

WATER PERMIT NO. 2002-1

Name of Applicant: City of Spearfish

Address: 625 5th St, Spearfish SD 57783

Phone: 605 642-1333

Amount of Water Claimed: 0.66 cfs

Total Acres: 40 acres

Source of Water Supply: groundwater (one well)

Water to be used for: irrigation

County: Lawrence

Type of Waste Disposal System:

Location: 4 miles east of Spearfish

PRIORITY

Date Received: 12-28-20

Application/License Fee: \$ 700

Corrected Application Received:

Period of Annual Use: April 1 - October

Remarks:

Diversion Point: NE 1/4 NW 1/4 Sec 22-T6N-R3E

Land to be Irrigated: NW 1/4 Sec 22-T6N-R3E

Depth of Well: 1400 feet deep

Well Driller:

Remarks:

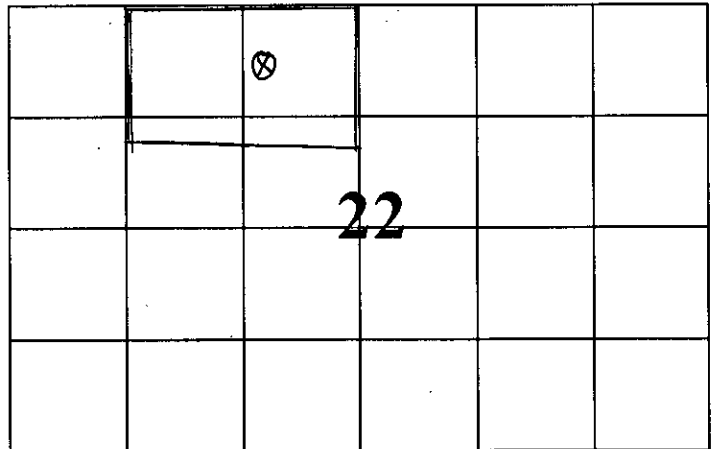
Type of Map: plat

Prepared by:

Reviewed and the Number Assigned on: 12-29-20

By: **Karen Schlaak**

Notice of Hearing - date to intervene: _____



**SOUTH DAKOTA
WATER PERMIT NO. 2002-1**

Date of first receipt of application December 28, 2020.

The Chief Engineer, on behalf of the Water Management Board, issues Water Permit No. 2002-1 to City of Spearfish, Brandy Kean, Public Works Director, 625 N 5th St, Spearfish SD 57783 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. 2002-1 appropriates 1.33 cubic feet of water per second (cfs) from two wells to be completed into the Madison Aquifer (approximately 1,400 feet deep) located in the NE 1/4 NW 1/4 Section 22 for irrigation of 40 acres of a sports complex to be located in the NW 1/4 Section 22; all in T6N-R3E. The permit holder is authorized a diversion rate greater than the statutory limit of 1 cfs per 70 acres. This site is located on the south side of Spearfish near the junction of Hwy 85 and I-90.
2. The amount of the appropriation may not exceed 2 acre feet annually for each acre of land to which water is actually and beneficially applied for irrigation. The water is to be used during the following described annual period: April 1 – October 31.
3. The date from which applicant may claim right is December 28, 2020.
4. The date of approval of Permit No. 2002-1 is March 8, 2021.
5. One-fifth of the construction is to be completed on or before September 8, 2023.
6. All construction is to be completed on or before March 8, 2026.
7. Water is to be put to beneficial use on or before March 8, 2030.
8. Water rights obtained in compliance with the laws of the State of South Dakota may not be unlawfully impaired by this appropriation.

QUALIFICATIONS

1. The wells approved under this Permit will be located near domestic wells and other wells which may obtain water from the same aquifer. The well owner under this Permit shall control his withdrawals so there is not a reduction of needed water supplies in adequate domestic wells or in adequate wells having prior water rights.
2. The wells authorized by Permit No. 2002-1 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. 2002-1 authorizes a maximum diversion rate of 1.33 cfs for irrigation of 40 acres with an annual volume not to exceed 2 acre feet of water per acre per year.

(continued)

4. In accordance with SDCL 46-1-14 and 46-2A-20, Permit No. 2002-1 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. 2002-1 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.
5. 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 Environment and Natural Resources

APR 06 2021

date



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

Mail to: DENR - Water Rights 523 E Capitol Ave Pierre, SD 57501-3182 ph. (605) 773-3352	No. <u>2002-1</u> (office use only) Hydrologic Unit <u>10120203</u>
	Basin <u>Belle Fourche River</u>
	Newspaper <u>Black Hills Pioneer</u>

PAID
DEC 28 2020
Ck# 071924

Application For Permit To Appropriate Water For Irrigation

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

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

1. Name to Appear on Irrigation Permit City of Spearfish

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

Mailing Address 625 5th. st. Spearfish ☒ SD ☒ 57783
(Address) (City) (State) (Zip Code)

Phone 605-642-1333 Mobile 605-645-1395 Email Miles. Burtz/aFF@cityofspearfish.com

2. Amount of water claimed 1.33 *CFS or 600 ~~300~~ **GPM --- ***AF Total Acreage 40
(*Cubic Feet per Second) (**Gallons per Minute) (***)Acre Feet - storage capacity of dam/dugout or annual use if applicable)

3. Source of water supply Madison Formation (2 wells)

4. Location of point of diversion 1 well NW1/4 of section 22, T.6N., R.3E (NE 1/4 NW 1/4)
(example - 3 wells in SW1/4 NE1/4 section T2-T104N-R53W)

County Lawrence ☒

5. County or counties where water will be used Lawrence

6. Annual period during which water is to be used All Year

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
Soccer, Ball Fields, Green space	40		
NW 1/4 Sec 22 - T6N-R3E			

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

This is a new Affordable housing development. In this area there will be 4 softball and 6 soccer fields that the City of Spearfish wants to irrigate using a new Madison Well.

RECEIVED
DEC 28 2020
WATER RIGHTS
PROGRAM

I, Dustin Lee Brandy Kean Public Works Director, 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) 1400 Depth to Top of Water Bearing Material 800 Depth to Water from Surface _____d) Distance to nearest domestic well on applicant's property N/A Property owned by others 200 ft. not used**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)

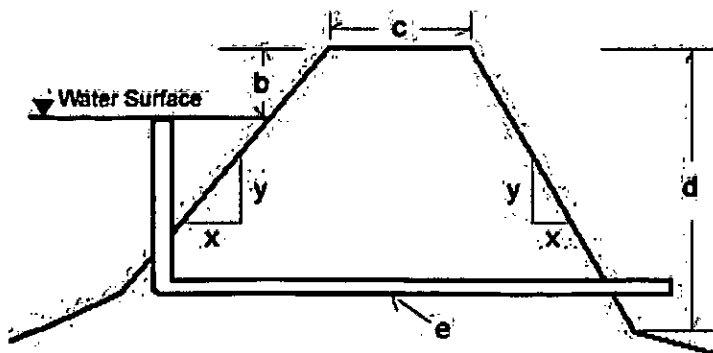
Upstream _____

Downstream _____

h) Surface Area of Impoundment _____

i) Storage _____ Acre Feet

j) Drainage Area Above Dam _____ Acres



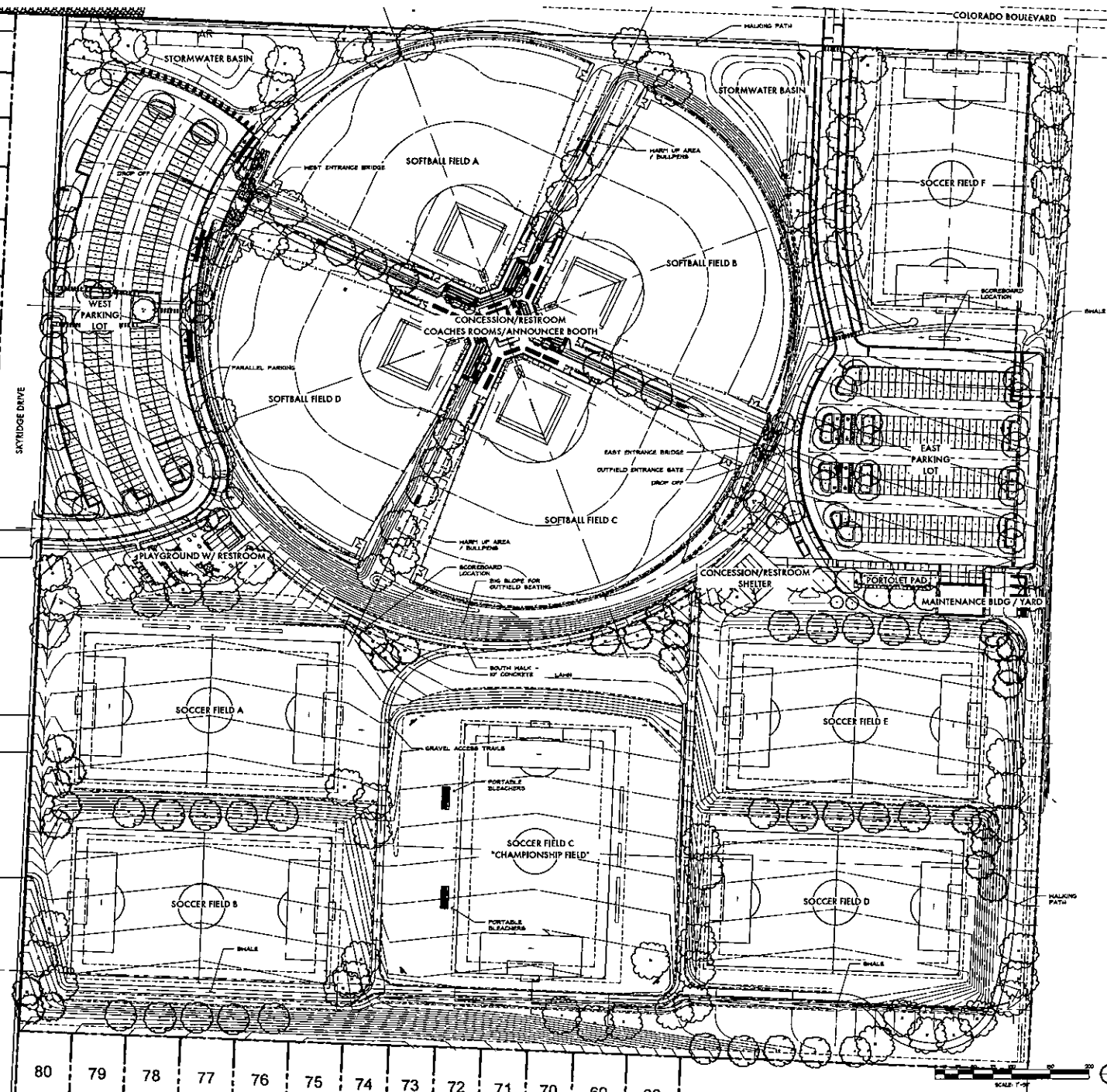
TOTAL PARK AREA	41.2 ACRES
EXISTING BUILDING AREA	0 SF
ZONING CLASSIFICATION	DEVELOPMENT REVIEW DISTRICT
SETBACKS	
BUILDINGS	25' FROM PROPERTY LINE

