



Annabella Town

WATER CONSERVATION PLAN

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July 27, 2022

Project #: 2207-053

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1. INTRODUCTION

Annabella is located south of Richfield and was settled in 1871. The name is derived from Ann S. Roberts and Isabella Dalton who were two of the first women to settle in the area.

Annabella Town has both a culinary water system and a secondary water system. The culinary water system provides water for indoor use throughout the entire Town, and outdoor use for approximately 20% of the Town. The secondary water system provides outdoor water for about 80% of the Town residents. The culinary system was last upgraded in 2020. The culinary water improvement project consisted of modifying and upgrading the piping, valving, pumps, and related equipment in the two well houses, installing SCADA system, installing 1,100 linear feet of 8" culinary water pipe to replace aged and undersized pipes, a new PRV vault, service connections, replacing and relocating 335 culinary water meters and related work.

The secondary system was installed in 1992 with no major upgrades or projects since that time.

2. EXISTING WATER RESOURCES

The Town's existing water system consists of the following:

2.1.1. WATER RIGHTS

Annabella Town obtains culinary water from two underground wells and three springs. The water rights were investigated and summarized to determine if the Town has adequate water right capacity for existing and future use. Annabella Town's existing Municipal water rights are shown in Table 2-1: Culinary Water Rights Summary.

In 1996 the Town purchased an underground water right for a well, water right No. 63- 4164 for 1.28 cfs limited to 54.75 acre feet per year.

Table 2-1: Culinary Water Rights Summary

Water Right No.	Source	Diversion Type	Peak Flow (gpm)	Diversion Limit (ac-ft)
63-14	Spring and Well	Surface/Underground	448.8	723.98
61-4164	Well	Underground	572.22	36.5
63-635	Well	Underground	-	18
Total Flow			1,021.02	796.73

Annabella Town obtains water for irrigation from several watersheds south of the Town in addition to the existing culinary wells and springs. The water rights were investigated and summarized to determine

if the Town has adequate water right capacity for existing irrigation demands and future needs. Annabella Town’s existing irrigation and stock water rights are shown in Table 2-2: Secondary Water Rights.

Table 2-2: Secondary Water Rights

Water Right No.	Source	Diversion Type	Peak Flow (cfs)	Diversion Limit (ac-ft)
63-4359	Underground	Irrigation	0.033	3
61-2103	Surface	Irrigation	-	36.5
63-2002	Underground	Irrigation	0.015	-
63-1850	Surface	Irrigation; Stockwater	158.9	800
63-693	Underground	Irrigation; Stockwater	0.022	7.06
Total Flow			158.97	846.56

2.1.2. SOURCE

The Annabella water system has three springs and two culinary wells that provide water to the culinary water system. The spring transmission line is connected to both the upper and lower tanks in the system and through a flow control valve is able to divert water to each tank. The spring first fills the lower tank then, once full, switches to the upper tank. When both tanks are full, the water is then diverted into the Annabella PI pond (PI pond) for pressurized irrigation use. The 600 South Well is dedicated to the upper tank and pressure zone and the 300 South Well is dedicated to the lower tank and pressure zone.

Historically Annabella has relied on Red Butte spring and the Town well for its culinary supply. Irrigation water comes from Annabella & Deep Lake Reservoir’s as well as Red Butte and Cottonwood Creeks.

Table 2-3 Current Source Capacities – Culinary

Source	Capacity (gpm)
600 South Well	600
300 South Well	800
Spring	135
Total Culinary Source	1,535

Both wells were re-equipped with new pumps and pump controls that included variable frequency drives in the 2020 project. The 300 South Well has the capability to pump to the Annabella PI pond to supplement secondary flows on short water years.

A major improvement was made in 1992 with the installation of a pressure irrigation system. This system conserves water and has reduced the demand on the culinary water system.

Secondary irrigation water is obtained primarily from Annabella Reservoir, Deep Lake, and Duck Lake on Cove Mountain. These lakes collect spring runoff and store the water for use in the summer months. Flows are controlled by outlet works at each reservoir and releases are matched to secondary irrigation demands. Available water varies from year to year and depends on annual snowpack and other precipitation. The Town also has direct flow rights from Red Butte and Cottonwood Creeks of 0.75 cfs. Due to the small size of these watersheds, water is typically only available for a short period each spring.

