00	\$16,000.00
SCHEDULE TOTAL				\$498,191.00	

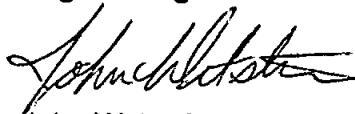


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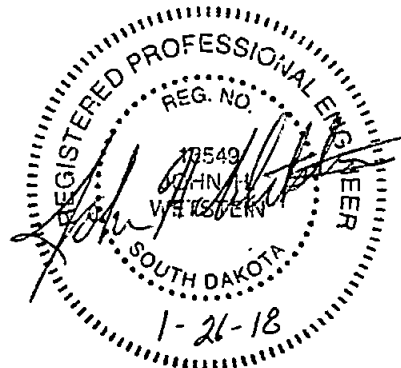
TABLE 2
Fairburn Section 28 Well
Estimated Drilling Costs

ITEM NO.	PAY ITEM	QUANTITY	UNIT	ENGINEER ESTIMATE	
				UNIT PRICE	ITEM TOTAL
1	Mobilization/Demobilization	1	LS	\$90,000.00	\$90,000.00
2	Bonds and Insurance	1	LS	\$20,000.00	\$20,000.00
3	Drill For, Furnish and Install Surface Casing	100	LF	\$225.00	\$22,500.00
4	Drill 12 1/2-inch Diameter Borehole	190	LF	\$95.00	\$18,145.00
5	Conduct Geophysical Logging	1	LS	\$2,500.00	\$2,500.00
6	Furnish and Install 9 1/2-inch O.D. Casing	2002	LF	\$28.50	\$57,057.00
7	Cement 9 1/2-inch Casing in Place	1	LS	\$61,634.00	\$61,634.00
9	Drill 8 1/2-inch Diameter Borehole	350	LF	\$85.00	\$29,750.00
10	Conduct Geophysical Logging	1	LS	\$9,500.00	\$9,500.00
11	Well Development and Rig Time	24	HR	\$500.00	\$12,000.00
12	Air Development	16	HR	\$600.00	\$9,600.00
13	Standby Time	16	HR	\$350.00	\$5,600.00
14	Furnish, Install and Remove Pump Test Equipment	1	LS	\$20,000.00	\$20,000.00
15	Run Pump Test	80	HR	\$200.00	\$16,000.00
SCHEDULE TOTAL				\$ 547,591.00	

Respectfully submitted,
Engineering Associates


John Wetstein

cc: Tim Barritt - TYVO





References

Strobel, Michael L, Joel M. Galloway, Ghaith R. Hamada and Gregory J. Jarrell, 2000, Potentiometric Surface of the Madison Aquifer in the Black Hills Area, South Dakota, U.S. Geological Survey Hydrologic Investigations Atlas HA-745 D.

Carter, Janet M., Daniel G. Driscoll and J. Foster Sawyer, 2003, Ground-Water Resource in the Black Hills Area, South Dakota, U.S. Geological Survey Water-Resources Investigations Report 03-4049.

Gott, Garland B., Don E. Wolcott and C. Gilbert Bowles, 1974, Stratigraphy of the Inyan Kara Group and Localization of Uranium Deposits; Southern Black Hills, South Dakota and Wyoming, U.S. Geological Survey Professional Paper 763.

Redden, Jack A. and Ed DeWitt, 2008, Maps Showing Geology, Structure, and Geophysics of the Central Black Hills, South Dakota, U.S. Geological Survey Scientific Investigations Map 2777.

Schlaak, Karen

From: Gronlund, Eric
Sent: Tuesday, February 20, 2018 8:24 AM
To: Mathiowetz, Adam (DENR); Schlaak, Karen
Cc: Duvall, Ron
Subject: FW: [EXT] water rights?

Will be getting an application from Fall River Water User District

From: Keith Neugebauer [mailto:keith.frwud@goldenwest.net]
Sent: Friday, February 16, 2018 4:26 PM
To: Gronlund, Eric
Subject: RE: [EXT] water rights?

Eric,

Thanks for the review and info. My board advised me to proceed with a new application for water at the site in Sec 28 in hopes that we would be getting further away from Wind Cave and Beaver Creek to minimize the potential impact to the water level in the Maddison in the Southern Hills. We would like to keep our future use permits as they are and were hoping to acquire an entirely new permit to drill and develop a well at the site discussed in the info I forwarded to you. I have filled out a new application for 1080 acre-feet and just stuck it in the mail today with a check along with a hard copy of my engineers review to start the application process. One thing to note to you and the Water Management Board is that we have had a problem with our South Well which I believe is permitted to 524 acre-feet but due to some restriction we can't feasibly pump more than 200 gpm of which added up to approximately 338 acre-feet last year. If it is a concern for the board we would consider reducing the appropriation of our South Well to 300 acre-feet annually but we are getting so far away my thought is the two wells would not impact each other. At this point it is all theory but the water district has some potential to expand but is in need of an additional water source to supply the future needs. We are hopeful this location will prove better than the other wells the district has developed and I look forward to working with you and the water management board. I understand the need to manage our resources to meet the needs of "public interest" and by no means do we want to effect the nearby stream flows or Wind Cave. We are open to suggestions to well locations that would minimize these impacts but hope to develop a well in a location with a high probability of good production. Please advise if there is more info needed or if you have any other ideas or locations we should look at.

Thanks,

Keith N.
FRWUD

From: Gronlund, Eric [mailto:Eric.Gronlund@state.sd.us]
Sent: Friday, February 16, 2018 2:26 PM
To: 'Keith Neugebauer'
Subject: RE: water rights?

Keith

Adam Mathiowetz and I both looked at the report on potential sites for wells to supply the Fall River Water Users District. This is a cursory look to see if there are any initial red flags. The true review will occur when an application is filed to appropriate water. Neither site (Angostura or Fairburn) appear to be within the future use area described by the

District's future use permit (Nos. 2560-2, 2560A-2 & 2560B-2) which reserves water from the Madison aquifer for contemplated needs. The first question is whether the District will want to amend the future use area again to one of these locations.

There are four criteria in state law that must be met in order to grant a water permit.

- 1) A reasonable probability that unappropriated water is available. The Madison aquifer has not been deemed fully appropriated. This is based on a regional assessment of availability based on estimated recharge versus withdrawal. Whether water is present in a sufficient quantity at a specific site will not fully known until a well is drilled. Although it certainly appears your consultant has worked towards finding a suitable site.

Also if the future use area is amended this becomes somewhat of a moot point in that the District would utilize water already reserved for use by the District.

- 2) Whether the proposed diversion be developed without unlawful impairment of existing rights. This will require review of known diversion in the area but adverse impacts are generally not anticipated
- 3) Whether the use is a beneficial use. Generally use by a rural water system has been deemed a beneficial use.
- 4) Whether the use is in the public interest. The public interest issue has come up in the past decade on a number of applications from the Madison aquifer in the southern Black Hills. The issue is whether withdrawals might have an adverse effect on area springs or the cave pools at Wind Cave. In the case of Southern Black Hills Water System (SBHWS) still deferred application at the "Streeter" site, the Water Management Board required an aquifer pump test to determine effects on Beaver Creek Springs and the cave pools prior to it acting on the permit. On SBHWS's future use permit there is a qualification that includes that there needs to be "particular attention given to the flows of Beaver Creek Springs, Cascade Springs and Hot Springs". On a permit obtained north of the Streeter site there is a qualification that the permit shall control withdrawals from the well so there is not a significant adverse effect of the water flow of Beaver Creek Springs or a significant adverse effect on the water quality and character in Beaver Creek Springs. Fall River Water User District's Permit No. 2560-2 and Future Use Permit No. 2629-2 includes similar language. I bring this up because the Water Management Board has shown sensitivity under the public interest criteria towards the potential impact to spring flows and that may need to be addressed.

Not sure I've necessarily answered your question but have attempted to give feedback on what goes into being able to grant a water right permit.

Eric Gronlund
Water Rights Program, DENR
605 773-3352
Eric.gronlund@state.sd.us

From: Keith Neugebauer [<mailto:keith.frwud@goldenwest.net>]
Sent: Tuesday, February 06, 2018 3:45 PM
To: Gronlund, Eric
Subject: [EXT] water rights?

Eric,

I am the manager for Fall River Water Users District and we are in the process of pursuing another water source for the district. We have had a cursory review done concerning possible locations to drill another well for the district and before we proceeded any further I wanted to reach out to you to gather any input you may have concerning the

permitting process and impact to other water rights. I have attached a short engineering report completed by our engineer and we are leaning toward the Fairburn Area and more toward S 20 R4 T7 site in Custer County. (See Attached). Thankyou in advance for any input and if you have any questions please let me know.

Thanks,

Keith Neugebauer

Fall River Water Users Dist.
PO Box 321
Oral SD 57766
(605)424-7648
(605)890-0434 cell

From: John H. Wetstein [<mailto:John.Wetstein@EAengineers.com>]
Sent: Friday, January 26, 2018 8:48 PM
To: keith.frwud@goldenwest.net
Cc: Tim Barritt
Subject: Fall River - Fairburn Area Hydrogeologic review

Keith,

Attached is my summary report of the Fairburn and Angostura areas.

John Wetstein
605 Plaza Ct (82070) | P.O. Box 2202 | Laramie, WY 82073
Phone: 307-742-9220 | Fax: 307-742-0316
John.Wetstein@EAengineers.com | <http://www.EAengineers.com/>



Code of the West

- 1 Live Each Day with Courage
- 2 Take Pride in Your Work
- 3 Always Finish What You Start
- 4 Do What Has to Be Done
- 5 Be Tough, But Fair
- 6 When You Make a Promise, Keep It
- 7 Ride for the Brand
- 8 Talk Less and Say More
- 9 Remember That Some Things Aren't For Sale
- 10 Know Where to Draw the Line

©2004 James P. Owen from his book *Cowboy Ethics*

Gronlund, Eric

From: Keith Neugebauer <keith.frwud@goldenwest.net>
Sent: Tuesday, February 20, 2018 2:55 PM
To: Gronlund, Eric
Subject: RE: [EXT] water permit application

Eric,

I would agree to the NW ¼ NE ¼ Sec 28-T4S-R7E. We are still negotiating a parcel to site the well so is this set in stone? I know we will end up within a ¼ section of this though if we are able to work out all the logistics.

