



**DEPARTMENT of AGRICULTURE
and NATURAL RESOURCES**

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**RECOMMENDATION OF THE CHIEF ENGINEER FOR FUTURE USE WATER PERMIT
APPLICATION NO. 9050-3, Grant-Roberts Rural Water System, Inc.**

Pursuant to SDCL 46-2A-2, the following is the recommendation of the Chief Engineer, Water Rights Program, Department of Agriculture and Natural Resources concerning Future Use Water Permit Application No. 9050-3, Grant-Roberts Rural Water System, Inc., PO Box 145, Milbank SD 57252.

The Chief Engineer is recommending APPROVAL of Application No. 9050-3 because 1) there is reasonable probability that there is unappropriated water available for the applicant's proposed use, 2) Grant-Roberts Rural Water System, Inc. has demonstrated a reasonable need for the water reserved, 3) the proposed use is a beneficial use and 4) it is in the public interest with the following qualifications:

1. Future Use Permit No. 9050-3 reserves 1,228 acre-feet of water annually from the Antelope Valley aquifer.
2. Future Use Permit No. 9050-3 is approved with the stipulation that this Permit is subject to review by the Water Management Board as to accomplishment in developing reserved water upon expiration of seven (7) years. This Permit shall be subject to cancellation if the Water Management Board determines during the review that the holder cannot demonstrate a reasonable need for the Permit.
3. The future use area approved under this Permit encompasses other wells which obtain water from the same aquifer. Any future water withdrawals from this reservation shall be controlled so there is not a reduction of needed water supplies in adequate domestic wells or in adequate existing wells for other water rights in place at the time an application to construct and place reserved water is filed.
4. At such time as definite plans are made to construct works and put the water reserved by this permit to beneficial use, specific application for all or any part of the reserved water must be submitted prior to construction of facilities pursuant to SDCL 46-5-38.1.

See report on application for additional information.

Adam Mathiowetz, PE
Chief Engineer
DANR-Water Rights Program
September 24, 2026

NOTE: Approval of Future Use Permit No. 9050-3 does not preclude approval of subsequent appropriations by other persons within the future use area identified on No. 9050-3. Approval of any such appropriations will have a priority date junior to No. 9050-3. However, future siting of wells by the Grant-Roberts Rural Water System to place water to beneficial use within the future use area will be subject to review during the application process to place to beneficial use regarding the likelihood of well interference between a Grant-Roberts Rural Water System well or wells, and wells of other users within the future use area.

Report to the Chief Engineer
On Future Use Permit Application No. 9050-3
Grant-Roberts RWS Inc.

September 4th, 2026

Future Use Permit Application No. 9050-3 proposes to reserve for future use 1,228 acre-feet of water annually from the Antelope Valley aquifer. The area to be reserved for future use is located in Sections 1 thru 4, 9 thru 16, 21 thru 28, 33 thru 36; all in T119N-R51W. The water will be reserved for future water supplies for rural water system use, serving users in Codington, Grant, Roberts, and Deuel Counties in South Dakota, as well as the cities of Nassau and Marietta, and Lac Qui Parle County in Minnesota. The future use area is located in Codington County, near South Shore, SD.

AQUIFER: Antelope Valley (AV)

HYDROGEOLOGY:

The Antelope Valley aquifer is a glacial outwash aquifer that is composed of very coarse sand to coarse gravel (Hansen, 1990 and 1994). Hedges and others (1982) estimated the areal extent of the aquifer to be 28,700 acres and the amount of recoverable water stored of 64,580 acre-feet in the Antelope Valley aquifer. Using first occurrence of aquifer materials maps (Jensen 2001, 2003, & 2004), county studies released after the Hedges and others (1982) study (Biessel & Gilbertson, 1987; Hansen, 1990), sand and gravel resource studies (Schulz, 1991; Jarrett, 1986), lithologic logs (Water Rights, 2026f), observation wells (Water Rights, 2026b), and well completion report data (Water Rights, 2026d), Water Rights Staff delineated an updated area for the Antelope Valley aquifer (Figure 1; Drennon, 2026), of approximately 35,000 acres.

The Antelope Valley aquifer is located in the axis of the drainage divide between the Big Sioux and Minnesota Rivers and is hydrologically connected to numerous small lakes and sloughs that overlie or are directly adjacent to the aquifer (Hansen, 1990). The aquifer is generally under unconfined conditions; however, there are locations where the aquifer is buried under up to 50 feet of till where it is under confined conditions (Hansen, 1990). In Grant and Codington Counties, the depth to the top of aquifer materials ranges from land surface to 57 feet below grade (Hansen, 1990). The average thickness of Antelope Valley aquifer materials is 34 feet with a documented maximum thickness of 52 feet (Hansen, 1990).

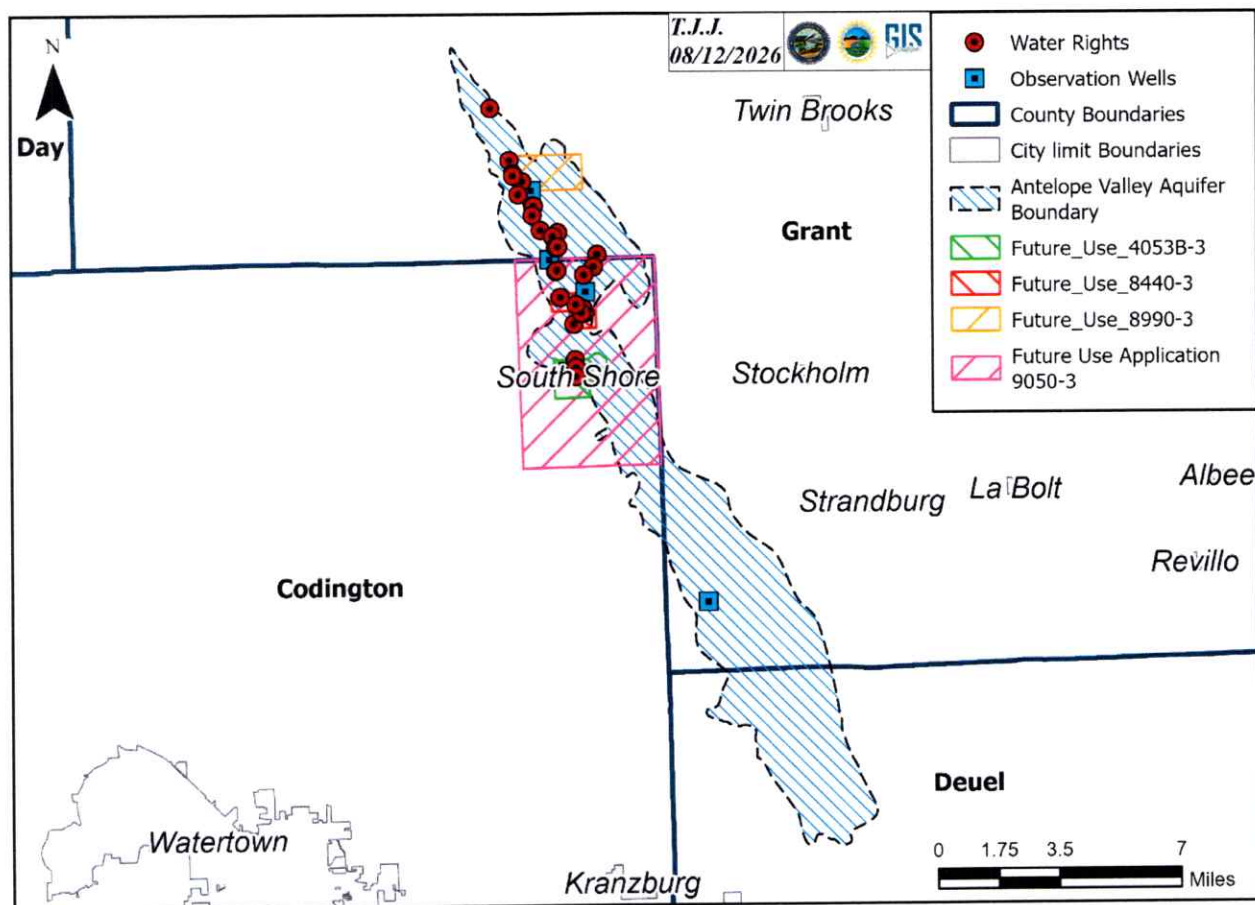


Figure 1. Map of the approximate Antelope Valley aquifer boundary (Drennon, 2026), the proposed location of future use area for Future Use Permit Application No. 9050-3, Antelope Valley aquifer observation wells, and Antelope Valley aquifer water rights (Water Rights, 2026b and 2026c).

South Dakota Codified Law (SDCL)

Future Use Permit Application No. 9050-3 proposes to reserve water from the Antelope Valley aquifer. Pursuant to SDCL 46-2A-10,

"A reservation for a future use may be approved only if there is a reasonable probability that unappropriated water is available for appropriation, that the quantity of water reserved will be needed by the entity and that the proposed use will be a beneficial use and in the public interest."

The probability of unappropriated water being available from the aquifer can be evaluated by considering SDCL 46-6-3.1,

"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 applicant's proposed use is for a water distribution system as defined by SDCL 46-1-6(17). However, the Antelope Valley aquifer is both younger than and stratigraphically higher than the Greenhorn Formation. Therefore, the average annual recharge and average annual withdrawal rates to and from the Antelope Valley aquifer needs to be considered. A review of the hydrologic budget and observation well data is provided for the information of the Chief Engineer and the Water Management Board.

HYDROLOGIC BUDGET:

Recharge

Recharge to the Antelope Valley aquifer is primarily through direct infiltration and subsequent percolation of rainfall and snowmelt where the aquifer is near or at land surface (Hansen, 1990). Additional recharge to the aquifer can occur in hydraulically connected lakes and sloughs, including Punished Woman, Round, and Crooked Lakes (Hansen, 1990; Water Rights, 2026d). Using observation well analysis, Hedges and others (1985) estimated a recharge rate of 2.3 inches per year to the Antelope Valley aquifer. The Antelope Valley aquifer has an estimated areal extent of approximately 35,000 acres (Drennon, 2026); therefore, the estimated average annual recharge rate (based on Hedges and others, 1985; Drennon, 2026) is approximately 6,700 acre-feet per year.

The observation well analysis method used by Hedges and others (1985) assumed a rise in water level in the aquifer as the only product of recharge to the aquifer. A rise in water level in the aquifer is the result of recharge to the aquifer exceeding discharge from the aquifer, indicating the observation well analysis method may be conservative when estimating a recharge rate because it does not necessarily account for recharge that occurs when discharge from the aquifer exceeds recharge.

Discharge

Discharge from the Antelope Valley aquifer is through well withdrawals and evapotranspiration where the aquifer is near or at land surface. Additional discharge from the aquifer is through outflow to hydraulically connected lakes and sloughs, including Punished Woman, Round and Crooked Lakes (Hansen, 1990; Water Rights, 2026d).

Currently, there are 18 water rights/permits authorized to appropriate water from Antelope Valley aquifer (Water Rights, 2026c). Additionally, there are four future use permits (Nos. 4053-3 and 4053B-3 for the Town of South Shore, 8440-3 for Grant-Robert RWS, and 8990-3 for City of Milbank) reserving a combined 2,079 acre-feet of water annually from the Antelope Valley aquifer (Water Rights, 2026c). Additionally, this application proposes to reserve 1,228 ac-ft/yr from Antelope Valley aquifer for future use.

Table 1 summarizes the reported use for three non-irrigation water rights/permits authorized to appropriate water from the Antelope Valley aquifer. The two non-irrigation water rights held by the Town of South Shore report their annual use to the Drinking Water Program (Drinking Water, 2026). The Town of South Shore reported using 14,175 gallons of water per day (16 ac-ft/yr) in 2025. Grant-Roberts Rural Water System currently holds Water Right No. 8439-3, which Water Permit No. 6654-3 and Water Permit No. 8321-3 were incorporated into, and is required to report the annual volume of water pumped from the Antelope Valley aquifer (Water Rights, 2026c). The reported historic annual use from the Grant-Roberts Rural Water System over the period of record (2003 to 2025) on file with the DANR - Water Rights Program and is listed in Table 2 (Water Rights, 2026c). The Grant-Roberts Rural Water System, on average, uses less than their permitted volume each year; therefore, the assumed maximum permitted use shown in Table 1 is a higher annual withdrawal rate estimate than what is actually being withdrawn each year from the Antelope Valley aquifer from the non-irrigation water rights/permits. However, this conservative method of estimating average annual withdrawals is used because Grant-Roberts Rural Water System has shown some increase in annual pumpage over the period of record as shown in Table 2 and currently holds a future use permit for potential future growth. Overall, the reported average annual withdrawal rate for the Antelope Valley aquifer non-irrigation water rights/permits is approximately 1,101 acre-feet per year (Table 1) (Water Rights, 2026c).

Table 1. Estimated average annual use for non-irrigation water rights/permits authorized to appropriate water from the Antelope Valley aquifer (Water Rights, 2026c).

Permit No.	Name	Uses	Status	Authorized Diversion Rate (cfs)	Permitted Annual Volume (acre-feet)	Reported Use (acre-feet/year)
4053A-3	Town of South Shore	MUN	License	0.58	N/A	16**
5520-3	Town of South Shore	MUN	License	0.09	N/A	
8439-3	Grant-Roberts Rural Water System	RWS	License	5.14	1,995	1,085*
					Total:	1,101
MUN Municipal, RWS Rural Water System *Reports annual non-irrigation use to the chief engineer. **Reports annual non-irrigation use to the Drinking Water Program.						

Table 2. Reported historic use from the Grant-Roberts Rural Water System water rights/permits (Water Rights, 2026c).

Year (Right/Permit Nos.)	Permitted (acre-feet/year)	Reported (acre-feet/year)	Year	Permitted (acre-feet/year)	Reported (acre-feet/year)
2003 (5576-3, 5576A-3)	1,074	761	2015 (5576-3, 5576A-3, 6654-3)	1,074	1,043
2004 (5576-3, 5576A-3, 6654-3)	1,074	792	2016 (5576-3, 5576A-3, 6654-3)	1,074	967
2005 (5576-3, 5576A-3, 6654-3)	1,074	645	2017 (5576-3, 5576A-3, 6654-3)	1,074	983
2006 (5576-3, 5576A-3, 6654-3)	1,074	835	2018 (6654-3, 8321-3)	1,381	1,154
2007 (5576-3, 5576A-3, 6654-3)	1,074	875	2019 (6654-3, 8321-3)	1,381	1,183
2008 (5576-3, 5576A-3, 6654-3)	1,074	890	2020 (6654-3, 8321-3)	1,381	1,158
2009 (5576-3, 5576A-3, 6654-3)	1,074	874	2021 (6654-3, 8321-3)	1,381	1,037
2010 (5576-3, 5576A-3, 6654-3)	1,074	881	2022 (6654-3, 8321-3)	1,381	1,077
2011 (5576-3, 5576A-3, 6654-3)	1,074	844	2023 (6654-3, 8321-3)	1,381	1,022
2012 (5576-3, 5576A-3, 6654-3)	1,074	887	2024 (6654-3, 8321-3)	1,381	1,063
2013 (5576-3, 5576A-3, 6654-3)	1,074	920	2025 (8439-3)	1,995	1,203
2014 (5576-3, 5576A-3, 6654-3)	1,074	963	Reported Average (2003-2025)		959
			Reported Average (2016-2025)		1,085

Currently, there are 15 irrigation water rights/permits authorized to appropriate water from the Antelope Valley aquifer (Water Rights, 2026c). Irrigation water rights/permits have been typically required to report their annual usage on an irrigation questionnaire since 1979. The estimated average annual withdrawal rate for the Antelope Valley aquifer irrigation water rights/permits that have reported over the period of record (1979 to 2025) is approximately 1,106 acre-feet per year (Table 3) (Water Rights, 2026a). To reflect the current level of development for irrigation water rights/permits more accurately, the average annual withdrawal rate for irrigation appropriations from 2016 to 2025 is approximately 1,343 acre-feet per year and will be used as the estimated average annual irrigation withdrawals for review of water availability (Table 3) (Water Rights, 2026a).

There are three recently approved irrigation water permits (8915-3, 9019-3, & 9022-3) that have not yet reported in the irrigation questionnaire (IQ) and need to be accounted for. Water Permit Nos. 8915-3, 9019-3, & 9022-3 are authorized to irrigate a combined 225 acres. Over the entire period of record, crop irrigators in the Tulare: East James aquifer of South Dakota applied, on average, 7.58 inches of water per acre per year (Drennon, 2025). However, the Tulare: East James aquifer is more than 60-miles southwest of the Antelope Valley aquifer. To account for the fluctuation in wet and dry cycles from year to year and differences in percolation of local

soils, an estimate of 10 inches (0.83 feet) of water per acre per year will be used to somewhat overestimate the annual withdrawal rate of the following irrigation water permits and applications. Assuming 0.83 feet of water per acre per year, the withdrawal rate for Water Permit Nos. 8915-3, 9019-3, & 9022-3 is approximately 187 acre-feet per year.

There are domestic wells completed into the Antelope Valley aquifer that do not require a water right/permit, so the withdrawal amount from those wells is unknown (Water Rights, 2026d). Due to their relatively low diversion rates, withdrawals from domestic wells are not considered to be a significant portion of the hydrologic budget. Additionally, with the development of rural water systems in areas where the Antelope Valley aquifer is the uppermost aquifer available, it is likely some domestic users may have transitioned to rural water. Therefore, the quantity of water withdrawn by domestic wells is estimated to be negligible to the hydrologic budget for the Antelope Valley aquifer.

Table 3. Reported irrigation use from the Antelope Valley aquifer from 1979 to 2025 (Water Rights, 2026a)

Year	Number of Permit/License	Annual Pumpage (ac-ft/yr)	Year	Number of Permit/License	Annual Pumpage (ac-ft/yr)
1979	7	73	2003	9	2,001
1980	9	435	2004	9	1,596
1981	7	513	2005	9	1,740
1982	5	61	2006	9	1,937
1983	6	543	2007	9	1,299
1984	6	136	2008	9	989
1985	6	49	2009	9	1,281
1986	6	41	2010	10	1,419
1987	6	645	2011	10	887
1988	7	1,827	2012	10	2,164
1989	7	1,427	2013	12	2,003
1990	10	1,606	2014	14	749
1991	12	989	2015	14	570
1992	11	650	2016	14	2,019
1993	11	310	2017	14	1,405
1994	10	699	2018	14	1,403
1995	10	469	2019	14	228
1996	8	1,029	2020	14	1,298
1997	8	932	2021	14	1,583
1998	9	1,136	2022	14	2,035
1999	9	1,379	2023	12	1,787
2000	9	1,608	2024	12	1,149
2001	9	1,809	2025	13	528
2002	9	1,534	Average (1979-2025)	10	1,106
			Average (2016-2025)	14	1,343

Hydrologic Budget Summary

The estimated average annual recharge rate to the Antelope Valley aquifer is approximately 6,700 acre-feet per year. The estimated average annual withdrawal rate from the Antelope Valley aquifer is approximately 5,938 acre-feet per year (non-irrigation: 1,101 acre-feet/year; irrigation: 1,343 acre-feet/year (2015 to 2024); Future Use Reservations: 2,079 acre-feet/year; Recently Approved Permit (2024): 187 acre-feet/year; and this Future Use Application No. 9050-3 (if approved): 1,228 acre-feet/year). Table 4 shows average annual recharge to the aquifer exceeds the average annual withdrawals. Based on the hydrologic budget, there is a reasonable probability unappropriated water is available from the Antelope Valley aquifer.

