

FUTURE WATER RIGHTS NEEDS ASSESSMENT

FOR THE TOWN OF SHERIDAN

PREPARED FOR:

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1. INTRODUCTION

The Town of Sheridan prepared this report to determine the future water needs of the Town of Sheridan Public Works municipal water supply and the adequacy of its existing water rights to serve a growing population. In the adjudication of water rights existing prior to July 1, 1973, Montana Code Annotated § 85-2-227 allows the operator of a public water supply to avoid the presumption of abandonment of any unused water rights if the entity has used any part of the water right or municipal water supply and has conducted a formal study, prepared by a registered professional engineer or qualified consulting firm, that includes a specific assessment that using the water right for municipal supply is feasible and that the amount of the water right is reasonable for foreseeable future needs. Town of Sheridan operates a municipal water supply and has claims to water rights which may not be presently used to the full extent of the claims but may be reasonably foreseen to be needed in the future.

The purpose of this study is to determine the future potential water demand and the water right needs for the population that could foreseeably be served by the Town of Sheridan's water system out to planning year 2075. The estimate for future water demand and water right needs is based on the current population of Sheridan, forecasted population growth, and the current per capita water demand. Town of Sheridan's existing water rights are summarized, and the forecast future water right needs are compared to existing water rights in this report.

The maximum flow rate needed to meet municipal peak demand in 2075 is unknown and will depend on the types of development which occur and public water supply regulation in 2075. Additional water storage can be constructed to meet maximum flow rates required for peak municipal demand. Town of Sheridan's existing water rights allow a significantly higher maximum flow rate than required to meet current municipal peak demand. Given these unknowns it is not possible to forecast the maximum flow rate needed in 2075. This future water rights needs assessment is therefore focused on the annual volume of water needed in acre-feet (acft) per year.

2. STUDY AREA

The Town of Sheridan is located in Madison County in the Ruby Valley along Highway 287 in Southwest Montana. Sheridan's municipal water system provides municipal water to residential, commercial, and municipal service connections including fire suppression water within the existing town limits. The current population of Sheridan as of the 2020 Census is 694. The current town limits include approximately 647 acres (1.01 square miles).

Connection to the municipal water system has historically been limited to water users within the town limits. Within town limits, there are approximately 300 acres of currently undeveloped land, with 100 acres potentially slated for development within the next few years. In recent decades there has been significant growth in the county immediately surrounding the town. That growth has to date occurred on private water systems. There is increasing developer interest in connection to municipal water and sewer as it can provide for more economical and denser development.

The future extent of the municipal water system in planning year 2075 is unknown and a defined planning area is not used. The population and water use forecast presented here is based on the 2020 Census population and foreseeable population growth rates and is not specific to any particular area on the ground. It is assumed that Sheridan will extend municipal water service to meet the requests and needs of development.

3. POPULATION GROWTH ANALYSIS

US Census population counts from 1980 through 2020 for Town of Sheridan and Madison County are shown in Table 1.

Table 1. Population annual average growth calculated from decadal US Census

Year	1980	1990	2000	2010	2020
Sheridan	646	652	659	642	694
Madison County	5448	5989	6851	7691	8623

The decadal census counts were used to calculate average annual growth for the decade, summarized in Table 2. The decadal growth is converted to average annual growth because annual growth is used in the equations used to forecast future growth to 2075.

Table 2. Population annual average growth rates calculated from decadal US Census

<i>Year</i>	1980-1990	1990-2000	2000-2010	2010-2020
<i>Town of Sheridan</i>	0.09%	0.11%	-0.26%	0.78%
<i>Madison County</i>	0.95%	1.35%	1.16%	1.15%

Population growth in recent decades within the Town of Sheridan municipal limit has been relatively low when compared to Madison County because land within the town limits is fairly built out, large agricultural tracts remain within the town limit, and development has occurred in areas adjacent to Sheridan. Based on patterns of development observed in recent decades the population of the area immediately surrounding Sheridan has been growing faster than within the town limits. As discussed in Section 2 we assume that future population growth of the area served by municipal water will include lands both within the current town limits and in areas outside of the town limits where municipal water will be extended in the future.

The county level population counts are the best data available for evaluating population growth rates in the areas where municipal services are expected to be needed in the next fifty years.

Census block data was not used for the following reasons. As of the date of this report, 2020 US Census block data is not available; 2020 data is available at either the town or county scale. It is not possible to determine exactly which Census blocks are likely to be connected to municipal water in the future. Extension of municipal water will likely be driven by requests from developers, which will depend on private landowner decisions and real estate market forces. Therefore, the Madison County population growth data is used to forecast population growth for the area that will be serviced by municipal water.