SOFTBALL FIELDS	4 FIELDS 1/2 TO 2/3 BASELINE, 31D OUTFIELD
SOCCER FIELDS	6 HARPS / SCHSAA REGULATION FIELDS OR 13 1/2-12 FIELDS

REQUIRED PARKING SUMMARY
 * DESIRED PARKING MAXIMUM PARKING 400 SPACES MINIMUM

# AREA REQUIRED		
PARKING / FACILITY TOTAL	MINIMUM NUMBER OF ACCESSIBLE SPACES STANDARD	TOTAL (STANDARD + VAN)
1 - 25	0	1
26 - 50	1	2
51 - 75	2	3
76 - 100	3	4
101 - 150	4	5
151 - 200	5	6
201 - 250	6	7
251 - 300	8	9
301 - 400	9	11
401 - 500	10	12
501 - 750	12	14
751 - 1000	15	17
1001 - 1500	20	22
1501 - 2000	25	27
2001 - 2500	30	32
2501 - 3000	35	37
3001 - 4000	45	47
4001 - 5000	55	57
5001 - 6000	65	67
6001 - 7000	75	77
7001 - 8000	85	87
8001 - 9000	95	97
9001 - 10000	105	107
10001 - 15000	130	132
15001 - 20000	160	162
20001 - 25000	190	192
25001 - 30000	220	222
30001 - 40000	280	282
40001 - 50000	350	352
50001 - 60000	420	422
60001 - 70000	490	492
70001 - 80000	560	562
80001 - 90000	630	632
90001 - 100000	700	702

NO. OF SPACES PROVIDED	PARKING TYPE
13	10 MINUTE PARKING (X277 PARALLEL SPACES)
8	ADA VAN ACCESSIBLE SPACE
10	ADA STANDARD ACCESSIBLE SPACE
415	STANDARD 32'X20' SPACE
253	TOTAL WEST PARKING LOT
182	TOTAL EAST PARKING LOT
443	ON SITE TOTAL SPACES*



FDR

TALLGRASS
Landscape Architecture for the American West
TALLGRASS LANDSCAPE ARCHITECTURE
412 NORTH 4TH STREET
CULVER CITY, CA 90230
PHONE: 310.241.5511
FAX: 310.241.5512
WWW.TALLGRASSLANDSCAPEARCHITECTURE.COM

811 Know what's below.
Call before you dig.

Use South Dakota's One Call to locate underground utilities before you dig. Examiners planning to dig, drill or trench should make the required notice request to South Dakota One Call two working days before the planned work.

Make your notice request by simply calling 811 (toll-free) and (800) 731-7474 or a variety of South Dakota notice requests are accepted 24/7. The One Call website is located at www.southdakonecall.com.

THESE DRAWINGS ARE CONCEPT DRAWINGS BASED UPON AERIAL PHOTOGRAPHY AND SAMPLE SITE OBSERVATION AND ARE INTENT TO REVEAL THE CONCEPTUAL SITE CONFIGURATION OF THE PROJECT. THESE ARE NOT INTENT TO REPRESENT FINAL LAYOUT AND GRADING INFORMATION, BUT RATHER SITE PERFORMANCE INFORMATION AND MINIMUM OF MAXIMUM GRADING LAYOUT, DEMOGRAPHICS AND AREA REQUIREMENTS. FINAL LAYOUT AND GRADING DECISIONS SHALL BE MADE ON SITE THROUGH JOINT CONSENSUS BETWEEN THE

RELEASE DATE	2020-11-04
PROJECT CONTACT	TANYA
PROJECT NUMBER	2020001

100

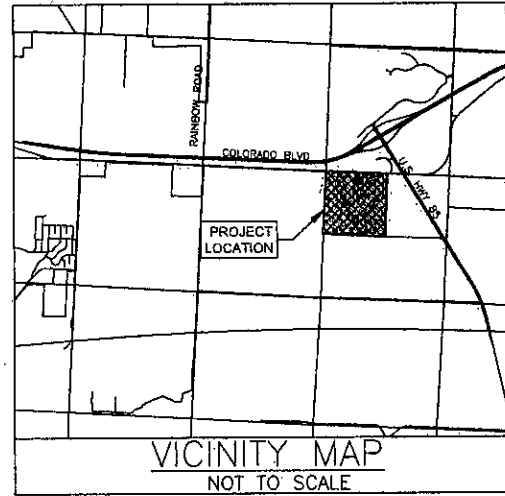
**SPEARFISH SPORTS
COMPLEX**

SPEARFISH, SD
SITE PLAN

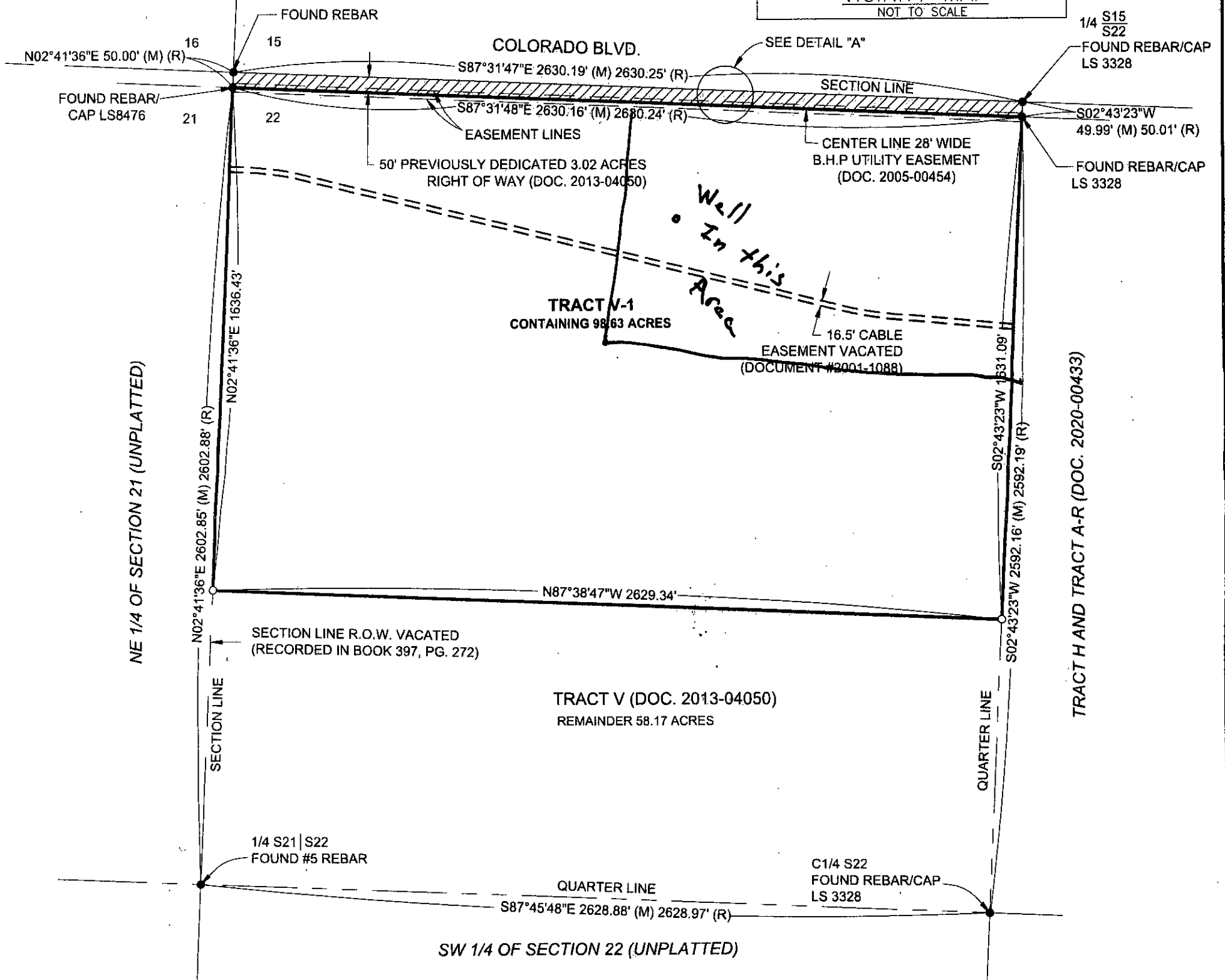
L-1
SHEET 1 OF 5 SHEETS

[illegible]

PLAT OF TRACT V-1 OF SKY RIDGE SUBDIVISION
A PART OF TRACT V OF ELKHORN RIDGE ADDITION TO THE
CITY OF SPEARFISH, LOCATED IN THE NW 1/4 OF
SECTION 22, T.6N., R.3E., B.H.M., LAWRENCE COUNTY, SOUTH DAKOTA



0 400
1"=400'



LEGEND

- (M) - MEASURED
- (R) - RECORD
- - SET #5 REBAR W/ ALUM CAP - #12000
- - FOUND MONUMENT AS NOTED

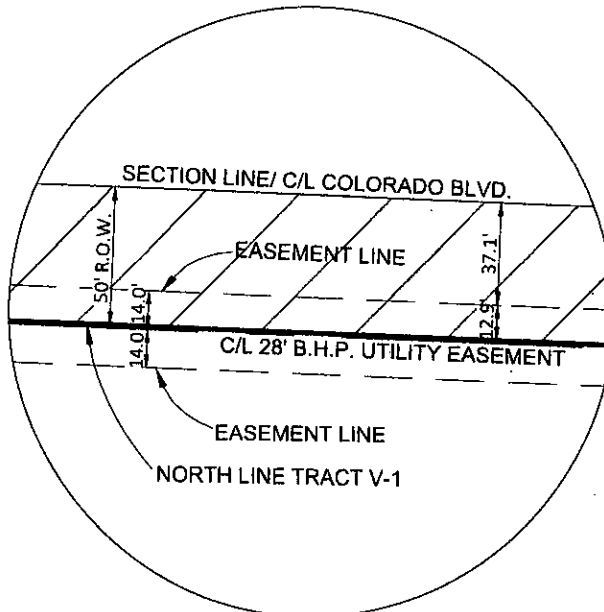
NOTES:

1. Basis of Bearing: The bearings shown on this plat are based on:
Horizontal Datum: NAD83 (1996)
Coordinate System: United States State Plane
Zone: South Dakota North 4001
Vertical Datum: NAVD88, Geoid 12B

Distances shown on this plat are GROUND distances, a combined factor of 1.00018979656 was used, scaled around Longitude N44°28'26.81358" Latitude W103°44'38.93389" being a 2.5" aluminum cap.

The mapping angle or convergence angle at the Northwest corner of section 22 is -2°39'13.6"
2. The acreages shown on this plat are based on GROUND distances.
3. Plot of Tract H and Tract A-R of the NE 1/4 of Section 22 is recorded as Document #2020-00433.
4. The Statutory section line Right-Of-Way between Sections 21 and 22 has been vacated pursuant to the document recorded in Book 397, Page 272.
5. The property shown on this plat is subject to SFHA Zone A as shown on FIRM of City of Spearfish, Lawrence County, South Dakota and Incorporated Areas. Community Panel Number 4600460225F, effective April 17, 2012.

DETAIL "A"



NOT TO SCALE



PREPARED BY:



703 MAIN STREET
SUITE 200
RAPID CITY, SD 57701
PHONE: 605-791-6100, FAX: 605-791-6161 1 of 2

Schlaak, Karen

From: Miles Burtzlaff <miles.burtzlaff@cityofspearfish.com>
Sent: Tuesday, December 29, 2020 9:02 AM
To: Schlaak, Karen
Subject: RE: [EXT] Water Permit Application

The new well is for irrigation of the the sports complex only. The affordable housing well be hooked to the city municipal drinking water system. In the future as Exit 17 area grows there is a plan to put in a well and tank for the drinking water system.

If you have any more questions give me a call. (605-645-1395)
Miles Burtzlaff

From: Schlaak, Karen <Karen.Schlaak@state.sd.us>
Sent: Monday, December 28, 2020 10:35 AM
To: Miles Burtzlaff <miles.burtzlaff@cityofspearfish.com>
Subject: Water Permit Application

We received the water permit application for the City of Spearfish. Is this application for irrigation of the sports complex from the new well only? Under Item No. 8 it states "This is a new affordable housing development." Please clarify if you will be submitting another application for the housing development at a later date.

Karen Schlaak

Water Rights Program
(605) 773-3352



Miles Burtzlaff

From: Schlaak, Karen <Karen.Schlaak@state.sd.us>
Sent: Monday, December 28, 2020 10:35 AM
To: Miles Burtzlaff <miles.burtzlaff@cityofspearfish.com>
Subject: Water Permit Application

We received the water permit application for the City of Spearfish. Is this application for irrigation of the sports complex from the new well only? Under Item No. 8 it states "This is a new affordable housing development." Please clarify if you will be submitting another application for the housing development at a later date.

Karen Schlaak
Water Rights Program
(605) 773-3352



Schlaak, Karen

From: Schlaak, Karen
Sent: Wednesday, January 20, 2021 4:16 PM
To: Miles Burtzlaff
Subject: RE: [EXT] Water Permit Application

I will make that change on the application.

From: Miles Burtzlaff <miles.burtzlaff@cityofspearfish.com>
Sent: Wednesday, January 20, 2021 4:12 PM
To: Schlaak, Karen <Karen.Schlaak@state.sd.us>
Subject: RE: [EXT] Water Permit Application

Could you please change the application from 1 well to 2 wells in the Madison formation. The second well would only be drilled if the 600 gal/min was not achieved in one well.

Thank you for your time.

Miles Burtzlaff

From: Schlaak, Karen <Karen.Schlaak@state.sd.us>
Sent: Thursday, January 14, 2021 8:43 AM
To: Miles Burtzlaff <miles.burtzlaff@cityofspearfish.com>
Subject: RE: Water Permit Application

I will make that change on the application.

From: Miles Burtzlaff <miles.burtzlaff@cityofspearfish.com>
Sent: Thursday, January 14, 2021 9:40 AM
To: Schlaak, Karen <Karen.Schlaak@state.sd.us>
Subject: RE: [EXT] Water Permit Application

The number that the design is calling for is 600 Gal/min.

Thanks for the help

Miles Burtzlaff

From: Schlaak, Karen <Karen.Schlaak@state.sd.us>
Sent: Tuesday, December 29, 2020 9:48 AM
To: Miles Burtzlaff <miles.burtzlaff@cityofspearfish.com>
Subject: RE: Water Permit Application

Thanks for the information. Happy New Year!

From: Miles Burtzlaff <miles.burtzlaff@cityofspearfish.com>
Sent: Tuesday, December 29, 2020 9:02 AM
To: Schlaak, Karen <Karen.Schlaak@state.sd.us>
Subject: RE: [EXT] Water Permit Application

The new well is for irrigation of the the sports complex only. The affordable housing well be hooked to the city municipal drinking water system. In the future as Exit 17 area grows there is a plan to put in a well and tank for the drinking water system.

If you have any more questions give me a call. (605-645-1395)

RECEIPT

WATER RIGHTS PROGRAM

South Dakota Department of Environment and Natural Resources

Date December 28, 2020

RECEIVED OF City of Spearfish 625 5th St Spearfish SD 57783

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

Fee for Application for Permit No. <u>2002-1</u> to Appropriate Water, to construct and to put water to beneficial use	\$500.00
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>2002-1</u>	\$200.00
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	\$700.00

By Eric Gronlund
Chief Engineer

me



DENR
SOUTH DAKOTA

**DEPARTMENT of ENVIRONMENT
and NATURAL RESOURCES**

JOE FOSS BUILDING
523 EAST CAPITOL
PIERRE, SOUTH DAKOTA 57501-3182
denr.sd.gov

**RECOMMENDATION OF CHIEF ENGINEER FOR WATER PERMIT
APPLICATION NO. 2002-1, City of Spearfish**

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. 2002-1, City of Spearfish, 625 5th St., Spearfish SD 57783.

The Chief Engineer is recommending APPROVAL of Application No. 2002-1 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. The wells approved under this Permit will be located near domestic wells and other wells which may obtain water from the same aquifer. The well owner under this Permit shall control his withdrawals so there is not a reduction of needed water supplies in adequate domestic wells or in adequate wells having prior water rights.
2. The wells authorized by Permit No. 2002-1 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. 2002-1 authorizes a maximum diversion rate of 1.33 cfs for irrigation of 40 acres with an annual volume not to exceed 2 acre feet of water per acre per year.
4. In accordance with SDCL 46-1-14 and 46-2A-20, Permit No. 2002-1 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. 2002-1 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.
5. 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
February 17, 2021

REPORT ON PERMIT APPLICATION NO. 2002-1

City of Spearfish

February 17, 2021

Water Permit Application No. 2002-1 by the City of Spearfish requests a maximum diversion rate of 1.33 cubic feet per second (cfs) of water from two wells to be completed into the Madison aquifer (approximately 1,400 feet deep) located in the NE $\frac{1}{4}$ NW $\frac{1}{4}$ of Section 22 for irrigating 40 acres of a sports complex to be located in the NW $\frac{1}{4}$ of Section 22; all in T6N-R3E. The applicant is requesting a diversion rate greater than the statutory limit due to the flow requirements needed to water the sports complex. The well sites for this application are located on the south side of Spearfish near the junction of Hwy 85 and I-90.

Aquifer: Madison (MDSN)

Hydrogeology

The Madison Group in South Dakota is a Lower Mississippian and Upper Devonian Age group composed of the overlying Pahasapa Limestone and underlying Englewood Limestone (Fahrenbach, et al., 2010). The Pahasapa Limestone is a Lower Mississippian Age white, light-gray to tan, fine- to medium-grained limestone, and dolomite containing brown to grey chert (Martin, Sawyer, Fahrenbach, Tomhave, & Schulz, 2004). The Englewood Limestone is a Lower Mississippian and Upper Devonian Age pink to lavender to light-gray, thin- to medium-bedded, fine- to medium-grained, argillaceous, dolomitic limestone (Martin, Sawyer, Fahrenbach, Tomhave, & Schulz, 2004). The Madison Group extends into eastern South Dakota, Nebraska, Wyoming, Montana, and North Dakota. In Western South Dakota, The Madison Group is estimated to have an areal extent of 19,116,160 acres (Allen, Illes, & Petres, 1985).

The Madison aquifer consists of the portions of the Madison Group, where there is both sufficient saturation and permeability to deliver water at an economical rate. The Madison aquifer is mostly under confined conditions except near where it outcrops around the Black Hills in South Dakota (Water Rights, 2021b; Water Rights, 2021c).

There was no well completion log submitted with this application; however, the lithologic log for observation well LA-95A located approximately 0.7 miles to the east of the proposed diversion point indicates the top of the Madison formation at 740 feet below grade and the last recorded water level on October 26, 2020, at 208.22 feet below grade (Water Rights, 2021c). Given the depth of the formation and the last recorded water level, the Madison aquifer is confined in this area with approximately 530 feet of hydraulic head.

