

WATER PERMIT NO. 6156-3

Name of Applicant: City of Brandon

Address: PO Box 95, Brandon SD 57005

Phone: 605 582-6515

Amount of Water Claimed: 2.23 cfs (968 AF)

Total Acres: NA

Source of Water Supply: groundwater (one well)

Water to be used for: municipal

County: Minnehaha

Type of Waste Disposal System: NA

Location:

PRIORITY

Date Received: 11-4-99

Fee: \$150

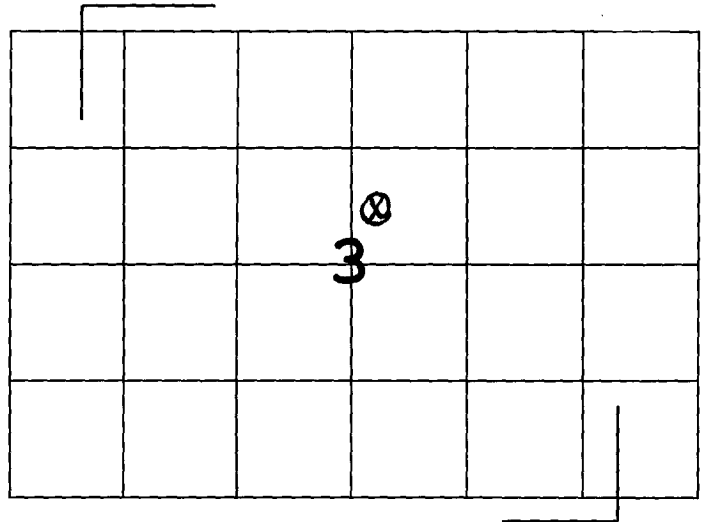
Corrected Application Received: 11-29-1999

Period of Annual Use: January 1 – December 31

Remarks: Increases the diversion rate authorized by Water Permit No. 6156-3

Diversion Point: SW ¼ NE ¼ Sec 3-T101N-R48W

Land to be Irrigated: NA



Depth of Well: 280

Well Driller: LTP Enterprise, Inc.

Remarks:

Type of Map: plat

Prepared by: Steve W Brockmueller, PE

Reviewed and the Number Assigned on: 11-29-1999

By: Karen Schlaak

Notice of Hearing - date to intervene: _____

FORM 2: Application for uses other than irrigation
(type or print)

Mail to: Water Rights Program Joe Foss Building 523 E. Capitol Pierre, SD 57501-3181 (605) 773-3352	(office use only)
	No. <u>6156-3</u> Hydrologic Unit <u>10170203</u>
	Basin <u>Sisoux River</u>
	Newspaper <u>The Argus Leader, Sioux Falls, SD</u>



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

Check use(s) of water:

☒ Municipal	☐ Suburban Housing	☐ Recreational	☐ Institutional
☐ Rural Water System	☐ Commercial	☐ Fish & Wildlife	☐ Geothermal Heat
☐ Domestic (over 18 gpm)	☐ Industrial	☐ Other	

Type of Application: New Vested Right (Use predates Mar 2, 1955) Future Use Reservation
(check one) Place to Beneficial Use Water Reserved by Future Use Permit No.
X Amendment/Correction to Permit No. 6027-3

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

1. Name of Applicant City of Brandon Phone 582-6515
(check one) X Owner Tenant/lessee
Mailing Address P.O. Box 95 Brandon State SD 57005
(223 Add'l) (Street, RR. or Box) (Zip Code)
2. Amount of water claimed 4.46 *CFS or 968 **GPM ***AF
(*Cubic Feet per Second) (**Gallons per Minute) (**Acre Feet - storage capacity of dam/dugout or annual use if applicable)
3. Source of water supply Split Rock Creek Aquifer
4. Location of point of diversion (example - 3 wells in SW1/4 NE1/4 section 12-T104N-R53W)
1 well in SW1/4 NE1/4 Sec. 3-T101N-R48W
County Minnehaha
5. County or counties where water will be used Minnehaha
6. Annual period during which water is to be used January through December 31

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)

This well was recently constructed in conjunction with a new water treatment plant. The well as constructed was test pumped and found to be capable of producing 2000 gpm of water and a pump capable of this flow was installed. The water treatment plant is designed to treat a flow of 2000 gpm. The City is currently throttling the valve to the reduced flow but would like to pump at the higher rate to improve efficiency.

STATE OF SOUTH DAKOTA)
County of Minnehaha) SS

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

I, Michael G. Schultz, the applicant, certify that I have read this application, have examined the attached map and that the matters stated are true and that I intend, and am able to complete the necessary construction.

Signed

Subscribed and sworn to before me this 1st day of November 1999

[Signature]

Notary Public

SOUTH DAKOTA
WATER PERMIT NO. 6156-3

Date of first receipt of application November 4, 1999.

Date of return to applicant for corrections, amendments or changes November 4, 1999.

Date of receipt of corrected application November 19, 1999.

The Chief Engineer, on behalf of the Water Management Board, issues Water Permit No. 6156-3 to City of Brandon, PO Box 95, Brandon SD 57005 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. 6156-3 authorizes an additional diversion rate of 2.23 cubic feet of water per second (cfs) from an existing well. Water Permit No. 6027-3 currently appropriates 2.23 cfs (968 acre-feet of water annually) from one well (Split Rock Creek Aquifer) 275 feet deep located in the SW $\frac{1}{4}$ NE $\frac{1}{4}$ Section 3-T101N-R48W. This permit authorizes increasing the diversion rate from this well to a total of 4.46 cfs without increasing the annual volume of 968 acre-feet of water.
2. The water appropriated shall be used for the purpose of supplying water for municipal use 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. 6156-3 is February 7, 2000.
5. The date from which applicant may claim right is November 4, 1999.
6. One-fifth of the construction is to be completed on or before August 7, 2002.
7. All construction is to be completed on or before February 7, 2005.
8. Water is to be put to beneficial use on or before February 7, 2009.
9. Water rights obtained in compliance with the laws of the State of South Dakota may not be unlawfully impaired by this appropriation.

QUALIFICATIONS

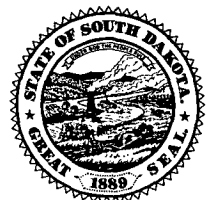
1. The well approved under this Permit will be located near domestic wells and other wells which may obtain water from the same aquifer. The well owner under this Permit shall control his withdrawals so there is not a reduction of needed water supplies in adequate domestic wells or in adequate wells having prior water rights.
2. The City of Brandon shall report to the Chief Engineer annually the amount of water withdrawn each year from the Split Rock Creek Aquifer.
3. Permit Nos. 6027-3 and 6156-3, combined, authorize a total annual diversion of 968 acre feet of water annually.

WATER MANAGEMENT BOARD

By: Garland Erbele
Garland Erbele, Chief Engineer
Water Rights Program
Department of Environment and Natural Resources

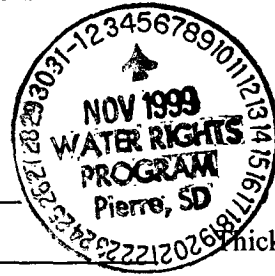
FEB 22 2000

date



Supplemental Information

(type or print in ink)



1. Well Information - Proposed Construction

- a) Drill Hole Diameter 24" Depth 215'
- b) Casing Type steel A53-906 Diameter 18" Thickness 0.375"
- c) Screen Type stainless steel Diameter 12 Thickness ±7/8"
- d) Gravel Pack natural development Length of Gravel Pack _____
- e) Depth to Top of Water Bearing Material 146'
- f) Depth to Water (ground surface to water level) 22.91'
- g) Distance to nearest existing domestic well: 300' to shallow wells in Big Sioux South Aquifer, 3000' to well in Split Rock Creek Aquifer
- On applicants property 600' to shallow wells in Big Sioux South Aquifer
- On property owned by others _____

2. Wastewater Disposal System Information

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

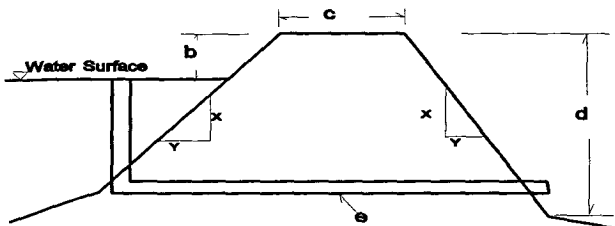
3. Dugout Information

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

4. Water Storage Dams

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

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



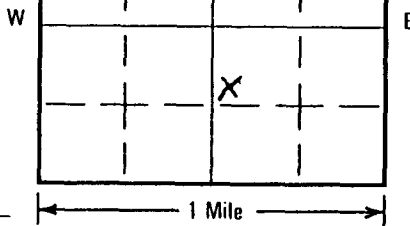
- b) Freeboard _____
- c) Crest Width _____
Crest Length _____
- d) Height _____
- e) Primary Outlet Capacity _____
If pipe, diameter _____
- f) Secondary Spillway Capacity _____
Spillway Width _____
- g) X & Y Slope _____
Upstream _____
Downstream _____
- h) Surface Area of Impoundment _____
- i) Storage _____ Acre Feet
- j) Drainage Area Above Dam _____ Acres

SOUTH DAKOTA WATER WELL COMPLETION REPORT

07-92

Location NW 1/4 SE 1/4 Sec 3 Twp 101 Rg 48
County MINNEHANA North

Please mark well location with an "X"



Well Completion Date

10-1-98

LOCATION:

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

PROPOSED USE:

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

METHOD OF DRILLING:

ROTARYCASING DATA: ☒ Steel ☐ Plastic ☐ Other

If other describe _____

PIPEWEIGHT	DIAMETER	FROM	TO	HOLE DIAMETER
<u>94.62</u> LB/FT	<u>24</u> IN	<u>0</u> FT	<u>60</u> FT	<u>28</u> IN
<u>70.59</u> LB/FT	<u>18</u> IN	<u>12</u> FT	<u>161</u> FT	<u>23</u> IN
_____ LB/FT	_____ IN	_____ FT	_____ FT	_____ IN

GROUTING DATA

Grout Type	No. of Sacks	Grout Weight	From	To
<u>NEAT CEMENT</u>	<u>69</u>	_____ lb./gal	<u>0</u> ft.	<u>60</u> ft.
<u>"</u>	<u>69</u>	_____ lb./gal	<u>10</u> ft.	_____ ft.

Describe grouting procedure PUMPEDSCREEN: ☐ Perforated pipe ☒ ManufacturedDiameter 12 IN Length 114 FEETMaterial STAINLESSSlot Size 30 Set From 161 Feet to 275 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: WATER
☐ NO, Why Not? JETTED
WITH CHLORINE

Laboratory sent to for water quality analysis _____

 Well Owner: CITY OF BRANDON
 Business Name: CITY OF BRANDON
 Address: 304 MAIN AVE
BRANDON S.D. 57005

WELL LOG:

DEPTH

FORMATION

FROM

TO

SEE LOG

STATIC WATER LEVEL

22

Feet

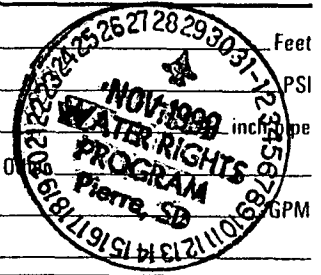
If flowing: closed in pressure _____

GPM flow _____ through _____

Controlled by ☐ Valve ☐ Reducers ☐ Other

Reduced Flowrate _____

Can well be completely shut in? _____



WELL TEST DATA:

☒ PumpedDescribe: TEST PUMP☐ Bailed☐ Other

Pumping Level Below Land Surface

111.65 ft. After 8 Hrs. pumped 2210 GPM

_____ ft. After _____ Hrs. pumped _____ GPM

If pump installed, pump rate _____ GPM

REMARKS

This well was drilled under license # 381

And this report is true and accurate.

