Ballard Water and Sewer Improvement District

Water Master Plan

3.15.22

Prepared by CRS Engineers + Jones & DeMille Engineering
2028 West 500 North | Vernal, Utah 84078
O. 435.781.2550 | F. 435.781.2950

This Page is left blank intentionally

CONTENTS

List of Figures

List of Tables

Executive Summary

In 2021, Ballard Water & Sewer Improvement District (BWSID) contracted with the team of CRS Engineers and Jones and Demille Engineering to update their culinary water master plan. The plan includes an analysis of the existing water system, uses of the water, and potential capital improvements. The following report provides the professional opinion of the team on methods BWSID may use to provide the best service to its customers both in the immediate future and in the long term (5-20 years). This plan is intended to be a living document that may be updated as improvement to the water system are realized.

How This Plan Should Be Used

This plan is meant to provide background information necessary to understand the BWID water system. This information can be used to inform decision makers about the ongoing operation and maintenance of the system as well as guiding future decisions as the system develops and grows.

Existing System Description

BWSID was formed in 1959 to provide water and sewer service to residents who were outside of the Roosevelt City boundary. Ballard City was established in 1976 and is the main customer of the water district. The district also serves customers outside of the Ballard City boundary. The Ute Tribe Domestic Water System (UTDWS) is used as the primary source of water in the district and continues to provide water to Ballard City and the surrounding area.

Water Use Characterization

Water use within the BWSID system follows similar patterns to other systems in the same region. Culinary water is stored in tanks and withdrawn for domestic use, fire control, and residential irrigation.

System Analysis

The BSWID system was analyzed using hydraulic modeling software (Bently WaterCAD). Additionally, use and water production data was studied in depth by professionals and the data was presented in this plan as a quick reference to the district patterns.

Operations & Maintenance and Water Quality

BWSID purchases treated water from UTDWS and as such has no treatment facility of their own. As part of this plan, and currently in process is a second source of culinary water through Roosevelt City.

Capital Improvement Plan

The capital improvement plan was developed based on the system analysis as well as several discussions with the water district board and maintenance team. This part of the plan will be updated frequently as specific needs arise.

1. Existing System Description

1.1. Introduction

In 1959 the Ballard Water & Sewer Improvement District (BWSID) was formed to provide water and sewer services to the area known as Ballard. The District currently obtains treated water from the Ute Tribe Domestic Water System (UTDWS). The UTDWS is the only supplier of water to the BWSID at the time of this writing. The water source for the system comes from Uriah Heap Springs and is treated before entering the BWSID system.

A water master plan was published in 2001 to describe the district's system and to meet projected demands. In 2011 a second master plan was created to update and model the system at the time.

The goal of this plan is to describe the current system and discuss future system development. One key feature this plan introduces is the use of a geographical information system (GIS) database to aid in mapping, maintenance and analysis of the system.

The information presented in this report is subject to the quality of the information currently available. The water system master plan consolidates the system information from different sources. The Main sources of information were:

- BWSID's GIS database (developed as part of this master plan)
- BWSID's 2011 Water System Master Plan
- BWSID's 2020 hydraulic model network (as compiled by CRS Engineers)
- Infrastructure information provided by BWSID Staff
- Water use data provided by BWSID

1.2. Water Department Organization

BWSID operates under the direction of the Ballard Water & Sewer Improvement District's board. The board is publicly elected independently from the City of Ballard. The Water District currently has 4 staff members that double as Ballard City employees. The organization of the division is shown in

Figure 1.