South Dakota Codified Law 46-5-6

Pursuant to SDCL 46-5-6, the diversion rate for an irrigation appropriation cannot be in excess of 1 cfs for every 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....” Water Permit Application No. 2002-1 proposes to divert water at a maximum rate of 1.33 cfs for the

irrigation of 40 acres or at a rate of 2.32 cfs per 70 acres. The applicant is requesting a diversion rate greater than the statutory limit due to the flow requirements needed to water the sports complex. It has been generally accepted that turf has greater water demand, and often there are time constraints for application of water that requires a greater diversion rate than the statutory limit. The request by the applicant is reasonable.

South Dakota Codified Law 46-2A-9

Pursuant to SDCL 46-2A-9, "A permit to appropriate water may be issued only if there is reasonable probability that there is unappropriated water available for the 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 the potential for unlawful impairment to existing water rights within the Madison aquifer.

Water Availability

SDCL 46-6-3.1 is considered when evaluating the probability of unappropriated water from an aquifer and states, "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 older and lower than the Greenhorn Formation; however, there is no water distribution system involved, and therefore the estimated average annual recharge and withdrawals must be considered.

Pursuant to SDCL 46-2A-20, "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."

This application proposes to withdraw water from the Madison Formation in Lawrence County, and therefore SDCL 46-2A-20 applies.

Hydrologic Budget

Recharge

The Madison aquifer receives recharge from infiltration of precipitation and streamflow on the outcrop area and may also receive inflow from the underlying Deadwood aquifer

(Carter, Driscoll, & Hamade, 2001; Long & Putnam, 2002). There are several studies that have been conducted regarding the Madison and Minnelusa aquifers recharge. Rahn & Gries (1973) estimated that the minimum amount of water recharge to the Carbonate aquifer (The Madison aquifer is a part of the Carbonate aquifer) by precipitation falling directly on the outcrop to be 146.14 cfs (105,870 ac-ft/yr) and 33.87 cfs (31,780 ac-ft/yr) from streamflow contributions. Woodward-Clyde Consultants (1981) estimated an upper bound recharge to the Madison aquifer by taking into account Rahn & Gries (1973) streamflow contributions estimate. Accounting for evapotranspiration of precipitation that falls on the Madison and Minnelusa Formation outcrops and streamflow contributions, Woodward-Clyde Consultants (1981) estimated the upper bound on average annual recharge to the Madison aquifer to be 400,000 ac-ft/yr. While these reports provide a possible range for the average annual recharge to the Madison aquifer and have been used by the Water Rights Program in the past, there has been a more recent study conducted that includes newer data and is more aquifer specific.

Carter, Driscoll, & Hamade (2001) analyzed streamflow and precipitation data from 1931 to 1998 in the Black Hills area in South Dakota and Wyoming to determine the average annual recharge to the Madison and Minnelusa aquifers. They estimated a combined average annual recharge to both the Madison and Minnelusa aquifers from streamflow contributions to be an estimated 67,500 ac-ft/yr and 181,760 ac-ft/yr from precipitation on the outcrop areas in the Black Hills, resulting in a combined estimated average annual recharge rate of 249,260 ac-ft/yr. It was also determined that of the combined recharge to both aquifers that approximately 55% of the total recharge goes to the Madison aquifer, and the remaining 45% recharges the Minnelusa aquifer. Therefore the estimated average annual recharge to the Madison aquifer is 137,093 ac-ft/yr.

Discharge

Currently, there are 155 active water rights/permits authorized to withdraw water from the Madison aquifer and 10 future use water rights/permits (Table 1) (Water Rights, 2021a).

Table 1. Future use permits reserving water from the Madison aquifer (Water Rights, 2021a).

Permit No.	Use Type	Permit Holder	Priority date	Reserved Water (ac-ft/yr)
369-1	MUN	City of Belle Fourche	12/10/1958	620
439-2	MUN	City of Rapid City	09/22/1956	3,367
1833-2	RWS	Weston Heights Home Owners	02/18/1983	211
1872-1	MUN	City of Spearfish	11/13/2006	2,704
1995-1	RWS	Black Hawk Water User District	04/15/2020	1,300
2086-2	MUN	City of Rapid City	05/18/1989	4,075
2560-2	RWS	Fall River Water Users District	05/16/2005	358
2560A-2	RWS	Fall River Water Users District	05/16/2005	0
2560B-2	RWS	Fall River Water Users District	05/16/2005	0
2580-2	RWS	Southern Black Hills Water System	03/02/2006	1,474
Mun = Municipal, RWS = Rural Water System			Sum	14,109

All current non-irrigation water rights/permits appropriating water from the Madison aquifer are summarized in Table 2. The amount of water that can be expected to be withdrawn by non-

irrigation water rights/permits can be estimated by assuming water rights/permits limited only by diversion rate will pump at the maximum permitted diversion rate 60 percent of the time, and those limited by an annual volume will use the entire permitted volume annually.

There are some municipalities that are served by rural water systems (Table 3); as such, the wells for these municipal water rights are maintained for standby use only. Therefore, the water used for these rights has been set to zero in Table 2 as the usage for them is reflected in the rural water systems permits/rights they are served by.

Table 2: Summary of expected use of non-irrigation water rights/permits from the Madison aquifer (Water Rights, Water Right/Permit Files, 2021a)

Use Type	No. of Water Rights/Permits	Permitted Diversion Rate (cfs)	Permitted Volume (ac-ft)	Expected Annual Use (ac-ft)
REC	1	1.000	N/A	435
MUN	33	16.820	16,026	23,337
IND	11	4.880	301	2,423
INS	2	0.200	N/A	87
DOM	4	0.220	71	167
RWS	16	5.183	3,323	5,576
COM	14	1.931	1,064	1,904
SHD	41	6.906	472	3,473
GEO	2	1.430	N/A	622
Total	124	38.570	21,257	38,024
REC = Recreation, MUN = Municipal, IND = Industrial, INS = Institutional, DOM = Domestic, RWS = Rural Water System, COM = Commercial, SHD = Suburban Housing Development, GEO = Geothermal				

Table 3: Municipalities served full time by rural water systems (DENR, 2021).

Permit No	Name	Status	Use Type	Licensed Diversion Rate (cfs)	Served By
272-1	City Of Eagle Butte	LC	MUN	0.600	TRI-COUNTY RWS
568-2	Town Of Midland	LC	MUN	1.330	WR/LJ-NORTH STANLEY
574-2	City Of Philip	LC	MUN	0.800	WR/LJ-NORTH STANLEY
743-1	City Of Dupree	LC	MUN	0.190	TRI-COUNTY RWS
1858-2	City Of Philip	LC	MUN	0.420	WR/LJ-NORTH STANLEY

Water Permit Application No. 2585-2 for Southern Black Hills Water System proposing to appropriate 1,600 ac-ft/yr from the Madison aquifer and is currently deferred until the potential impacts on cave pools in Wind Cave National Park and to Beaver Creek are assessed (Water Rights, 2021a). Water Permit Application No. 2685-3 for Powertech (USA) Inc. proposing to appropriate 888.8 ac-ft/yr from the Madison aquifer and is held in abeyance until other permitting processes are completed (SD-DENR, 2020).

There are 32 water rights/permits for irrigation, with 15 of those having more than one use type listed and authorized to appropriate water from the Madison aquifer. The water appropriation for water rights/permits that have multiple uses is calculated, assuming they will pump at their maximum diversion rate 60% of the time. The majority of irrigation water rights/permits are

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required to report water usage each year in the form of an irrigation questionnaire; this allows for more accurate budget calculations. Table 4 consists of water rights/permits that have reported for at least 10 years and includes any estimated non-irrigation use if applicable.

Table 4. Water rights/permits with more than 10 years of reported irrigation and the average reported irrigation use for the years 1982 to 2019 and estimated non-irrigation use for multiple use type water rights/permits assuming they pump at the maximum diversion rate 60% of the time (Water Rights, 2021a; Water Rights, 2021d).

Permit No.	Name/Business	Priority	Years of Reported Irrigation	Authorized Acres	Diversion Rate (cfs)	Average Reported Irrigation Use (ac-ft/yr)	Estimated Non Irrigation Use (ac-ft/yr)	Total Estimated Withdrawal (ac-ft/yr)
858-2	John & Heidi McBride	02/05/1965	36	655.75	9.36	7.1	N/A	7.1
1009-1	Donald F/Ann J Brady	02/01/1974	38	53.73	0.78	31.6	N/A	31.6
1185-1	Donald F/Ann J Brady	01/18/1979	38	22.52	0.38	107	N/A	107
1223-1	Montana Dakota Land LLC	03/10/1981	38	263	0.67	205.6	N/A	205.6
1363-1	Spearfish Canyon Cntry CI	09/15/1986	33	80.1	0.9	60.7	N/A	60.7
1452-1	Black Hills State College	12/19/1988	31	25.44	3.33	17.9	1,447	1,464.9
1635-1	Black Hills Nat'l Cemetery	04/02/1990	24	54.5	0.82	96.4	356	452.4
1725-2	Janice R Crowser	08/20/1980	21	75.1	1.07	1.1	N/A	1.1
1842-1	Tom C Davis	04/05/2005	15	330	0.44	0	N/A	0
1858-1	Glencoe Camp Resort II LLC	03/08/2006	14	34	0.86	0	374	374
1899-1	Davis Ranches Inc	08/25/2008	11	100	1.43	0	N/A	0
1911-2	Hart Ranch Development Co	09/27/1984	26	124	0.88	124.6	383	507.6
2106-2	Stuart Rice	06/06/1990	27	2.8	0.08	0.9	35	35.9
2286-2	Donald Konechne	04/28/1993	26	38.5	0.1	10.9	N/A	10.9
2313-2	Coca-Cola Bottling	04/08/1994	25	3	0.33	7.4	143	150.4
2458-2	City of Rapid City	03/30/2001	19	107	0.8	104.7	N/A	104.7
2593-2	Hart Ranch Development	06/15/2006	13	72.5	0.49	14	213	227
Sum				2,041.94	22.72	789.9	2,951	3,740.7

Using the same method as Kilts (2017) irrigation rights/permits that are new (less than 10 years) or are not required to report their usage are estimated to use 2 ac-ft/yr per authorized acre (Table 5).

Table 5. Water rights/permits with less than 10 years of reported irrigation or that are not required to report their usage and their estimated irrigation appropriation using 2 ac-ft/yr per acre, and estimated non-irrigation use for multiple use type water rights/permits assuming they pump at the maximum diversion rate 60% of the time (Water Rights, 2021a; Water Rights, 2021d).