As shown in Table 2, Madison County has experienced consistent growth in recent decades, from 0.95-1.35% annually. In the most recent two-year period, 2020 and 2021, the Town has received considerable new interest in development using municipal water and sewer as population migration trends have changed in response to the Covid-19 pandemic. Available information from developer requests, real estate activity, and observations indicate that population growth in Madison County is at a recent high. The 1990-2000 annual growth of Madison County of 1.35% was selected to represent a reasonably foreseeable population growth rate for the area where municipal water service is likely to expand through planning year 2075. The 2020 and forecast future population for the Town of Sheridan is summarized in Table 3.

Table 3: Town of Sheridan 2020 US Census and forecast population

Year	2020	2030	2040	2050	2060	2070	2075
Population	694	794	908	1,039	1,188	1,359	1,454

4. PER CAPITA WATER DEMAND

The average per capita daily water use for the Town of Sheridan municipal water supply is 166 gallons per day per capita (GPCD). The average daily water usage was measured using Town of Sheridan Public Works records of daily pumped water from 2017-2021. These measurements are described in the Town of Sheridan Water System Capacity Assessment - Technical Memorandum (WWC Engineering, expected release in February 2022).

5. FUTURE WATER RIGHT NEEDS

The forecast annual water use for the Town of Sheridan municipal water supply is summarized in Table 4. Town of Sheridan’s forecast annual water use is 270.4 Acre-Ft in 2075. It should be noted that DNRC’s standard for average per capita daily water use for municipalities is 250 GPCD.¹ If DNRC’s standard of 250 GPCD were used, Sheridan’s forecasted water use for 2075 would be 407.2 Acre-Ft.

¹ See Water Right Claim Examination Rule 29(b)(4)(ii); and Water Rights Claims Examination Manual, X(C)(3)(h) (May, 2013).

Table 4. Town of Sheridan forecast average daily and annual water use

<i>Year</i>	<i>Population</i>	Per capita water demand (GPCD)	Average daily water use (GPD)	Annual water use (Acre-Ft/Yr)
2020	694	166	115,204	129.0
2030	794	166	131,804	147.6
2040	908	166	150,728	168.8
2050	1,039	166	172,474	193.2
2060	1,188	166	197,208	220.9
2070	1,359	166	225,594	252.7
2075	1,454	166	241,364	270.4

6. TOWN OF SHERIDAN EXISTING WATER RIGHTS

Town of Sheridan’s existing water rights are summarized in Table 5 and are described below.

STATEMENTS OF CLAIM

Town of Sheridan water rights include four Statements of Claim to Indian Creek surface water with priority dates ranging from 1864 to 1956. The Town also has one 1948 claim to groundwater for the Rossiter Spring located near Indian Creek. These older Statements of Claim from Indian Creek and Rossiter Spring formerly provided water to the municipal water supply. The regular use of Indian Creek and Rossiter Spring water was discontinued in 1991 after the Town constructed several water wells for supply. The Town reports that this water supply has been used infrequently since 1991 during periods of extreme drought.

Table 5. Town of Sheridan existing water rights sorted by priority date.

Water right	Type	Priority date (year, month, day)	Source type	Source	Diversion	Period of use	Max flow (GPM)	Max volume (Acre-Ft)
41C 193833 00	STATEMENT OF CLAIM	1864 10 15	SURFACE WATER	INDIAN CREEK	HEADGATE	YEAR ROUND	33.66	54.75
41C 193832 00	STATEMENT OF CLAIM	1866 04 10	SURFACE WATER	INDIAN CREEK	HEADGATE	YEAR ROUND	112.2	181.48
41C 193834 00	STATEMENT OF CLAIM	1866 04 15	SURFACE WATER	INDIAN CREEK	HEADGATE	YEAR ROUND	33.66	54.75
41C 193830 00	STATEMENT OF CLAIM	1948 04 01	GROUND WATER	SPRING, UNNAMED TRIBUTARY OF INDIAN CREEK	PIPELINE	YEAR ROUND	250	405
41C 193831 00	STATEMENT OF CLAIM	1956 04 01	SURFACE WATER	INDIAN CREEK	HEADGATE	JAN 1- MAY 31, SEP 1- DEC 31	179.52	216
41C 195660 00	STATEMENT OF CLAIM	1982 04 29	GROUND WATER	GROUND WATER	WELL	YEAR ROUND	55	88.96
41C 49701 00	GROUND WATER CERTIFICATE	1983 03 03	GROUND WATER	GROUND WATER	WELL	YEAR ROUND	55	88.7
41C 72317 00	PROVISIONAL PERMIT	1989 08 17	GROUND WATER	GROUND WATER	WELL	YEAR ROUND	775	645