Drilling firm LTP ENTERPRISES, INC.Signature of License Representative: Randy R. Ruland

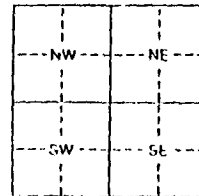
Signature of Well Owner or Equitable Property Holder: _____

Date: _____



FARGO, N.D.
HUTCHINSON, MN.

↑
N



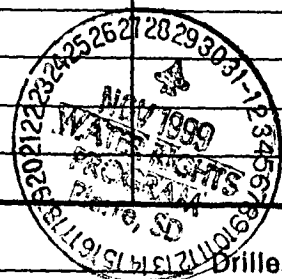
Sec. T R

DRILLERS LOG

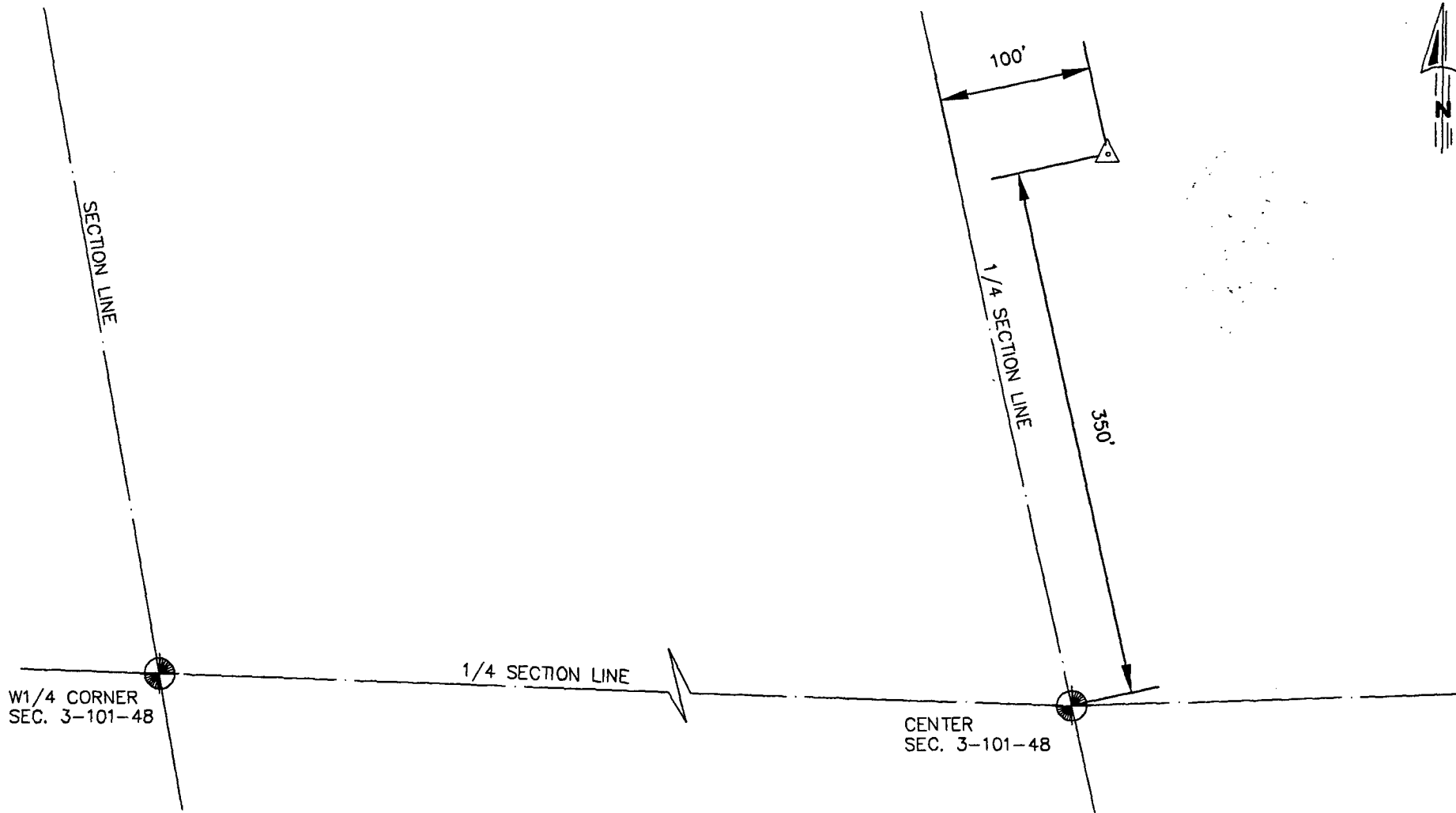
Drilled for City of Brandon, SD By Fargo Office
 Location of Test Hole Legal SE SW NW SE Sec. 3 T101N R48W
South East corner of Park Test Hole No. 1-98 Well No.
 Size of test hole. 6 3/4 Date started 9-1-98 Date completed 9-1-98 Total Hours

FORMATIONS DRILLED

TYPE OF FORMATION	COLOR OF FORMATION	STARTED AT WHAT DEPTH	ENDED AT WHAT DEPTH	THICKNESS OF FORMATION
Top Soil	Black	G.L.	4	4
Clay	Brown	4	12	8
Sand	Brown	12	15	3
Gravel	Colored	15	27	12
Rock-gravel	Colored	27	34	7
Clay (hard)	Gray	34	46	12
Sand	Colored	46	58	12
Clay w/small lenses of clay	Gray	58	75	17
Sand w/lenses of clay (poor sample)	Gray	75	89	14
Rock & Sand	Colored	89	91	2
Sand & gravel	Colored	91	96	5
Silt Stone & shale (hard)	Blk, Gray	96	124	28
Shale (Brittle)	Blk, Gray	124	145	21
Fine Sand (drilled dirty)	Gray	145	151	6
Sand (drilled fair) w/lenses of Clay	Gray	151	161	10
Sand (drilled good)	Pink Gray	161	238	77
Dirty sand & Shale	Blk, Gray, PK	238	243	5
Finer sand (drilled fair) took water	Pink	243	275	32
Shale w/small sand lenses	Gray, Blk	275	280	5



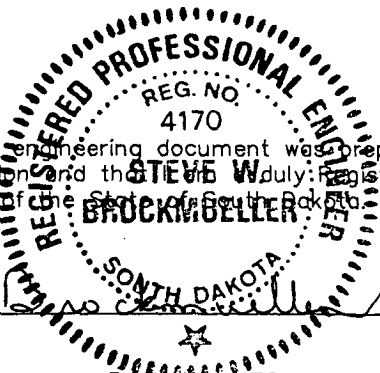
Signed Don Heitmanek Driller



I hereby certify that this engineering document was prepared under my direct supervision and that I am duly Registered Engineer under the laws of the State of South Dakota.

By: Steve W. Brockmueller
Steve Brockmueller

Date: 11-20-97 Reg. No. 4170



WELL LOCATION
SW1/4SW1/4NE1/4 SEC. 3-T101-R48
APPLICATION FOR WATER PERMIT
CITY OF BRANDON

NOVEMBER 17, 1997

SHEET 1 OF 1

6156-3

RECEIPT

Water Rights Program

South Dakota Department of Environment and Natural Resources

N^o 416245

Pierre, _____ November 4, 1999

RECEIVED OF City of Brandon, Brandon, SD 57808
the following amount in fees for services rendered as provided for by law:

Fee for Application for Permit No. <u>6156-3</u> to Appropriate Water, to construct and to put water to beneficial use _____	150	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. _____		
Fee for Filing Transfer Form _____		
Fee for Filing Extension Request _____		
Fee for _____		

(Any Other Work Provided by Law)	Total	150 00

By John Hatcher
Chief Engineer

RECEIPT

Water Rights Program

South Dakota Department of Environment and Natural Resources

NS 416269

Pierre, November 19, 1999

RECEIVED OF City of Brandon, P.O. Box 95, Brandon, SD 57005
the following amount in fees for services rendered as provided for by law:

Fee for Application for Permit No. _____ to Appropriate Water, to construct
and to put water to beneficial use _____

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. 6156-3

Fee for Filing Transfer Form _____

Fee for Filing Extension Request _____

Fee for _____

(Any Other Work Provided by Law)

Total

50 00

50 00

By

Chief Engineer

John Hatch

REPORT FOR
WATER PERMIT APPLICATION NO. 6156-3
CITY OF BRANDON
JANUARY 10, 1999

Water Permit Application No. 6156-3 proposes an additional diversion rate of 2.23 cubic feet of water per second (cfs) from an existing well. Water Permit No. 6027-3 currently appropriates 2.23 cfs (968 acre-feet of water annually), from one well (Split Rock Creek Aquifer), 275 feet deep, located in the SW¼ NE¼ Section 3, T101N-R48W. This application proposes to increase the diversion rate from this well to 4.46 cfs without increasing the annual volume of 968 acre-feet of water. The water is for municipal use.

AQUIFER: Split Rock Creek (SRKC)

AQUIFER CHARACTERISTICS:

The Split Rock Creek Aquifer is composed of the interbedded sand, siltstone, shale and claystone of the Cretaceous aged Split Rock Creek Formation. The Split Rock Creek Formation occurs in paleo-valleys in the Sioux Quartzite where the quartzite is deeply buried. The main body of the aquifer is located in a narrow valley approximately three to four miles wide that extends from the eastern edge of Sioux Falls into Minnesota (figure1).

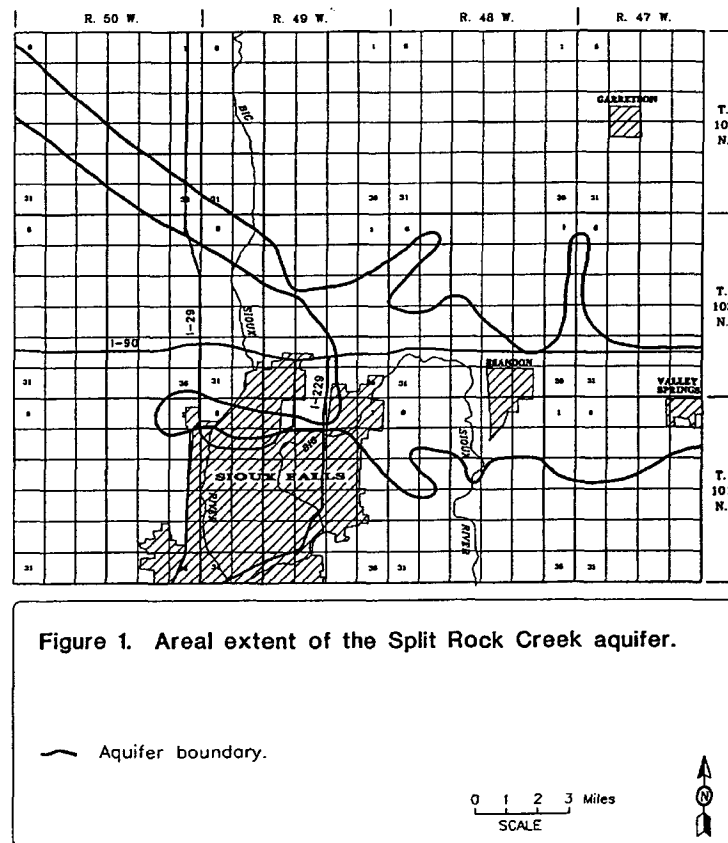


Figure 1. Areal extent of the Split Rock Creek Aquifer (modified from Pence, 1997)

SRKC Water Rights

⊕ SRKC Observation wells

2

One of the earliest Water Right's Observation Wells completed into the Split Rock Creek Aquifer is MA-80Z. This well is located approximately two and one-half miles east of this well site (see figure 2). A hydrograph of this observation well is included (see figure 3), because of the long period of record for the well and its proximity to this permit.