Table 2-4: Current Source Capacities – Culinary

Source	Capacity (gpm)
Annabella Reservoir/ Deep Lake/ Duck Lake	158.9
Red Butte and Cottonwood Creeks	0.75
Total Culinary Source	159.65

2.1.3. STORAGE

The Annabella Town culinary water system currently has two concrete tanks for storage. One tank is located at an elevation of 5,500 feet and the other is located at 5,450 feet. Each tank serves their respective pressure zones in town. Table 2-5: Current Storage Capacities – Culinary shows the storage capacity of each tank.

Table 2-5: Current Storage Capacities – Culinary

Tank	Capacity (gallons)	Elevation
Upper	500,000	5500
Lower	250,000	5450
Total Storage	750,000	

Table 2-6: Current Source Capacities – Secondary includes the storage capacity for the secondary water reservoirs. These volumes are dependent on the snowpack and can vary year-to-year.

Table 2-6: Current Source Capacities – Secondary

Source	Capacity (Acre-ft)	Elevation
Annabella Reservoir/ Deep Lake/ Duck Lake	800	
Annabella PI Pond	10	5487
Total Storage	810	

2.1.4. EXISTING DISTRIBUTION SYSTEM

Annabella Town services many of the existing culinary connections with the secondary water system, which substantially reduces the peak day demand on the culinary water system.

The existing culinary distribution system consists of piping that is 12-inches in diameter and smaller. The majority of the pipelines are PVC, except for the 4-inch ductile iron pipeline that conveys water from the

springs to the tanks. In addition, there are 66 hydrants and approximately 140 valves in the system. There are currently two pressure zones in the water system. In the 2020 project, the two pressure zones were connected through the installation of a pressure reducing valve (PRV) which allows water from the upper pressure zone to supplement flows in the lower pressure zone during times of high demand in the lower pressure zone.

There are certain locations outside of the municipal boundary that they do not provide with full level of service for. While these areas are serviced with Annabella’s culinary water, fire flow is not provided.

The existing irrigation system consists of piping that is 12-inches in diameter and smaller. The distribution system typically provides more than adequate pressure throughout the system.

3. CURRENT WATER USE/WATER MANAGEMENT ISSUES AND GOALS

NOTES: This section includes the historical patterns of water delivery and use by the water utility. Future water needs and infrastructure requirements based on growth projections should be identified. Comparison of current water supplies and future projections will reveal if and when additional supplies will be needed. List past water conservation measures as well as opportunities for improving the efficient water use. Indicate any opportunities to coordinate with other companies to develop and implement management conservation measures. List short and long term goals for efficient water use. Identify potential use of any water gained from reductions in use due to the implementation of the water conservation plan. The current and possible future water rates should be discussed in detail.

3.1. CURRENT WATER USE

In 2021, Annabella diverted 121.75 acre-ft of water through their culinary sources and 169.23 acre-ft through their secondary sources. Individual source flow data is not readily available. Table 3-1: Historical Water Usage shows the water use records for the last 10 years for both culinary and secondary sources.

Table 3-1: Historical Water Usage

Year	Culinary (acre-ft)	Secondary (acre-ft)	Total Usage (acre-ft)
2021	121.75	169.23	290.98
2020	176.88	118.22	295.1
2019	110.66	43.41	154.07
2018	115.01	104.21	219.22
2017	122.31	56.75	179.06
2016	113.28	not reported	N/A
2015	113.34	not reported	N/A
2014	113.76	not reported	N/A
2013	120.40	not reported	N/A
2012	113.38	not reported	N/A
2011	102.98	not reported	N/A
Average Annual Usage	120.34	98.36	227.69

3.2. CURRENT WATER RATE

Annabella’s water rates are tiered to promote water conservation. Higher water rates correspond with higher water usage (see Table 3-2: Monthly Use Rates).

Table 3-2: Monthly Use Rates

Base Rate	\$35.97 (2% increase annually)	10,000
1st Overage	\$1.25 per 1,000 gallons	10,000-20,000
2nd Overage	\$1.50 per 1,000 gallons	20,000-35,000
3rd Overage	\$1.75 per 1,000 gallons	35,000-50,000
4th Overage	\$2.25 per 1,000 gallons	50,000+

Currently the Town does not meter individual secondary water use, so a standard monthly assessment is used based on the size of the lot. See Table 3-3: Secondary Fee Schedule for details.