Permit No.	Name/Business	Priority	Years of Reported Irrigation	Authorized Acres	Diversion Rate (cfs)	Estimated Irrigation Use (ac-ft/yr)	Estimated Non Irrigation Use (ac-ft/yr)	Total Estimated Withdrawal (ac-ft/yr)
419-2	Wind Cave National Park	12/29/1955	N/A	6	0.15	12	65	77
1707A-1	Elkhorn Ridge @ Frawley Ranches LLC	01/06/2000	N/A	100	3.71	200	1,610	1,810
1707E-1	Elkhorn Ridge @ Frawley Ranches LLC	01/06/2000	13	N/A	N/A	2.3	0 *	0 *
1885-1	John T & Veronica Widdoss	04/09/2007	3	22	0.11	44	36 **	80 **
1923-1	Jim Montieth	02/15/2011	8	3	0.11	6	48	54
1931-1	Elkhorn Ridge @ Frawley Ranches LLC	08/17/2012	7	3.3	0.17	6.6	74	80.6
1945-1	Frawley Ranches LLC	02/10/2014	6	265	1.11	530	N/A	530
1960-1	One Diamond Inc	04/11/2016	4	150	1.28	300	556	856
2673-2	Diocese of Rapid City	05/27/2011	7	7	0.12	14	N/A	14
2741-2	Tubbs Land & Cattle LLC	08/20/2018	1	567	3.34	1,134	N/A	1,134
2773-2	Arrowhead Country Club	07/27/2017	2	100	1.11	200	N/A	200
Sum				1,223.30	11.21	2,448.9	2,353	4,835.6

* Is an extension of time to place water to beneficial use for Water Permit No. 1707A-1

** Is assumed to pump at maximum diversion rate 100% of the time due to the sum of the estimated withdrawal for irrigation and estimated non-irrigation use is greater than is physically possible at the licensed diversion rate.

There are 5 water rights/permits for irrigation currently authorized to withdraw from the Madison aquifer that have an estimated use that is calculated separately (Table 6). Water Right No. 1650-1 is not required to report annual withdrawals and has no authorized acres for irrigation; however, it supplies water for Water Right No. 1231-1, which permits a 110 ac-ft dam for commercial livestock and irrigation of 134 acres (Water Rights, 2021a). Kilts (2017) estimated the withdrawal of Water Right No. 1650-1 based on the irrigation reported for Water Right No. 1231-1 to be 55.9 ac-ft/yr.

Water Rights/Permits 1096-1, 1096A-1, 1496-1, and 1670-1 withdraw water from one dam and one well completed into the Madison aquifer for either irrigation or rural water system use. Water Right No. 1096A-1 and Water Permit No. 1496-1 are authorized to withdraw water during the entire year for rural water system use (Water Rights, 2021a). The administrative file for Water Right No. 1670-1 indicates the well was not valved and cannot be shut off when flow is not being put to beneficial use. A letter dated September 9, 1998, submitted as part of the public comments prior to approval of Water Right No. 1670-1, stated that when water is not used for irrigation or rural water system use, it is used for fish and wildlife propagation. The letter requested the well's flow remain unrestricted when not used for irrigation or rural water system use (Water Rights, 2021a). Assuming the well is still flowing at the diversion rate authorized by Water Right No. 1096A-1 of 1.33 cfs, the well withdraws an estimated 964 ac-ft/yr for all four water rights/permits combined.

Table 6. Water Rights/Permits and estimated withdrawal calculated separately (Water Rights, 2021a).

Permit No.	Name/Business	Priority	Years of Reported Irrigation	Authorized Acres	Diversion Rate (cfs)	Average Reported Irrigation Use (ac-ft/yr)	Total Estimated Withdrawal (ac-ft/yr)
1096-1	Bar Bar V Livestock LLC	04/16/1976	29	216	1.88	65.3	964
1670-1	Bar Bar V Livestock LLC	06/09/1998	22	253	3.61	51.7	
1096A-1	Butte Meade Sanitary Dist	04/16/1976	N/A	N/A	1.33	N/A	
1496-1	Butte Meade Sanitary Dist	06/20/1990	N/A	N/A	1.33	N/A	
1650-1	Foothill Land & Cattle LLC	04/03/1997	N/A	N/A	0.89	N/A	55.9
Sum				469	9.04	117	1,019.9

Hydrologic Budget Summary

The estimated average annual recharge to the Madison aquifer from streamflow contributions and precipitation on the outcrop in the Black Hills area is 137,093 ac-ft/yr (Carter, Driscoll, & Hamade, 2001). The estimated average annual well withdrawals for the Madison aquifer is 64,265 ac-ft/yr, including this application (Table 7). Therefore there is a reasonable probability that water is available for this appropriation.

Table 7. Summary of well withdrawals from the Madison aquifer.

Well Withdrawal Type	Amount (ac-ft/yr)
This Application If Approved	80
Future use (Table 1)	14,109
Non Irrigation (Tables 2, 4, 5)	43,328
Permits Pending Approval	2,488.8
Average Reported Irrigation Use (Table 4)	789.9
Estimated Irrigation Use (Table 5)	2,448.9
Other (Table 6)	1,019.9
Sum	64,265

Localized Hydrologic Budget

Carter, Driscoll, Hamade, & Jarrell (2001) calculated hydrologic budgets for the Madison and Minnelusa aquifers for the Black Hills area during the water years of 1987 to 1996. This was accomplished by dividing the Black Hills into nine subareas to minimize apparent flow across the boundaries. These subareas were determined based on several factors, including locations of major artesian springs, streamflow loss zones, and areas dominated by precipitation recharge. The proposed diversion point for this application is in subarea 2 (Figure 1). The hydrologic budget for subarea 2 is shown in Table 8.

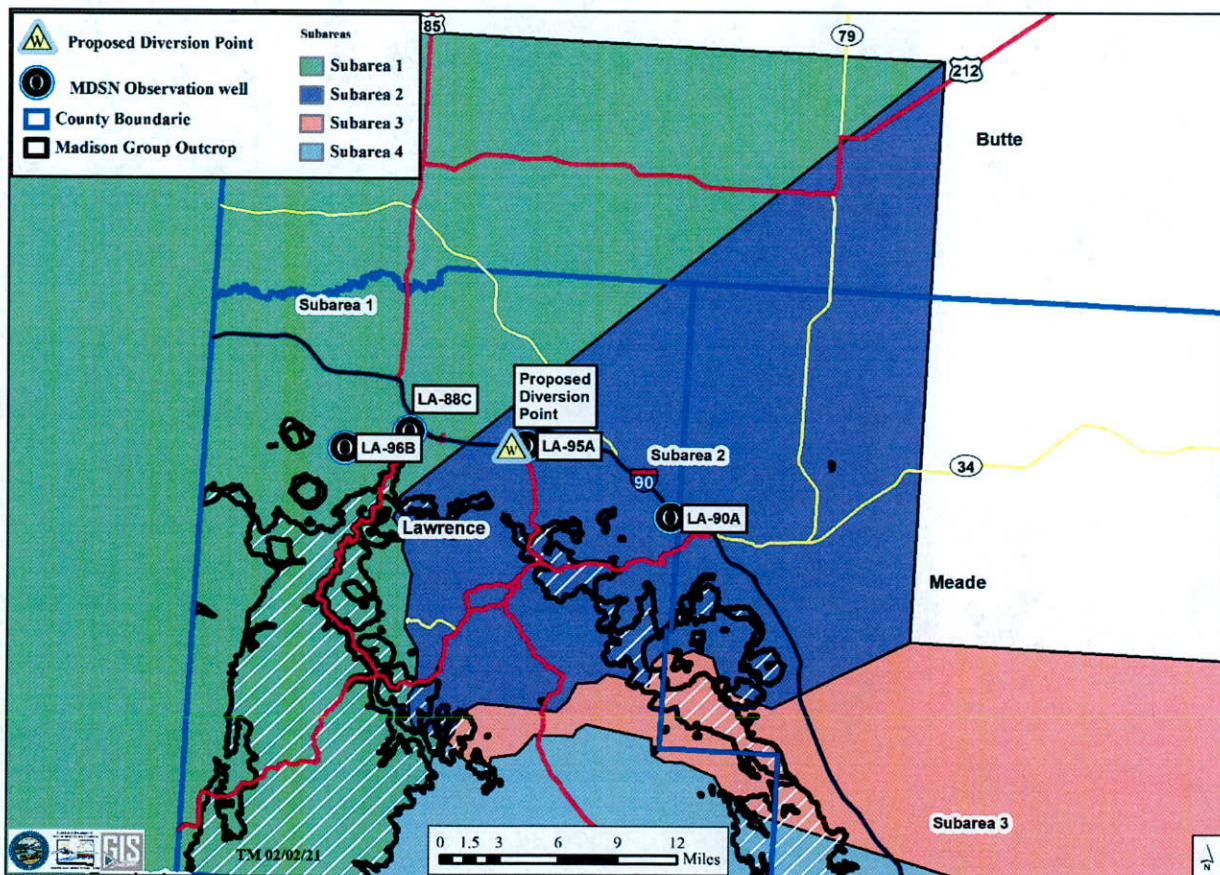


Figure 1: Subareas used for Madison and Minnelusa aquifer localized hydrologic budgets, the Madison Group outcrop, the proposed diversion point, and observation wells monitoring the Madison aquifer (Carter, Driscoll, Hamade, & Jarrell, 2001; Water Rights, 2021c).

Table 8. Estimated average annual hydrologic budget for subarea 2 for the Madison and Minnelusa aquifers in the Black Hills area for the water years 1987-1996 modified from Carter, Driscoll, Hamade, & Jarrell (2001).