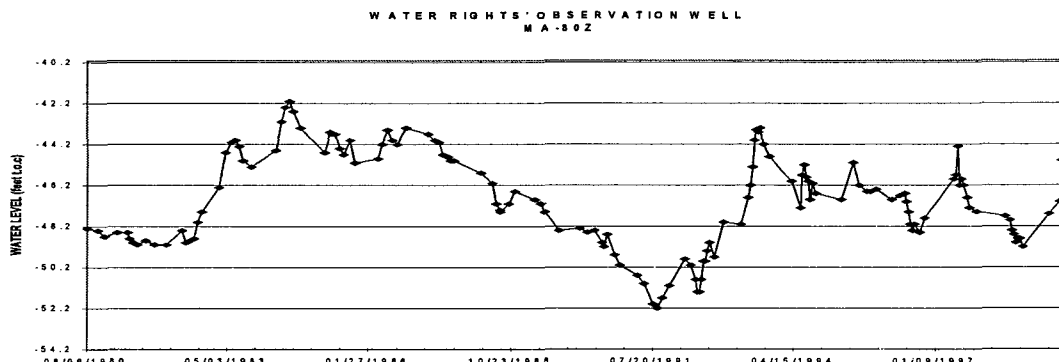


Figure 3. Hydrograph for Water Rights Observation Well MA-80Z, located approximately two and one-half miles from Brandon's well

The hydrograph is typical for Split Rock Creek Aquifer Observation wells. In general the hydrograph shows the aquifer is recharged and that the water level of the aquifer responds well to climatic conditions; that is, rising water levels during wet years (recharge) and gradually declining water levels during dry years.

Possible sources of recharge to the Split Rock Creek aquifer include 1). infiltration of precipitation falling on outcrops of Sioux Quartzite that subsequently moves along fractures in the quartzite and into the Split Rock Creek Aquifer ; 2) streamflow loss from Split Rock Creek; and 3) inflow from the Valley Springs Aquifer (Lindgren, 1992). The potentiometric surface of the aquifer suggests the main source of recharge is probably the Sioux Quartzite. The average annual recharge has not been quantified for this aquifer.

In 1995, the City of Sioux Falls, through their consultants Howard R. Green Company, conducted an aquifer test to evaluate the hydraulic properties of the aquifer, determine the production capability of the aquifer, and examine the water quality of the aquifer. This study (Pence, 1997) indicates with production wells properly designed, constructed and located the aquifer has an overall potential to yield 5 mgd" (5,610 acre-feet annually). Although recharge was not quantified, this seems to be a very conservative number (less than 1% of the estimated water in storage in the aquifer).

REVIEW OF EXISTING WATER RIGHTS:

Currently, there are 17 Water Permits/Rights appropriating water from the Split Rock Creek Aquifer representing a total appropriation of 13.052 cfs (Water Rights, 1998). Appropriative uses include municipal (8 permits/rights), (Valley Springs, Brandon, and Sioux Falls); suburban housing development (2 permits/rights); industrial (5 permits/rights); commercial (1 permit) and one permit for fire protection. In addition, there are two future use permits reserving water from the aquifer. All of the water reserved by Future Use No. 4929-3, (Corson Village Water), has been appropriated and 188 ac-feet annually remains reserved for future use by Permit No. 5444-2, (Valley Springs). The board has denied one future use appropriation from the Split Rock Creek Aquifer (No. 5084-3, East

Dakota Water Development District), basically because the District could not demonstrate a need for the appropriation. There is one permit (No. 5752-3), currently in deferred status pending legal issues associated with Brandon Wood Preserving.

The total pumpage from the aquifer is expected to be less than 1,200 acre-feet per year. The major users from the Split Rock Creek Aquifer are the City of Sioux Falls and the City of Brandon. Water use from the aquifer reported by these cities is included in Table 1.

Table 1. Reported Water Pumpage from the Split Rock Creek Aquifer

	1997	1998	1999
Sioux Falls	123,843,400 gal. ₁ (380 ac-ft)	171,565,500 gal. ₂ (526 ac-ft)	124,940,000 gal. ₂ (383 ac-ft)
Brandon	163,427,200 gal. ₃ (501 ac-ft)	129,435,450 gal. ₄ (397 ac-ft)	166,739,100 gal. ₄ (512 ac-ft)
Total	881 ac-ft	923 ac-ft	895 ac-ft

₁Stefanich, 1988; ₂Stefanich, 2000; ₃Olson, 1988, ₄Fletcher, 2000

The nearest appropriation from the Split Rock Creek Aquifer, other than the City's own wells, is Water Permit No. 5276-3, Brandon Wood Preserving. Water Permit No. 5276-3 is located approximately one and one-half miles of the well to be used to supply this permit. The status of Brandon Wood Preserving is not clear, as the company filed for Chapter 11 in Bankruptcy Court and suffered a catastrophic fire in 1999. The next nearest appropriation (Corson Village) is approximately two and one-quarter miles from this well, followed by Northern States Power at approximately two and one-half miles, see Figure 2.

Effects on Existing Water Rights:

The Split Rock Creek Aquifer is a confined aquifer, as such the water level does fluctuate when the aquifer is pumped. Drawdown at the production well can be estimated using information provided on the Well Completion Report for the well. The report indicates that the well was pumped for 8 hours at 2,210 gpm with a drawdown of 89.65 feet. A specific capacity of 24.5 gallons per minute per foot of drawdown would create a drawdown of around 82 feet at a 4.46 cfs pumping rate.

The cone of depression in a confined aquifer can extend over a relatively large area of the aquifer. For example, over 10 feet of drawdown was measured at the City of Sioux Falls' aquifer test in Brandon at an observation well 589 feet from the production well measured after three days of pumping at 260 gallons per minute (Pence, 1997).

Observation wells in the Brandon area: MA-87H, MA-87I, MA-87E and MA-80Z, may show some drawdown from the City's pumping (figures 3, 4, 5, 6). However as the hydrographs reveal, drawdown is not significant and the water levels recover to near pre-pumping levels. It should be noted that until November 1999, the City of Brandon only pumped "Well No. 3" (Fletcher, 2000) which is the northern most "Brandon" well on figure 2. Diversions by this well are authorized by Water Permit/Right Nos. 1804-3, 5295-3, 5296-3, 5868-3. The maximum diversion rate authorized for this well is 1.39 cfs (625 gpm).

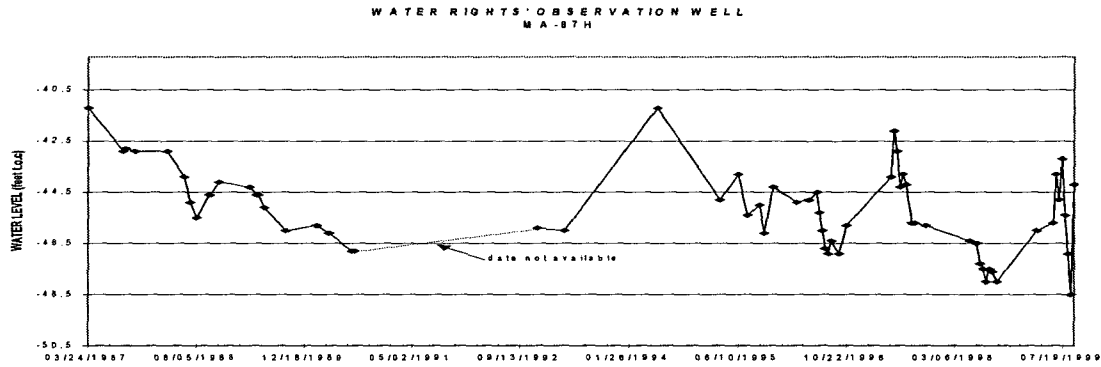


Figure 4. Hydrograph for Water Rights Observation Well MA-87H, located approximately 6,800 feet from Brandon's well

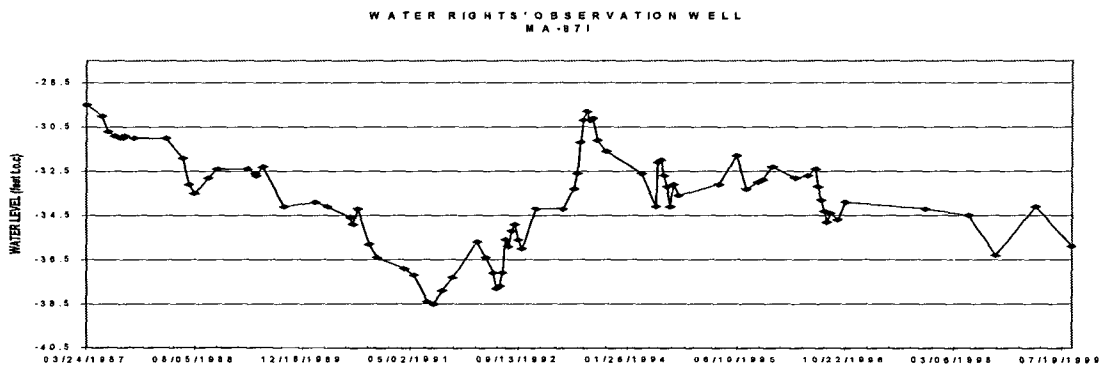


Figure 4. Hydrograph for Water Rights Observation Well MA-87I, located approximately 11,000 feet from Brandon's well

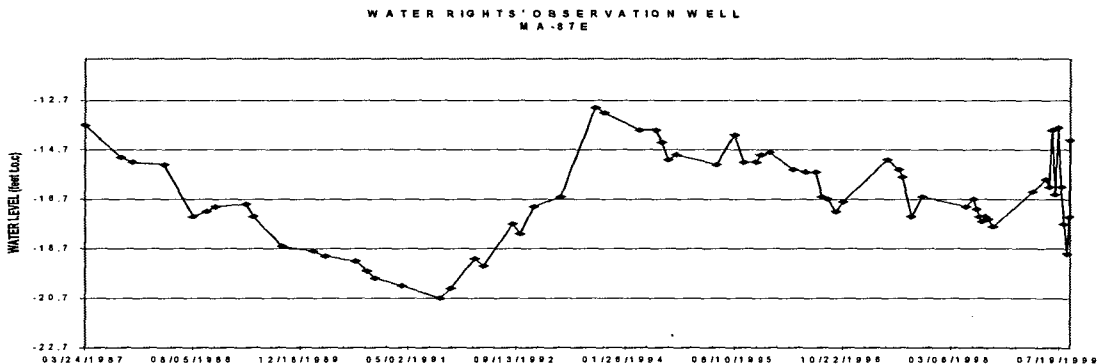


Figure 5. Hydrograph for Water Rights Observation Well MA-87E, located approximately 7,200 feet from Brandon's well

The affect this additional diversion would have on area water levels can be monitored with observation wells that are in place. Any affect the increased diversion rate proposed by this application will have on existing water rights will not be significantly. To demonstrate this, the Theis equations can be used to evaluate this appropriation. These equations are based on a number

of assumptions, some of these (e.g. the aquifer is a uniform thickness, the aquifer is infinite in areal extent, etc) are not met in the Split Rock Creek Aquifer. However, while the drawdowns predicted should not be considered absolute, the equations are useful to demonstrate the significance of increasing the diversion rate on this well.

The Theis equations are:

$$h_0 - h = \frac{114.6 Q W(u)}{T} \qquad S = \frac{T t u}{2693 r^2}$$

Where:

$h_0 - h$ is the drawdown in feet
 Q is the well discharge (gpm)
 T is the transmissivity (gal/day/ft.)
 r is the distance to the well (feet)
 S is the storativity (dimensionless)
 t is the time since pumping began (minutes)
 $W(u)$ is a well function constant

The Brandon Pump Test done for City of Sioux Falls identified the Storativity of the Split Rock Creek Aquifer of 1.1×10^{-4} to 6.7×10^{-4} , and a Transmissivity of 1,600-1,700 ft²/day, and reported a saturated thickness of 69 feet at the site (Pence, 1997). Since

$$T = kb \quad \text{or} \quad k = T/b$$

where:

K is hydraulic conductivity (feet/day)
 b is aquifer thickness (feet)

the hydraulic conductivity at the Brandon test site (approximately one-half mile from this well) is equals 23.91 ft/day.