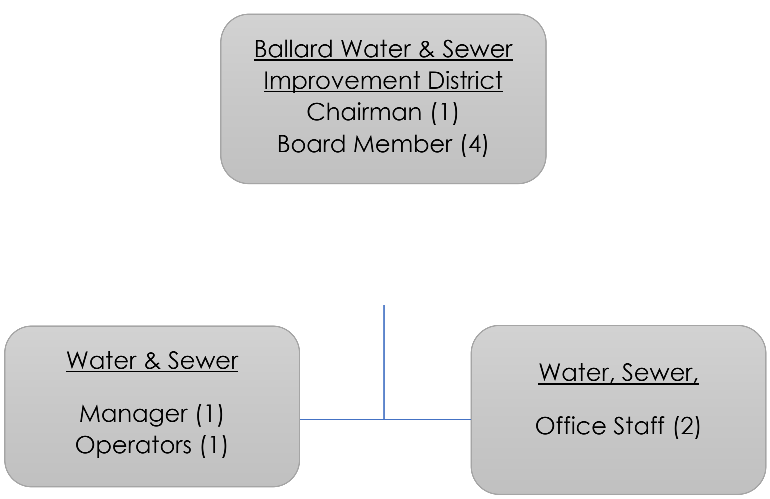


Figure 1: Water Division Organizational Chart

1.3. Historic Water Master Plans

<u>2001 Water Master Plan</u>

In response to a growing population, a Ballard City Water Master Plan was completed in 2001 by Sunrise Engineering Inc. under the authority of the Ballard Water Improvement District or BWID (later known as the Ballard Water and Sewer Improvement district). The objective of the plan was to evaluate the existing BWID water system. The plan also addressed the anticipated population growth based on the previous decade of population data.

Population projections were analyzed and evaluated. They indicated that by the year 2020 the population of Ballard City would be more than 1,269. By comparison, the actual population of Ballard City in the year 2000 was 1,155. System-wide connections in 1999 were reported at 292, and the projected connections for the year 2020 were 457. By the year 2020 system connections were 480, which is significantly higher than were projected.

The primary source of water for BWID was Uriah Heap Spring by means of the Ute Indian Tribe. The spring water entered 8" pipes which carried the water to the 75,000-gallon and the 200,000-gallon tanks. From the tanks, the water was distributed through the system.

The system storage capacity was 275,000 gallons in the following tanks:

Hilltop Tank	200,000 gallons
75k Tank	75,000 gallons

There was a concerted effort in 2001 to project population figures and put in place a water system to support the population growth projected for 2020. Ballard City made prudent investments in primary distribution and storage facilities based on the 2001 evaluation, including a 500,000-gallon storage tank near Montes Creek as well as pipe replacement projects.

<u>2011 Ballard Water Improvement District Water System Master Plan</u>

In 2011, the BWID Water Master Plan was updated by Engineering Services LLC. Population projections were analyzed, and demands were projected 50 years to the year 2061. The 2011 report indicated that by the year 2016, the number of water meter connections would be 426. By comparison, the actual number of water meter connections in Ballard City in the year 2016 was 446. Additionally, the report projected by the year 2061, there would be 1,588 connections.

Based upon an analysis of the 2011 system, all 4-inch transite pipe was replaced in the system. A computer model of the proposed system, including storage, connections, and pressure reduction stations yielded pipe sizes and system characteristics needed to meet the projected 2061 demands. A priority list of each improvement was developed and published in the 2011 evaluation to guide local funding and construction decisions.

By the 2011 Master Plan the district increased their storage to 700,000 gallons. Based on the recommendation of the 2011 Master Plan a 1-million-gallon tank was built in 2019 and replaced the 200,000-gallon Hilltop tank to increase the storage to accommodate the 1,080,000-gallon fire suppression requirement.

1.4. Existing System

All water for BWSID is treated and supplied by the UTDWS. The Tribe treats the water that is sold to BWSID. The existing system consists of 2 tanks, 5 pressure reducing valves, 5 air vacuum reliefs throughout the system, 480 connections, and a network of pipes from 2 to 12 inches in diameter.

Figure 2 shows the basic layout and features of the system. The schematic that is part of this figure shows features that affect the hydraulics of the system and indicates how those features are connected and their relative elevations.