Subarea 2	Inflows			Outflows		
	Streamflow Recharge	Precipitation Recharge	Net groundwater Inflow	Artesian Springflow	Wells	Net Groundwater Outflow
cfs	27.1	10.8	0	0	3.7	34.2
ac-ft/yr	19,632.9	7,824.2	0.0	0.0	2,680.5	24,776.6

As shown in Table 8, Carter, Driscoll, Hamade, & Jarrell (2001) estimated the average annual recharge to subarea 2 for the Madison and Minnelusa aquifers due to streamflow, precipitation, and groundwater inflow to be 27,457.1 ac-ft/yr. Carter, Driscoll, & Hamade (2001) estimated that approximately 55% of recharge occurring to the Madison and Minnelusa aquifers contributes to the Madison aquifer, which results in an estimated average annual recharge to the Madison aquifer of 15,101 ac-ft/yr in Subarea 2. Currently, in subarea 2, there are 33 water rights/permits and 1 future use permit authorized to withdraw water from the Madison aquifer (Water Rights, 2021a). Using the same methods used to calculate withdrawals from the previous discharge section and including this application, the estimated average annual withdrawal for the Madison aquifer in subarea 2 is approximately 10,700 ac-ft/yr.

Groundwater models rely on a number of assumptions and do not account for all possible recharge sources, and there is more data now available for this reason; observation well analysis is necessary and detailed in this report documenting that there is a reasonable probability that unappropriated water is available for this application.

Observation Well Data

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

The DENR-Water Rights Program monitors 25 observation wells completed into the Madison aquifer (Water Rights, 2021c). Observation wells provide data on how the aquifer reacts to regional climatic conditions and pumping in the immediate vicinity of those observation wells. The nearest observation wells that can be used for analysis are LA-95A (0.7 miles northeast), LA-88C (5.2 miles northwest), LA-96B (8.4 miles west), and LA-90A (8.8 miles southeast). The hydrographs for these wells are shown in Figure 2. All of these observation wells are within four miles of where the Madison outcrops in the Black Hills. The Black Hills Madison outcrop is the primary recharge area for the Madison aquifer in South Dakota, and as such, observation wells near the outcrop will show higher recharge than areas downgradient of them. As a result, observation wells near the outcrop show greater fluctuations due to seasonal recharge and withdrawals, while observation wells further away show more attenuated readings.

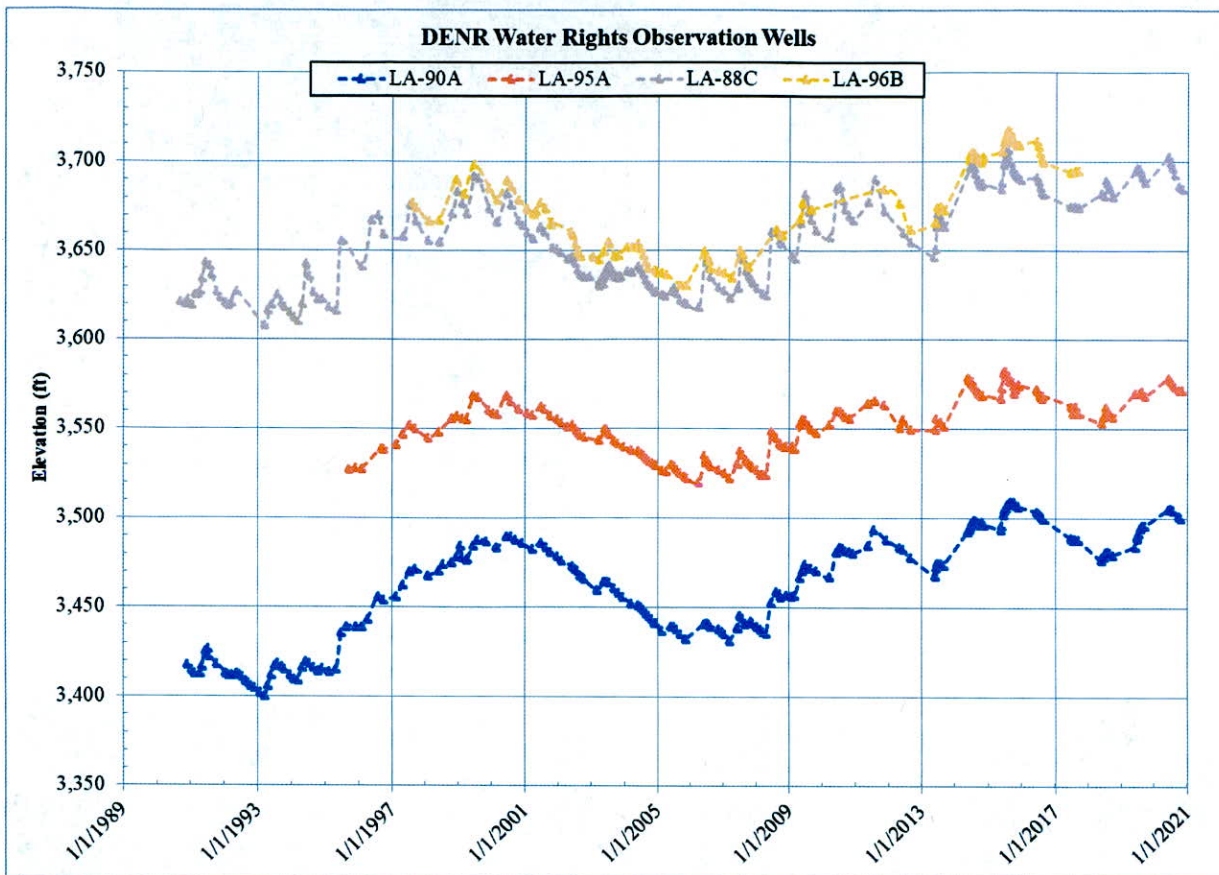


Figure 2: Hydrograph for observation wells LA-95A (0.7 miles northeast), LA-88C (5.2 miles northwest), LA-96B (8.4 miles west), and LA-90A (8.8 miles southeast) (Water Rights, 2021c).

Observation well LA-96B is currently obstructed with the last reading taken on September 13, 2017. Water levels shown in the observation wells change in response to climatic conditions declining during drier periods and rising during wetter periods, and show no or minimal responses to pumping. Any responses to pumping are relatively short-term and are masked by recharge to and natural discharge from the aquifer indicating climatic conditions govern the changes in water level and not the effects of pumping. Furthermore, the general trend in the water level over the period of record is rising. Recognizing recharge to and natural discharge from the Madison aquifer can be captured for pumping, the hydrographs document that unappropriated water is available for this proposed appropriation.

Potential For Unlawful Impairment Of Existing Water Rights

Currently, there are 155 water rights/permits appropriating water from the Madison aquifer (Water Rights, 2021a). The nearest water right/permit to the applicant's proposed diversion point is approximately 0.5 miles to the southeast (Table 10 and Figure 3). There are a number of domestic wells on file with the SD DENR-Water Rights Program, which appear to be completed into the Madison within the area illustrated in Figure 3 (Water Rights, 2021b).

Table 10: Nearby water rights/permits currently authorized to withdraw water from the Madison aquifer, illustrated in Figure 3 (Water Rights, 2021a).

Permit No.	Name	Status	Use	Rate (cfs)	Acres
1187-1A	Simon Contractors	LC	IND	0.04	N/A
1547-1	Simon Contractors	LC	IND	0.09	N/A
1583-1	Will/Mary Ellen Lantis	LC	COM	0.04	N/A
1707A-1	Elkhorn Ridge @ Frawley Ranches Llc	PE	IRR	3.70	100
1707E-1	Elkhorn Ridge @ Frawley Ranches Llc	PE	IRR	0	N/A
1916-1	Simon Contractors	LC	IND	0.22	N/A
1923-1	Roger & Jean Ranschau	LC	IRR	0.11	3
1931-1	Elkhorn Ridge @ Frawley Ranches Llc	LC	IRR	0.17	3.3
1945-1	Frawley Ranches Llc	PE	IRR	1.11	265
1987-1	Centennial Vista Estates Homeowners Assoc	LC	DOM	0.06	N/A

LC = Water Right, IND = Industrial, COM = Commercial, PE = Water Permit, IRR = Irrigation, DOM = Domestic

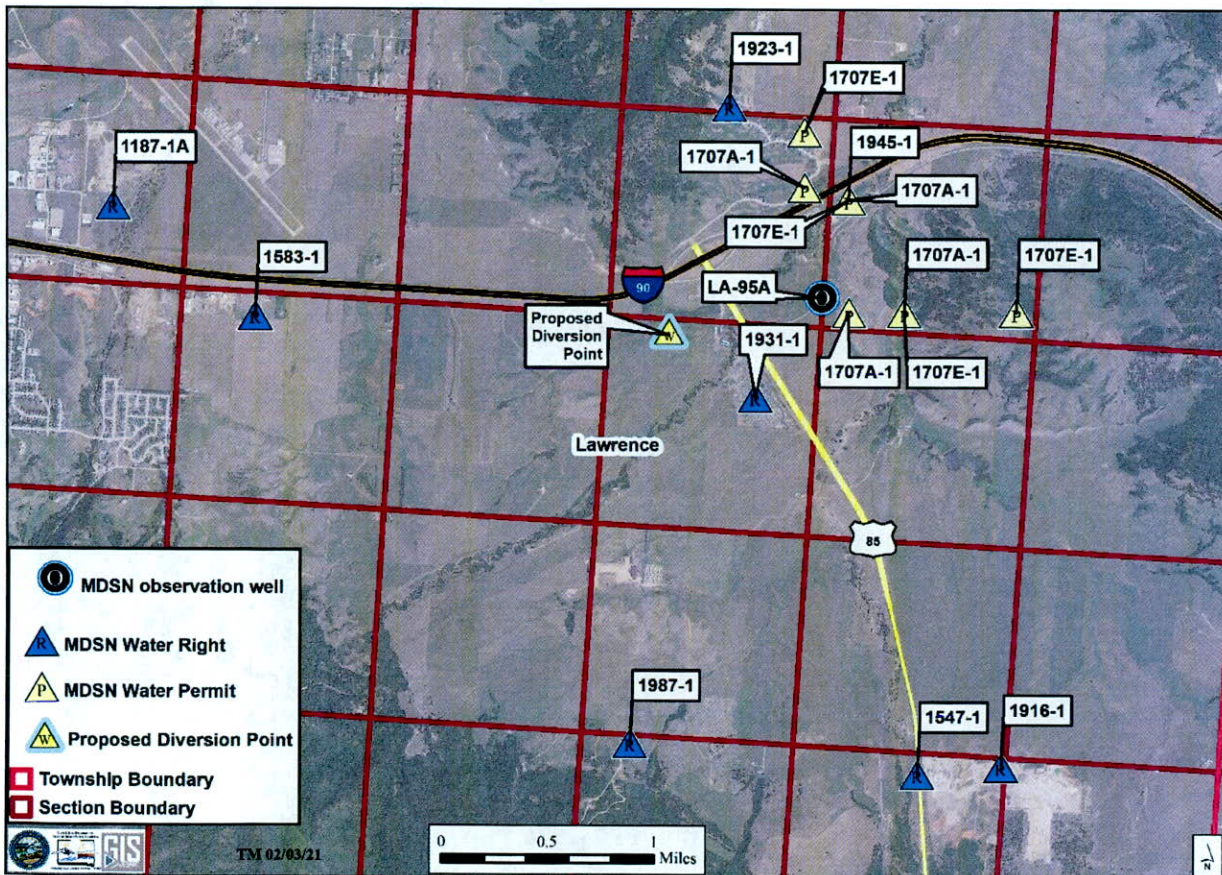


Figure 3: Map showing the location of the proposed diversion point, nearby water rights/permits, and nearby observation wells (Water Rights, 2021a; Water Rights, 2021c).

The Madison aquifer is confined in this area, so drawdown from pumping could extend a significant distance from the proposed well site. The thickness of the Madison aquifer in the area of this application is expected to be approximately 450 feet. This would allow sufficient thickness for a pump to be placed 20 feet below the top of the aquifer. Nearby adequate wells should not be adversely impacted by pumping at this proposed diversion rate.

An adversely impacted well as defined in ARSD 74:02:04:20(7):

“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.”

SDCL 46-6-6.1 does not necessarily protect artesian head pressure as a means of delivery, and in the past, the Water Management Board has recognized that to place water to maximum beneficial use, a certain amount of drawdown may occur (Water Rights, 1995). The Water Management Board has also 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 deeper water levels. Given the artesian head pressure at the well site is expected to be approximately 530 feet, the thickness of the Madison aquifer in the area (450 ft), and the laws and rules governing water use and protecting adequate wells, well interference from this proposed diversion is not expected to cause an adverse impact. Therefore, there is a reasonable probability that any interference created by pumping for this proposed appropriation will not be unlawfully impair existing water rights and domestic users with adequate wells.

Springs

In the past, there have been concerns, the development of the Madison aquifer will affect spring discharge. The nearest major spring that is sourced primarily by water from the Madison aquifer is Higgins Gulch Spring, located approximately 8 miles to the northwest of the well site for this application (Naus, Driscoll, & Carter, 2001). In considering the deferral of Water Permit Application No. 2585-2 for the Southern Black Hills Water System, the Water Management Board adopted a conclusion of law stating in part, “...The only protection South Dakota law provides when considering an application for an underground water permit for flow from an artesian spring is under the public interest criteria” (Water Rights, 1997). Given the distance between the proposed well sites and Higgins Gulch Spring, there is a reasonable probability this application can be developed without making an impact that would be measurable above the natural fluctuations of the nearest spring.

Term Limit

Although there is a reasonable probability unappropriated water is available, and the applicant can develop the proposed use without unlawful impairment of existing rights, the Water Management Board has not determined in a hearing that the requirements of SDCL 46-2A-20 to omit the term limit requirement have been met. Therefore, this application is subject to a 20-year term limit.

Conclusions

1. Water Permit Application No. 2002-1 by the City of Spearfish requests a maximum diversion rate of 1.33 cubic feet per second (cfs) of water from two wells to be completed into the Madison aquifer (approximately 1,400 feet deep) for irrigating 40 acres of a sports complex.
2. This application is seeking a diversion rate that exceeds the statutory limit of 1 cfs for every 70 acres. This application is seeking an equivalent rate of 2.32 cfs per 70 acres due to the flow requirements needed to water the sports complex.
3. Based on observation well data and the hydrologic budget, there is a reasonable probability that unappropriated water is available from the Madison aquifer.
4. There is a reasonable probability that the diversion proposed by this application will not unlawfully impair adequate wells for existing water rights and domestic use.
5. This application is subject to a 20-year term limit.



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SD DENR – Water Rights Program

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STATE OF SOUTH DAKOTA:

COUNTY OF LAWRENCE:

Letitia Lister of said County and State being first duly sworn, on her oath says: That the BLACK HILLS PIONEER is a legal daily newspaper of general circulation, printed and published in the City of Spearfish, in said County and State by Letitia Lister, and has been such a newspaper during the times hereinafter mentioned; and that said newspaper has a bonafide circulation of at least 200 copies weekly, and has been published within said County in the English language for at least one year prior to the first publication of the notice herein mentioned, and is printed in whole or in part in an office maintained at the place of publication; and that I, Letitia Lister, the undersigned, am the Publisher of said newspaper and have personal knowledge of all the facts stated in this affidavit; and that the advertisement headed:

Notice Of Application

No. 2002-1

a printed copy of which is hereto attached, was printed and published in said newspaper for 1 successive and consecutive weeks, the first publication being made on the 24th day of Feb, 2021, and the last publication on the _____ day of _____, that the full amount of fees charged for publishing same, to-wit: The sum of \$ 28.64, insures solely to the benefit of the publisher of the BLACK HILLS PIONEER, that no agreement or understanding for a division thereof has been made with any person and that no part thereof has been agreed to be paid to any other person whomsoever.

[Signature]
Subscribed and sworn to before me this 15th day of March, 2021

[Signature]

Notary Public, Butte County, South Dakota

My commission expires: 3-21-2023

**NOTICE OF
APPLICATION
NO. 2002-1 to
Appropriate Water**

Notice is given that the City of Spearfish, c/o Brandy Kean, Public Works Director, 625 5th St, Spearfish SD 57783 has filed an application for a water permit to appropriate 1.33 cubic feet of water per second (cfs) from two wells to be completed into the Madison Aquifer (approximately 1,400 feet deep) located in the NE 1/4 NW 1/4 Section 22 for irrigation of 40 acres of a sports complex to be located in the NW 1/4 Section 22; all in T6N-R3E. The applicant is requesting a diversion rate greater than the statutory limit of 1 cfs per 70 acres. This site is located on the south side of Spearfish near the junction of Hwy 85 and I-90.

Pursuant to SDCL 46-2A-2, the Chief Engineer

recommends APPROVAL of Application No. 2002-1 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. The Chief Engineer's recommendation with qualifications, the application, and staff report are available at <http://denr.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 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 March 8, 2021.

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.

Published once at the total approximate cost of \$28.64.

#119
Feb 24

RECEIVED

FEB 24 2021

WATER RIGHTS
PROGRAM

NOTICE OF APPLICATION NO. 2002-1 to Appropriate Water

Notice is given that the City of Spearfish, c/o Brandy Kean, Public Works Director, 625 5th St, Spearfish SD 57783 has filed an application for a water permit to appropriate 1.33 cubic feet of water per second (cfs) from two wells to be completed into the Madison Aquifer (approximately 1,400 feet deep) located in the NE 1/4 NW 1/4 Section 22 for irrigation of 40 acres of a sports complex to be located in the NW 1/4 Section 22; all in T6N-R3E. The applicant is requesting a diversion rate greater than the statutory limit of 1 cfs per 70 acres. This site is located on the south-side of Spearfish near the junction of Hwy 85 and I-90.

Pursuant to SDCL 46-2A-2, the Chief Engineer recommends APPROVAL of Application No. 2002-1 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. The Chief Engineer's recommendation with qualifications, the application, and staff report are available at <http://denr.sd.gov/public> or contact Ron Duvall for this information, or other information, at the Water Rights Program address provided below.

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Published once at the total approximate cost of _

Schlaak, Karen

From: Schlaak, Karen
Sent: Thursday, February 18, 2021 11:16 AM
To: nancy.hoffman@cityofspearfish.com
Subject: 2002-1, City of Spearfish public notice
Attachments: 2002-1public.short.docx

Nancy,

Attached is a copy of the public notice with the correct name of the public works director. I have emailed the Black Hills Pioneer with the change. As stated in the letter, please contact the paper to authorize publication and arrange for payment.

Thanks for making us aware of the name change.

Karen Schlaak

Water Rights Program
(605) 773-3352



Schlaak, Karen

From: Schlaak, Karen
Sent: Wednesday, February 17, 2021 11:20 AM
To: Miles Burtzlaff
Subject: Water Permit Application No. 2002-1, City of Spearfish
Attachments: 0599.pdf

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

Karen Schlaak

Water Rights Program
(605) 773-3352



Schlaak, Karen

From: Schlaak, Karen
Sent: Thursday, February 18, 2021 11:09 AM
To: legals@bhpioneer.com
Subject: RE: [EXT] 2002-1, City of Spearfish
Attachments: 2002-1public.short.docx

Please replace the original notice, I sent yesterday with the attached notice. I was informed that the City of Spearfish has a new public works director, so there is a name change in the first paragraph.
Please let me know you received this.

Thanks,
Karen

From: legals@bhpioneer.com <legals@bhpioneer.com>
Sent: Wednesday, February 17, 2021 11:37 AM
To: Schlaak, Karen <Karen.Schlaak@state.sd.us>
Subject: Re: [EXT] 2002-1, City of Spearfish

Hi Karen,

I will get this published on February 24th. Thanks.

On Feb 17, 2021, at 10:16 AM, Schlaak, Karen <Karen.Schlaak@state.sd.us> wrote:

Attached is a notice to be published on February 24, 2021.

City of Spearfish, c/o Dustin Lee, Public Works Director, 625 5th St, Spearfish SD 57783 (605 642-1333) 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
Water Rights Program
(605) 773-3352
<image003.jpg>



DENR
SOUTH DAKOTA

**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 NEWSPAPER RIGHT AWAY.**

February 17, 2021

City of Spearfish
c/o Dustin Lee, Public Works Director
625 5th St
Spearfish SD 57783

Dear Mr. Lee:

Water Permit Application No. 2002-1 for irrigation use has been examined and found to comply with the South Dakota Water Laws and applicable rules. A notice has been sent to the Black Hills Pioneer printed at Spearfish SD (Ph # 605 642-2761). You will need to contact the newspaper 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 newspaper to authorize publication of your Notice and to arrange for payment. Early contact with the paper 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,

Karen Schlaak

Karen Schlaak
Water Rights Program
(605) 773-3352

enclosures

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

NOTICE OF APPLICATION NO. 2002-1 to Appropriate Water

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Published once at the total approximate cost of _



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SOUTH DAKOTA

**DEPARTMENT of ENVIRONMENT
and NATURAL RESOURCES**

JOE FOSS BUILDING
523 EAST CAPITOL
PIERRE, SOUTH DAKOTA 57501-3182
denr.sd.gov

APR 06 2021

City of Spearfish
Brandy Kean, Public Works Director
625 N 5th St
Spearfish SD 57783

Dear Ms. Kean:

Enclosed is Water Permit No. 2002-1 authorizing construction of the water diversion system and beneficial use of the water, not exceeding the limits as specified in the Water Permit.