The completion report for well that is to be used to supply this application indicates the aquifer is approximately 130 feet thick at this site. Assuming a uniform hydraulic conductivity in this area, the transmissivity at this site would be approximately 3,108 ft²/day.

The maximum drawdown caused by a withdrawal would result from continuous pumping at the maximum diversion rate. This application proposes an increase of the diversion rate without increasing the annual volume appropriated (968 acre-feet/year). Currently, this well is permitted for a maximum diversion rate of 2.23 cfs (1000 gpm). Since continuous pumping at 2.23 cfs would take 315,142 minutes to pump 968 acre-feet, the maximum drawdown from this well under the existing permit can be predicted by solving the Theis Equation with $t = 315,142$ minutes and $Q = 1000$ gpm. At the nearest appropriation, (Water Permit No.5276-3) which is approximately one and one-half miles from this well, the maximum drawdown would be predicted to be 20.4 feet. Doubling the permitted diversion rate decreases the time required to pump the permitted annual volume by half. Solving the Theis Equations with $t = 157,571$ minutes and $Q = 2000$ gpm predicts a drawdown of 34.4 feet at a distance of one and one-half miles.

As stated earlier, the drawdowns predicted should not be considered absolute (i.e. 20 feet versus 34 feet). However, application of the Theis Equations confirms that doubling the diversion rate of this well while keeping the annual volume withdrawn constant does not significantly increase the drawdown in the area.

Although the Water Management Board must consider the impact of this additional drawdown on area wells, pursuant to SDCL 46-6-6.1, the board is not required to control large capacity wells to maintain artesian head pressure as a method of delivery. In addition SDCL 46-1-4 requires South Dakota's water resources to be put to beneficial use to the fullest extent of which they are capable.

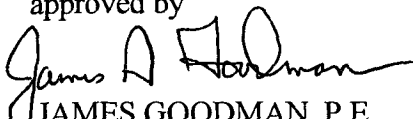
CONCLUSIONS:

1. Water Permit Application 6156-3 proposes to increase the diversion rate authorized from an existing well from 2.23 cfs to 4.46 cfs.
2. This application proposes to increase the diversion rate without increasing the annual volume of 968 acre-feet of water.
3. This permit does not appropriate additional water from the Split Rock Creek Aquifer.
4. The affect of this appropriation will be measurable, (theoretically up to 14 feet additional drawdown one and one-half miles away). This additional drawdown will not be adverse to adequate wells.



KEN BUHLER
Natural Resources Engineer

approved by



JAMES GOODMAN, P.E.
Natural Resources Engineer

REFERENCES:

- Lindgren, R., and Niehus C., 1992, Water Resources of Minnehaha County, South Dakota: U.S. Geological Survey Water Resources Investigations Report 91-4101
- Olson, D., 1998, Personal Communication
- Fletcher, W., 2000, Personal Communication

Pence, S, 1997, Summary of The Split Rock Creek Aquifer Study, SD Geological Survey Open-File Report 87-UR, SD DENR-Geological Survey, Vermillion SD

Stefanich, T., 1998, Personal communication

Stefanich, T., 2000, Personal communication

Water Rights Program, 2000, "Observation Well Files", DENR-Water Rights Program, Joe Foss Building, Pierre, SD

Water Rights Program, 2000, "Water Permit/Right Files", DENR-Water Rights Program, Joe Foss Building, Pierre, SD



**DEPARTMENT of ENVIRONMENT
and NATURAL RESOURCES**

JOE FOSS BUILDING
523 EAST CAPITOL
PIERRE, SOUTH DAKOTA 57501-3181
www.state.sd.us/denr

August 19, 1999

Steve Brockmueller
Stockwell Engineers, Inc.
211 East 14th Street, Suite 200
Sioux Falls SD 57104-6913

Dear Mr. Brockmueller:

Last week when I was out of the office you called regarding Water Permit No. 6027-3 for the city of Brandon. The water permit currently appropriates 2.23 cubic feet of water per second (1000 gpm) from one well with an annual volume limitation of 968 acre-feet of water annually.

It is my understanding that this well is capable of producing 2000 gpm and the city intends to develop the well to produce at this quantity. However, the total use from the well will not exceed 968 acre feet of water annually authorized by Permit No. 6027-3. The question is whether additional water permitting is necessary for the greater diversion rate.

I believe a new water right permit is necessary to authorize the additional diversion rate from the well. I have enclosed a water right permit application form. The application filing fee is \$150 for an increase in the diversion rate without increasing the annual volume of 968 acre feet of water. Any application will need the public notice associated with all new water right permit applications.

Please feel free to contact me if you have any questions.

Sincerely,

Eric Gronlund
Water Rights Program
605 773-3352

enclosure



**DEPARTMENT of ENVIRONMENT
and NATURAL RESOURCES**

JOE FOSS BUILDING
523 EAST CAPITOL
PIERRE, SOUTH DAKOTA 57501-3181
www.state.sd.us/denr

November 4, 1999

Steve Brockmueller
Stockwell Engineers, Inc.
211 E 14th St, Suite 200
Sioux Falls SD 57104-6913

Dear Mr. Brockmueller:

Thank you for submitting the *Application for a Permit to Appropriate Water* on behalf of the City of Brandon.

We are in receipt of the \$150 application filing fee. In addition to the application filing fee, the Water Rights Program now collects the \$50 licensing fee at the time of filing. Please submit \$50 for the licensing of the water permit.

If available, please submit the well log for the recently constructed well. I have reviewed our files and can not find that we have received the well log.

If you have any questions, please contact me.

Sincerely,

Karen Schlaak
Water Rights Program
605 773-3352

c: Michael G Schultz, City of Brandon



**DEPARTMENT of ENVIRONMENT
and NATURAL RESOURCES**

JOE FOSS BUILDING
523 EAST CAPITOL
PIERRE, SOUTH DAKOTA 57501-3181
www.state.sd.us/denr

January 14, 2000

The Argus Leader
P.O. Box 5034
Sioux Falls, SD 57117-5034

ATTENTION: Legal Public Notice

Enclosed is a Notice of Hearing on Application No. 6156-3 to Appropriate Water to be published twice. Please publish the first notice on January 21, 2000, with the second publication 7 days later.

The applicant must verify to you that the notice is to be published, before you make the first publication. **Please BILL the APPLICANT for the cost of publication.** The APPLICANT is City of Brandon, %Michael G. Schultz, P.O. Box 95, Brandon, SD 57005 (Ph # (605) 582-6515).

Please send the Water Rights Program the first publication immediately. The publication is checked for accuracy so any corrections can be made in the second publication. You may use the form below or fax a copy of the first publication. Any fax should be sent to the attention of Karen Schlaak at (605) 773-4068. Publication errors can invalidate the public notice.

After the second publication, **please send us an affidavit or use the enclosed Proof of Publication form.** The applicant pays the cost of publication, but the Water Rights Program records require an affidavit or Proof of Publication. Delays in receiving the affidavit can be costly to the applicant.

Sincerely,

Eric Gronlund
Natural Resources Engineer
605 773-3352

enclosures

-----CU T HERE-----

No. 6156-3

TO: Eric Gronlund
Water Rights Program
Joe Foss Building
Pierre SD 57501-3181

Date _____

We are in receipt of your letter of January 14, 2000, enclosing Notice of Hearing to Appropriate Water by Application No. 6156-3 which was first published in our issue of _____. **ENCLOSED IS A COPY OF THIS FIRST PUBLICATION.**

Name

Newspaper

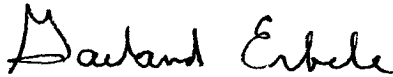
**RECOMMENDATION OF CHIEF ENGINEER FOR WATER PERMIT
APPLICATION NO. 6156-3, City of Brandon**

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. 6156-3, City of Brandon, c/o Michael G. Schultz, P.O. Box 95, Brandon SD 57005.

The Chief Engineer is recommending APPROVAL of Application No. 6156-3 because 1) there is reasonable probability that there is unappropriated water available for the applicant's proposed use, 2) the proposed diversion can be developed without unlawful impairment of existing rights, 3) the proposed use is a beneficial use and 4) it is in the public interest with the following qualifications:

1. The well 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 City of Brandon shall report to the Chief Engineer annually the amount of water withdrawn each year from the Split Rock Creek Aquifer.
3. Permit Nos. 6027-3 and 6152-3, combined, authorize a total annual diversion of 968 acre feet of water annually.

See report on application for additional information.



Garland Erbele, Chief Engineer
January 14, 2000

Instruction to Newspaper - Publish first Notice on January 21, 2000, with the second publication 7 days later. The applicant is responsible for payment.

NOTICE OF APPLICATION NO. 6156-3 to Appropriate Water

Notice is given that City of Brandon, PO Box 95, Brandon SD 57005 has filed an application for a water permit for an additional diversion rate of 2.23 cubic feet of water per second (cfs) from an existing well. Water Permit No. 6027-3 currently appropriates 2.23 cfs (968 acre-feet of water annually) from one well (Split Rock Creek Aquifer) 275 feet deep located in the SW ¼ NE ¼ Section 3-T101N-R48W. This application proposes to increase the diversion rate from this well to a total of 4.46 cfs without increasing the annual volume of 968 acre-feet of water. The water is for municipal use.

Pursuant to SDCL 46-2A-2, the Chief Engineer recommends APPROVAL of Application No. 6156-3 because 1) existing rights will not be unlawfully impaired, 2) it is a beneficial use of water, and 3) it is in the public interest. In accordance with SDCL 46-2A-23, the Chief Engineer will act on the application, as recommended, unless a petition is filed opposing the application or the applicant files a petition contesting the Chief Engineer's recommendation. 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 the application. Notice of the hearing will be given to the applicant and any person filing a petition.

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 February 7, 2000.

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. Contact Eric Gronlund at the above Water Rights Program address to request copies of information pertaining to this application. Nettie H. Myers, Secretary, Department of Environment and Natural Resources.

AFFIDAVIT OF PUBLICATION

STATE OF SOUTH DAKOTA

COUNTY OF MINNEHAHA } ss

Mary Boysen being duly sworn, says: That The Argus Leader is, and during all the times hereinafter mentioned was, a daily legal newspaper as defined by SDCL 17-2-21, as amended published at Sioux Falls, Minnehaha County, South Dakota; that affiant is and during all of said times, was an employee of the publisher of such newspaper and has personal knowledge of the facts stated in this affidavit; that the notice, order or advertisement, a printed copy of which is hereto attached, was published in said newspaper upon

SAT	, the	22	day of	JANUARY	2000,
SAT	, the	29	day of	JANUARY	2000,
	, the		day of		2000,
	, the		day of		2000,
	, the		day of		2000,
	, the		day of		2000,
	, the		day of		2000,

and that \$96.49 was charged for publishing the same including
A \$5.00 affidavit fee.

Mary Boysen

Subscribed and sworn to before me January 31, 2000,

Joan Stahl

Notary Public, South Dakota

My Commission expires June 30, 2005

State Notices

NOTICE OF APPLICATION NO. 6156-3 to Appropriate Water

Notice is given that City of Brandon, PO Box 95, Brandon SD 57005 has filed an application for a water permit for an additional diversion rate of 2.23 cubic feet of water per second (cfs) from an existing well. Water Permit No. 6027-3 currently appropriates 2.23 cfs (968 acre-feet of water annually) from one well (Split Rock Creek Aquifer) 275 feet deep located in the SW1/4 NE1/4 Section 3-T101N-R48W. This application proposes to increase the diversion rate from this well to a total of 4.46 cfs without increasing the annual volume of 968 acre feet of water. The water is for municipal use.