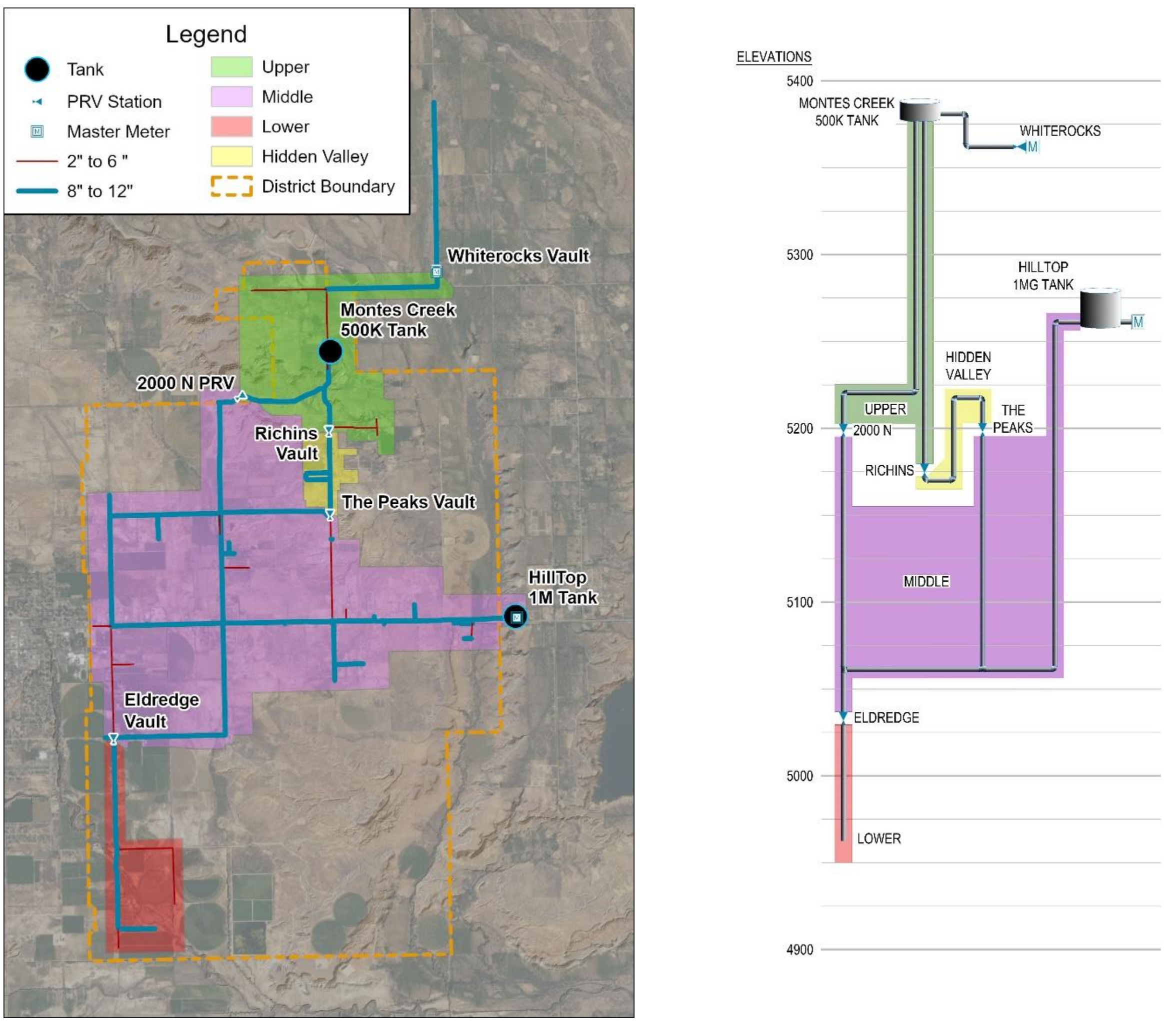


Figure 2: Water System Overview

1.4.1 Existing Supply

BWSID has an agreement with the Ute Indian Tribe wherein the Tribe agrees to deliver treated water at two locations. The agreement is valid through March 4, 2029. The tribe and BWSID have worked well together with this agreement. We recommend the process of renewing the agreement be started soon so the renewal takes place before the timeline runs out.

The treated water from the Tribe currently enters the Ballard system at two locations, at the Whiterocks Meter Vault (4500 East 3000 North) at the Hilltop Tank meter vault on U.S. Highway 191. The source of the raw water treated by the Tribe is Uriah Heap Springs.

Historically the Tribe has limited the water supply in time of drought. When supply is reduced, the residents in the North part of the system experience more frequent low pressure.

Utah Division of Drinking Water Rules R309-510-7(1) requires a water system to be able to both legally and physically meet the peak day demand, and the average yearly demand. Data over the past several years from Ballard City's operations shows the peak day demand to be 430,000 gallons per day and the average yearly demand to be 566 gallons per connection. The system operations under these conditions have been mostly satisfactory, showing the current system able to meet its demands.

BWSID currently relies on a single water source. It should be noted that in 2021 BWSID entered into an agreement with Roosevelt City wherein Roosevelt will provide water to the District as it has excess available. The district also has a similar agreement with the Johnson Water Improvement District. At the time of this report, a physical connection has not been made with either of those alternative sources.

It would serve the District well to continue to seek alternative sources for projected long term demands beyond 20 years. Other possible sources for additional water include a connection to the Victory Pipeline or drilling a well and purchasing water rights to become an independent source of water. The District should also begin the process of renewing their agreement with the UTDWS.

1.4.2 Existing Storage

BSWID has constructed two storage tanks, the Hilltop Tank at approximately 5100 E Highway 40, and the Montes Creek tank at 2500 N 3500 E. The Hilltop Tank is a post tensioned concrete tank. The Montes Creek tank is a regular reinforced concrete tank.

The Montes Creek tank receives water at the north end of the system from the Whiterocks Vault. The tank distributes water to the portions of the Upper zone, the Hidden Valley, Middle, and Lower pressure zones. There is a portion of the upper zone that relies solely on the storage provided by the Tribe outside of the system boundary.

The Hilltop Tank receives water from east of the system. The tank collects the water and distributes it to the Middle and Lower zones.

Ballard Water and Sewer Improvement District water system storage tanks have the following capacities:

Hilltop Tank	1,000,000 gallons
Montes Creek Tank	500,000 gallons
Total Owned Storage	1,500,000 gallons

1.4.3 Existing Distribution

BWSID has been very proactive in upgrading their piping system which has over 25 miles of waterline installed. There are currently 19.0 square miles in the District's service area. Elevations within City boundaries range from 4,950 feet to 5,450 feet above mean sea level.

The existing BWSID water distribution system is shown in Figure 2. Starting on the north end of the system, a transmission line from the UTDWS conveys water to the Whiterocks Vault where the water is metered and enters the BWSID system. From the point of entry, the water is conveyed to the Northernmost area of the system or the Upper Pressure Zone and into the Montes Creek tank. There are connections upstream of the Montes Creek tank that receive water directly from the Whiterocks vault and are subjected to the pressures provided by the Pressure Reducing Valve (PRV) in that vault.

From the Montes Creek tank, the water enters the remainder of the Upper pressure zone. The water from the upper pressure zone passes through two PRVs into the Hidden Valley Zone and the Middle zone. The Richens Vault controls pressure entering is conveyed to the Hidden Valley Zone to the Peaks Vault into the Middle zone. The water conveyed through the 2000 N PRV passes directly to the Middle zone. From the Middle zone the water passes to the Eldredge Vault into the Lower zone.

From the east of the system, a transmission line fills the Hilltop Tank. From the Hilltop Tank, 8-inch and 10-inch transmission pipelines convey the water through the Highway 40 corridor where the water is then distributed through the Middle and lower zones. Table 1 shows the pipe lengths by material type and pipe diameter.

Table 1: Pipe Inventory Lengths

Diameter [in]	PVC [ft]	Cast Iron [ft]	HDPE [ft]	All Materials [ft]	All Materials [mi]
2	2,099	818		2,917	0.6
3	5,314	-		5,314	1.0
4	983	-		983	0.2
6	23,778	-		23,778	4.5
8	77,661	367		78,028	14.8
10	22,526	-	6,145	22,526	4.3
12	1,354	-		1,354	0.3
All Diameters	**133,715**	**1,185**	**6,145**	**134,900**	**25.5**

The distribution piping is primarily PVC ranging in size from 2" to 12", with cast iron segments of 2" and 8" pipe remaining in isolated areas. BWID has replaced many pipelines within the past twenty years; however, the distribution system is still in need of larger diameter pipe in some areas. State regulations require that all new pipe be 8" diameter or larger.

The Utah Division of Drinking Water Rule R309-550-5(4) specifies that water mains with fire hydrants must be at least 8" in diameter unless a hydraulic model shows a 6" diameter pipe will meet fire flow and pressure requirements. BWSID has upgraded much of the distribution system to 8" PVC lines since the first Evaluation was published. Future maintenance and upgrades of lines will ensure the system will be adequate to meet demands over the next 20 years. Figure 3 shows the distribution system in further detail.

1.4.4 Control Valves and Meters

There are 5 pressure reducing valves (PRVs) and 3 air/vacuum (AV) valve locations in the distribution system. The system has 480 customer meters reported in 2020 to the DWRi. There are 2 master meters the City relies on to measure flow, one located at the Whiterocks vault and one at by the Hilltop tank.

Table 2: PRV Sizes

Vault Name	Approximate Location	Main Valve Size [in]	Bypass Valve Size [in]	Pressure In [psi]	Pressure Out [psi]
White Rocks Vault	3000 N 4500 E	10	4	122	98
2000 N Vault	2500 E 2000 N	8	4	78	30
Richins Vault	1750N 3500 E	8	4	88	76
The Peaks Vault	1000 N 3500 E	8	4	66	30
Eldredge Vault	1000 S 1500 E	8	4	102	73

1.4.5 Water Rights

As 2021, BWSID does not have any water rights that belong to the district. Water rights are further discussed in section 3.3 of this report.

1.4.5 SCADA and monitoring Systems

To monitor the system the Supervisory Control and Data Acquisition (SCADA) system is in place. The SCADA system monitors the pressures at the five PRVs and the water elevation at both tanks. The real-time data provided through the SCADA system assists the manager in making maintenance decisions and sends warnings when a problem occurs.

1.5. Summary

The water system serves the population within the District boundary. In 2020 the District supplied 82,737,640 gallons of water to 480 customer accounts. BWSID operates and maintains over 25.5 miles of water pipes, 2 storage tanks, and 5 PRVs. The infrastructure supplies water across the four pressure zones within Ballard City.