Indian Creek Surface Water Claims

Town of Sheridan senior Indian Creek surface water claims 41C 193833 00, 41C 193832 00, and 41C 193834 00 have priority dates from 1864-1866 and a combined maximum volume of 290.98 Acre-Ft. These three claims are the Town's most senior water rights and are among the most senior surface water rights to Indian Creek (Table 6). Table 6 only shows the most senior water rights to Indian Creek, with priority dates as senior as the Town's three senior claims. Claims junior to this are unlikely to be reliably supplied during much of the irrigation season.

Town of Sheridan Claim 41C 193833 00 shares the earliest priority date on Indian Creek with Claim 41C 39186 00 held by a private irrigator. Indian Creek has limited physical availability of water during much of the year, except for the period of high flow during spring runoff. Continuous flow measurements are not available for Indian Creek and the period when flow is sufficient to supply all three Town of Sheridan senior Indian Creek claims is unknown. It is expected that surface water is available for claims 41C 193833 00, 41C 193832 00, and 41C 193834 00 during the non-irrigation season, but during the irrigation season surface water may be limited such that all three of these Town of Sheridan claims are not supplied.

Table 6. Indian Creek senior surface water rights (Town of Sheridan claims shown in green)

Water right number	Owners	Enforceable priority date	Purpose	Max acres	Max flow (GPM)	Volume (Acre-Ft)
41C 193833 00	SHERIDAN, TOWN OF	1864-10-15	MUNICIPAL	NA	33.66	54.75
41C 39186 00	BRADLEY LIVESTOCK LC	1864-10-15	IRRIGATION	390	529.58	see note 1
41C 193832 00	SHERIDAN, TOWN OF	1866-04-10	MUNICIPAL	NA	112.2	181.48
41C 9252 00	CHARLES V LOGIE; NANNETTE M LOGIE	1866-04-10	IRRIGATION	206	1009.8	see note 1
41C 193834 00	SHERIDAN, TOWN OF	1866-04-15	MUNICIPAL	NA	33.66	54.75
41C 35480 00	JENNIE L EBERLINE; RICHARD D EBERLINE	1866-04-15	STOCK	NA	see note 1	see note 1
41C 35483 00	JENNIE L EBERLINE; RICHARD D EBERLINE	1866-04-15	IRRIGATION	400	529.58	see note 1
41C 39183 00	BRADLEY LIVESTOCK LC	1866-04-15	IRRIGATION	840	561	see note 1
1- Volume limited to historical and beneficial use.						

Town of Sheridan's 1956 junior claim 41C 193831 00 to Indian Creek is not shown in Table 6. That claim has a limited period of use, January 1 - May 31 and September 1 - December 31, and there are many surface water rights held by other water users which are senior. Flows in Indian Creek may be sufficient to supply this junior claim during spring runoff and possibly during the non-irrigation season.

Groundwater Claims

Town of Sheridan has a 1948 groundwater claim 41C 193830 00 to use the Rossiter Spring, with a maximum volume of 405 Acre-Ft. This spring formerly supplied flow to the municipal water supply, regular use of this source ended in 1991 after the current municipal wells were constructed. No recent data is available on the flow rate that can be appropriated from this spring.

Town of Sheridan's 1982 Statement of Claim 41C 195660 00 is for an older well that is not currently in use. That well is referred to as the "Hollensteiner well" in municipal water system reports and in the water right files. The 1982 Statement of Claim for the Hollensteiner well has a volume of 88.96 Acre-Ft. However, that claim is likely invalid because the well should have been filed under the 1962 Groundwater Statute when it was drilled in 1966 but an original Notice of Completion for the well has not been found. The Town filed the 1983 Groundwater Certificate 41C 49701 00 to cover water use from the Hollensteiner well after DNRC placed an issue remark on the 1982 Statement of Claim.

PROVISIONAL PERMIT FOR GROUNDWATER

Provisional Permit 41C 72317 00 is for groundwater pumped by the existing municipal public water wells up to 645 Acre-Ft annually. The Provisional Permit has an August 17, 1989 priority date from when the initial wells were constructed.