Pursuant to SDCL 46-2A-2, the Chief Engineer recommends APPROVAL of Application No. 6156-3 because 1) existing rights will not be unlawfully impaired, 2) it is a beneficial use of water, and 3) it is in the public interest. In accordance with SDCL 46-2A-23, the Chief Engineer will act on the application, as recommended, unless a petition is filed opposing the application or the applicant files a petition contesting the Chief Engineer's recommendation. 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 the application. Notice of the hearing will be given to the applicant and any person filing a petition.

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 February 7, 2000.

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. Contact Eric Gronlund at the above Water Rights Program address to request copies of information pertaining to this application.

Nettie H. Myers,
Secretary, Department of
Environment and Natural
Resources.
Jan. 22, 29, 2000

1025





**DEPARTMENT of ENVIRONMENT
and NATURAL RESOURCES**

JOE FOSS BUILDING
523 EAST CAPITOL
PIERRE, SOUTH DAKOTA 57501-3181
www.state.sd.us/denr

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

February 14, 2000

City of Brandon
%Michael G. Schultz
P.O. Box 95
Brandon, SD 57005

Dear Mr. Schultz:

Water Permit Application No. 6156-3 for municipal use has been examined and found to comply with the South Dakota Water Laws and applicable rules. A notice of hearing has been sent to the Publisher of the Argus leader printed at Sioux Falls, SD (Ph # (605) 331-2200). For your information, a copy of the notice, the recommendation of the Chief Engineer and a 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 of Hearing and to arrange for payment. Early contact with the paper can eliminate delays. The publisher has been instructed to publish your notice once each week for two consecutive weeks with the last publication to occur twenty days before the board meeting. The newspaper has 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

c: Steve Brockmueller, Stockwell Engineers, 211 E. 14th St., Suite 200, Sioux Falls, SD 57104-6913

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.



**DEPARTMENT of ENVIRONMENT
and NATURAL RESOURCES**

JOE FOSS BUILDING
523 EAST CAPITOL
PIERRE, SOUTH DAKOTA 57501-3181
www.state.sd.us/denr

FEB 22 2000

City of Brandon
%Michael G. Schultz
P.O. Box 95
Brandon, SD 57005

Dear Mr. Schultz:

Enclosed is Water Permit No. 6156-3 authorizing construction of your 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,

Garland Erbele, Chief Engineer
Water Rights Program
(605) 773-3352

enclosures

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

Date 2-25-00

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



FROM: City of Brandon
(name)
304 Main Avenue
(address)
Brandon, SD 57005
(city, state, zip)

605-582-6769
(phone)

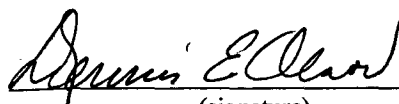
I have completed the construction of the water use system and I have put the water to beneficial use to the maximum extent it is going to be used.

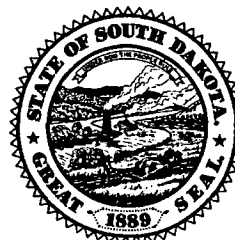
Water Permit No. 6156-3 states that the water use system is to be constructed by February 7, 2005, and water is to be put to beneficial use by February 7, 2009.
(date) (date)

The water use system was completed on February 25, 2000.
(date)

Applying the water to beneficial use was completed on February 25, 2000.
(date)

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


(signature)



Permit Nos. 6027-3 & 6156-3**Big Sioux River - Water District****Report of Examination of Works and/or Application of Water to Beneficial Use**

TO: Chief Engineer, Water Rights Program, DENR, Foss Bldg., Pierre SD 57501

I have this day, October 14, 2004³, made a thorough examination of the water use system constructed by City of Brandon of PO Box 95, Brandon SD 57005 holder of Permit Nos. 6027-3 & 6156-3, bearing the priority of November 19, 1997 and November 4, 1999 authorizing the diversion of 2.23 and 2.23 cu. ft. per second of the waters of Split Rock Creek Aquifer for municipal purposes, in Minnehaha County.

Inspection contact & relationship to permit holder, if applicable: **Wayne Fletcher, Public Works Director (605) 582-2273**

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

- 1) Well Drilling Firm: LTP Enterprises, Inc.
- 2) No. of Wells 1
- 3) Depth(s) 275 feet
- 4) Well log is available yes
- 5) Comment: drilled in 1998

Casing:

- 1) Diameter 10 inches
- 2) Length 126 feet
- 3) Type steel

Screen:

- 1) Type stainless steel
- 2) Length 149 feet
- 3) Static water level 23 feet

Pump:

- 1) Make Goulds
- 2) Model 14RJMC2
- 3) Size 10"
- 4) Capacity 2000 GPM

Motor:

- 1) Make submersible
- 2) Model No.
- 3) Horsepower rating 100 hp

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

- 1) Type pvc 2) Size 12 inches 3) Length 800 feet
- 1) Type pvc 2) Size 16 inches 3) Length 900 feet

C. Works used to apply water to beneficial use:

Municipal water system

D. Compliance with Permit Requirements:

- 1) Permit qualifications being abided by yes
- 2) Exceptions to compliance are: none

The system is in good condition with the point(s) of diversion located as follows: 350' N and 100' E of the center of Section 3, T101N, R48W. The works are capable of diverting and conveying to the place of use 4.44 cu. ft. per second of water which is to be used for municipal purposes. Water has been put to beneficial use to the maximum extent as follows:

Municipal water system.

The license should be issued for 4.44 cfs.

All structures, wells and lands on map yes

Comments or other permit(s) associated with the project:

Water Right No. 6156-3 authorizes an additional diversion rate of 2.23 cfs from an existing well authorized by Water Right No. 6027-3. Water Right Nos. 6027-3 and 6156-3 should be incorporated and licensed for a combined 4.44 cfs (2,000 gpm), 2.23 cfs retains a priority date of November 19, 1997 and 2.21 cfs retains a priority date of November 4, 1999.



Lynn Beck

Natural Resources Engineer Specialist
DENR, Water Rights Program

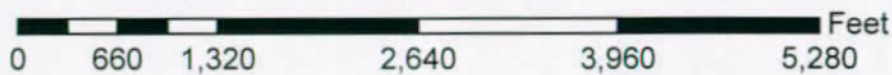
Date report completed: February 25, 2004



WATER RIGHT NOS. 6027-3 and 6156-3 CITY OF BRANDON



SCALE



Lynn Beck

Lynn Beck
Natural Resources Engineer Specialist
DENR, Water Rights Program
February 25, 2004



South Dakota Department of
Environment and Natural Resources



STATE OF SOUTH DAKOTA

WATER LICENSE NO. 6156-3

(1) City of Brandon, PO Box 95, Brandon SD 57005 made Application No. 6156-3, November 4, 1999 for a water permit to increase the diversion rate authorized by Water Permit No. 6027-3, Minnehaha County, South Dakota for municipal purposes. Permit No. 6156-3, with a priority date of November 4, 1999 was approved February 7, 2000 and issued to the applicant for diversion of water with construction of the described water supply system to be completed on or before February 7, 2005 and for the application to beneficial use of water on or before February 7, 2009.

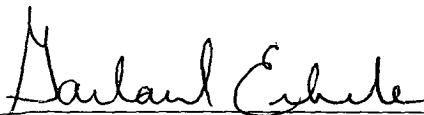
Water Permit No. 6027-3, with a priority date of November 19, 1997 authorized diversion of 2.23 cubic feet of water per second (968 acre-feet annually) from 1 well. The applicable portions of No. 6027-3 have been incorporated into No. 6156-3.

(2) The water supply system has been completed and water applied to beneficial use in accordance with South Dakota State Law. Pursuant to South Dakota Codified Law 46-5-30.1, the holder and/or owner of Incorporated Water Right No. 6156-3 is issued a license, bearing priority dates of November 19, 1997 (2.23 cfs) and November 4, 1999 (2.21 cfs) to appropriate 4.44 cubic feet of water per second from groundwater (one well) for municipal purposes.

The diversion point is located: 350 feet north and 100 feet east of the center of Section 3-T101N-R48W (SW ¼ NE ¼).

(3) This license is subject to South Dakota Water Law, any limitations or conditions listed in Water Permit Nos. 6027-3 and 6156-3 including the following now applicable qualifications:

- The well 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.
- The well shall be constructed by a licensed well driller and construction shall comply with Water Management Board Well Construction Rules, Chapter 74:02:04 with the well casing pressure grouted (bottom to top) from the producing formation to the surface pursuant to Section 74:02:04:28.
- The City shall report to the Chief Engineer annually the amount of water withdrawn each year from the Split Rock Creek Aquifer.
- Permit Nos. 6027-3 and 6156-3, combined, authorize a total annual diversion of 968 acre-feet of water annually.



Garland Erbele, Chief Engineer
Water Rights Program
Department of Environment and Natural Resources

MAY 10 2004

date





MAY 10 2004

**DEPARTMENT of ENVIRONMENT
and NATURAL RESOURCES**

PMB 2020
JOE FOSS BUILDING
523 EAST CAPITOL
PIERRE, SOUTH DAKOTA 57501-3182
www.state.sd.us/denr

6156-3

City of Brandon
% Wayne Fletcher Public Works Dir
PO Box 95
Brandon SD 57005

Dear Mr. Fletcher:

Enclosed is Water License No. 6156-3. This is the final water right document completing your process of obtaining a Water Right.

As long as you use the water beneficially, as stated in the Water License, State Water Laws provide that you have a continuing right to use the water.

Sincerely,

Garland Erbele, Chief Engineer
Water Rights Program
(605) 773-3352

NOTE: The applicable portions of No. 6027-3 are incorporated into Water License No. 6156-3

enclosures



6156-3
DEPARTMENT of ENVIRONMENT
and NATURAL RESOURCES

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

denr.sd.gov

March 23, 2017

Jon Fischer
Stockwell Engineers, Inc.
801 N. Phillips Ave., Suite 100
Sioux Falls, SD 57104

Mr. Fisher:

I am writing in response to your March 23, 2017 e-mail to the South Dakota Department of Environment and Natural Resources. You requested permission to drill a test well on behalf of the City of Brandon prior to approval of an additional diversion point for Water Right No. 6156-3.

Pursuant to South Dakota Well Construction Standard 74:02:04:21, Thein Well is authorized to construct a test well to be completed into the Splitrock Creek aquifer to be located in SW ¼ NE ¼ of Section 3-T101N-R48W in Minnehaha County, prior to approval of an additional diversion point for Water Right No. 6156-3. The test well must be constructed in accordance with the SD Well Construction Standards. Any test holes that are abandoned must be plugged pursuant to the SD Well Construction Standards. Approval of this test well does not assure approval of an additional diversion point. Additionally, any test pumping that is in addition to normal diversions may require a temporary water use permit and a temporary discharge permit. These can be obtained by contacting Genny McMath at (605) 773-3352.

Sincerely,

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



6156-3

CITY OF BRANDON
304 Main Avenue, P.O. Box 95, Brandon, SD 57005
Telephone: (605) 582-6515 FAX: (605) 582-6831
E-mail: bread@cityofbrandon.org

RECEIVED

JUL 31 2017

**WATER RIGHTS
PROGRAM**

July 27, 2017

Eric Gronlund
Water Rights Program
South Dakota DENR
523 East Capitol
Pierre, SD 57501

Re: Water Rights Transfer
Brandon, South Dakota

Dear Mr. Gronlund:

The City of Brandon is proposing to drill a new well as shown on the enclosed exhibit. This well would be an additional diversion point for Water Right No. 6156-3. The new diversion point will be located approximately 500' north of the existing well and is in the SW ¼ NE ¼ of Section 3-T101N-R48W. The well shall be approximately 300' deep at the bottom of the screen. A test well was completed by Thein Well in April 2017. The results of the test well are enclosed. We propose to maintain the well currently associated with Water Right No. 6156-3 as a back-up well. The City would not utilize both wells simultaneously. Also, no additional water is appropriated to the 4.44 cubic feet per second authorized by Water Right No. 6156-3. Please feel free to contact the City of Brandon or Stockwell Engineers, Inc. with any questions or comments you may have regarding this additional diversion point.

Respectfully submitted,

Bryan Read
Brandon City Administrator

Enclosures: Test Well Results
Additional Diversion Point Location Maps

cc: Jon Brown, Stockwell Engineers, Inc.



Water Permit No. 6156-3 Transfer
Additional Diversion Point
Brandon, South Dakota



Scale: 1" = 200'

STOCKWELL
07/25/2017 SEI No: 16146

Brandon
SOUTH DAKOTA
Building a Better Life



THEIN WELL

P.O. BOX 778, 11355 HWY. 71 NE (ACROSS FROM RINGO LAKE)
SPICER, MINNESOTA 56288 • (320) 796-2111
www.theinwell.com • E-mail: theinwell@tds.net

WELLS ~ PUMPS
SALES ~ SERVICE

Since 1893

April 21, 2017

Shashi Prasad
Stockwell Engineers
801 N. Phillips Ave., Suite 100
Sioux Falls, SD 57104

Dear Shashi,

We are pleased to provide you with the well information, and the test pump results from the 6" well we installed in Brandon, SD. We are also including the formation sand analysis and well screen design provided by Johnson well screen. Please review this information.

The test pump results were a little tricky to analyze, because of interference from Well # 6. We believe that the specific capacity is at around 16 gallons per foot of draw down. At these capacities we feel that you should be able to obtain the desired yield from the production well.

I feel that the well may not be as productive as production well #6; because the formation sample indicates that the formation is made up of fine to medium sand. Fortunately the formation is thick and the well is deep enough so that you should have enough available draw down to build a successful well.

Respectfully,

Robert Thein

rt/js

CLARA CITY, MN 56222 (320) 847-3207 • MONTICELLO, MN 55362 (763) 271-4200

CERTIFIED MASTER WATER WELL CONTRACTOR
Equal Opportunity Employer

MEMBER
NGWA

MEMBER
AWWA

SOUTH DAKOTA WATER WELL COMPLETION REPORT

11-02

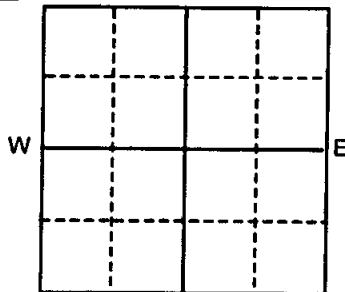
Location <u>SE ¼ NW ¼</u> Sec <u>3</u> Twp <u>101</u> Rg <u>48 W</u>		Well Owner: <u>City of Brandon</u>																																				
County <u>Minnehaha</u>		Business Name: _____																																				
Please mark well location with an "X" 		Address: <u>P.O. Box 95</u>																																				
		City, State, Zip: <u>Brandon</u> <u>SD</u> <u>57005</u>																																				
Well Completion Date <u>April 4, 2017</u>		WELL LOG: <table border="1" style="width:100%; border-collapse: collapse;"> <thead> <tr> <th rowspan="2">FORMATION</th> <th colspan="2">DEPTH</th> </tr> <tr> <th>FROM</th> <th>TO</th> </tr> </thead> <tbody> <tr><td>Top Soil</td><td>0</td><td>5</td></tr> <tr><td>Clay Brown</td><td>5</td><td>7</td></tr> <tr><td>Sand Dirty Brown</td><td>7</td><td>11</td></tr> <tr><td>Sand & Gravel Dirty Brown</td><td>11</td><td>23</td></tr> <tr><td>Clay Tan</td><td>23</td><td>24</td></tr> <tr><td>Sand & Gravel Clean Rounded</td><td>24</td><td>38</td></tr> <tr><td>Clay Tan</td><td>38</td><td>39</td></tr> <tr><td>Clay Sandy Blue</td><td>39</td><td>41</td></tr> <tr><td colspan="3">Continued on next page</td></tr> </tbody> </table>		FORMATION	DEPTH		FROM	TO	Top Soil	0	5	Clay Brown	5	7	Sand Dirty Brown	7	11	Sand & Gravel Dirty Brown	11	23	Clay Tan	23	24	Sand & Gravel Clean Rounded	24	38	Clay Tan	38	39	Clay Sandy Blue	39	41	Continued on next page					
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METHOD OF DRILLING: Rotary		REMARKS GPS: N43 34 54.1 W96 34 47.3 Well was drilled as a test well/ monitoring well to collect data for proposed municipal well.																																				
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SCREEN: ☒ Perforated pipe ☐ Manufactured Diameter <u>5.00</u> Inches Length <u>68.0</u> Feet Material <u>PVC</u> Slot Size <u>.025</u> Set From <u>221.0</u> Feet to <u>289.0</u> Feet Other information _____		This well was drilled under license # <u>475</u> and this report is true and accurate. Drilling firm: <u>Thein Well Co., Inc</u> Signature of License Representative: _____ Signature of Well Owner or Equitable Property Holder: _____ Date: _____																																				
WAS A PACKER OR SEAL USED? ☐ Yes ☒ No If so, what material? _____ Describe packer(s) and location _____		DISINFECTION: Was well disinfected upon completion? ☒ Yes, How? <u>Chlorinated</u> ☐ No, Why Not? _____ Lab to which water quality sample sent for analysis _____																																				

SOUTH DAKOTA WATER WELL COMPLETION REPORT

11-02

Location Sec Twp Rg County

North

Please mark well
location with an "X"Well Completion Date

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

PROPOSED USE:

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

METHOD OF DRILLING:

CASING DATA:

If other describe ☐ Steel ☐ Plastic ☐ Other

PIPEWEIGHT	DIAMETER	FROM	TO	HOLE DIAMETER
LB/FT	IN	FT	FT	IN
LB/FT	IN	FT	FT	IN
LB/FT	IN	FT	FT	IN

GROUTING DATA:

Grout Type	No. of Sacks	Grout Weight	From	To
		Lb/gal	Ft	Ft
		Lb/gal	Ft	Ft

Describe grouting procedure

SCREEN:

☐ Perforated pipe ☐ Manufactured
 Diameter Inches Length Feet
 Material
 Slot Size Set From Feet to Feet
 Other information
WAS A PACKER OR SEAL USED? ☐ Yes ☐ NoIf so, what material? Describe packer(s) and location

DISINFECTION: Was well disinfected upon completion?

☐ Yes, How? ☐ No, Why Not? Lab to which water
quality sample sent for analysis Well Owner: City of BrandonBusiness Name: Address: P.O. Box 95City, State, Zip: Brandon SD 57005

WELL LOG:

FORMATION	DEPTH	
	FROM	TO
Clay Blue	41	48
Clay a little sandy, thin gravel layer	48	51
Sand Medium Brown	51	59
Sand & Gravel, thin clay layer	59	79
Clay Blue	79	81
Sand Fine, lots of sea shells blue	81	86
Clay Blue	86	91
Sand Fine	91	101
Continued on next page		

STATIC WATER LEVEL

FEET

If flowing: closed in pressure PSIGPM flow through Inch pipeControlled by ☐ Valve ☐ Reducers ☐ Other Reduced flow rate GPMCan well be completely shut in?

WELL TEST DATA:

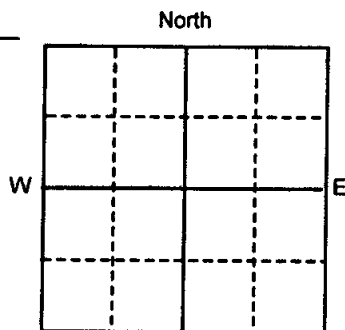
☐ Pumped Describe: ☐ Bailed☐ Other Pumping Level Below Land Surface Ft. After Hrs. pumped GPM Ft. After Hrs. pumped GPMIf pump installed, pump rate: GPM

REMARKS

This well was drilled under license # and this
report is true and accurate.Drilling firm: Signature of License Representative: Signature of Well Owner or Equitable Property Holder: Date:

SOUTH DAKOTA WATER WELL COMPLETION REPORT

11-02

Location $\frac{1}{4}$ $\frac{1}{4}$ Sec Twp Rg County Please mark well
location with an "X"Well Completion Date

K — 1 Mile — H

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

PROPOSED USE:

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

METHOD OF DRILLING:

CASING DATA:

If other describe ☐ Steel ☐ Plastic ☐ Other

PIPEWEIGHT	DIAMETER	FROM	TO	HOLE DIAMETER
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GROUTING DATA:

Grout Type	No. of Sacks	Grout Weight	From	To
		Lb/gal	Ft	Ft
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Describe grouting procedure

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DISINFECTION: Was well disinfected upon completion?

☐ Yes, How?
☐ No, Why Not?
 Lab to which water quality sample sent for analysis
Well Owner: City of BrandonBusiness Name: Address: P.O. Box 95City, State, Zip: Brandon SD 57005

WELL LOG:

FORMATION	DEPTH	
	FROM	TO
Shale hard rock like	101	117
Shale soft w/ bentonite layers	117	120
Shale black hard rock like	120	152
Clay gray soft	152	156
Sandy clay with sand layer	156	171
Sand fine to med. white pink	171	260
Shale	260	262
Sand fine	262	265
Continued on next page		

STATIC WATER LEVEL FEETIf flowing: closed in pressure PSIGPM flow through Inch pipeControlled by ☐ Valve ☐ Reducers ☐ Other Reduced flow rate GPMCan well be completely shut in?

WELL TEST DATA:

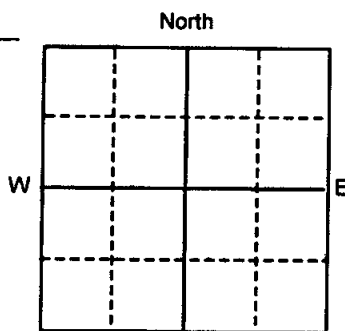
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SOUTH DAKOTA WATER WELL COMPLETION REPORT

11-02

Location $\frac{1}{4}$ $\frac{1}{4}$ Sec Twp Rg County Please mark well
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PROPOSED USE:

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METHOD OF DRILLING:

CASING DATA:

If other describe

PIPEWEIGHT	DIAMETER	FROM	TO	HOLE DIAMETER
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Describe grouting procedure

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DISINFECTION: Was well disinfected upon completion?

☐ Yes, How?
☐ No, Why Not?
 Lab to which water
 quality sample sent for analysis
Well Owner: City of BrandonBusiness Name: Address: P.O. Box 95City, State, Zip: Brandon SD 57005

WELL LOG:

FORMATION	DEPTH	
	FROM	TO
Shale Black	265	267
Sand Fine Pink	267	276
Sand Med Fine Pink	276	280
Coal Shale Black	280	282
Sand Fine Medium Pink	282	292
Shale Black	292	295
Siltstone Hard Black	295	301

STATIC WATER LEVEL FEETIf flowing: closed in pressure PSIGPM flow through Inch pipeControlled by ☐ Valve ☐ Reducers ☐ Other Reduced flow rate GPMCan well be completely shut in?