On the quantity I wasn't sure on the calculations recommended to come up with the acre-ft to apply for so I calculated out the 1.5 cfs to equal 1086 but reduced the amount to equal an even number according to the application fees. I agree the possibility of us being able to produce that amount of water on an annual basis is unreasonable at that rate but thought it needed to match at least approximately. I would say that according to my calculations 600 acre-ft would service the needs of this expansion area and would agree to reduce the application to reflect this amount. Please let me know if you have any other question.

Thanks,

Keith N.
FRWUD

From: Gronlund, Eric [<mailto:Eric.Gronlund@state.sd.us>]
Sent: Tuesday, February 20, 2018 1:09 PM
To: 'Keith Neugebauer'
Subject: water permit application

Keith – DENR received the FRWUD's application in the mail.

Item No. 4 of the application indicates the proposed well to be in the N ½ Section 28-T4S-R7E. We will public notice the well to the quarter-quarter section. Based on the map this is the NW ¼ NE ¼ Section 28-T4S-R7E. Do you concur?

Item No. 2 on the application states the amount of water claimed on a diversion rate basis to be 1.5 cfs (673 gpm) and a volume of 1,080 acre feet of water annually. A direct conversion of continuous pumping at a rate 1.5 cfs over an entire year it 1,086 acre feet of water. I bring this up as normally a well is not operated continuously over the course of a year. There are obviously peak periods when the well is exercised more frequently than other times of the year. I am inquiring whether the 1,080 acre feet annual volume is a reasonable expectation of what FRWUD intends to place to beneficial use from the well.

It is common when a municipality or RWS converts from a diversion rate to an annual volume to apply a 60% pumping rule. Please let me know your thoughts on how FRWUD arrived at an annual volume of 1,080 acre feet.

Eric Gronlund
Water Rights Program, DENR
605 773-3352
Eric.gronlund@state.sd.us



**DEPARTMENT of ENVIRONMENT
and NATURAL RESOURCES**

JOE FOSS BUILDING
523 EAST CAPITOL
PIERRE SOUTH DAKOTA 57501-3182
<http://denr.sd.gov>

**RECOMMENDATION OF CHIEF ENGINEER FOR WATER PERMIT
APPLICATION NO. 2784-2, Fall River Water Users District**

Pursuant to SDCL 46-2A-2, the following is the recommendation of the Chief Engineer, Water Rights Program, Department of Environment and Natural Resources concerning Water Permit Application No. 2784-2, Fall River Water Users District, c/o Keith Neugebauer, Manager, PO Box 3211, Oral SD 57766.

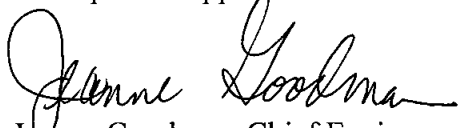
The Chief Engineer is recommending APPROVAL of Application No. 2784-2 with a 20 year term pursuant to SDCL 46-1-14 and 46-2A-20 because 1) although evidence is not available to justify issuing this permit without a 20 year term limitation, there is reasonable probability that there is unappropriated water available for the applicant's proposed use, 2) the proposed diversion can be developed without unlawful impairment of existing rights, 3) the proposed use is a beneficial use and, 4) it is in the public interest with the following qualifications:

1. In accordance with SDCL 46-1-14 and 46-2A-20, Permit No. 2784-2 is issued for a twenty year term. Pursuant to SDCL 46-2A-21, the twenty year term may be deleted at any time during the twenty year period or following its expiration. If the twenty year term is not deleted at the end of the term, the permit may either be cancelled or amended with a new term limitation of up to twenty years. Permit No. 2784-2 may also be cancelled for nonconstruction, forfeiture, abandonment or three permit violations pursuant to SDCL 46-1-12, 46-5-37.1 and ARSD 74:02:01:37.
2. The well will be located near domestic wells and other wells which may obtain water from the same aquifer and is in the vicinity of Grace Coolidge Spring, Battle Creek Spring and Beaver Creek Spring. The well owner, under these Permits shall control withdrawals so there is not a reduction of needed water supplies in adequate domestic wells or in adequate wells having prior water rights or a significant reduction of water flows from Grace Coolidge Spring, Battle Creek Spring and Beaver Creek Spring.
3. The well authorized by Permit No. 2784-2 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.
4. Fall River Water Users District shall report to the Chief Engineer annually the amount of water withdrawn from the Madison aquifer.

(continued)

5. Water Permit No. 2784-2 appropriates up to 600 acre feet of water annually.

See report on application for additional information.

A handwritten signature in black ink, reading "Jeanne Goodman". The signature is written in a cursive style with a large initial "J" and "G".

Jeanne Goodman, Chief Engineer

April 18, 2018

REPORT TO THE CHIEF ENGINEER
ON
WATER PERMIT APPLICATION NO. 2784-2
FALL RIVER WATER USERS DISTRICT
C/O KEITH NEUGEBAUER, MANAGER
APRIL 18, 2018

Water Permit Application No. 2784-2 proposes to appropriate 600 acre-feet (ac-ft) of water annually at a maximum diversion rate of 1.5 cubic feet of water per second (cfs) from one well to be completed into the Madison aquifer (approximately 2,350 feet deep) for rural water system use in Custer and Fall River Counties. The well is to be located in the NW ¼ NE ¼ Sec. 28-T4S-R7E in Custer County. The well site is approximately 4 miles west of Fairburn and 12 miles southwest of Hermosa.

AQUIFER: Madison (MDSN)

Aquifer Characteristics:

The Madison aquifer is a regional scale aquifer underlying portions of Montana, Nebraska, North Dakota, South Dakota, Wyoming, and Canada (Peterson, 1984). The Madison aquifer is contained within the Madison Limestone, locally known as the Pahasapa Limestone and the Englewood Limestone. The Madison aquifer underlies approximately 19,116,160 acres and contains an estimated 644,827,200 ac-ft of recoverable water in storage in western South Dakota (Allen et al, 1985), and underlies approximately 5,362 square miles and contains an estimated 51,512,300 ac-ft of recoverable water in storage in eastern South Dakota (Hedges et al, 1982).

Long and others (2012) stated the Madison aquifer is a “mature karst aquifer” that contains fractures and “solution-enlarged” cavities. The upper portion of the Madison Limestone generally has higher permeability due to the presence of more fractures and solution cavities than the lower portion (Green, 1993). The Madison Limestone is expected to be 300 feet thick in the area of the proposed well site (Carter and Redden, 1999a and 1999b). The top of the Madison aquifer is expected to be approximately 2,000 feet below ground surface at the proposed well site (Carter and Redden, 1999a; USGS, 1957). The static water level of the aquifer is expected to be between 100 and 200 feet below ground surface at the proposed well site (McKaskey, 2013; Wetstein, 2018). The Madison aquifer is under confined conditions at the proposed well site.

SOUTH DAKOTA CODIFIED LAW (SDCL) 46-2A-9

Pursuant to SDCL 46-2A-9, a permit to appropriate water may be issued only if there is a reasonable probability that there is unappropriated water available for this applicant’s proposed use, that the proposed diversion can be developed without unlawful impairment of existing rights and that the proposed use is a beneficial use and in the public interest. This report will address the availability of unappropriated water and effects on existing rights from the aquifer that are pertinent to this application.

WATER AVAILABILITY:

This application proposes to appropriate water from the Madison aquifer. The probability of unappropriated water 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 Madison aquifer is stratigraphically lower/older than the Greenhorn Formation and the applicant is a water distribution system as defined in SDCL 46-1-6(17). Therefore, a comparison of average annual recharge and average annual withdrawals from the Madison aquifer does not necessarily need to be performed for this application. However out of an abundance of caution, water availability will be examined.

Hydrologic Budget

Recharge

The Madison aquifer is recharged through infiltration of precipitation and through streamflow losses on the outcrop area. Carter and others (2001a) estimated the combined average annual recharge through streamflow losses and precipitation to the Madison and Minnelusa Aquifers to be 249,211 ac-ft/yr. They went on to say that about 55 percent (137,066 ac-ft/yr.) of the recharge went to the Madison aquifer and 45 percent (112,145 ac-ft/yr.) entered the Minnelusa aquifer (Carter et al, 2001a). Carter and others (2001a) stated that both aquifers received approximately the same precipitation recharge, but the Madison aquifer received a higher percentage of streamflow loss recharge due to its outcrop area being upgradient of the Minnelusa Formation's outcrop area.

Withdrawals:

Discharge from the Madison aquifer occurs through pumping of wells, and flow from headwater and artesian springs (Carter et al, 2001a). There are 150 water rights/permits authorized to withdraw water from the Madison aquifer, 8 future use permits reserving water from the Madison aquifer, 1 deferred application (Deferred Application No. 2585-2 for Southern Black Hills Water System), and 1 application held in abeyance (Application No. 2685-2 for Powertech (USA) Inc) that propose to use water from the Madison aquifer.

The majority of the water use is for non-irrigation purposes. Historically, the average annual water use by non-irrigation appropriations limited by instantaneous diversion rate has been less than 60 percent of full time pumping at the permitted diversion rate. The estimated average annual use by appropriations only limited by maximum diversion rate is less than 23,000 ac-ft/yr. There are also water rights/permits limited by an annual volume. It is assumed that permits limited by an annual volume will eventually develop the full volume. Appropriations limited by

an annual volume are estimated to pump approximately 20,250 ac-ft/yr. Future use permits reserve 12,189 ac-ft/yr. Deferred Application No. 2585-2 for Southern Black Hills Water System was deferred for the assessment of the potential impacts to Beaver Creek and the cave pools of Wind Cave National Park. If Deferred Application No. 2585-2 were to be approved it would be limited to pumping a maximum of 1,600 ac-ft/yr. Application No. 2685-2 for Powertech (USA) Inc is held in abeyance at the request of the applicant while the applicant completes the required federal permitting process. If approved as is, Application No. 2685-2 would be limited to pumping 888.8 ac-ft/yr. Combined, the estimated average annual non-irrigation pumpage, future use reservation, and proposed use is expected to be less than 58,000 ac-ft/yr.