GROUND WATER CERTIFICATE

Ground Water Certificate 41C 49701 00 for the Hollensteiner well has a volume of 88.7 Acre-Ft. Available information indicates the Hollensteiner well has not been used for municipal supply since the current municipal groundwater wells were constructed in the 1990s. It is assumed that a replacement well needs to be constructed to exercise this water right.

MUNICIPAL WATER RIGHT SERVICE AREA

The water right service area (place of use) for Town of Sheridan's water rights are shown in Attachment 1. The place of use of Provisional Permit 41C 72317 00 for the current municipal wells is shown in light blue outline on the map in Attachment 1. It roughly follows the town boundary and also includes a small area to the southeast of Bieler Lane which is mostly undeveloped.

The place of use for Statements of Claim to Indian Creek and Rossiter Spring (41C 193833 00, 41C 193832 00, 41C 193834 00, 41C 193831 00, and 41C 193830 00), and the Ground Water Certificate for the Hollensteiner well (41C 49701 00) are shown in the purple outline in

Attachment 1. These older water rights all share the same place of use, which is slightly different than the place of use for the Provisional Permit for the current municipal wells. The place of use for these water rights does not include the area to the southeast of Bieler Lane and instead includes an area east of the town limits which is largely undeveloped.

7. SUMMARY OF EXISTING WATER RIGHTS COMPARED TO FORECAST WATER USE

Town of Sheridan is forecast to need an annual volume of 270.4 Acre-Ft of water in planning year 2075. The annual volume in the water rights for each water source Town of Sheridan holds water rights to are compared to the forecast water use in the following sections.

Indian Creek Surface Water

Senior Statements of Claim to Indian Creek (41C 193833 00, 41C 193832 00, 41C 193834 00) have sufficient volume (290.98 Acre-Ft) for forecast 2075 water use if water is physically available in Indian Creek at all times needed.

Junior Statement of Claim to Indian Creek (41C 193831 00) provides additional 216 Acre-Ft of water which is not forecast to be needed in 2075. Additionally, this claim has a limited period of use and is junior such that it cannot reliably supply water during summertime peak demand.

Rossiter Spring Groundwater

Statement of Claim to Rossiter Spring (41C 193830 00) has sufficient volume (405 Acre-Ft) for forecast 2075 water use if water is physically available in the spring at all times needed.

Groundwater wells

Provisional Permit 41C 72317 00 for the current municipal water supply wells has sufficient volume (645 Acre-Ft) for forecasted 2075 water use. It should be noted that even if DNRC's standard of 250 GPCD were used which would result in a forecasted water use for 2075 of 407.2 Acre-Ft, Provisional Permit 41C 72317 00 would still provide sufficient volume.