WELL TEST DATA:

☐ Pumped Describe:
☐ Bailed
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REMARKS

This well was drilled under license # and this report is true and accurate.Drilling firm: Signature of License Representative: Signature of Well Owner or Equitable Property Holder: Date:



THEIN WELL

P.O. BOX 778, 11355 HWY. 71 NE (ACROSS FROM RINGO LAKE)
SPICER, MINNESOTA 56288 • (320) 796-2111
www.theinwell.com • E-mail: theinwell@tds.net

WELLS ~ PUMPS
SALES ~ SERVICE

Since 1893

Well Log for: City of Brandon SD

Date: 4/4/2017

Well Size: 6"

Total Well Depth: 291'

SWL: 35'

Geological Material	Color	From	To
Top Soil		0	5
Clay	Brown	5	7
Sand Dirty	Brown	7	11
Sand & Gravel Dirty	Brown	11	23
Clay	Tan	23	24
Sand & Gravel Clean Rounded		24	38
Clay	Tan	38	39
Clay Sandy	Blue	39	41
Clay	Blue	41	48
Clay a little sandy, thin gravel layer	Blue	48	51
Sand	Med.Brown	51	59
Sand & Gravel, thin clay layer		59	79
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Shale		260	262
Sand Fine	Pink	262	265
Shale	Black	265	267
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Coal Shale	Black	280	282
Sand Fine Med	Pink	282	292
Shale	Black	292	295
Siltstone Hard	Black	295	301

CLARA CITY, MN 56222 (320) 847-3207 • MONTICELLO, MN 55362 (763) 271-4200

MEMBER
NGWA

CERTIFIED MASTER WATER WELL CONTRACTOR
Equal Opportunity Employer

MEMBER
AWWA

Drawdown/Recovery Measurements

Driller: Thein Well Co.

Date: 4-11-2017

Owner: City of Brandon, SD

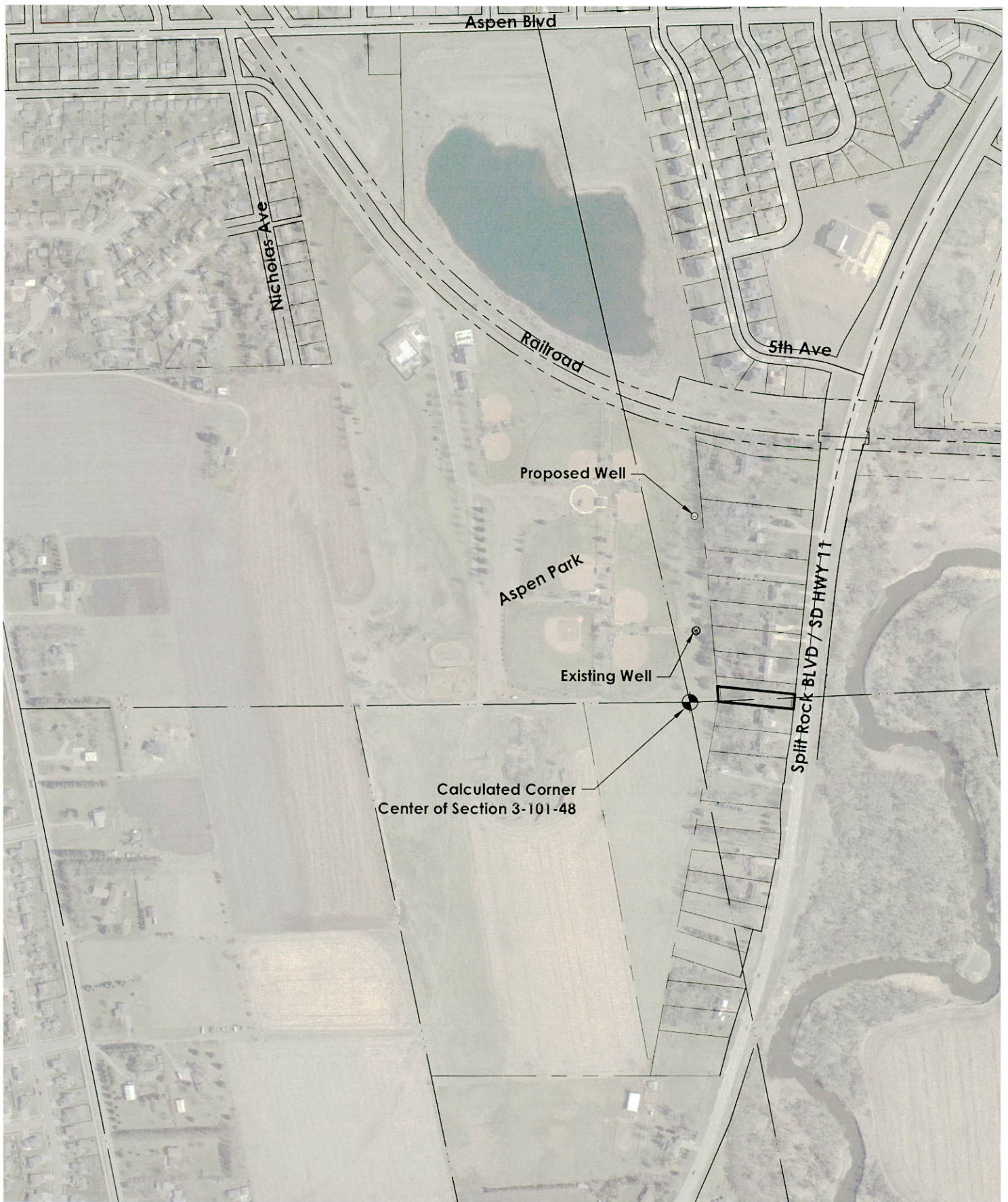
Well No: 6" Test Well

Static Water Level:

31.33

Time Start: 12.30 p.m.

Pumping Test						Pumping Test					
Time	Time in Minutes	Pumping Level	Draw Down	GPM	Sand	Time	Time in Minutes	Pumping Level	Draw Down	GPM	Sand
12:31	1	36	4.67	100		5:50	320	55.67	24.34		
12:32	2	36	4.67			6:00	330	52.25	20.92		
12:33	3	36.5	5.17			6:10	340	50.67	19.34		Production well off
12:34	4	37.08	5.75			6:20	350	49.83	18.50		
12:35	5	37.67	6.34			6:30	360	49.42	18.09		
12:40	10	37.83	6.50			6:40	370	53.5	22.17		Production well on
12:45	15	37.5	6.17			6:45	375	57	25.67	220	
12:50	20	37.58	6.25			6:50	380	57.5	26.17		
12:55	25	37.58	6.25			6:55	385	57.08	25.75		
1:00	30	37.58	6.25			7:00	390	58.25	26.92		
1:10	40	37.5	6.17			7:05	395	58.75	27.42		
1:20	50	37.5	6.17			7:10	400	56.83	25.50		
1:30	60	37.5	6.17			7:15	405	55	23.67		
1:40	70	39.5	8.17		Production well turned on	7:20	410	53.92	22.59		
1:50	80	42.33	11.00			7:30	420	53.33	22.00		
2:00	90	43.25	11.92			7:40	430	52.67	21.34		
2:10	100	44.92	13.59			7:50	440	52.33	21.00		
2:20	110	45.5	14.17			8:00	450	54.25	22.92		Production well on
2:30	120	46	14.67								
2:40	130	42.58	11.25		Production well turned off						
2:50	140	40.92	9.59								
3:00	150	40	8.67								
3:10	160	39.42	8.09								
3:20	170	39.25	7.92								
3:30	180	38.83	7.50								
3:40	190	38.5	7.17								
3:50	200	38.17	6.84								
4:05	215	42.5	11.17								
4:10	220	42.67	11.34	150							
4:15	225	42.83	11.50								
4:20	230	42.67	11.34		Production well 28'						
4:25	235	42.5	11.17								
4:30	240	42.5	11.17								
4:35	245	47	15.67								
4:40	250	47.33	16.00	200							
4:45	255	47.17	15.84								
4:50	260	47.17	15.84								
4:55	265	49.83	18.50		Production well on						
5:00	270	51.58	20.25								
5:10	280	53.17	21.84								
5:20	290	54.08	22.75								
5:30	300	55	23.67								
5:40	310	55.17	23.84								



Water Permit No. 6156-3
Additional Diversion Point
VICINITY MAP
Brandon, South Dakota



Scale: 1" = 500'

STOCKWELL
07/25/2017 SEI No: 16146

Brandon
SOUTH DAKOTA
Building a Better Life

Request for Addition of Diversion Point

NAME: City of Brandon

ADDRESS: 304 Main Avenue, P.O. Box 95, Brandon, SD 57005

DATE: August 21, 2017

COUNTY: Minnehaha

TELEPHONE: (605) 582-6515

BACKGROUND:

Water Right No. 6156-3 appropriates 968 acre-ft of water annually at a maximum diversion rate of 4.44 cubic feet of water per second (cfs) from one well completed in the Split Rock Creek aquifer, 280 feet deep, in the SW $\frac{1}{4}$ NE $\frac{1}{4}$ of Sec 3-T101N-R48W. Water Right No. 6156-3 is for municipal use by the City of Brandon, SD.

An application was submitted to the South Dakota DENR Water Rights Program requesting to add an additional diversion point for Water Right No. 6156-3. The new well will be approximately 300 feet deep, and located approximately 500 feet north of the existing well, also within the SW $\frac{1}{4}$ NE $\frac{1}{4}$ of Sec 3-T101N-R48W. The existing well is going to be maintained as a back-up well and the wells will not be used concurrently.

AUTHORITY:

Pursuant to SDCL 46-5-13.1, the location of a diversion point may be changed or additional diversion points may be licensed provided the following conditions are met and the potential for interference with other existing diversions is not increased:

- **Developed water source same as permitted source**

The water source authorized by Water Right No. 6156-3 is the Split Rock Creek aquifer. The existing well is completed to a depth of 280 feet. The proposed well is going to be completed to a depth of approximately 300 feet. Information from the test well at the proposed location shows that both wells are completed into the same sand unit.

- **No additional water appropriated**

No additional appropriation of water is requested. This request is for the addition of a diversion point. Water Right No. 6156-3 appropriates 968 acre-ft of water annually at a maximum diversion rate of 4.44 cfs (1,975 gpm) for municipal use from one well.

Review of Existing Diversions

The well completion report and water rights databases were reviewed for the nearest domestic wells and water rights/permits on file. The nearest domestic well on file and completed into this aquifer is approximately 0.6 miles northeast of the current and proposed diversion locations. The nearest water right/permits completed into this aquifer are less than 1000 feet to the east and west of the current and proposed diversion locations. These water rights/permits are for the City of Brandon, SD. Based upon the

small change in distance from other water rights/permits in the Split Rock Creek aquifer, additional interference is not expected to be a concern.

Observation Well Data

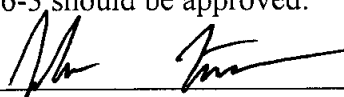
The Water Rights Program has 12 observation wells completed into the Split Rock Creek aquifer. The nearest observation well completed into this aquifer (MA-87H) is located approximately 0.9 miles southeast of the well sites. Historic water levels in MA-87H show that the potentiometric surface in that area of the aquifer has gradually declined approximately 15 feet since 1987.

CONCLUSION

- The additional diversion point does not propose to appropriate additional water.
- The water source continues to be the Split Rock Creek aquifer.
- Unlawful impairment of existing water rights/permits and domestic wells is not expected to occur.

RECOMMENDED ACTION

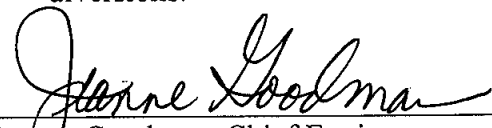
Based on the above criteria, it is recommended that the additional diversion point under Water Right No. 6156-3 should be approved.



John Farmer
Water Rights Program

The Chief Engineer makes a finding pursuant SDCL 46-5-13.1 and ARSD 74:02:01:14.01 that:

The change of diversion point does not increase the potential for adverse effects to existing diversions.



Jeanne Goodman, Chief Engineer
Water Rights Program



6156-3

DEPARTMENT of ENVIRONMENT
and NATURAL RESOURCES

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

denr.sd.gov

August 23, 2017

City of Brandon
c/o Bryan Read
P.O.Box 95
Brandon, SD 57005

To Mr. Read:

Water Right No. 6156-3 appropriates 968 acre-ft of water annually at a maximum diversion rate of 4.44 cubic feet of water per second (cfs) from one well completed in the Split Rock Creek aquifer, 280 feet deep, in the SW ¼ NE ¼ of Sec 3-T101N-R48W.