There are 32 water rights/permits that include irrigation as a permitted water use. Kilts (2017) thoroughly examined the historic irrigation use from the Madison aquifer. Kilts (2017) calculated the estimated average annual use for irrigation purposes to be 1,035.7 ac-ft/yr. Since completion of Kilts' (2017) review, more irrigation data has not become available. However, Water Permit No. 2773-2 for Arrowhead Country Club has been approved for the irrigation of 100 acres. Assuming maximum water application, two feet of water on each acre, Water Permit No. 2773-2 will pump 200 ac-ft/yr. The sum of the potential use under Water Permit No. 2773-2, and the historic average annual irrigation use is 1,235.7 ac-ft/yr.

Carter and others (2001b) estimated average domestic and livestock water use from the Madison aquifer during water years 1987 to 1996 at about 2.25 percent of well withdrawals. This relatively small percentage is likely do to the high cost of constructing a Madison aquifer well except near the outcrop, and that once away from the outcrop area there are typically other overlying aquifers. Using Carter and others (2001b) estimated percentage of total pumping, domestic use from the Madison aquifer is expected to be less than 1,400 ac-ft/yr.

Hydrologic Budget

Carter and others (2001a) estimated the average annual recharge to the Madison aquifer to be 137,066 ac-ft/yr. The estimated non-irrigation appropriative use plus future use reservations plus potential use by a deferred application and an application held in abeyance water use is expected to be less than 58,000 ac-ft/yr. The average annual irrigation use plus maximum potential use of a new water permit is 1,235.7 ac-ft/yr. Domestic use from the Madison aquifer is expected to be less than 1,400 ac-ft/yr. That is a total of 60,635.7 ac-ft/yr., which is less than half of the estimated average annual recharge. This shows that on the whole the Madison aquifer is a huge resource that can likely sustain additional appropriation.

Localized Hydrologic Budget

Carter and others (2001b) developed hydrologic budgets for the Madison and Minnelusa aquifers combined in the Black Hills area for water years 1987 to 1996, and broke down both aquifers into nine sub-areas based on hydraulic flow paths to minimize flow across boundaries. The well site proposed by this application is located in sub-area 6 (Carter et al, 2001b). The well site proposed by this application is approximately four miles from the outcrop/recharge area of the Madison aquifer (see Figure 1). Figure 1 is a map of the project area including Madison aquifer water rights/permits and a background map of the Madison aquifer sub-areas from Carter and others (2001b). Table 1 is a list of the water rights/permits and future use permits shown in Figure 1. Table 2 is the hydrologic budget for sub-area 6 (Carter et al, 2001b).

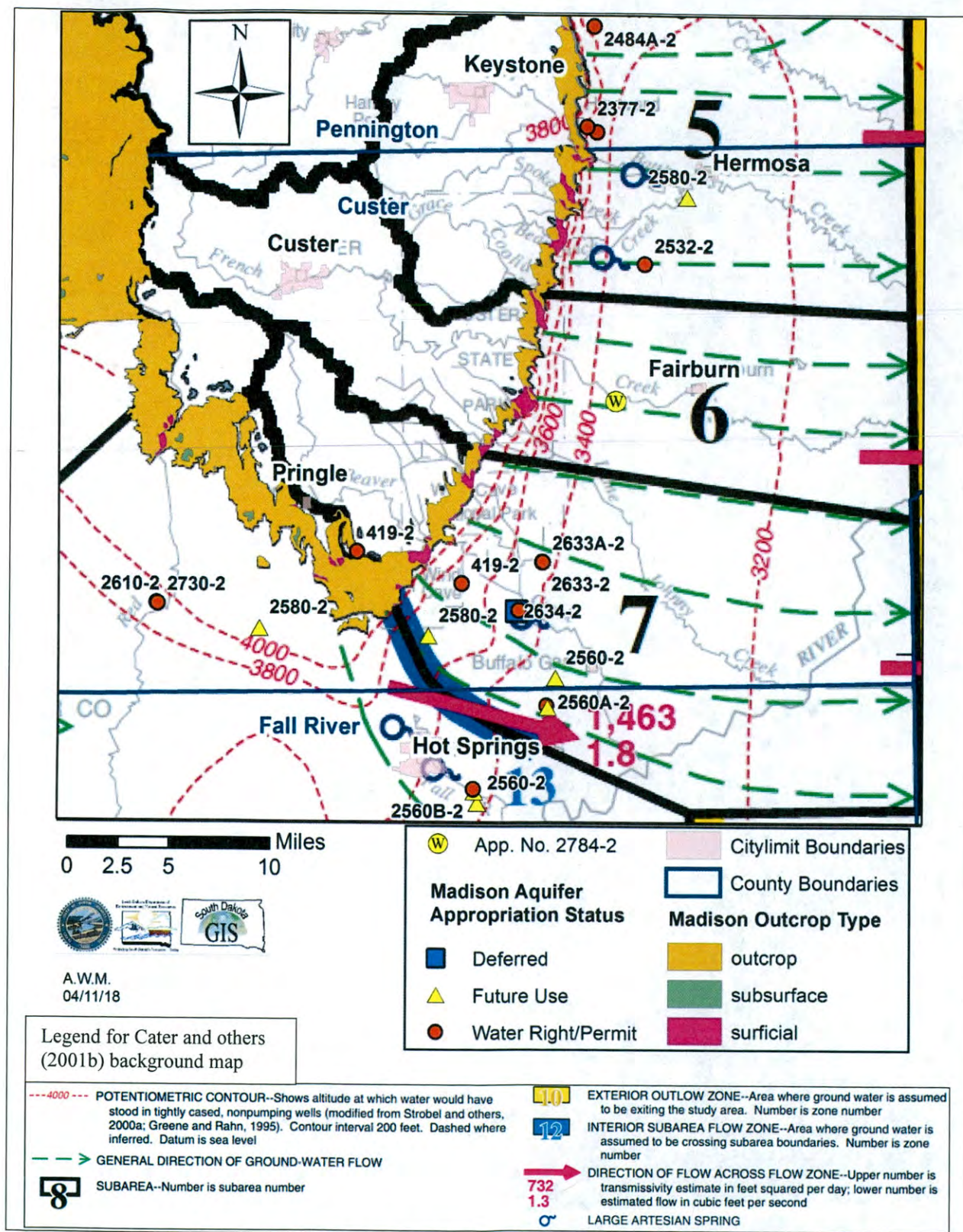


Figure 1- Map of the area near the proposed well site for Application No. 2784-2 including Madison aquifer water rights/permits and future use permits (Water Rights, 2018b), with background map of Madison aquifer sub-areas from Carter and others (2001b)

Table 1- Water rights/permits and future use permits shown in Figure 1 (Water Rights, 2018b)

PERMIT NO.	NAME	COUNTY	STATUS	USE	CFS	ACRES	PERMITTED VOLUME
419-2	WIND CAVE NATIONAL PARK	CU	LC	COM/IRR	0.15	6	N/A
2377-2	SOUTHERN BLACK HILLS WATER SYSTEM, INC	PE	LC	COM/SHD	0.333	N/A	N/A
2484A-2	PINE GROVE COMMUNITY WATER	PE	LC	SHD	0.392	N/A	N/A
2532-2	HERMOSA WATER USERS ASSN	CU	LC	RWS	1.11	N/A	N/A
2560-2	FALL RIVER WATER USERS DISTRICT	FR	FU	RWS	N/A	N/A	358
2560A-2	FALL RIVER WATER USERS DISTRICT	FR	FU	RWS	N/A	N/A	0
2560B-2	FALL RIVER WATER USERS DISTRICT	FR	FU	RWS	N/A	N/A	0
2580-2	SOUTHERN BLACK HILLS WATER SYSTEM	FR	FU	RWS	N/A	N/A	1,474
2585-2	SOUTHERN BLACK HILLS WATER SYSTEM	CU	DF	RWS	2.67	N/A	1,600
2610-2	ISAAC S JEFFS, TRUSTEE for UNITED ORDER OF SOUTH DAKOTA	CU	PE	SHD	0.21	N/A	N/A
2615-2	FALL RIVER WATER USERS DISTRICT	FR	LC	RWS	0.07	N/A	42
2629-2	FALL RIVER WATER USERS DISTRICT	FR	LC	RWS	0.72	N/A	524
2633-2	SOUTHERN BLACK HILLS WATER SYSTEM	CU	PE	RWS	0.67	N/A	484
2633A-2	SOUTHERN BLACK HILLS WATER SYSTEM	CU	PE	RWS	N/A	N/A	N/A
2634-2	STREETTER FAMILY LIMITED PARTNERSHIP	CU	LC	RWS	0.243	N/A	N/A
2730-2	ISAAC S JEFFS, TRUSTEE for UNITED ORDER OF SOUTH DAKOTA	CU	PE	DOM	0.236	N/A	60
CU= Custer, PE= Pennington, FR= Fall River, LC= Water Right, PE= Water Permit, DF= Deferred, FU= Future Use, Com= Commercial, IRR= Irrigation, SHD= Suburban Housing Development, REC= Recreational, RWS= Rural Water System, DOM= Domestic							

Table 2- Hydrologic budget for sub-area 6 for Water Years 1987-1996 near the proposed well site for Application No. 2784-2 (modified from: Carter et al, 2001b)

Stream-flow recharge	Precipitation Recharge	Minnelusa Groundwater Inflow	Madison Groundwater Inflow	Minnelusa Groundwater Outflow	Madison Groundwater Outflow	Artesian Spring-flow	Well Withdrawals
7.4 cfs	0.9 cfs	0.8 cfs	0 cfs	6.3 cfs	2.8 cfs	0 cfs	0 cfs
5,357 ac-ft/yr.	652 ac-ft/yr.	579 ac-ft/yr.	0 ac-ft/yr.	4,561 ac-ft/yr.	2,027 ac-ft/yr.	0 ac-ft/yr.	0 ac-ft/yr.