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

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

Sincerely,

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

enclosures

2002-1 SOUTH DAKOTA WATER WELL COMPLETION REPORT

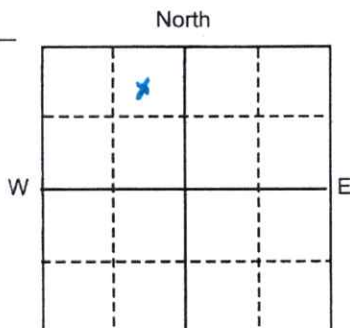
SD EForm - 1621LD V1

11-02

Location NE 1/4 NW 1/4 Sec 22 Twp 6 N Rg 3 E

County Lawrence

Please mark well location with an "X"



Well Completion Date

1/2023

1 Mile

NO PUMP INSTALLED AT THAT TIME

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

> 500' ft. from SEPTIC (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
<u>65#</u> LB/FT	<u>16"</u> IN	<u>0</u> FT	<u>41</u> FT	<u>22"</u> IN
<u>40.5#</u> LB/FT	<u>10.75</u> IN	<u>0</u> FT	<u>1028</u> FT	<u>14.75</u> IN

GROUTING DATA:

Grout Type	No. of Sacks	Grout Weight	From	To
<u>CLASS G</u>	<u>230</u>	<u>14.6</u> Lb/gal	<u>0</u> Ft	<u>1028</u> Ft
<u>LOT#</u>	<u>230</u>	<u>12.0</u> Lb/gal		

Describe grouting procedure

POSTIVE DISPLACEMENT PRESSURE GROUT

SCREEN:

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 ☒ No

If so, what material?

Describe packer(s) and location

DISINFECTION: Was well disinfected upon completion?

☒ Yes, How? CHLORINE SOLUTION

☐ No, Why Not?

Lab to which water quality sample sent for analysis

MIDCONTINENT LABS

Well Owner: CITY OF SPORRSEN

Business Name: SKY RIVER SPORTS COMPLEX IRRIGATION W

Address: 625 N. 5TH STREET

City, State, Zip: SPORRSEN SD 57783

WELL LOG:

FORMATION	DEPTH	
	FROM	TO
<u>SPORRSEN</u>	<u>0</u>	<u>330</u>
<u>MUNNEKATA</u>	<u>330</u>	<u>364</u>
<u>ATACHE</u>	<u>364</u>	<u>505</u>
<u>M. WILKINSON</u>	<u>505</u>	<u>946</u>
<u>MARION</u>	<u>946</u>	<u>1356</u>

STATIC WATER LEVEL

276 FEET

If flowing: closed in pressure N/A 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: TESTED WITH 125HP PUMP
☐ Bailed 1 GENERATOR
☐ Other

Pumping Level Below Land Surface

572' Ft. After 6 Hrs. pumped 550 GPM

483' Ft. After 2 Hrs. pumped 450 GPM

If pump installed, pump rate: _____ GPM

REMARKS

This well was drilled under license # 698 and this report is true and accurate.

Drilling firm: WATER SYSTEM DRILL INC

Signature of License Representative:

SEAN ATKINSON

Signature of Well Owner or Equitable Property Holder:

RECEIVED

Date: 3/30/2023

APR 19 2023

OFFICE OF
WATER



2381 South Plaza Drive P.O. Box 3388 Rapid City, SD 57709
(605) 348-0111 – www.thechemistrylab.com

SCOTT HEIMER
WATER SYSTEM DRILLING, INC.
PO BOX 368
GILLETTE, WY 82717

Sample Site: Sky Ridge Irrigation Well
Sampled: 11/15/22 at 09:15 AM
by Scott Heimer
Sample Matrix: Water

Lab ID#: 20221115911
Received: 11/15/22 at 03:02 PM
by Steve Ristau
Account: 9639
Water System Drilling, Inc.

Parameter	Result	Units	DF	MDL	PQL	Method	Analyst/Date
Physical Properties							
Electrical Conductivity	1080	µmhos/cm	1	0.200	5.00	SM 2510B	JAM 11/16/22
Non-Metallics							
Nitrogen, Nitrate (NO ₃)	< 0.500	mg/L	10	0.079	0.500	SM 4500-NO ₃ F	BLL 11/16/22
Sulfate (SO ₄)	< 10.0	mg/L	1	0.928	10.0	SM 4500-SO ₄ E	BLL 11/18/22
Metals - Dissolved							
Sodium (Na)	13.7	mg/L	1	0.057	0.500	SM 3111 B	GRT 11/21/22
Metals - Total							
Arsenic (As)	< 0.005	mg/L	10	0.00045	0.005	EPA 200.8	TNA 11/17/22
Bacteria							
E. coli	Absent		1			SM 9223 B (P/A)	JMH 11/15/22
Total Coliform	Absent		1			SM 9223 B (P/A)	JMH 11/15/22
Radiological							
Gross Alpha	6.02	pCi/L	1			EPA 900.0	SYS 12/16/22
Radium-226	0.585	pCi/L	1			EPA 903.1	SYS 12/20/22
Radium-228	0.349	pCi/L	1			EPA 904.0	SYS 12/19/22
Precision Data							
Gross Alpha precision	± 2.50	pCi/L	1			SC - Gross Alpha precision	SYS 12/16/22
Radium-226 precision	± 0.382	pCi/L	1			SC-Radium 226 precision	SYS 12/20/22
Radium-228 precision	± 0.261	pCi/L	1			SC-Radium 228 precision	SYS 12/19/22
MDA Data							
Gross Alpha MDA	2.94	pCi/L	1			SC - Gross Alpha MDA	SYS 12/16/22
Radium-226 MDA	0.452	pCi/L	1			SC - Radium 226 MDA	SYS 12/20/22
Radium-228 MDA	0.523	pCi/L	1			SC - Radium 228 MDA	SYS 12/19/22

Approved By: _____

Steve Ristau

Approved On: 12/21/2022 2:15:03 PM

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APR 19 2023

OFFICE OF
WATER

Step Rate Test Data

Full Test and Recovery

Rate (gpm)	Elapsed Time	Drawdown
450	2.5	109.3
450	3	115.3
450	4	128.3
450	5	137.3
450	6	144.3
450	7	150.1
450	8	154.7
450	9.5	159.8
450	10	161.4
450	15	173.0
450	20	180.0
450	25	185.6
450	30	188.8
450	35	192.2
450	40	194.0
450	45	196.3
450	50	197.7
450	60	200.2
450	70	202.3
450	80	203.7
450	90	204.2
450	120	207.9
525	121	227.8
525	122	235.3
525	123	238.5
525	124	242.1
525	125	244.3
525	126	246.1
525	127	247.7
525	128	249.0
525	129	249.9
525	130	250.7
525	135	252.8
525	140	255.0
525	145	257.0
525	150	257.9
525	155	258.7
525	160	259.8
525	165	260.6
525	170	261.2
525	180	261.6
525	190	264.7
525	200	268.3
525	210	269.8

SWL 276.6
 SWL Probe 483.3
 Probe Depth 759.9

Step 1
 Rate (gpm)
 450

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Elapsed Time	Probe readings
2.5	374.0
3	368.0
4	355.0
5	346.0
6	339.0
7	333.2
8	328.6
9.5	323.5
10	321.9
15	310.3
20	303.3
25	297.7
30	294.5
35	291.1
40	289.3
45	287.0
50	285.6
60	283.1
70	281.0
80	279.6
90	279.1
120	275.4

Step 2	
Rate (gpm)	Elapsed Time
525	1
	2
	3
	4
	5
	6
	7
	8
	9
	10
	15
	20
	25
	30
	35
	40
	45
	50
	60
	70
	80
	90
	120

Step 3
Rate (gpm)
550

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WATER

		Recovery	
Elapsed Time	Probe readings	Rate (gpm)	Elapsed Time
1	205.1	0	1
3.5	201.1		2
4	200.6		3
5	200.5		4
6.5	199.5		5
7	199.4		6
8	198.2		7
9	197.7		8
10	196.7		9
15	194.0		10
21	193.3		15
25	192.6		20
30	192.5		25
35	191.7		30
40	191.2		35
45	190.7		40
50	190.2		45
60	188.9		50
70	188.8		60
80	188.7		70
90	188.2		80
120	187.1		90
			120
			150
			180
			240
			300

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APR 19 2023

OFFICE OF
WATER

525	240	271.3
550	241	278.2
550	243.5	282.2
550	244	282.7
550	245	282.8
550	246.5	283.8
550	247	283.9
550	248	285.1
550	249	285.6
550	250	286.6
550	255	289.3
550	261	290.0
550	265	290.7
550	270	290.8
550	275	291.6
550	280	292.1
550	285	292.6
550	290	293.1
550	300	294.4
550	310	294.5
550	320	294.6
550	330	295.1
550	360	296.2

0	361	192.8 Recovery
0	362	152.8
0	363	128.6
0	364	114.3
0	365	104.7
0	366	96.6
0	367	89.5
0	368	83.3
0	369	78.1
0	370	73.9
0	375	59.3
0	380	46.0
0	385	38.0
0	390	32.1
0	395	27.6
0	400	23.9
0	405	22.0
0	410	18.6
0	420	14.9
0	430	12.1
0	440	10.1
0	450	8.6
0	480	5.6
0	510	3.9

RECEIVED
APR 19 2023
OFFICE OF
WATER

0	540	2.8
0	600	1.7
0	660	1.1

RECEIVED

APR 19 2023

OFFICE OF
WATER