You filed a request to add an additional diversion point for Water Right No. 6156-3. The new well will be approximately 300 feet deep, and located approximately 500 feet north of the existing well, also within the SW ¼ NE ¼ of Sec 3-T101N-R48W. The existing well is going to be maintained as a back-up well and the wells will not be used concurrently.

Upon review of the request and pursuant to SDCL 46-5-13.1, the additional diversion point for Water Right No. 6156-3 is authorized without application or publication of a notice of hearing pursuant to SDCL 46-2A-4. No increase in the authorized diversion rate has been requested or approved.

If you have any questions, please contact John Farmer at (605) 773-3352.

Sincerely,


Jeanne Goodman, Chief Engineer
Water Rights Program

cc: Jon Brown, Stockwell Engineers, Inc. 801 N. Phillips Ave., Suite 100, Sioux Falls, SD 57104

6156-3

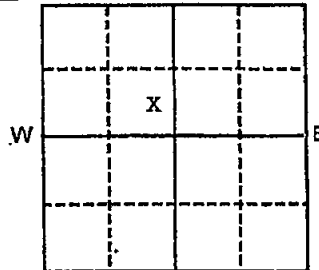
SOUTH DAKOTA WATER WELL COMPLETION REPORT

11-02

Location 1/4 NW 1/4 Sec 3 Twp 101 Rg 48Well Owner: City of BrandonCounty Minnehaha

North

Please mark well location with an "X"



Well Completion Date

March 12, 2019

1 Mile

Distance to nearest potential pollution source (septic tank, abandoned well, feed lot, etc.)
ft. from _____ (Identify source)

PROPOSED USE:

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

METHOD OF DRILLING:

Reverse Rotary

CASING DATA:

☒ Steel ☐ Plastic ☐ Other

If other describe _____

PIPEWEIGHT	DIAMETER	FROM	TO	HOLE DIAMETER
78.6 LB/FT	20.00 IN	0.0 FT	200.0 FT	28.00 IN
_____ LB/FT	_____ IN	_____ FT	_____ FT	_____ IN
_____ LB/FT	_____ IN	_____ FT	_____ FT	_____ IN

GROUTING DATA:

Grout Type	No. of Sacks	Grout Weight	From	To
Neat Cement	216	Lb/gal	0.0 Ft	85.0 Ft
Bentonite	5	Lb/gal	85.0 Ft	185.0 Ft

Describe grouting procedure

Bentonite Super Sack (4,000 lbs/vol) per di: 11/8
AM 4/18/19
 Pressure Grouted

SCREEN:

☐ Perforated pipe ☒ Manufactured
Diameter 14.00 Inches Length 80.0 FeetMaterial Stainless Steel V-WireSlot Size .045 Set From 202.0 Feet to 282.0 FeetOther information .005" slot stainless steel from 282' to 285'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? 25 lbs. HDH☐ No, Why Not? _____

Lab to which water quality sample sent for analysis

Midcontinent Testing Laboratories

Business Name: _____

Address: 304 Main Ave.City, State, Zip: Brandon SD 57005

WELL LOG:

FORMATION	DEPTH	
	FROM	TO
Top soil	0	5
Clay	5	7
Dirty sand	7	11
Dirty sand and gravel	11	23
Clay	23	24
Sand and gravel	24	38
Clay	38	39
Sandy clay	39	41
Clay	41	48

STATIC WATER LEVEL 26.0 FEET

If flowing: closed in pressure _____ PSI

GPM flow 2,000.0 through 10.00 inch pipeControlled by ☒ Valve ☐ Reducers ☐ Other _____Reduced flow rate 1,000.0 GPM

Can well be completely shut in? Yes

WELL TEST DATA:

☒ Pumped Describe: Pump, balled and surged for 12 hours each
☒ Balled
☒ Other

Pumping Level Below Land Surface

150.0 Ft. After 36.0 Hrs. pumped 2,000.0 GPM

_____ Ft. After _____ Hrs. pumped _____ GPM

If pump installed, pump rate: _____ GPM

REMARKS

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WATER RIGHTS PROGRAM

This well was drilled under license # 273

report is true and accurate.

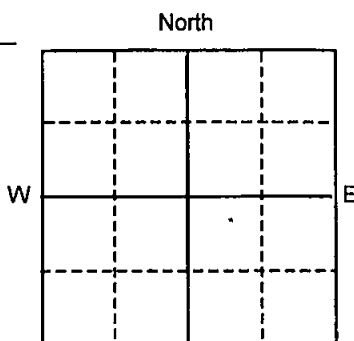
Drilling firm Charles Sargent Irrigation, Inc.Signature of License Representative: [Signature]

Signature of Well Owner or Equitable Property Holder:

[Signature] Rollic Hoke City of BrandonDate: 4-18-19

SOUTH DAKOTA WATER WELL COMPLETION REPORT

11-02

Location $\frac{1}{4}$ $\frac{1}{4}$ Sec Twp Rg County Please mark well
location with an "X"Well Completion Date Distance to nearest potential pollution source (septic tank, abandoned well, feed lot, etc.)?
 ft. from (Identify source)

PROPOSED USE:

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

METHOD OF DRILLING:

CASING DATA:

☐ Steel ☐ Plastic ☐ Other
If other describe

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

GROUTING DATA:

Grout Type	No. of Sacks	Grout Weight	From	To
<u> </u>	<u> </u>	<u> </u> Lb/gal	<u> </u> Ft	<u> </u> Ft
<u> </u>	<u> </u>	<u> </u> Lb/gal	<u> </u> Ft	<u> </u> Ft

Describe grouting procedure

SCREEN:

☐ Perforated pipe ☐ Manufactured
Diameter Inches Length FeetMaterial Slot Size Set From Feet to FeetOther information WAS A PACKER OR SEAL USED? ☐ Yes ☐ NoIf so, what material? Describe packer(s) and location

DISINFECTION: Was well disinfected upon completion?

☐ Yes, How? N/A☐ No, Why Not? Lab to which water
quality sample sent for analysisWell Owner: City of BrandonBusiness Name: Address: 304 Main Ave.City, State, Zip: Brandon SD 57005

WELL LOG:

FORMATION	DEPTH	
	FROM	TO
Sandy clay with thin gravel layer	48	51
Sand	51	59
Sand & Gravel, thin clay layer	59	79
Clay	79	81
Fine sand, lots of sea shells	81	86
Clay	86	91
Fine sand	91	101
Shale, hard rock	101	117
Soft shale, bentonite layers	117	120

STATIC WATER LEVEL FEETIf flowing: closed in pressure PSIGPM flow through Inch pipeControlled by ☐ Valve ☐ Reducers ☐ Other Reduced flow rate GPMCan well be completely shut in?

WELL TEST DATA:

☐ Pumped Describe: ☐ Bailed☐ Other

Pumping Level Below Land Surface

 Ft. After Hrs. pumped GPM Ft. After Hrs. pumped GPMIf pump installed, pump rate: GPM

REMARKS

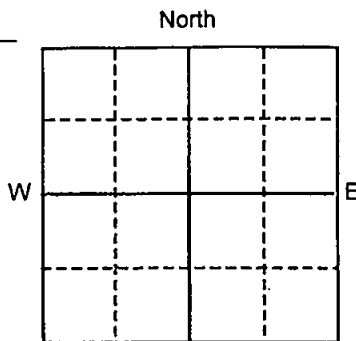
RECEIVED

APR 18 2019

WATER RIGHTS
PROGRAMThis well was drilled under license # and this
report is true and accurate.Drilling firm: Signature of License Representative: Signature of Well Owner or Equitable Property Holder: Date:

SOUTH DAKOTA WATER WELL COMPLETION REPORT

11-02

Location $\frac{1}{4}$ $\frac{1}{4}$ Sec Twp Rg County Please mark well
location with an "X"Well Completion Date

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

PROPOSED USE:

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

METHOD OF DRILLING:

CASING DATA:

☐ Steel ☐ Plastic ☐ Other
If other describe

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

GROUTING DATA:

Grout Type	No. of Sacks	Grout Weight	From	To
<u> </u>	<u> </u>	<u> </u> Lb/gal	<u> </u> Ft	<u> </u> Ft
<u> </u>	<u> </u>	<u> </u> Lb/gal	<u> </u> Ft	<u> </u> Ft

Describe grouting procedure

SCREEN:

☐ Perforated pipe ☐ Manufactured
Diameter Inches Length FeetMaterial Slot Size Set From Feet to FeetOther 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? N/A

☐ No, Why Not?
Lab to which water
quality sample sent for analysis Well Owner: City of BrandonBusiness Name: Address: 304 Main Ave.City, State, Zip: Brandon SD 57005

WELL LOG:

FORMATION	DEPTH	
	FROM	TO
Black shale, hard rock	120	152
Soft gray clay	152	156
Sandy clay with sand layer	156	171
Fine sand to medium sand	171	260
Shale	260	262
Fine sand	262	265
Shale	265	267
Fine sand	267	276
Fine, medium sand	276	280

STATIC WATER LEVEL

 FEETIf flowing: closed in pressure PSIGPM flow through Inch pipeControlled by ☐ Valve ☐ Reducers ☐ Other Reduced flow rate GPMCan well be completely shut in?

WELL TEST DATA:

☐ Pumped Describe: ☐ Bailed☐ Other

Pumping Level Below Land Surface

 Ft. After Hrs. pumped GPM Ft. After Hrs. pumped GPMIf pump installed, pump rate: GPM

REMARKS

RECEIVED

APR 18 2019

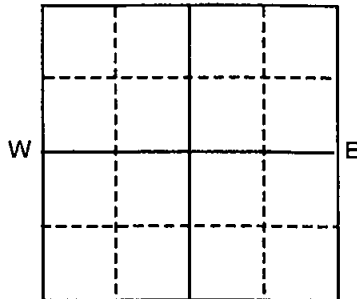
WATER RIGHTS
PROGRAMThis well was drilled under license # and this
report is true and accurate.Drilling firm: Signature of License Representative: Signature of Well Owner or Equitable Property Holder: Date:

SOUTH DAKOTA WATER WELL COMPLETION REPORT

11-02

Location $\frac{1}{4}$ $\frac{1}{4}$ Sec Twp Rg Well Owner: City of BrandonBusiness Name: Address: 304 Main Ave.City, State, Zip: Brandon SD 57005County

North

Please mark well
location with an "X"Well Completion Date

1 Mile

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

PROPOSED USE:

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

METHOD OF DRILLING:

CASING DATA:

☐ Steel ☐ Plastic ☐ Other
If other describe

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

GROUTING DATA:

Grout Type	No. of Sacks	Grout Weight	From	To
<u> </u>	<u> </u>	<u> </u> Lb/gal	<u> </u> Ft	<u> </u> Ft
<u> </u>	<u> </u>	<u> </u> Lb/gal	<u> </u> Ft	<u> </u> Ft

Describe grouting procedure

SCREEN:

☐ Perforated pipe ☐ Manufactured
Diameter Inches Length FeetMaterial Slot Size Set From Feet to FeetOther information WAS A PACKER OR SEAL USED? ☐ Yes ☐ NoIf so, what material? Describe packer(s) and location

DISINFECTION: Was well disinfected upon completion?

☐ Yes, How? N/A☐ No, Why Not? Lab to which water
quality sample sent for analysis

WELL LOG:

DEPTH

FORMATION	FROM	TO
Coal shale	280	282
Fine, medium sand	282	292
Shale	292	295
Hard siltstone	295	301

STATIC WATER LEVEL

FEET

If flowing: closed in pressure PSIGPM flow through Inch pipeControlled by ☐ Valve ☐ Reducers ☐ Other Reduced flow rate GPMCan well be completely shut in?

WELL TEST DATA:

☐ Pumped Describe: ☐ Bailed☐ Other

Pumping Level Below Land Surface

 Ft. After Hrs. pumped GPM Ft. After Hrs. pumped GPMIf pump installed, pump rate: GPM

REMARKS

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