There are no appropriative users (Water Rights, 2018b) from the Madison aquifer in Carter and others (2001b) sub-area 6. Currently, all use from sub-area 6, as defined by Carter and others (2001b), is for domestic purposes. There are a number of domestic wells on file with the DENR-Water Rights Program within the boundaries of sub-area 6 as defined in Carter and others (2001b) that appear to be completed into the Madison aquifer (Water Rights, 2018c). Carter and others (2001a) stated the Madison aquifer typically receives 55 percent of the total recharge to the Madison and Minnelusa aquifers. That means the Madison aquifer portion of the combined stream-flow and precipitation recharge (6,009 ac-ft/yr.) is 3,305 ac-ft/yr. This application is

proposing to appropriate 600 ac-ft/yr. from the Madison aquifer. Therefore, there is a reasonable probability unappropriated water is available for this proposed appropriation.

Observation Well Data:

Administrative Rule of South Dakota Section 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 DENR-Water Rights Program monitors 25 observation wells completed into the Madison aquifer (Water Rights, 2018a). Figure 2 shows Madison aquifer observation wells and water rights/permits within approximately 13 miles of the well site proposed by this application (Water Rights, 2018a and 2018b). The water rights/permits shown in Figure 2 were previously listed in Table 1. Figures 3, 4, and 5 show the hydrographs for CU-93A, CU-91A, and PE-95A, respectively.

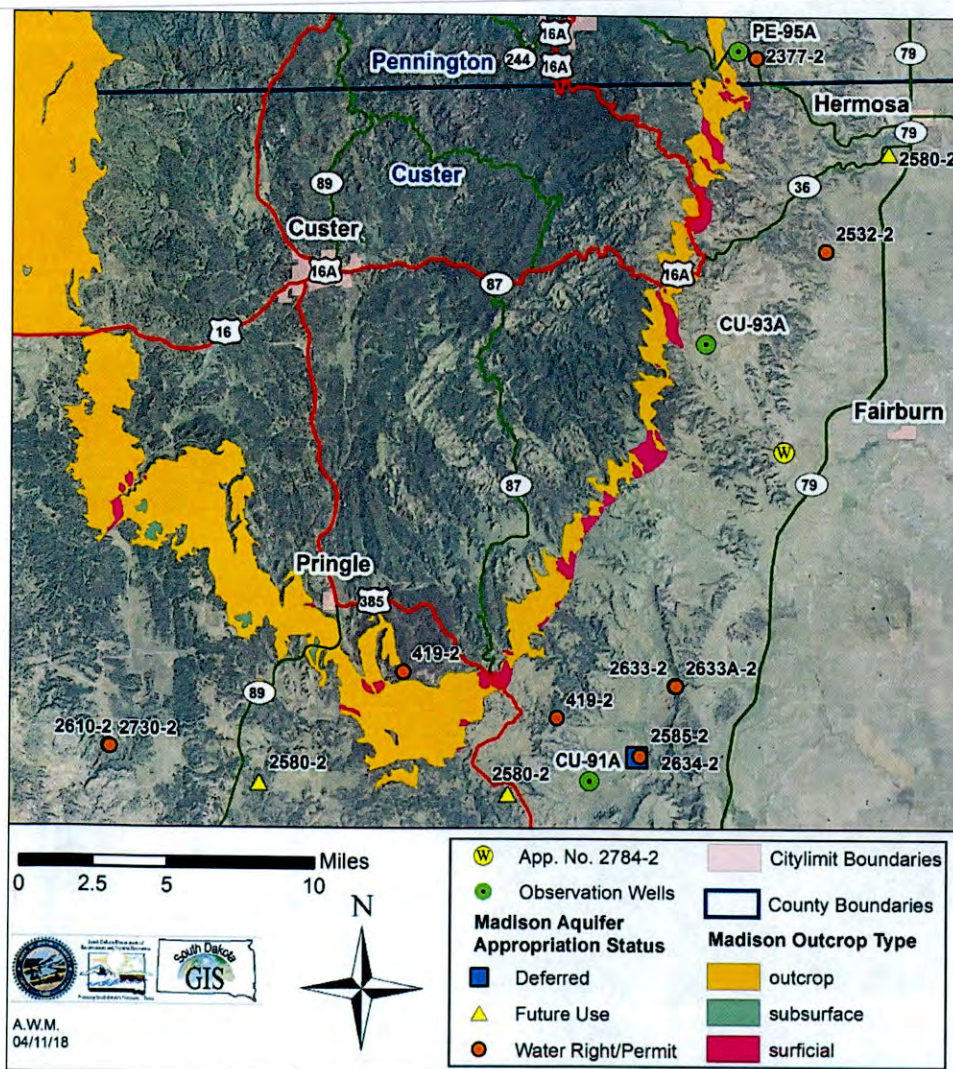


Figure 2- Map of Madison aquifer observation wells and water rights/permits (Water Rights, 2018a and 2018b), and Madison outcrop by type (Carter and Redden, 1999a)

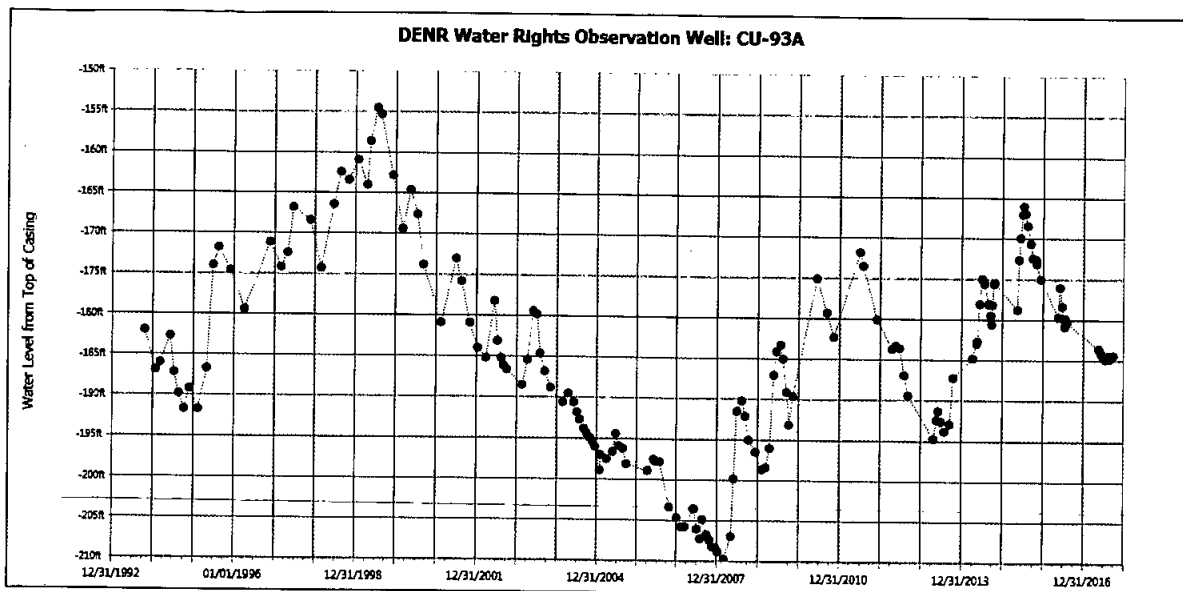


Figure 3- Hydrograph for DENR observation well CU-93A, located approximately 4.5 miles northwest of the proposed well site (Water Rights, 2018a)

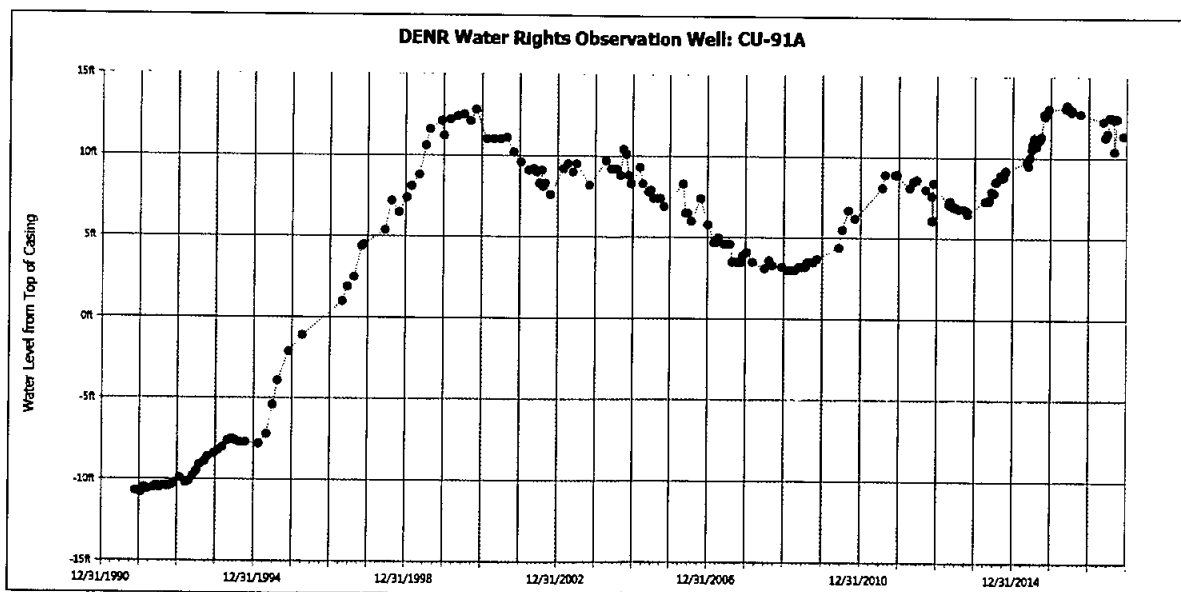


Figure 4- Hydrograph for DENR observation well CU-91A, located approximately 12.8 miles southwest of the proposed well site (Water Rights, 2018a)

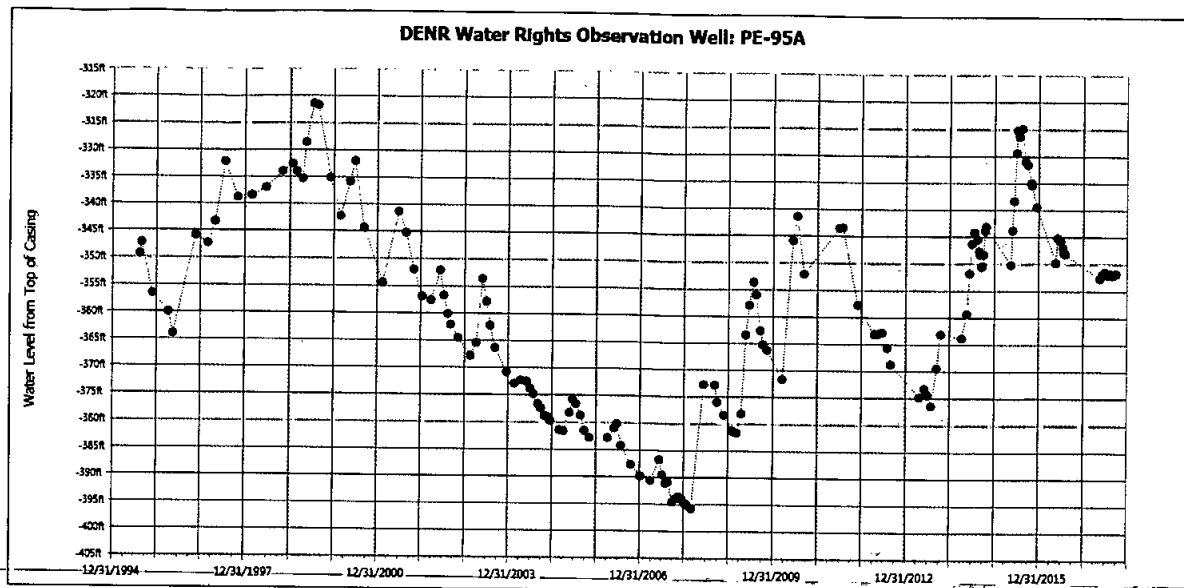


Figure 5- Hydrograph for DENR observation well PE-95A, located approximately 13.4 miles north of the proposed well site (Water Rights, 2018a)

These three hydrographs are representative of the hydrographs for the other DENR Madison aquifer observation wells. The hydrographs show the aquifer's response to climatic condition and clearly demonstrates the aquifer receives recharge. The water levels rise during wetter periods and slowly decline during drier periods. Any effects on the water levels of the aquifer caused by pumping are temporal. Overall, the effects of climatic conditions dominate changes in water levels in the Madison aquifer. This means recharge to and natural discharge from the aquifer significantly exceeds well withdrawals. Recognizing natural discharge along with recharge can be captured for pumping, the observation well data document there is unappropriated water available for this proposed appropriation. The observation well data support the hydrologic budget data.

EXISTING WATER RIGHTS:

As shown in Figures 1 and 2, the nearest well authorized by a water right/permit to withdraw water from the Madison aquifer is the well authorized by Water Right No. 2532-2 for the Hermosa Water Users Association approximately 6.8 miles north of the proposed well site (Water Rights, 2018b). The well authorized by Water Permit No. 2633-2 and given an extension for time to construct by Water Permit No. 2633A-2 for Southern Black Hills Water System is the next nearest appropriative well at approximately 8.6 miles southwest of the proposed well site (Water Rights, 2018b). The nearest Madison aquifer well used for domestic purposes on file with the SD DENR-Water Rights Program is approximately 6 miles southwest of the well site proposed by this application (Water Rights, 2018c). That is not to say there are not any domestic wells closer to the proposed well site. Any domestic wells that were constructed prior to when well completion reports were required to be submitted to the Water Rights Program, thus not on record with the Water Rights Program in this area, are likely along the eastern edge of the Madison outcrop and are most likely three to four miles away from the proposed well site.

Wells authorized by water rights/permits and domestic wells completed into aquifers stratigraphically above (Minnelusa aquifer) or below (Deadwood aquifer) the Madison aquifer

are not expected to be affected by this proposed diversion since the lower Minnelusa and Madison formations can be considered confining beds that isolate the Madison aquifer hydraulically from the other aquifers

At the proposed well site, the Madison aquifer is under confined conditions. That means the water level of the aquifer can be subject to fairly significant fluctuations in water level caused by natural conditions (see Figures 3, 4, and 5) or by pumping. The drawdown created by pumping in a confined aquifer may extend a considerable distance from the pumped well. There is no way to specifically quantify the drawdown or the cone of influence from a pumped well without aquifer testing. Furthermore, the aquifer characteristics of the Madison aquifer can vary considerably within a short distance (Greene, 1993). Meaning, drawdown caused by pumping a well may not necessarily be the same in all directions from the pumped well.

While it is not currently possible to determine the exact drawdown by pumping this proposed diversion, it is possible to estimate drawdown. Carter and others (2001b) estimated transmissivity of the Madison aquifer at the borders of sub-area 6 to be 1,045 ft²/d. Applying this transmissivity, assuming a storage coefficient of 2×10^{-4} , and a diversion rate of 0.829 cfs, the drawdown one mile from a pumping well is less than 27.5 feet after one year of continuous pumping and less than 15.7 feet at three miles over the same time period using the Theis Equation (Utah Division of Water Rights, 2018). The diversion rate of 0.829 cfs was used because that is the average diversion rate required to pump the 600 ac-ft/yr. requested by this application. The Theis equation requires a number of simplifying assumptions, some of which may not apply in this case. However, the solutions to the equation are still useful in showing the drawdown is not likely to be adverse. Both of the drawdown estimates are much less than historic amplitude of water level change in the Madison aquifer as shown in the hydrographs (see Figures 3, 4, and 5).

South Dakota Codified Law (SDCL) 46-6-6.1 does not necessarily protect artesian head pressure as a means of delivery, and the Water Management Board has recognized that to place water to maximum beneficial use, a certain amount of drawdown may occur. In order to balance interests between irrigation use and delivery of water by artesian head pressure, the Water Management Board defined an “adversely impacted domestic well” in Administrative Rule of South Dakota (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”.

At the proposed well site, there is likely more than 1,600 feet of artesian head pressure. And, the Water Management Board considered the delivery of water by artesian head pressure versus maximum beneficial use of water issue for Water Right No. 2313-2 for Coca-Cola Bottling Company of the Black Hills. The Water Management Board adopted Findings of Facts and Conclusions of Law that noted 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 an adverse impact it would also be in conflict with SDCL 46-1-4 (Water Rights, 1995). With that in mind, some existing well owners may need to lower their pumps to accommodate for deeper water levels depending on the specific characteristics of this area of the Madison aquifer. However, when considering the statute (SDCL 46-6-6.1), rule (ARSD 74:02:04:20(7)), the artesian head pressure, and the distance between wells, well interference from this proposed diversion is not expected to cause an adverse impact. Furthermore, it should be noted that DENR-Water Rights Program Madison aquifer observation wells located in areas with large capacity municipal Madison aquifer wells (i.e.: Rapid City, Spearfish, and Sturgis) show drawdown from pumping has never been adverse. The drawdown has ranged from a few feet to tens of feet (Water Rights, 2018a). When this is considered against the natural amplitude of water level changes in the Madison aquifer, it shows this proposed diversion is not likely to cause adverse impacts to existing users.

PUBLIC INTEREST CONCERNS:

Artesian Springs

There are three large artesian springs within approximately 12 miles of the proposed well site. Grace Coolidge Creek Spring is approximately 7.3 miles north, Battle Creek Spring is approximately 11.5 miles north, and Beaver Creek Spring is approximately 11.5 miles south of the well site proposed by this application (Naus et al, 2001). Some or most of the source water for these three artesian springs is from the Madison aquifer (Naus et al, 2001). There is at least one water right/permit authorized to pump water from the Madison aquifer within a few miles of each Battle Creek and Grace Coolidge Creek Springs and several within a few miles of Beaver Creek Spring. Buhler (2014) noted there appeared to be a relationship between the potentiometric surface of the Madison aquifer as shown in the hydrograph for CU-91A and the measurement of discharge from Beaver Creek Spring as measured by the National Park Service. Buhler (2014) also noted that if there were a cause and effect relationship between the spring discharge and potentiometric surface of the Madison aquifer a decline in the potentiometric surface of the aquifer could decrease spring discharge. However, it would likely take a large change of hydraulic gradient, in excess of any changes caused by climatic conditions, in the vicinity of the spring to significantly alter the discharge from the spring.

The Water Management Board when considering Future Use Permit No. 2560-2 for Fall River Water User District accepted that South Dakota Water Law does not protect artesian head pressure as a means of diversion and determined that well interference resulting in decreased discharge from “artesian” springs could probably not be considered an adverse impact. The Water Management Board did however recognize that it would be a public interest issue. The future use area authorized under Future Use Permit No. 2560-2 is approximately 13.7 miles south of the well site proposed by this application and 3 miles south of Beaver Creek Spring. Given the distance of this proposed diversion to large area springs and the presence of other water rights/permits much closer to the springs that are pumping with no apparent detriment to the springs, it is unlikely that pumping this proposed diversion will have any measurable impact on area spring discharge.

Wind Cave National Park

In the past, the National Park Service has intervened in matters of water permit application from the Madison aquifer in the southern Black Hills area. Their primary concern was the potential effects on water levels of lakes and pools in Wind Cave that are hydraulically connected to the Madison aquifer caused by pumping new and existing water rights/permits. Buhler (2014) addressed the potential impacts from pumping the diversion proposed by Water Permit No. 2730-2. He noted that even though there was already development of Madison aquifer water rights/permits in the area the water levels in the lakes and pools within the park changed in a matter similar to the nearest DENR observation well, CU-91A, which was following changes in climatic conditions. He noted that because of the distance, approximately 13 miles, and the natural fluctuation of the water level of the Madison aquifer as reflected in the water level of the lakes and pools, pumping authorized under Water Permit No. 2730-2 was not expected to impact the water level of the lakes and pools. The well site for this application is approximately 10 miles away from the lakes and pools in Wind Cave National Park. It is likely there will be no issues as illustrated by Buhler (2014).