Table 3-3: Secondary Fee Schedule

Lot Size (acres)	Monthly Assessment
0.5 to 0.99	\$17.00
1.00 to 2.99	\$19.00
3.00 +	\$25

3.3. GROWTH PROJECTIONS

Historic population growth rates were calculated from Census data and the community’s water connection data. The Census data shows that in the years 2000 and 2010 there was a population of 603 and 795, respectively. These populations yield an average annual growth rate of 2.80%. The community data shows that from 2014 to 2018 the culinary water service connections increased from 296 to 312, respectively. These service connections yield an average annual growth rate of 1.23%.

The Utah Governor’s Office of Management and Budget (GOMB) produces their own growth projections based on Census data. This data predicts that over a 30 year period the average annual growth rate of Annabella will be approximately 0.77%. This data is shown in Table 3-4: Annabella Town Population Projections.

Table 3-4: Annabella Town Population Projections

Year ->	2010	2015	2020	2025	2030	2035	2040	2045	2050	Average Annual Growth Rate
Community	795	845	898	955	1,015	1,078	1,146	1,218	1,295	1.23%
GOMB	795	825	855	893	930	964	999	1,039	1,079	0.77%
Census	795	913	1048	1,203	1,382	1,587	1,822	2,092	2,402	2.80%

The data from Table 3-4: Annabella Town Population Projections was plotted on a graph to better visualize the growth rates and is shown in Figure 1: Growth Projections. The Census data has a higher growth rate than both the community data and the GOMB data. So as not to be overly conservative and considering that the community data is the most accurate, the community data was selected for use in all the growth projections of this study.

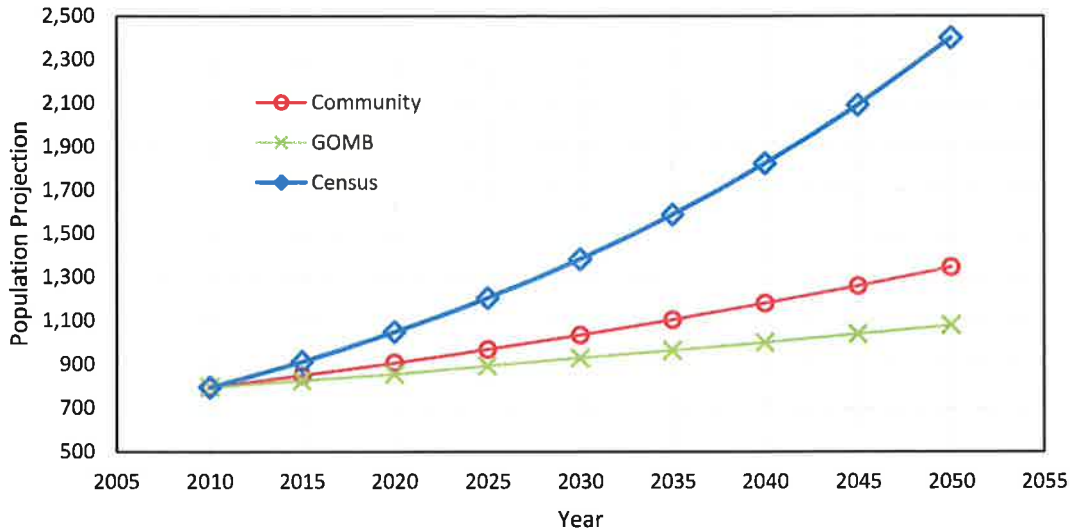


Figure 1: Growth Projections

3.4. SHORT TERM WATER MANAGEMENT GOALS

The following is a list of short term water management goals:

- Install meters on all secondary taps
- Record actual water usage for each tap
- Restructure secondary rates to include tiered rate structure to promote water conservation
- Redeveloped springs to ensure clean and sustainable water source
- Public education to the need to conserve water

3.5. LONG TERM WATER MANAGEMENT GOALS

- Purchase additional water rights as they come available
- Drill new well to create new upper pressure zone
- Public education to the need to conserve water

4. IDENTIFICATION OF ALTERNATIVES TO MEET FUTURE WATER NEEDS

4.1. WATER RIGHTS

The Town owns enough culinary water rights to meet the demands through the 30-year planning period, however, some of the water rights are not accessible to the existing water systems. Because the Town has a secondary irrigation system that services approximately 75% of the system, the required culinary water rights are lower than what is typically seen in a Town the size of Annabella.

4.2. SOURCE

The Town currently has enough source capacity to meet the projected culinary and secondary demands of the 30-year planning period assuming all pumps are operating at full capacity.

The Town plans to redevelop Red Butte spring to provide a long-term sustainable water source. Recent issues with high nitrate levels in the 300 South well has prompted discussions and drilling a new well to replace this well for culinary use, allowing the 300 South well to be dedicated to the secondary water system to supplement flows in the summer.

4.3. STORAGE

The town currently has enough storage capacity to meet the projected demands of the system. If a new well is drilled, a new tank could be constructed at a higher elevation allowing for the creation of a new pressure zone and allowing better service to existing homes at the top of town, and also opening the door for additional houses to be built in that area.

4.4. DISTRIBUTION

The culinary system has been recently upgraded and improved in the 2020 project, which fixed deficiencies in town. The spring transmission line is failing and should be replaced in the near future.

5. EVALUATION AND SELECTION OF ALTERNATIVES

The public has been involved through public meetings and involvement of all water related projects and improvement.

The Town Council will reevaluate the trends and performance of the water system the first council meeting in February of each year. Any water conservation measures deemed appropriate will be discussed during this time. The culinary and secondary water masterplans will be reevaluated at a minimum of every 5 years to ensure that the town is still operating within the recommendations from the 2018 masterplan. When updates are required, engineering services will be solicited and procured to provide technical assistance. Masterplan updates will utilize current and applicable rules and regulations from DDW, UDWRi, IFC, and other best-practice references.

6. ASSOCIATED PLANS – EMERGENCY RESPONSE

6.1.1. EMERGENCY RESPONSE PLAN HAZARDOUS WASTE SPILLS

Contact essential health and safety officials, i.e., Sever County Sheriff's Department, U.S. Forest Service, BLM, etc. Contact the District Engineer with the Utah Department of Environmental Quality Work with authorities as necessary to expedite containing and cleaning up spill.

6.1.2. EARTHQUAKES

Attempt to locate waterline breaks. Mobilize forces to make repairs. Evaluate extent of possible contamination, sample as necessary. Institute a "boil order" if needed.

6.1.3. RATIONING PLAN

Should water supplies become less than necessary for municipal use, for whatever reasons, the Annabella Water Department may be required to ration water in order to sustain critical supplies. It is assumed that conditions requiring rationing will be short term. The main objective during periods of low water supplies is to maintain sufficient quantities for basic hygiene and culinary needs. The first 3 items are planning items to prepare for possible rationing. The last 3 items are actions that the Water Department may be forced to take based upon the severity of the water shortage.

- Evaluate source capacity and establish action level for implementation of rationing.
- Develop multiple scenarios with estimates on duration of rationing, based on various low flow quantities and the number of active and future water connections.
- Notify the public as to possible rationing.
- Request voluntary reduction of outside watering.
- Implement mandatory outside watering schedule.
- Implement additional mandatory water use reduction measures.

6.1.4. WATER SUPPLY DECONTAMINATION PLAN

The following items constitute a plan for dealing with water supply contamination within Annabella Town's water system. The plan will be administered by the Annabella Town Council, and implemented by the Annabella Town Water Department, under the direction of the waterworks Superintendent. Basically, the Town will follow the State Drinking Water Rules concerning Monitoring, Reporting, and Public Notification as per Section R309-104. If continued monitoring shows a contaminant to be persistent over time, methods for eliminating the contaminant will be reviewed. The review will include available options, relative effectiveness as well as ease and cost of implementation of options. Should all available treatment alternatives prove ineffective or cost prohibitive, abandonment of the source may be the only responsible course of action.

7. LIST OF COMPANY OFFICERS

Mayor: Brent Christensen

Town Council: Jill Anderson
Ken Blackburn
Hayven Dunn
Kelvin Johns

I, Brent Christensen, presiding Mayor of the Town of Annabella, hereby certify that the attached Water Conservation plan has been established and adopted by our Town Council members on Sept. 8, 2022, 2022.

Brent Christensen

Brent Christensen, Mayor



ATTEST:

Tina Mitchell

Tina Mitchell, Clerk