Table 4. List of water rights/permits withdrawals, estimated use of recently approved permits, this application (if approved), and unconfined/confined recharge to the Antelope Valley aquifer (Water Rights, 2026a)

	Pumpage for the Antelope Valley Aquifer (ac-ft/yr)
Future Use	2,079
Non-Irrigation Appropriation	1,101
Irrigation Appropriation (2015-2024)	1,343
Recently Approved Irrigation Permits (2024-2026)	187
Current Estimated Withdrawal	4,710
This Future Use Application (9050-3)	1,228
Total Estimated Withdrawal	5,938
Total Recharge	6,700

OBSERVATION WELL DATA:

Administrative Rule of South Dakota (ARSD) 74:02:05:07 requires that the Water Management Board shall rely upon the record of observation well measurements in addition to other data to determine that the quantity of water withdrawn annually from the aquifer does not exceed the estimated average annual recharge of the aquifer.

The DANR-Water Rights Program monitors four observation wells completed into the Antelope Valley aquifer with observation wells in the area of this application shown on Figure 3 (Water Rights, 2026b). These observation wells provide data on how the aquifer reacts to regional climatic conditions and local pumping. The three closest observation wells to the future use area are CD-76G (within the proposed future use area), GT-77G (northern boundary of the future use area), and GT-76D (approximately 2 miles north) (Water Rights, 2026b). The water level elevations for these observation wells are displayed in Figure 2 (Water Rights, 2026b). The data points utilized to construct the hydrographs are measurements of the static water level in the observation wells from the top of the well casing converted to feet from the NGVD29 datum.

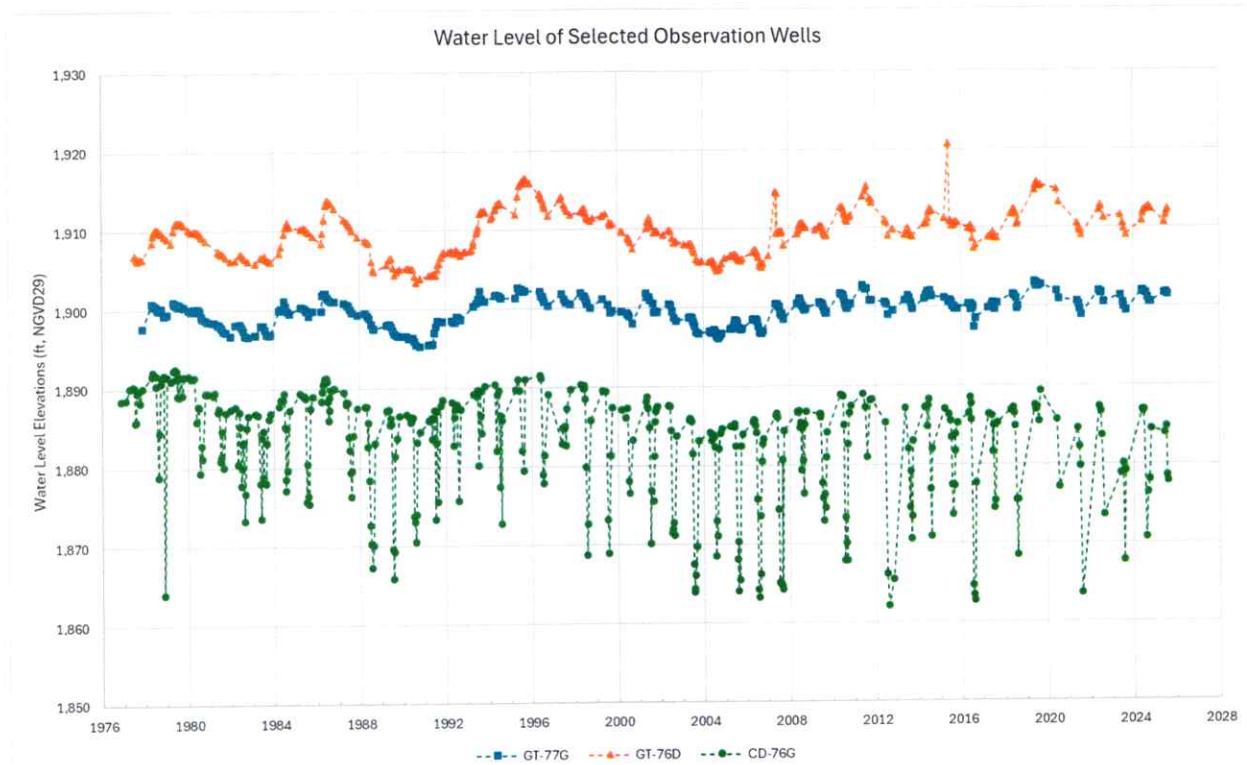


Figure 2. A hydrograph showing the elevation of water levels of observation wells GT-77G, GT-76D, and CD-76G (Water Rights, 2026b)

A majority of the observation wells in the Antelope Valley aquifer have a relatively stable trend in the water level, as seen in Figure 2. Observation well CD-76G is under confined conditions. Wells under confined conditions are expected to show a greater fluctuation in response to nearby pumping when compared to unconfined wells, as shown in the hydrograph for CD-76G, which responds to numerous nearby appropriative wells compared to the other wells. The other observation wells are unconfined and show much less response to localized pumping. The hydrographs for the Antelope Valley aquifer observation wells indicate that the aquifer responds well to climatic conditions because water levels are rising during wetter periods (early spring snowmelt and precipitation) and declining to a stable water level during drier periods. Additionally, the water levels in the observation wells display that the amount of recharge to and natural discharge from the aquifer greatly exceeds pumping with the aquifer with water levels returning to pre-pumping conditions between irrigation seasons. Aquifer recovery indicates that climatic conditions and therefore, the effects of recharge to and natural discharges from the aquifer govern the long-term fluctuations of waters levels in the aquifer rather than the impacts of pumping from the Antelope Valley aquifer. By recognizing that both recharge to and natural discharge from an aquifer can be captured for pumping, the observation well hydrographs demonstrate unappropriated water is available.

POTENTIAL FOR UNLAWFUL IMPAIRMENT OF EXISTING WATER RIGHTS:

The proposed future use area overlies several water rights/permits, other future use areas, and is within a mile of several other water rights in the Antelope Valley aquifer. Figure 3 shows water

rights within and near the area for this application, as well as DANR Observation Wells GT-77G & CD-76G in relation to the proposed future use area. Table 5 lists the water rights shown in Figure 3. If this application is approved, a more specific review of the possibility of unlawful impairment of existing water rights based on the proposed well location(s) must be performed when the applicant requests to place the reserved water to beneficial use.

Table 5. List of water rights/permits shown in Figure 3 (Water Rights, 2026c).

Permit	Name/Business	Priority	Status	Use Type	CFS	Acres
2478-3	Joe/John Arthur	12/15/1975	License	Irrigation	1.07	75
3672-3*	Coast Properties Investors LLC	02/23/1977	License	Irrigation	1.78	132
3781-3	Joe/John Arthur	02/27/1975	License	Irrigation	3.75	264
4053A-3	Town of South Shore	10/20/1976	License	Municipal	0.58	0
4053B-3	Town of South Shore	10/20/1976	Future Use	Municipal	N/A	192 (acre-feet)
5520-3	Town of South Shore	10/20/1976	License	Municipal	0.09	0
7975-3*	Jim & Dan Thyen	02/12/2014	License	Irrigation	1.67	117
8439-3	Grant-Roberts RWS	08/24/2020	License	RWS	5.14	0
8440-3	Grant-Roberts RWS	09/15/2008	Future Use	RWS	N/A	767 (acre-feet)
8915-3	Craig Arthur	12/20/2024	Permit	Irrigation	1.67	160

*These Water Rights are intended to be incorporated into other pending applications (9019-3 & 9022-3);
RWS: Rural Water System

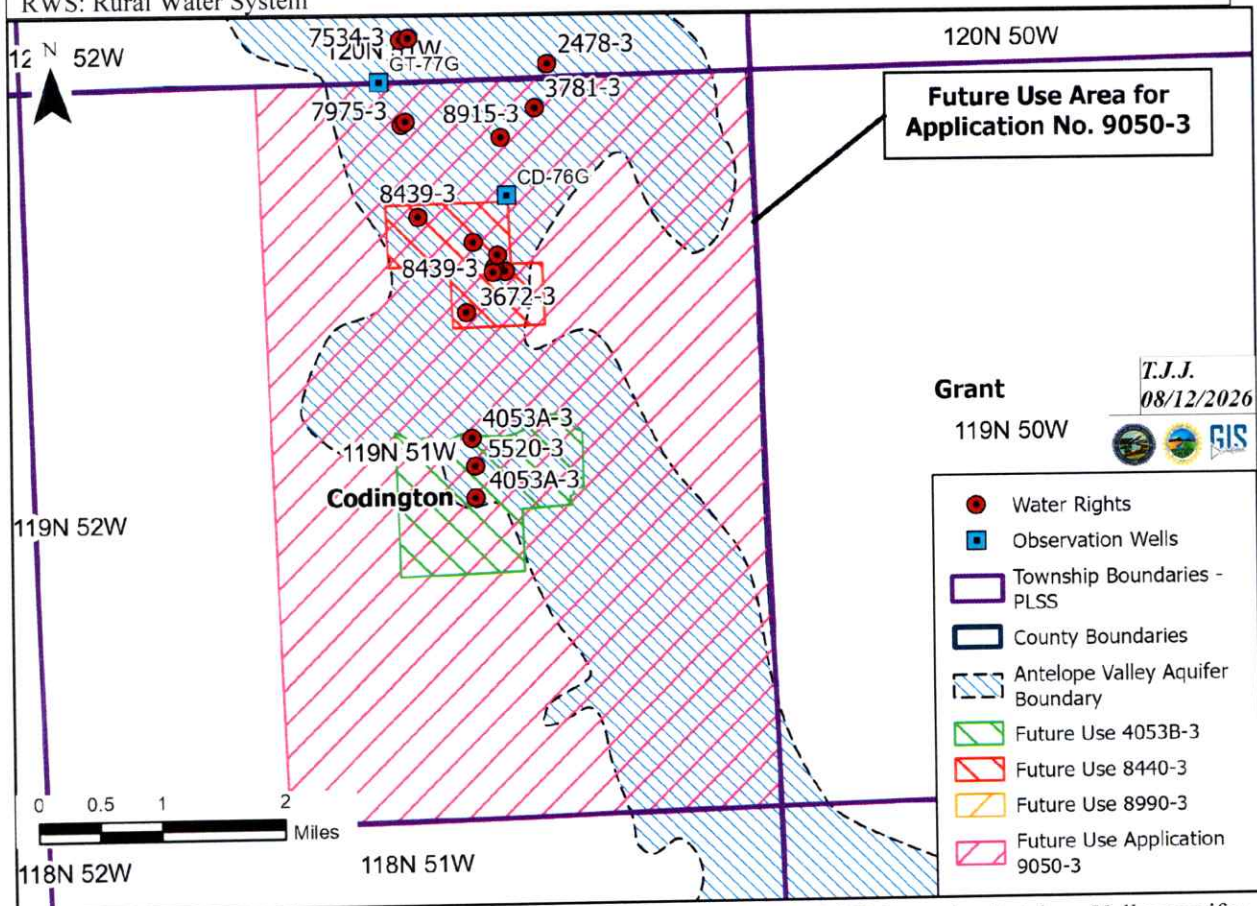


Figure 3. Map of proposed future use area for Future Use Application No. 9050-3, nearby Antelope Valley aquifer water rights/permits, and observation wells (Water Rights, 2026b and 2026c).

CONCLUSIONS:

1. Water Permit Application No. 9050-3 proposes to reserve for future use 1,228 acre-feet of water annually from the Antelope Valley aquifer. The area to be reserved for future use is located in Sections 1 thru 4, 9 thru 16, 21 thru 28, 33 thru 36; all in T119N-R51W. The water will be reserved for future water supplies for rural water system use, serving user in Codington, Grant, Roberts, and Deuel Counties in South Dakota, as well as the Cities of Nassau and Marietta, and Lac Qui Parle County in Minnesota. The future use area is located in Codington County, near South Shore, SD.
2. Based on observation well data and the hydrologic budget, there is a reasonable probability that unappropriated water is available from the Antelope Valley aquifer.
3. This application does not authorize construction of works or application of water to beneficial use.



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

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