TERM LIMITATION:

In consideration of applications for a water permit to appropriate water from the Madison aquifer using a newly constructed well, SDCL 46-2A-20 requires:

“...no water permit for construction of works to withdraw water from the Madison formation in Butte, Fall River, Custer, Lawrence, Meade and Pennington counties may be issued for a term of more than twenty years, unless the water management board determines, based upon the evidence presented at a hearing that:

- (1) Sufficient information is available to determine whether any significant adverse hydrologic effects on the supply of water in the Madison formation would result if the proposed withdrawal were approved; and
- (2) The information, whether provided by the applicant or by other means, shows that there is a reasonable probability that issuance of the proposed permit would not have a significant adverse effect on nearby Madison formation wells and springs.”

Although the criteria for approval of a water permit reviewed (i.e.: there is a reasonable probability unappropriated water is available and this proposed diversion can be developed without unlawful impairment of existing rights) in this report as established in SDCL 46-2A-9 are met, evidence is not available to justify issuing this permit without a term limitation of 20 years.

CONCLUSIONS:

1. Application No. 2784-2 proposes to appropriate 600 ac-ft/yr. from the Madison aquifer at a maximum instantaneous diversion rate of 1.5 cfs from one well for rural water system use.
2. The Madison aquifer is a viable aquifer and is found under confined conditions in the area of the proposed well site.

3. Based on the observation well data, a regional and a localized hydrologic budget, there is a reasonable probability unappropriated water is available for this proposed appropriation.
4. There is a reasonable probability the diversion proposed by this application can be made without adversely impacting existing appropriative or domestic users with adequate wells.
5. There have been public interest concerns in the past regarding artesian springs, and the lakes and pools in Wind Cave National Park with the development of Madison aquifer water rights/permits in the southern Black Hills area.
6. This application should include the 20 year term limitation as required by SCL46-2A-20.



Adam Mathiowetz, PE
SD DENR-Water Rights Program

REFERENCES:

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PROOF OF PUBLICATION

STATE OF SOUTH DAKOTA

COUNTY OF FALL RIVER

I, Sara Pesch, office manager of the Hot Springs Star, being first duly sworn, on my oath, depose and say that the Hot Springs Star is a weekly legal newspaper for the publication of legal and other official notices, printed and published at Hot Springs, in Fall River County, South Dakota, in the English language and having a bonafide circulation of at least three hundred copies weekly and which said Hot Springs Star has been published within said county of Fall River County for more than fifty-two successive weeks prior to the publication of the attached notice, and printed in an office maintained in Hot Springs, the place of publication, and that I have personal knowledge of the fact of the publication of said notice as hereafter specified.

That a legal notice of which the annexed is a printed copy, cut from the said Hot Springs Star and to which reference is hereby made as part of this affidavit was regularly published in said weekly newspaper once each week for 1 successive weeks, the first of said weekly publications having been so made in said newspaper on the 30th day of May, 20 18; and the last of said weekly publications having been so made in said newspaper on the 30th day of May, 20 18; that the said notice was published in the regular and entire issue of every number of said newspapers during the time of publication; and that said published in the newspaper, and not in the supplement.

Sara Pesch

Subscribed in my presence and sworn to before me this

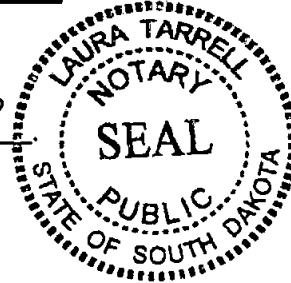
6 day of June, A.D., 20 18

Laura Tarrell

Notary Public

Printer's Fee \$ 30.60

Paid by _____



My Commission Expires
December 3, 2019

Legals

NOTICE OF APPLICATION
NO. 2784-2 to Appropriate Water
Notice is given that Fall River Water Users District, c/o Keith Neugebauer, Manager, PO Box 321, Oral SD 57766 has filed an application to appropriate 600 acre-feet of water annually at a maximum pump rate of 1.5 cubic feet of water per second from one well to be completed into the Madison Aquifer (approximately 2,350 feet deep) located in the NW 1/4 NE 1/4 Section 28-T4S-R7E which is approximately 12 miles southwest of Hermosa SD. The water is for rural water system use serving users in Custer and Fall River Counties.
Pursuant to SDCL 46-2A-2, the Chief Engineer recommends APPROVAL of Application No. 2784-2 with qualifications because 1) although evidence is not available to justify issuing this permit without a 20 year term limitation, 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 rights, 3) the proposed use is a beneficial use and, 4) it is in the public interest. The Chief Engineer's recommendation with qualifications, the application, and staff report are available at <http://denr.sd.gov/public> or contact Eric Gronlund for this information, or other information, at the Water Rights Program address provided below.
Any person interested in opposing or supporting this application or recommendation must file a written petition with BOTH the applicant and Chief Engineer. The applicant must file a petition if contesting the Chief Engineer's recommendation. The Chief Engineer's address is "Water Rights Program, Foss Building, 523 E Capitol, Pierre SD 57501 (605 773-3352)" and the applicant's mailing address is given above. A petition filed by either an interested person or the applicant must be filed by June 11, 2018.
The petition may be informal, but must include a statement describing the petitioner's interest in the application, the petitioner's reasons for opposing or supporting the application, and the signature and mailing address of the petitioner or the petitioner's legal counsel, if legal counsel is obtained.
If the applicant does not contest the recommendation of the Chief Engineer and no petition to oppose the application is received, the Chief Engineer shall act on the application pursuant to the recommendation with no hearing held before the Water Management Board. If a petition opposing the application or contesting the recommendation is filed, then a hearing will be scheduled and the Water Management Board will consider this application. Notice of the hearing will be given to the applicant and any person filing a petition.
Steven M. Pirner, Secretary, Department of Environment and Natural Resources. Published once of the total approximate cost of \$30.60

Affidavit of Publication

RECEIVED

APR 27 2018

WATER RIGHTS
PROGRAM

STATE OF SOUTH DAKOTA

County of Pennington

SS:

Sheri Sponder being first duly sworn, upon his/her oath says: That he/she is now and was at all time hereinafter mentioned, an employee of the RAPID CITY JOURNAL, a corporation of Rapid City, South Dakota, the owner and publisher of the RAPID CITY JOURNAL, a legal and daily newspaper printed and published in Rapid City, in said County of Pennington, and has full and personal knowledge of all the facts herein stated as follows: that said newspaper is and at all of the times herein mentioned has been a legal and daily newspaper with a bonafide paid circulation of at least Two Hundred copies daily, and has been printed and published in the English language, at and within an office maintained by the owner and publisher thereof, at Rapid City, in said Pennington County, and has been admitted to the United States mail under the second class mailing privilege for at least one year prior to the publication herein mentioned; that the advertisement, a printed copy of which, taken from said Rapid City Journal, the paper in which the same was published, is attached to this sheet and made a part of this affidavit, was published in said paper once each day for one successive day, the first publication there of being on the 25th day of April 2018 that the fees charged for the publication there of are 65 dollars and 69 cents.

Sheri Sponder

Subscribed and sworn to before me this 25th
day of April, 2018.

Kerri Bernard

Notary public

8/21/2019

My commission expires

April 25 L21081038 NOTICE OF APPLICATION NO. 2784-2 to Appropriate Water

Notice is given that Fall River Water Users District, c/o Keith Neugebauer, Manager, PO Box 321, Oral SD 57766 has filed an application to appropriate 600 acre-feet of water annually at a maximum pump rate of 1.5 cubic feet of water per second from one well to be completed into the Madison Aquifer (approximately 2,350 feet deep) located in the NW 1/4 NE 1/4 Section 28-T4S-R7E which is approximately 12 miles southwest of Hermosa SD. The water is for rural water system use serving users in Custer and Fall River Counties.

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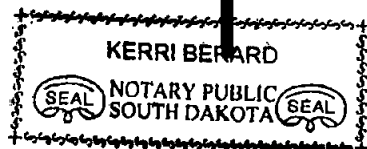
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The petition may be informal, but must include a statement describing the petitioner's interest in the application, the petitioner's reasons for opposing or supporting the application, and the signature and mailing address of the petitioner or the petitioner's legal counsel. If legal counsel is obtained.

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

/s/ Steven M. Pirner, Secretary
Department of Environment and
Natural Resources

(Published once at the total approximate
cost of \$65.69)



Affidavit of Publication

State of South Dakota)

)ss.

County of Custer)

Charles W. Najacht of said county, being duly sworn, on oath says that he is publisher of the Custer County Chronicle, a weekly newspaper printed and published in Custer City, said County of Custer and has full and personal knowledge of all the facts herein stated; that said newspaper is a legal newspaper and has a bona-fide circulation of at least two hundred copies weekly, and has been published within said County for fifty-two successive weeks next prior to the publication of the notice herein, mentioned, and was and is printed wholly or in part in an office maintained at said place of publication: that the

Dept of Environment & Natural Resources

Fall River Water Users District

Application # 2784-2

a printed copy of which, taken from the paper in which the same was published, is attached to this sheet, and is made a part of this Affidavit, was published in said newspaper at least once each week for one successive week(s), on which said newspaper was regularly published, to wit:

Apr 25, 2018 ; _____ ; _____ ;

_____ ; _____ ; _____ ;

_____ ; _____ ; _____ ;

_____ ; _____ ; _____ ;

the full amount of the fees for the publication of the annexed notice is \$ _____.

Charles W. Najacht

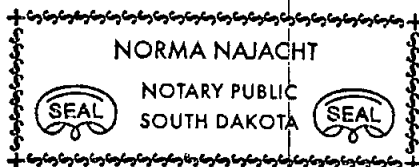
Subscribed and sworn to me before this 25th

of April, 2018 ;

Norma Najacht

NOTARY PUBLIC

MY COMMISSION EXPIRES: May 5, 2018



NOTICE OF APPLICATION

NO. 2784-2 TO
APPROPRIATE WATER

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address provided below.