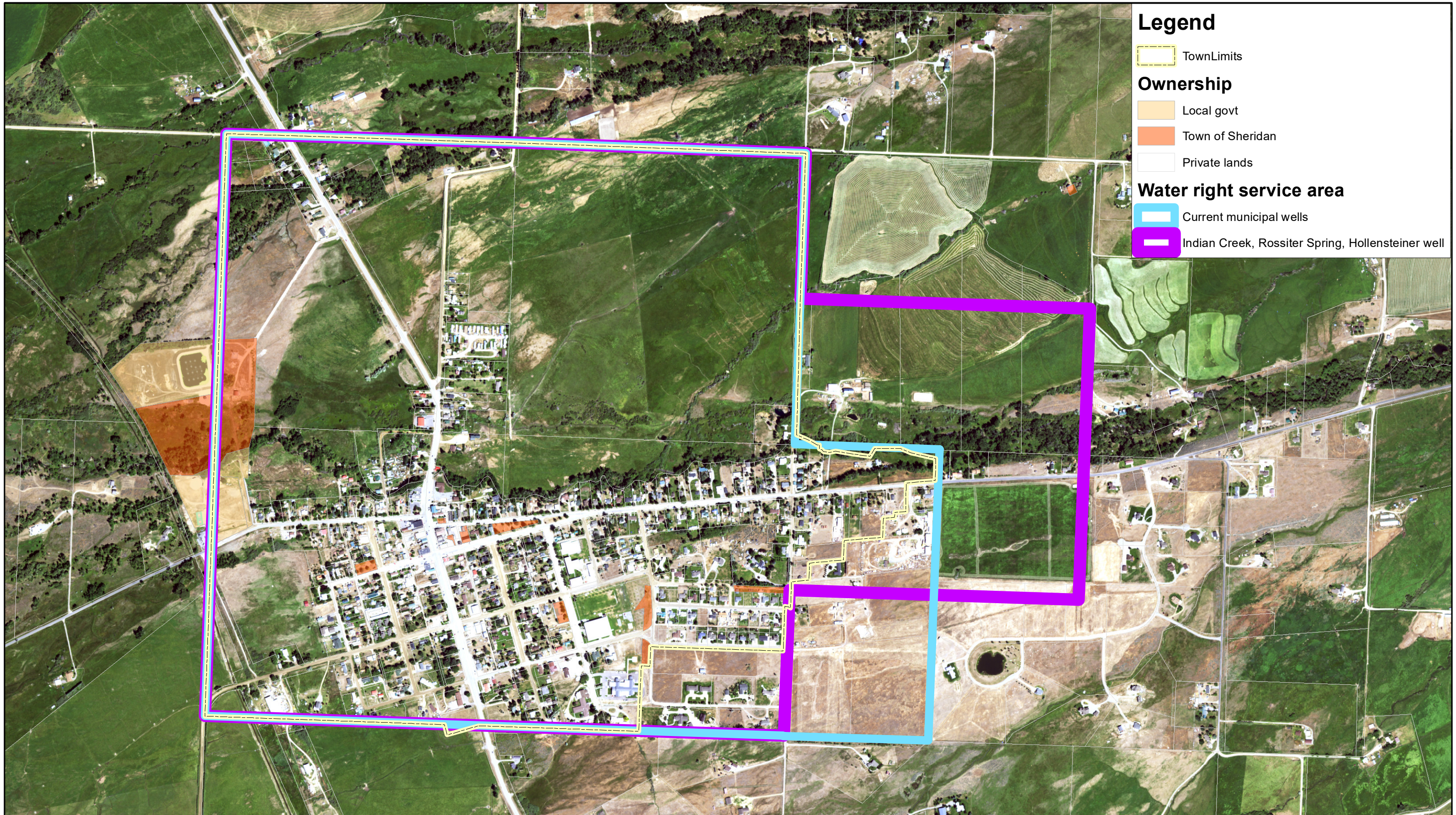
Ground Water Certificate 41C 49701 00 for the Hollensteiner well has a volume of 88.7 Acre-Ft. This water right does not have sufficient volume to provide water for current nor forecast water use but may be used in tandem with other water rights to provide water supply.

Future use of the Town's water rights will depend on the source of water supply that is used, whether groundwater wells, Indian Creek surface water, or the Rossiter Spring. The Town is currently solely using the municipal water supply wells under Provisional Permit 41C 72317 00 because the wells are currently in operable condition and provide a source of supply that does

not require water treatment and disinfection. However, the aquifers tapped by the municipal water supply wells have proven to have limited flow and the current wells do not provide adequate peak flow for current demand.

The Town has already constructed two additional redundant wells to attempt to meet DEQ standards for redundancy for the municipal public water supply and anticipates constructing an additional redundant well in the near future to attempt to meet current demand. It is unknown at this time if the groundwater supply appropriated under the Provisional Permit 41C 72317 00 will meet the forecast 2075 water use or if the Town will need to develop new water supply infrastructure using the Indian Creek surface water or Rossiter Spring either directly from those sources or using those water rights as mitigation for appropriation from another source. It is advised that the Town retain the ability to exercise all of their water rights so that it has flexibility in which source of supply is developed to meet forecast future water use. The senior surface water claims are essential to providing reliable water either directly from those sources or for mitigation.

The water right service area may also determine which municipal water rights are used in the future. The difference in the service areas for the various water rights may allow some flexibility in providing municipal water service to new development.



Legend

TownLimits

Ownership

Local govt

Town of Sheridan

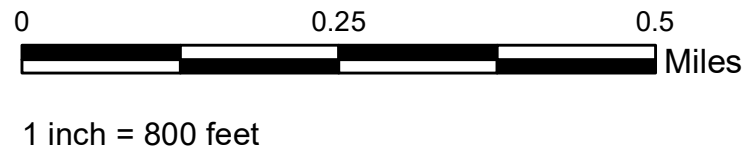
Private lands

Water right service area

Current municipal wells

Indian Creek, Rossiter Spring, Hollensteiner well

**Attachment 1. Town of Sheridan
Water right places of use (service area)**



Designed By: Ian Magruder

Checked by: Scott Payne, PhD

Sheet No.
1

Date: 2/16/2022

Other info: