DEPARTMENT of AGRICULTURE and NATURAL RESOURCES
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RECOMMENDATION OF ACTING CHIEF ENGINEER FOR WATER PERMIT APPLICATION NO. 2903-2, SnowBird HideAway

Pursuant to SDCL 46-2A-2, the following is the recommendation of the Acting Chief Engineer, Water Rights Program, Department of Agriculture and Natural Resources concerning Water Permit Application No. 2903-2, SnowBird HideAway, PO Box 108, Hill City SD 57745.

The Acting Chief Engineer is recommending APPROVAL of Application No. 2903-2 because 1) there is reasonable probability that there is unappropriated water available for the applicant's proposed use, 2) the proposed diversion can be developed without unlawful impairment of existing domestic water uses and water rights, 3) the proposed use is a beneficial use and 4) it is in the public interest as it pertains to matters of public interest within the regulatory authority of the Water Management Board with the following qualifications:

1. The existing wells approved under Water Permit No. 2903-2 are located near domestic wells and other wells which may obtain water from the same aquifer. Water withdrawals must be controlled so there is not a reduction of needed water supplies in adequate domestic wells or in adequate wells having prior water rights.

2. The permit holder must report to the Chief Engineer annually the amount of water withdrawn from the Crystalline Rock Aquifer.

3. Water Permit No. 2903-2 authorizes a total annual diversion of up to 12.9 acre-feet of water.

See report on application for additional information.

Adam Mathiowetz, PE
Acting Chief Engineer
March 4, 2026

Report to the Chief Engineer

On Water Permit Application No. 2903-2

SnowBird HideAway

March 04, 2026

Water Permit Application No. 2903-2 proposes to appropriate up to 12.9 acre-feet of water annually at a maximum combined instantaneous diversion rate of 0.1 cubic feet per second (cfs) (approximately 45 gallons per minute (gpm)) from four existing wells completed into the Crystalline Rock aquifer (all approximately 200 feet deep) located in the NE ¼ SW ¼ of Section 28 for use in a water distribution system located in the NE ¼ SW ¼ (Tract 8R Storm Hill Subdivision & Lots 3-5 Storm Hill Subdivision No. 2) of Section 28; all in T1S-R5E. The site of interest is located in Pennington County approximately one and one-half miles east of Hill City, SD.

AQUIFER: Crystalline Rock (CRSL)

HYDROGEOLOGY:

The Crystalline Rock aquifer consists of many localized aquifers within the Precambrian-aged, crystalline core of the Black Hills, where extensive fractures and weathering zones allow for the transmission of water (Driscoll and Carter, 2001). In the core of the Black Hills, the crystalline rock is generally exposed at land surface except where overlain by localized gravel deposits and alluvium along stream beds and topsoil (Martin et al., 2004; Redden et al., 2016). The crystalline rocks that comprise the aquifer have very low primary porosity, so water movement in the aquifer is controlled by secondary porosity. Secondary porosity is where groundwater flow is through fractures, joints, and faults (Rahn, 1979). The nature of secondary porosity is highly variable and unpredictable; therefore, local aquifer characteristics are site specific. The Crystalline Rock aquifer is estimated to have an outcrop area of approximately 574,000 acres (Rahn, 1979). Rahn (1979) estimated the effective porosity of the Crystalline Rock aquifer to be one percent of the outcrop area, while assuming groundwater is only recoverable in fractures and joints that typically only occur within a depth of 500 feet of ground surface, resulting in an estimated 2,900,000 acre-feet of recoverable water in storage for the Crystalline Rock aquifer in western South Dakota. Driscoll and Carter (2001) estimated the outcrop of the "Localized aquifers in the crystalline core area (Precambrian/Tertiary/Other)" to be approximately 616,800 acres.

The geology underlying the general location of the existing well sites consist primarily of the Tenderfoot Formation (Xtg) (muscovite phyllite and muscovite schist) (Redden et al., 2017).

Due to the unpredictable nature of secondary porosity, and the very low primary porosity of crystalline rock, it is very difficult to determine if the aquifer is confined or unconfined at a specific site. Depending on exactly what depth the secondary porosity was encountered in the well bore and the water level in the well compared to the secondary porosity features, the well

may change from acting as a confined well to an unconfined well at various water levels that are not comparable to adjacent wells completed into the same aquifer.

Water well completion reports were submitted with Water Permit Application No. 2903-2 for three of the four existing wells (Water Rights, 2026c). A reiteration of the hydrogeology from the water well completion reports is displayed in Table 1. It was noted in the file with the application that the fourth well was drilled 'pre-1985.' The DANR-Water Rights Program did not require submittal of well completion reports until the mid-1980's.

Table 1. Water well completion report submitted with Water Permit Application No. 2903-2 (Water Rights, 2026c)

Formation Log	From	To
Broken Schist	0	2
Mica Schist	2	225
Date of Well Completion	02/18/1996	
Estimated Static Water Level (at well completion)	65	

Formation Log	From	To
Topsoil Clay	0	10
Mica Schist	10	205
Date of Well Completion	09/05/2023	
Estimated Static Water Level (at well completion)	31	

Formation Log	From	To
Mica Schist	0	195
Date of Well Completion	11/30/2024	
Estimated Static Water Level (at well completion)	Flowing 1 GPM	

Figure 1 displays the location of the existing wells proposed to be used by Water Permit Application No. 2903-2, with the Crystalline Rock aquifer water rights/permits within approximately two miles (Water Rights, 2026b), and the significant fault locations (modified from Redden et al., 2016 and Redden et al., 2017). Table 1 lists the water rights/permits displayed in Figure 1. It is highly likely the localized portion of the Crystalline Rock aquifer this application proposes to use is limited by these mapped faults and other significant geological features (such as, synclines and anticlines). Furthermore, the actual areal extent of the localized aquifer is likely even further limited by localized secondary porosity. However, information is not available to delineate an exact extent of the localized aquifer.

Based on the geologic features shown in Figure 1, the existing wells proposed to be used are separated from the other nearby water rights/permits by several faults (modified from Redden et al., 2016 and Redden et al., 2017; Water Rights, 2026b).

South Dakota Codified Law (SDCL) 46-2A-9

Pursuant to SDCL 46-2A-9, "A permit to appropriate water may be issued only if there is a reasonable probability that there is unappropriated water available for the applicant's proposed use, that the diversion point can be developed without unlawful impairment of existing domestic water uses and water rights, and that the proposed use is a beneficial use and in the public interest as it pertains to matters of public interest within the regulatory authority of the Water Management Board as defined by SDCL 46-2-9 and 46-2-11." This report will address the availability of unappropriated water and the potential for unlawful impairment of existing domestic water uses and water rights within the Crystalline Rock aquifer.

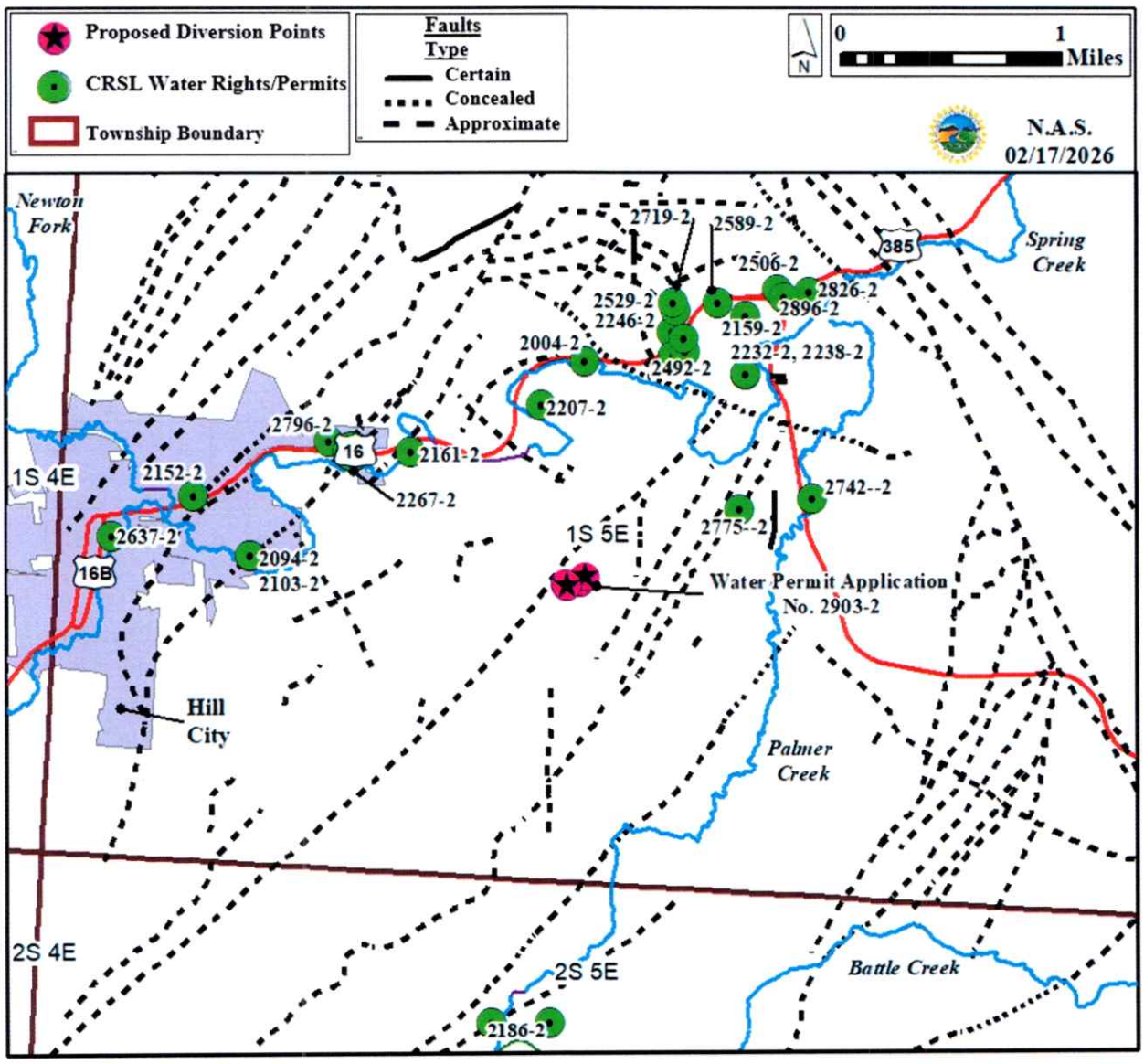

Figure 1. Location of the existing wells proposed to be used by Water Permit Application No. 2903-2 with the Crystalline Rock aquifer water rights/permits within approximately two miles (Water Rights, 2026b), and the significant fault locations (modified from Redden et al., 2016 and Redden et al., 2017)

Table 1. Water rights/permits authorized to appropriate water from the Crystalline Rock aquifer within approximately two miles of the existing wells, as shown in Figure 1 (Water Rights, 2026b)

Permit No.	Name	Status	Use	Authorized Diversion Rate (cfs)	Licensed/Permitted Volume (acre-feet/year)
2004-2	Gustave A Orloske	LC	COM	0.02	N/A
2094-2	City of Hill City	LC	MUN	0.25	N/A
2103-2	City of Hill City	LC	MUN	0.2	N/A
2152-2	Drew Dawson	LC	COM	0.05	N/A
2159-2	Daisey Enterprise LLC	LC	COM	0.07	N/A
2161-2	Lode Stone Motel	LC	COM, DOM	0.017	N/A
2186-2	Recreational Adventures	LC	COM	0.326	N/A
2207-2	Robins Roost Cabins	LC	COM	0.02	N/A
2232-2	Mountain View Lodge	LC	COM	0.034	N/A
2238-2	Larry & Karen Moore	LC	COM, DOM	0.022	N/A
2246-2	Gordon W Collins	LC	COM	0.022	N/A
2267-2	Larry & Karen Moore	LC	COM	0.1	N/A
2492-2	Rushmore Forest Products	LC	IND, DOM	0.52	N/A
2506-2	Daisey Enterprise LLC	LC	COM	0.01	N/A
2529-2	Addie Camp Water & Septic Association Inc	LC	COM	0.056	N/A
2589-2	Rolland & Dawnette Owens	LC	COM	0.022	N/A
2637-2	Black Hills Central Railroad Co	LC	COM	0.09	N/A
2719-2	Addie Camp Water & Septic Association Inc	LC	COM	0.06	N/A
2742-2	J&A Recreation LLC	LC	COM, DOM	0.056	10
2775-2	Chace or Leslie Larsen	LC	COM	0.031	2
2796-2	Nelson's Oil & Gas Inc	LC	COM	0.018	1
2826-2	Andy Edsen	PE	COM	0.033	6
2896-2	Country Store at Three Forks	PE	COM	0.22	1
LC: Licensed Water Right; PE: Water Permit; COM: Commercial; DOM: Domestic; IND: Industrial; MUN: Municipal					

WATER AVAILABILITY:

Water Permit Application No. 2903-2 proposes to appropriate water from the Crystalline Rock aquifer. The probability of unappropriated water being available from the aquifer can be evaluated by considering SDCL 46-6-3.1, which requires "No application to appropriate groundwater may be approved if, according to the best information reasonably available, it is probable that the quantity of water withdrawn annually from a groundwater source will exceed the quantity of the average estimated annual recharge of water to the groundwater source. An application may be approved, however, for withdrawals of groundwater from any groundwater formation older than or stratigraphically lower than the greenhorn formation in excess of the average estimated annual recharge for use by water distribution systems." The Crystalline Rock aquifer is older than and stratigraphically lower than the Greenhorn Formation (Fahrenbach et al., 2010) and the applicant's proposed use is for use in a water distribution system as defined by SDCL 46-1-6(17). Therefore, the Water Management Board's authority to approve this application is not restricted by whether or not recharge exceeds withdrawals. However, since the Board needs to find that there is unappropriated water available, a hydrologic budget analyzing average annual recharge and average annual withdrawal rates to and from the Crystalline Rock

aquifer is included in this technical report for the information of the Chief Engineer and Water Management Board.

HYDROLOGIC BUDGET:

Recharge

Recharge to the Crystalline Rock aquifer is through the infiltration of precipitation and streamflow losses (Driscoll and Carter, 2001).

Driscoll and Carter (2001) estimated the average annual recharge rate, over the water years 1950 to 1998, to the Crystalline Rock aquifer in its entirety within the core of the Black Hills, must be at least equal to the average withdrawal rate of 3,600 acre-feet per year. Driscoll and Carter (2001) further concluded that the recharge to the Crystalline Rock aquifer must be much larger than the estimated 3,600 acre-feet per year to account for discharge to streams. Driscoll and Carter (2001) stated, in regard to the Crystalline Rock aquifer, "Recharge conditions are highly transient and have large spatial variability; thus, quantification is not attempted." While looking at faults and other significant geological features may allow for some limiting of the areal extent, there is not sufficient data available to attempt a delineation of the localized Crystalline Rock aquifer near the existing wells with any level of certainty. Furthermore, the spatial variability and transient nature of the recharge means that even if there was a delineation for the local Crystalline Rock aquifer at the applicant's proposed location, simply applying the 3,600 acre-feet per year equally over the entirety of the aquifer is inappropriate. However, by utilizing Driscoll and Carter's (2001) estimated recharge rate of 3,600 acre-feet per year, or 0.07 inches per year, for the Crystalline Rock aquifer, a general sense of the minimum average annual recharge rate is provided. It must be emphasized that, due to the transient and variable nature of the recharge conditions, this number is not necessarily reliable. Furthermore, Driscoll and Carter (2001) noted that average annual recharge rate must be much greater to account for discharge from the Crystalline Rock aquifer to streamflow. Therefore, there is no estimated average annual recharge rate available for the localized Crystalline Rock aquifer the applicant proposes to use, however.

Carter and Driscoll (2001) estimated an average annual yield potential. The average annual yield potential is essentially how much precipitation is left after subtracting evapotranspiration. Carter and Driscoll (2001) utilized a recharge factor to estimate how much of the annual yield could infiltrate and recharge a bedrock aquifer in the Black Hills, such as the Madison and Minnelusa aquifers. However, Carter and Driscoll (2001) did not estimate a recharge factor for the crystalline core of the Black Hills because the localized Crystalline Rock aquifers are not extensive regional aquifers and are highly variable in nature.

Figure 2 displays a map of the estimated annual yield potential from Carter and Driscoll's (2001) report, with the location of the existing wells for Water Permit Application No. 2903-2, and the location of the Crystalline Rock aquifer observation wells in western South Dakota (Water Rights, 2026a). The Crystalline Rock aquifer near the existing well locations has an estimated average annual yield potential from approximately 1 and 2 inches per year (Driscoll and Carter, 2001). Average annual yield potential is not appropriate to use as a recharge rate for the

Crystalline Rock aquifer, but it does provide a general sense of an upper limit of a possible recharge rate.

Medler and others (2025) updated the recharge estimates from Carter and Driscoll's (2001) report for six major bedrock aquifers in the Black Hills; however, neither report included estimates for Crystalline Rock aquifer. The recharge estimates for the six major bedrock aquifers from Medler and others (2025) report included additional years of data (1931 to 2022) compared to the original Carter and Driscoll (2001) report (1931 to 1998). While Medler and others (2025) did not produce an updated annual yield map, the additional years of data did result in slightly increased average annual precipitation estimates to the six major bedrock aquifers in the Black Hills area included in both reports, which would presumably result in an increase to annual yield potential.

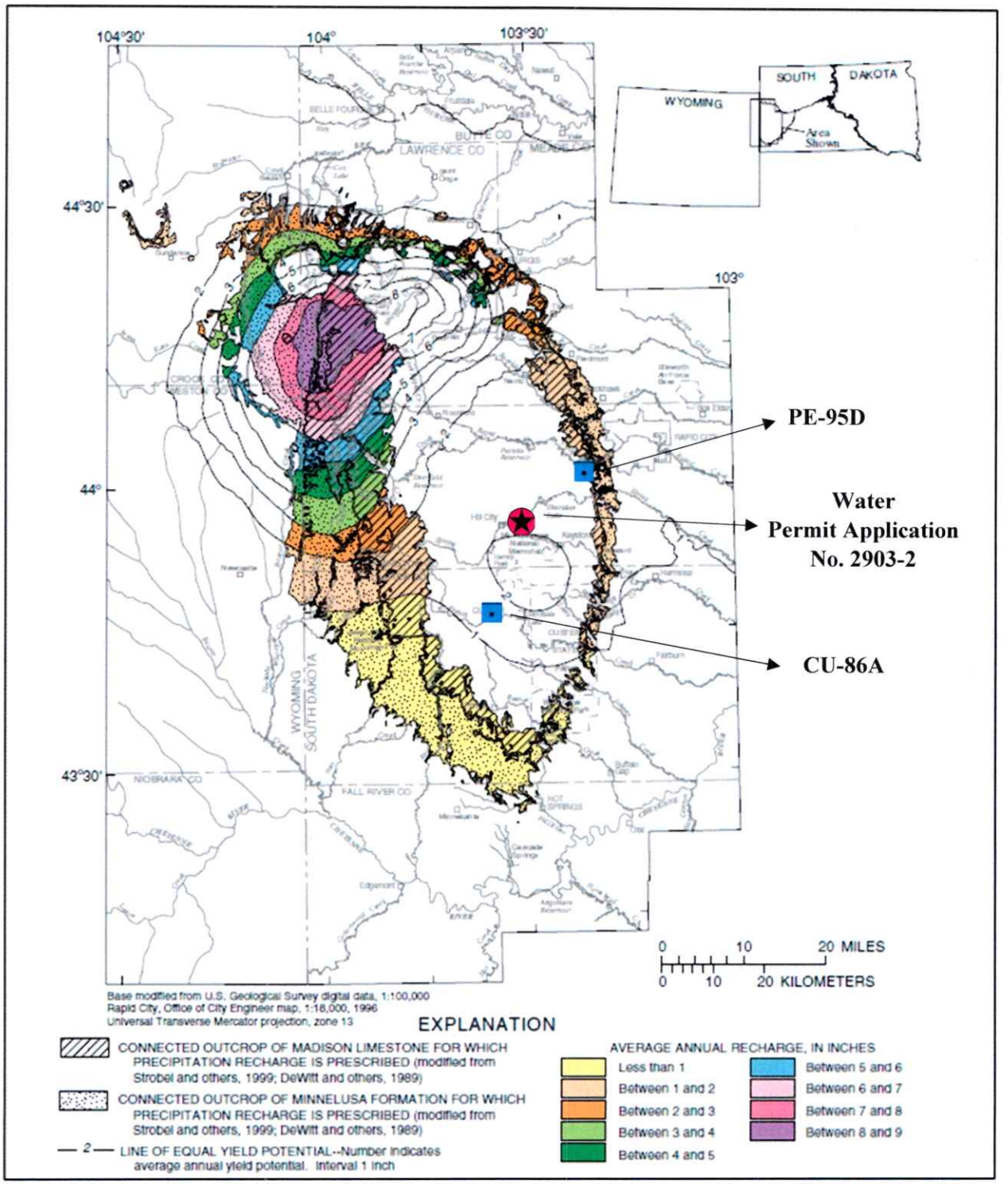

Figure 2. Estimated annual yield potential for the Black Hills in South Dakota and Wyoming for water years 1950 to 1998 (modified from Carter, J. M., Driscoll, D. G., Hamade, G. R., & Jarrell, G.J., 2001), with the location of the existing wells proposed to be used by Water Permit Application No. 2903-2, and the Crystalline Rock aquifer observation wells in western South Dakota (Water Rights, 2026a and 2026c)

Discharge

Discharge from the Crystalline Rock aquifer is primarily through well withdrawals (Water Rights, 2026c), seepage to streams and limited spring flow discharge (Driscoll and Carter, 2001), and evapotranspiration where the static water level of the aquifer is at or near the ground surface.

As shown in Figure 1, the existing wells proposed to be used by this application are separated from the other nearby water rights/permits by several faults (modified from Redden et al., 2016 and Redden et al., 2017; Water Rights, 2026b).

Historically, average water use by non-irrigation appropriations limited by an instantaneous diversion rate has been assumed to be pumping 60% of full time at the respective permitted diversion rate. Water rights/permits limited by an annual volume are assumed to withdraw their entire respective annual volume limitation. These are standard methods used by the DANR-Water Rights Program for estimating annual withdrawals by non-irrigation appropriations from an aquifer (Water Rights, 2026c). These methods are likely an overestimation of withdrawals.

There are a number of domestic wells completed into the Crystalline Rock aquifer within the area of the existing wells that do not require a water right/permit, so the withdrawal amount from those wells is unknown (Water Rights, 2026c). There could potentially be other domestic wells completed into the Crystalline Rock aquifer near the existing wells that are not on file with the DANR-Water Rights Program, or wells that are no longer in use. As noted earlier in the report, it is difficult to determine the areal extent of the localized Crystalline Rock aquifer due to the unpredictable nature of secondary porosity. Therefore, it is difficult to determine exactly how large of a component of the hydrologic budget domestic use may represent.

However, in the past, the Water Rights Program has used Carter and Neitzert's (2008) report on estimated water use in South Dakota, which has been accepted by the Water Management Board to estimate domestic water use using the following assumptions: 1) 2.5 residents per rural dwelling, and 2) either the average water use per capita by self-serve well users for the county of interest or an average use from across the state if county specific data is not available. For Pennington County, self-supplied domestic water users withdrew approximately 70 gallons per day per capita. That is equivalent to approximately 0.2 acre-feet per year for each rural dwelling, assuming each dwelling has one well, using the previously mentioned assumptions, and that the dwelling is occupied year-round. There were 30 domestic wells identified that are separated by faults from the other nearby well logs on file and near existing wells (shown in Figure 3) (modified from Redden et al., 2016 and Redden et al., 2017; Water Rights, 2026c). The well depths for these 30 domestic wells varies from 125 to 460 feet below the ground surface (Water Rights, 2026c). The DANR-Water Rights Program Well Completion Report database maps reports at the centroid of the smallest geographical division provided on the report submitted by the well driller. Therefore, the locations as mapped are not the exact locations of the well. However, the data provides a sense of how many wells are in the general area.

It is unlikely that each of the domestic wells as numbered in Figure 3 are completed within the same fault complex as the existing wells for this application. One reason for this is due to how well completion report locations are provided to the Water Rights Program and subsequently

how the completion reports are mapped. With that, it is unlikely due to the high variability of the fractures and faults that comprise the Crystalline Rock aquifers. Therefore, it is unlikely that each of the domestic wells as numbered in Figure 3 are withdrawing from the same localized portion of the Crystalline Rock aquifer as the applicant's existing wells (Water Rights, 2026c). However, to somewhat overestimate the domestic use withdrawal rate in this area, assuming 0.2 acre-feet per year for each rural dwelling, the 30 domestic wells estimated use equates to approximately six acre-feet per year. This estimate for domestic use is provided to give a sense of scale to local domestic use from the Crystalline Rock aquifer rather than be an estimate for the use of each domestic well that may be present but not on record with the Water Rights Program.

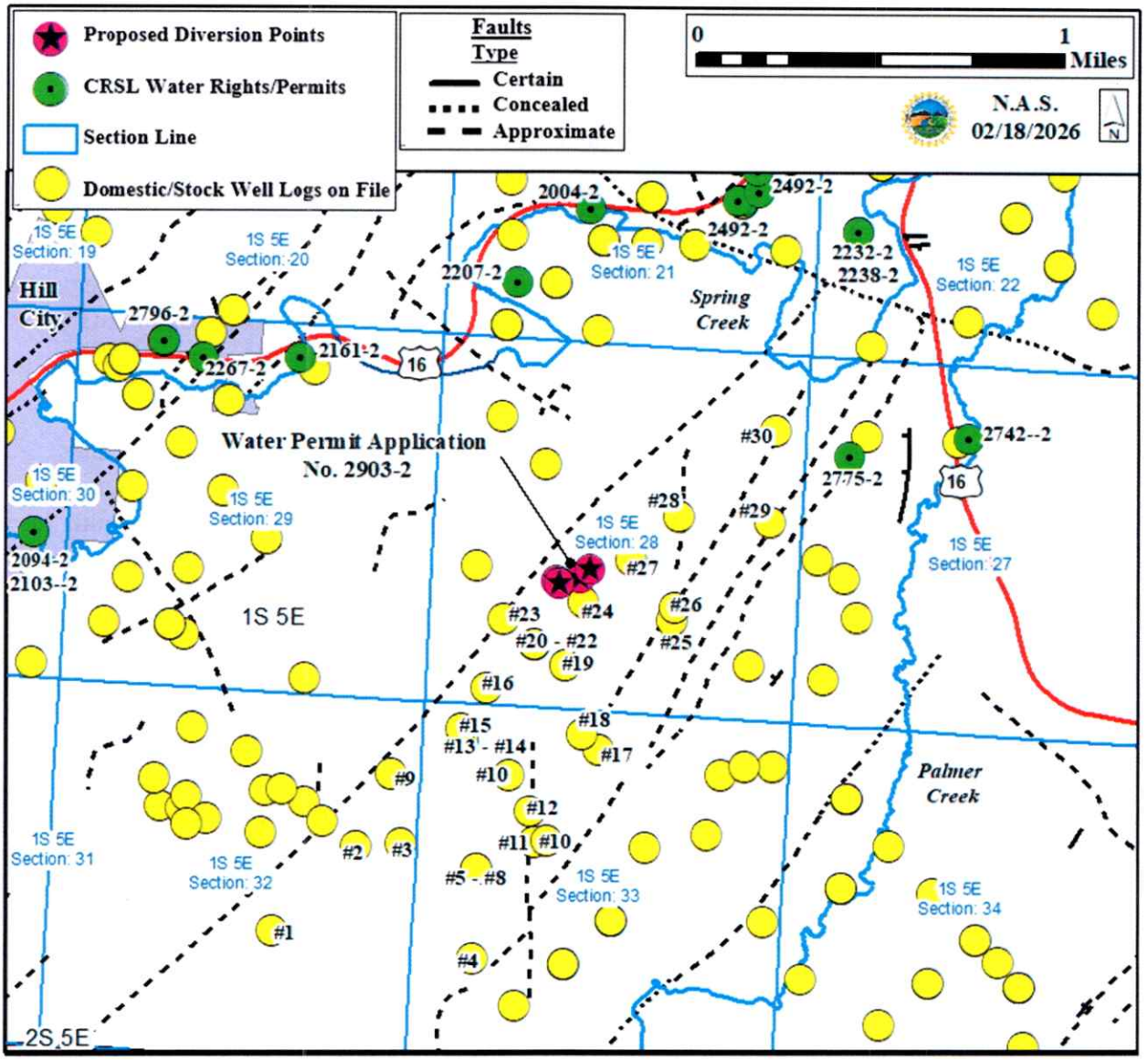

Figure 3. Location of the existing wells proposed to be used by Water Permit Application No. 2903-2 with the Crystalline Rock aquifer domestic wells within approximately two miles (Water Rights, 2026c), and the significant fault locations (modified from Redden et al., 2016 and Redden et al., 2017)

Hydrologic Budget Summary

There is no estimated average annual recharge rate available for the localized Crystalline Rock aquifer. However, to provide a general sense of minimum and maximum recharge to the aquifer, Driscoll and Carter (2001) estimated a minimum recharge rate of 3,600 acre-feet per year, or 0.07 inches per year. It must be emphasized that, due to the transient and variable nature of the recharge conditions, this number is not necessarily reliable. Additionally, the average annual recharge rate must be much greater to account for losses from the Crystalline Rock aquifer to streamflow (Driscoll and Carter, 2001). Utilizing average annual yield potential, Driscoll and Carter (2001) provided a general sense of an upper limit on a possible recharge rate to the Crystalline Rock aquifer ranging from approximately 1 to 2 inches per year.

The estimated average annual withdrawal rate for Water Permit Application No. 2903-2 (if approved) is approximately 12.9 acre-feet per year. Assuming 0.2 acre-feet per year for each rural dwelling, the 30 domestic wells near the existing wells equates to approximately six acre-feet per year. Collectively, the estimated average annual withdrawal rate is approximately 18.9 acre-feet per year.

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.

Observation wells provide data on how the aquifer reacts to regional climatic conditions and local pumping. The DANR-Water Rights Program monitors two observation wells that have been historically considered as completed into the Crystalline Rock aquifer in western South Dakota (Water Rights, 2026a). These observation wells are PE-95D (approximately 10.2 miles northeast of the existing wells) and CU-86A (approximately 11.3 miles southwest of the existing wells) (Water Rights, 2026a). Kilts (2018) determined that observation well PE-95D is open to both the Deadwood Formation and the Crystalline Rock, so it is uncertain how representative observation well PE-95D is of either the Deadwood or Crystalline Rock aquifer. Therefore, only observation well CU-86A will be used in this analysis. The hydrograph for observation well CU-86A is displayed in Figure 4 (Water Rights, 2026a). The data points utilized to construct the hydrograph are measurements of the static water level in the observation wells from the top of the well casing.

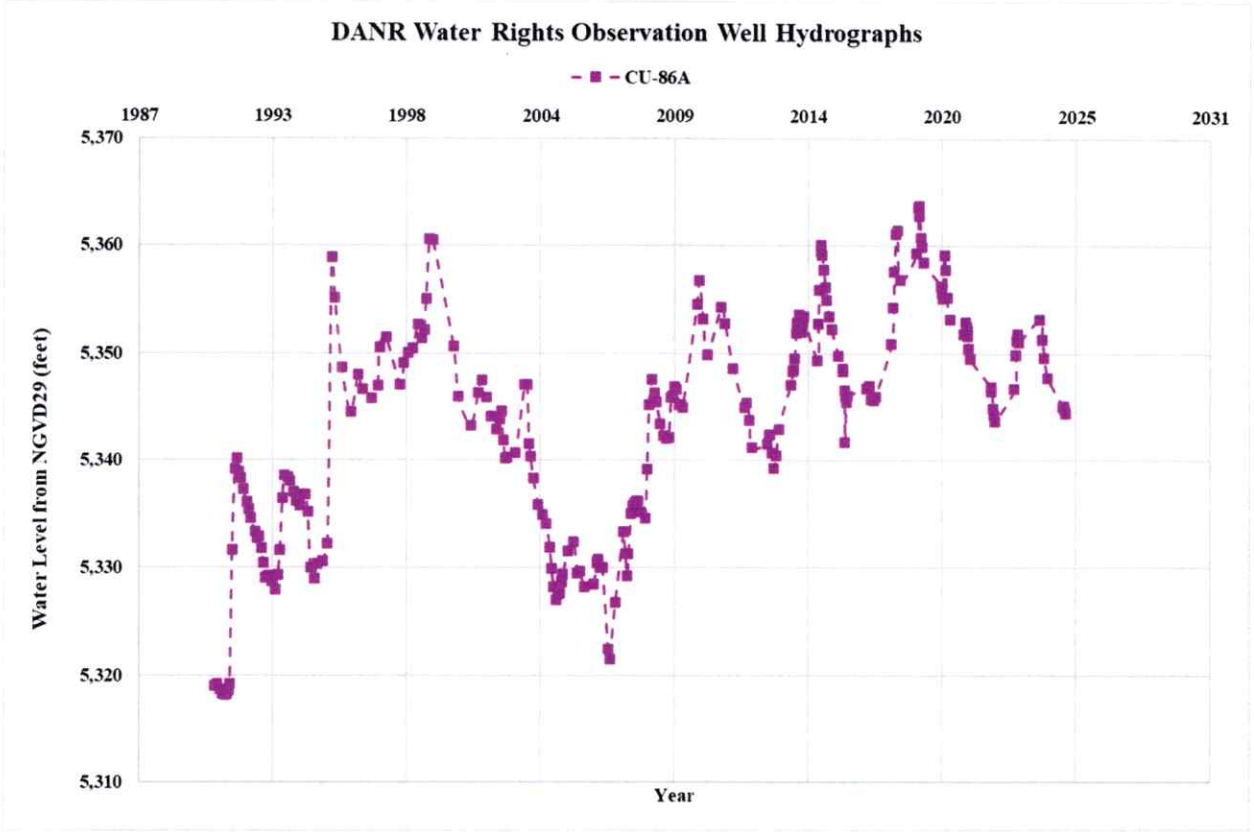

Figure 4. Hydrograph for observation well CU-86A (Water Rights, 2026a)

The hydrograph for CU-86A indicates 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. Over the period of record, the water levels displayed on the hydrograph for observation well CU-86A have fluctuated approximately 45 feet in response to climatic conditions (Water Rights, 2026a). An examination of the hydrograph shows that any effects caused by pumping on the water levels of CU-86A are masked by climatic conditions indicating that changes in water levels are governed by natural conditions, that is to say recharge to and natural discharge from the aquifer. Both recharge to and natural discharge from an aquifer can be captured for pumping. Although observation well CU-86A is located approximately 11.3 miles southwest of the existing wells, the hydrograph still documents that recharge to the Crystalline Rock aquifer has occurred over the period of record (Water Rights, 2026a).

POTENTIAL FOR UNLAWFUL IMPAIRMENT OF EXISTING WATER RIGHTS:

As shown in Figure 1, the existing wells proposed to be used by this application are likely separated from the other nearby water rights by several faults (modified from Redden et al., 2016 and Redden et al., 2017; Water Rights, 2026b). The closest water right/permit to the existing wells is Water Right No. 2775-2, which is held by Chace or Leslie Larsen. The diversion point

for Water Right No. 2775-2 is located approximately 0.76 miles northeast of the nearest existing well proposed to be used by this application (Table 1) (Figure 1) (Water Rights, 2026b).

There are domestic wells on file with the DANR-Water Rights Program that are completed into the Crystalline Rock aquifer, with the closest domestic well on file (not held by the applicant) (205 feet deep) located approximately 0.06 miles (340 feet) south of the nearest existing well (Water Rights, 2026c). There could potentially be other domestic wells completed into the Crystalline Rock aquifer near the wells the applicant proposes to use that are not on file with the DANR-Water Rights Program. The location of the domestic wells in the well completion report database maintained by the Water Rights Program is based on the location listed by the driller on the well completion report.

In Pennington County, there has been one complaint submitted to the DANR-Water Rights Program regarding potential well interference for wells completed into the Crystalline Rock aquifer (Water Rights, 2026d). The complaint involved Water Right No. 2572-2, held by Sheridan Lake Highlands HOA, during the initial development of the permit. In October of 2006, the Chief Engineer limited Water Right No. 2572-2 to a maximum diversion rate of 18 gallons per minute, which is known as the limit for reasonable domestic use detailed in ARSD 74:02:01:01(7) (Water Rights, 2026b and 2026d). This well interference complaint was heard at a Water Management Board meeting and the Board concluded the permit holders had satisfied each of the factors set forth in SDCL 46-2A-9; additionally, no complaints have been reported since that hearing (Water Rights, 2026b and 2026d). The diversion points authorized under Water Right No. 2572-2 are located approximately 8.9 miles northeast of the existing wells (Water Rights, 2026b). There have been no other complaints submitted to the DANR-Water Rights Program regarding well interference for adequate wells completed into the Crystalline Rock aquifer within Pennington County (Water Rights, 2026d).

In May of 2021, the Chief Engineer received a complaint regarding a number of entities near Rockerville, South Dakota (Pennington County) that were suspected of using water without proper permitting. Since then, the entities mentioned in this complaint have obtained the proper permitting necessary for their respective water withdrawals (Mathiowetz, 2021a and 2021b; Water Rights, 2026c).

Development of both appropriative and domestic use wells completed into the Crystalline Rock aquifer have continued with minimal history of well interference complaints in Pennington County. Water Permit Application No. 2903-2 is requesting a relatively limited diversion rate, appropriation volume, the wells have been in place and are presumed to have been in use since approximately 'pre-1985', 1996, 2023, and 2024 without any reported well interference complaints, and the Crystalline Rock aquifer has large natural fluctuations of water levels that often mask or exceed drawdown caused by well pumping. Therefore, there is a reasonable probability this application can be developed without unlawful impairment of existing water right/permit holders or domestic users with adequate wells (Water Rights 2026b, 2026c, and 2026d).

An adequate well as defined in ARSD 74:02:04:20(6):

> "A well constructed or rehabilitated to allow various withdrawal methods to be used, to allow the inlet to the pump to be placed not less than 20 feet into the saturated aquifer or formation material when the well is constructed, or to allow the pump to be placed as near to the bottom of the aquifer as is practical if the aquifer thickness is less than 20 feet."

The Water Management Board recognizes that putting water to beneficial use requires a certain amount of drawdown to occur. The Board has developed rules to allow water to be placed to maximum beneficial use without the necessity of maintaining artesian head pressure for domestic use. The Water Management Board defined an "adversely impacted domestic well" in ARSD 74:02:04:20(7) as:

> "A well in which the pump intake was set at least 20 feet below the top of the aquifer at the time of construction or, if the aquifer is less than 20 feet thick, is as near to the bottom of the aquifer as is practical and the water level of the aquifer has declined to a level that the pump will no longer deliver sufficient water for the well owner's needs."

Due to the very low primary porosity of the Crystalline Rock aquifer, and the highly variable and uneven nature of secondary porosity, 20 feet of saturated thickness above the pump inlet may not be sufficient for a dependable water supply. Without conducting an aquifer performance test, the precise drawdown effects caused by pumping a well cannot be determined. Over the period of record, the water levels shown on the hydrograph for observation well CU-86A (Figure 4) have fluctuated approximately 45 feet due to climatic conditions. Pump depth requirements for a well are detailed in ARSD 74:02:04:60(2), which states in part, "The depth of the pump setting shall be determined by dividing the specific capacity into the required yield and adding at least 10 additional feet to maintain pump inlet submergence below the maximum anticipated drawdown, where possible."

There is a reasonable probability that the proposed diversion by Water Permit Application No. 2903-2 will not unlawfully impair adequate wells for existing water rights/permits and domestic users because:

- Continued development of the Crystalline Rock aquifer has occurred without a significant history of well interference complaints (Water Rights, 2026d);

- The hydrograph for observation well CU-86A (Figure 4) showing natural fluctuations in water levels over the period of record (Water Rights, 2026a), along with Driscoll's and Carter's (2001) commentary, indicate there is natural recharge to the Crystalline Rock aquifer;

- Adequate domestic wells are protected under South Dakota Codified Water Law;

- Water Permit Application No. 2903-2 seeks to appropriate a relatively small annual volume of water; and

- The existing wells proposed to be used have been in place and are presumed to have been in use since approximately 'pre-1985', 1996, 2023, and 2024 without any reported well interference complaints on file with the DANR-Water Rights Program (Water Rights, 2026d).

If this application is approved, a qualification requiring the applicant to control their water withdrawals should be included, so there is not a reduction of needed water supplies in adequate domestic wells or in adequate wells having prior water rights.

CONCLUSIONS:

1. Water Permit Application No. 2903-2 proposes to appropriate up to 12.9 acre-feet of water annually at a maximum combined instantaneous diversion rate of 0.1 cfs (approximately 45 gpm) from four existing wells completed into the Crystalline Rock aquifer (all approximately 200 feet deep) for use in a water distribution system. The site of interest is located in Pennington County approximately one and one-half miles east of Hill City, SD.

2. There is a reasonable probability that the proposed diversion by Water Permit Application No. 2903-2 will not unlawfully impair adequate wells for existing water rights/permits and domestic users.

3. If this application is approved, a qualification requiring the applicant to control their water withdrawals, so there is not a reduction of needed water supplies in adequate domestic wells or in adequate wells having prior water rights, should be included.

4. If this application is approved, a qualification requiring the applicant to report to the Chief Engineer annually the amount of water withdrawn each year from the Crystalline Rock aquifer should be included.

Nakaila Steen

Nakaila Steen
Natural Resources Engineer III
SD DANR - Water Rights Program

References

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