Any person interested in opposing or supporting this application or recommendation must file a written petition with BOTH the applicant and Chief Engineer. The applicant must file a petition if contesting the Chief Engineer's recommendation. The Chief Engineer's address is "Water Rights Program, Foss Building, 523 E. Capitol, Pierre SD 57501 (605 773-3352)" and the applicant's mailing address is given above. A petition filed by either an interested person or the applicant must be filed by May 7, 2018.

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Steven M. Pimer, Secretary, Department of Environment and Natural Resources.

Published once at the total approximate cost of \$27.73.

4/25

RECEIVED

MAY 09 2018

WATER RIGHTS
PROGRAM



DEPARTMENT of ENVIRONMENT
and NATURAL RESOURCES

JOE FOSS BUILDING
523 EAST CAPITOL
PIERRE, SOUTH DAKOTA 57501-3182

denr.sd.gov

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

April 18, 2018

Fall River Water Users District
c/o Keith Neugebauer, Manager
PO Box 3211
Oral SD 57766

Dear Mr. Neugebauer:

Water Permit Application No. 2784-2 for rural water system use has been examined and found to comply with the South Dakota Water Laws and applicable rules. A notice has been sent to the following papers:

Custer County Chronicle (Ph # 605-673-2217)
Hot Spring Star (Ph # 605-745-4170)
Rapid City Journal (Ph # 605-394-8300)

You will need to contact the newspapers and authorize publication of this notice. For your information, a copy of the notice, the recommendation of the Chief Engineer and report on the application are enclosed. Please review the notice prior to publication and notify this office, if you have any corrections or questions.

Be sure to contact the above newspapers to authorize publication of your Notice and to arrange for payment. Early contact with the papers can eliminate delays. Upon receiving authorization from you, the publisher has been instructed to publish your notice. The newspaper has 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,

Eric Gronlund
Natural Resources Engineer
(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.

Instruction to Newspaper - Publish the Notice on April 24 or 25, 2018. The applicant is responsible for payment.

NOTICE OF APPLICATION NO. 2784-2 to Appropriate Water

Notice is given that Fall River Water Users District, c/o Keith Neugebauer, Manager, PO Box 321~~X~~, Oral SD 57766 has filed an application to appropriate 600 acre-feet of water annually at a maximum pump rate of 1.5 cubic feet of water per second from one well to be completed into the Madison Aquifer (approximately 2,350 feet deep) located in the NW 1/4 NE 1/4 Section 28-T4S-R7E which is approximately 12 miles southwest of Hermosa SD. The water is for rural water system use serving users in Custer and Fall River Counties.

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Steven M. Pirner, Secretary, Department of Environment and Natural Resources. Published once at the total approximate cost of_____.

Schlaak, Karen

From: Schlaak, Karen
Sent: Wednesday, April 18, 2018 9:43 AM
To: RCY Legals (legals@rapidcityjournal.com)
Subject: 2784-2, Fall River Water Users District
Attachments: FORM8.FRM.doc; 2784-2public.short.docx

Attached is a notice to be published on April 25, 2018.

Fall River Water Users District, c/o Keith Neugebauer, PO Box 3211, Oral SD 57766 (605 424-7648) has been notified to contact you to authorize publication and arrange for payment.

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

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

Karen Schlaak

SD DENR, Water Rights Program
(605) 773-3352



Schlaak, Karen

From: Schlaak, Karen
Sent: Wednesday, April 18, 2018 9:41 AM
To: hsstar@lee.net
Subject: 2784-2, Fall River Water Users District
Attachments: 2784-2public.short.docx; FORM8.FRM.doc

Attached is a notice to be published on April 25, 2018.

Fall River Water Users District, c/o Keith Neugebauer, PO Box 3211, Oral SD 57766 (605 424-7648) has been notified to contact you to authorize publication and arrange for payment.

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

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

Karen Schlaak
SD DENR, Water Rights Program
(605) 773-3352



Schlaak, Karen

From: Schlaak, Karen
Sent: Wednesday, April 18, 2018 9:40 AM
To: custerchronicle@gwtc.net
Subject: 2784-2, Fall River Water Users District
Attachments: 2784-2public.short.docx; FORM8.FRM.doc

Attached is a notice to be published on April 25, 2018.

Fall River Water Users District, c/o Keith Neugebauer, PO Box 3211, Oral SD 57766 (605 424-7648) has been notified to contact you to authorize publication and arrange for payment.

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

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

Karen Schlaak
SD DENR, Water Rights Program
(605) 773-3352



Schlaak, Karen

From: Schlaak, Karen
Sent: Tuesday, May 15, 2018 9:04 AM
To: hsstar@lee.net
Subject: FW: 2784-2, Fall River Water Users District
Attachments: 2784-2public.short.docx; FORM8.FRM.doc

I still have not received the affidavit. We cannot issue the permit to Fall River WUS until the affidavit is received.

Sent to: Water Rights Program, 523 E Capitol, Pierre SD 57501

Thank you,
Karen

From: Schlaak, Karen
Sent: Monday, May 07, 2018 10:18 AM
To: hsstar@lee.net
Subject: FW: 2784-2, Fall River Water Users District

Please send me an affidavit for this publication. Fall River WUD is responsible for payment, but we need an affidavit for our records.

Thank you,
Karen

From: Schlaak, Karen
Sent: Wednesday, April 18, 2018 9:41 AM
To: hsstar@lee.net
Subject: 2784-2, Fall River Water Users District

Attached is a notice to be published on April 25, 2018.

Fall River Water Users District, c/o Keith Neugebauer, PO Box 3211, Oral SD 57766 (605 424-7648) has been notified to contact you to authorize publication and arrange for payment.

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

Karen Schlaak
SD DENR, Water Rights Program
(605) 773-3352



Schlaak, Karen

From: Schlaak, Karen
Sent: Wednesday, May 23, 2018 10:39 AM
To: 'sara.pesch@rapidcityjournal.com'
Subject: 2784-2, Fall River Water Users District
Attachments: 2784-2public.short.docx; FORM8.FRM.doc

Attached is a notice to be published on May 30, 2018.

Fall River Water Users District, c/o Keith Neugebauer, PO Box 3211, Oral SD 57766 (605 424-7648) has been notified to contact you to authorize publication and arrange for payment.

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

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

Karen Schlaak
SD DENR, Water Rights Program
(605) 773-3352



*I called Misty @ FRWUD
and told her that notice
hadn't been published in Hot Springs Star
and I resent it*

*6/6/18
Misty called about status
frwud@goldenwest.net*

NOTICE OF APPLICATION NO. 2784-2 to Appropriate Water

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Steven M. Pirner, Secretary, Department of Environment and Natural Resources. Published once at the total approximate cost of _____.



DEPARTMENT of ENVIRONMENT
and NATURAL RESOURCES

JOE FOSS BUILDING
523 EAST CAPITOL
PIERRE SOUTH DAKOTA 57501-3182
<http://denr.sd.gov>

JUN 15 2018

Fall River Water Users District
Keith Neugebauer, Manager
PO Box 321
Oral SD 57766

Dear Mr. Neugebauer:

Enclosed is Water Permit No. 2784-2 authorizing construction of the water diversion system and beneficial use of the water, not exceeding the limits as specified in the Water Permit.

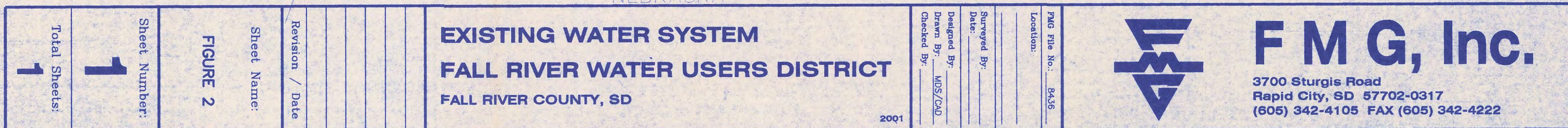
Form 10, *Notice of Completion of Works and Application of Water to Beneficial Use*, is enclosed. Please return this completed form after you have finished the system and have put the water to beneficial use. An investigation can then be scheduled so the water license may be issued, thus completing the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

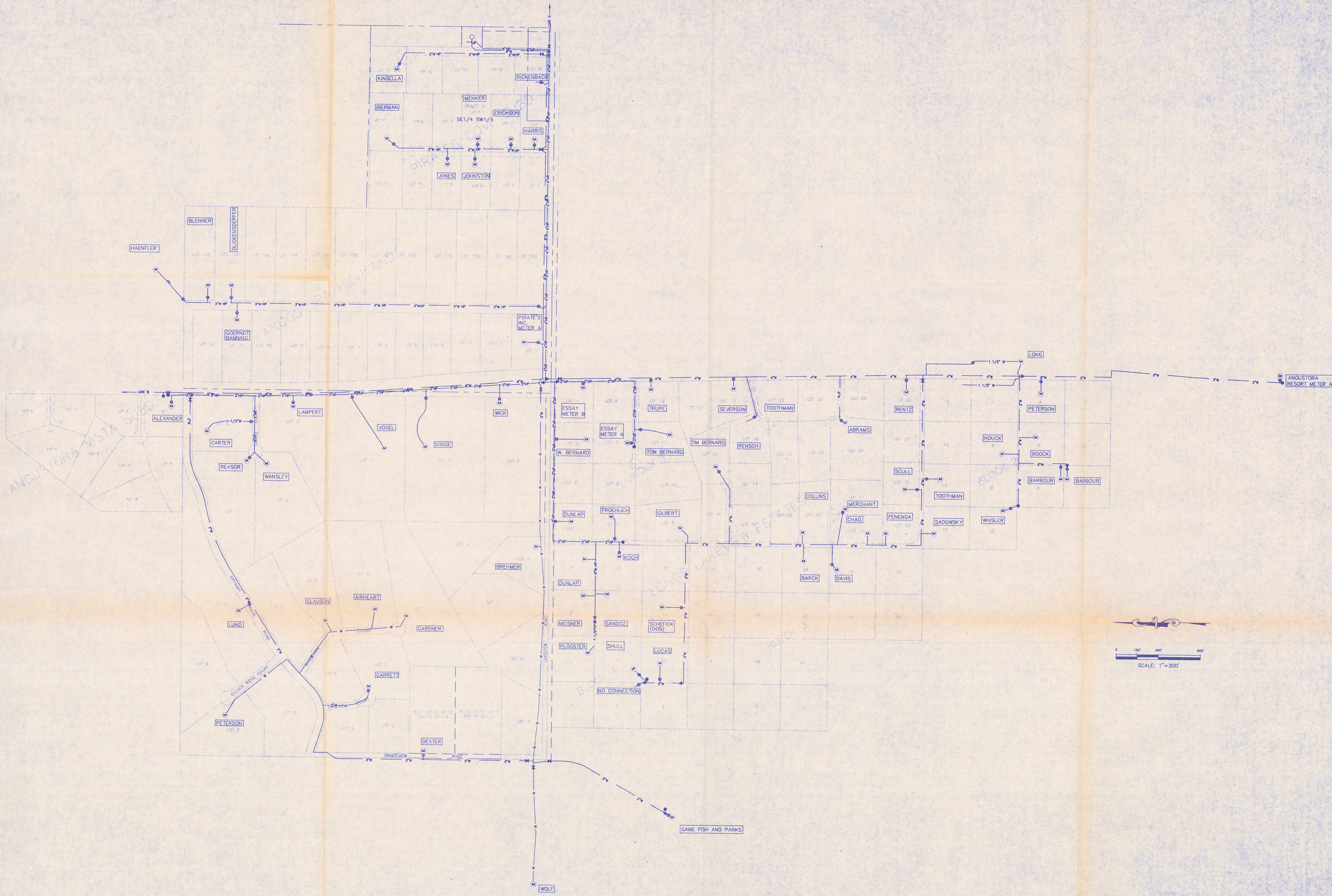
An informational sheet *Common Water Right Questions?* is also enclosed. This sheet is intended to answer some of the questions associated with obtaining and keeping a water right.

Sincerely,

Jeanne Goodman, Chief Engineer
Water Rights Program
(605) 773-3352

enclosures





F M G, Inc.
3700 Sturgis Road
Rapid City, SD 57702-0317
(605) 342-4105 FAX (605) 342-4222

FMG File No.: 8436

Location:
XXX
XXX

Surveyed By: XXX
Date: XXX

Designed By: ADF/CGK
Drawn By: CGK/MDS/YS
Checked By: ADF

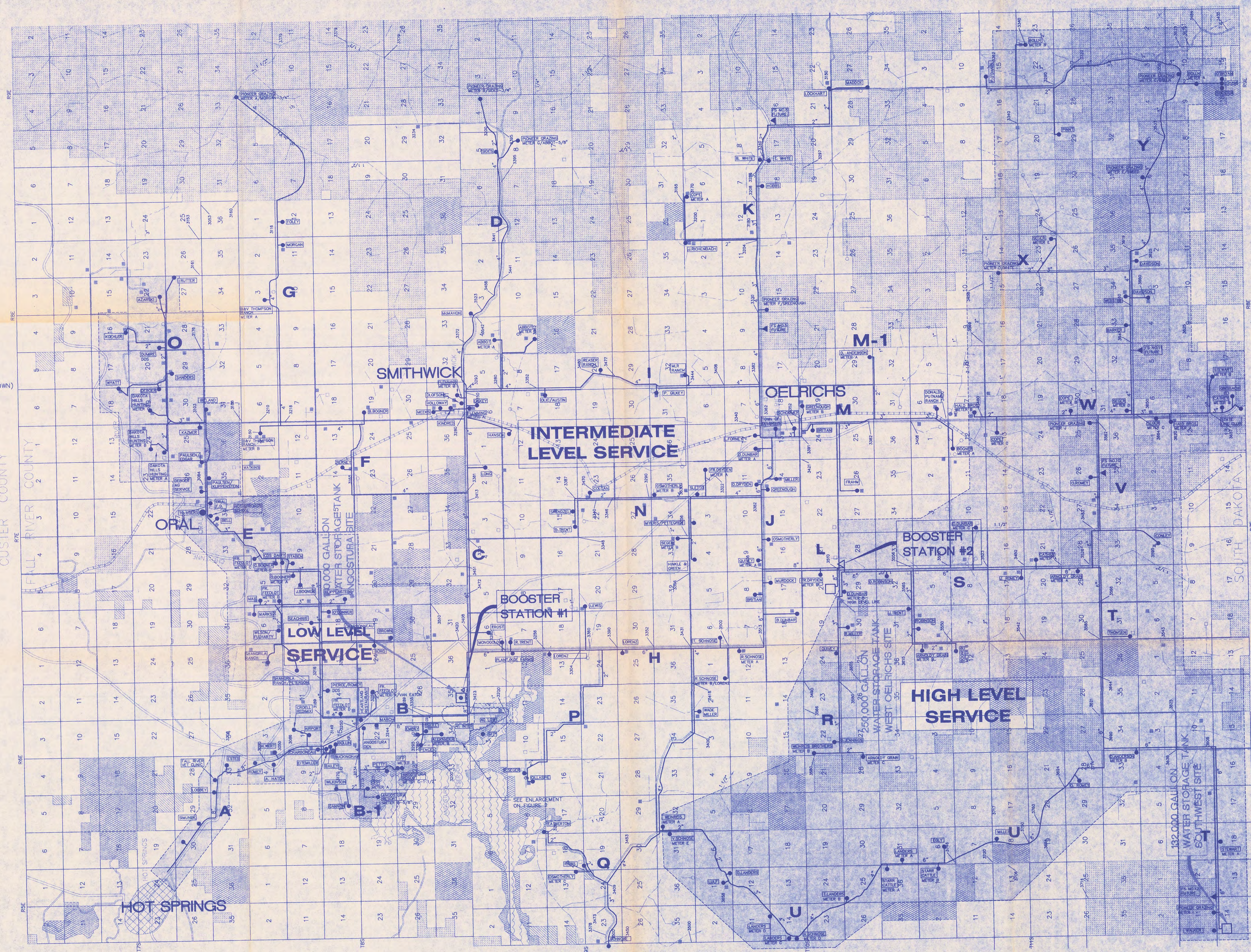
FALL RIVER WATER
ANGOSTURA AREA
FALL RIVER COUNTY, SD

Revision / Date

Sheet Name:
**ANGOSTURA
AREA
ENLARGEMENT**

Figure Number:
2

AUGUST 2005



SD EForm - 1621LD V1

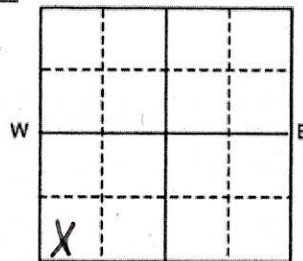
SOUTH DAKOTA WATER WELL COMPLETION REPORT

11-02

Location SW 1/4 SW 1/4 Sec 21 Twp 4S Rg 7ECounty CUSTER

North

Please mark well location with an "X"



Well Completion Date

JUNE 2020

1 Mile

Distance to nearest potential pollution source (septic tank, abandoned well, feed lot, etc.)?
ft. from N/A (identify source)

PROPOSED USE:

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

METHOD OF DRILLING:

MUD ROTARYCASING DATA: ☒ Steel ☐ Plastic ☐ Other

If other describe

PIPEWEIGHT	DIAMETER	FROM	TO	HOLE DIAMETER
65 LB/FT	16 IN	0 FT	56 FT	22 IN
40.50 LB/FT	10.75 IN	0 FT	792 FT	14.75 IN
23 LB/FT	7 IN	766 FT	2121 FT	9.525 IN

GROUTING DATA:

Grout Type	No. of Sacks	Grout Weight	From	To
XLT #6	320	12.8# Lb/gal	0 FT	792 FT
XLT #20	575	12# Lb/gal	766 FT	2121 FT

Describe grouting procedure 14.8#
15.5#POSITIVE DISPLACEMENTSCREEN: N/A ☐ Perforated pipe ☐ Manufactured

Diameter _____ Inches Length _____ Feet

Material _____

Slot Size _____ Set From _____ Feet to _____ Feet

Other information

WAS A PACKER OR SEAL USED? ☐ Yes ☐ NoIf so, what material? N/A

Describe packer(s) and location

DISINFECTION: Was well disinfected upon completion?

☒ Yes, How? CHLORINELab to which water quality sample sent for analysis ☐ No, Why Not?MID CONTINENT LABSWell Owner: FAIR RIVER WATER USERS DISTRICT

Business Name:

Address: P.O. Box 321City, State, Zip: ORAL SD 57760-0321

WELL LOG:

DEPTH

FORMATION	FROM	TO
LAKOTA	0	146
SHANDALE	146	600
SPEARHEAD	600	1030
MINNEKATA	1030	1080
OPECK	1080	1220
MINNELESA	1220	1880
MADISON	1880	2220
DEADWOOD	2220	2300

STATIC WATER LEVEL

FEET

If flowing: closed in pressure 77 PSIGPM flow 110 through 2" Inch pipeControlled by ☒ Valve ☐ Reducers ☐ Other

Reduced flow rate _____ GPM

Can well be completely shut in? yes

WELL TEST DATA:

☒ Pumped Describe:☐ Bailed☐ Other

Pumping Level Below Land Surface

533 Ft. After 72 Hrs. pumped 300 GPM

Ft. After _____ Hrs. pumped _____ GPM

If pump installed, pump rate: NO PERMANENT PUMP

REMARKS

This well was drilled under license # 698 and this report is true and accurate.Drilling firm: WATER SYSTEM DRUG INC

Signature of License Representative:

SCOTT ACKERMAN

Signature of Well Owner or Equitable Property Holder:

RECEIVED

Date: 12/8/2020

DEC 21 2020

WATER RIGHTS PROGRAM