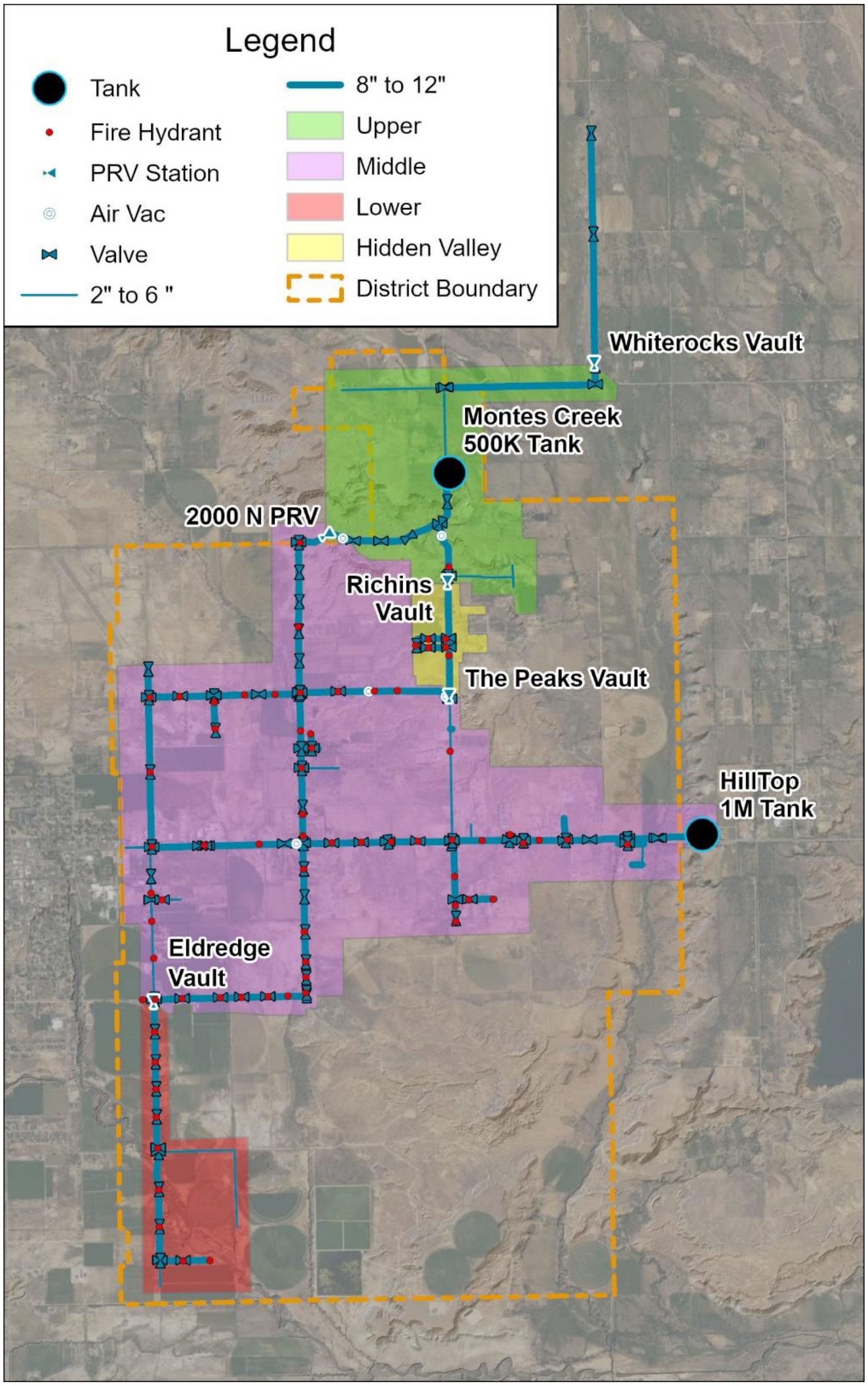


Figure 3: Distribution System

2. Water Use Characterization

2.1. Introduction

The evaluation of water requirements under existing and future conditions involves the analysis of land use, population growth and historical water production for Ballard. This section presents current population and water production information and uses it in conjunction with future population to calculate future water system demands.

2.2. Existing Water Use

2.2.1 Historical Water Production

Demand on the existing system for the years 2010-2020 based on meter readings is shown in Table 3. Figure 4 shows monthly water use from 2010-2020 within the District.

Table 3: Ballard City Water System Historic Water Use

Year	2010	2011	2012	2013*	2014**	2015	2016	2017	2018	2019	2020	Average
Connections	365	372	449	436	489	448	446	476	473	479	480	447
Use [ac-ft]	245.6	213.3	255.2	380.1	301.3	295.9	311.0	341.6	282.2	230.2	252.9	282.7
Use [ac-ft/con]	0.67	0.57	0.57	0.87	0.62	0.66	0.70	0.72	0.60	0.48	0.53	0.63
Month	**Flow [Gallons/Day/Connection]**											
January	369	276	242	250	916	232	259	245	280	260	219	323
February	304	370	226	283	272	384	1,174	233	321	286	438	390
March	276	298	225	249	157	264	236	203	287	192	462	259
April	485	472	544	349	550	415	341	357	431	248	572	433
May	546	479	621	542	585	496	495	549	628	525	574	549
June	772	718	809	992	705	669	804	714	988	695	620	771
July	846	784	980	927	1,361	766	1,603	959	970	763	690	968
August	1,750	890	739	1,363	653	1,083	966	1,345	936	717	688	1,012
September	675	690	828	3,512	488	709	658	767	777	625	536	933
October	565	585	333	355	347	1,201	354	443	348	382	405	483
November	311	315	295	304	280	343	317	917	225	244	265	347
December	276	258	233	231	254	487	306	922	190	201	176	321
									Nine-year average daily demand			566

*The DWRi report for 2013 is not available. All values for this year come from metered data received from the District.

**The DWRi report for 2014 does not report water use. Use and Flow values for this year come from meter data received from the District.

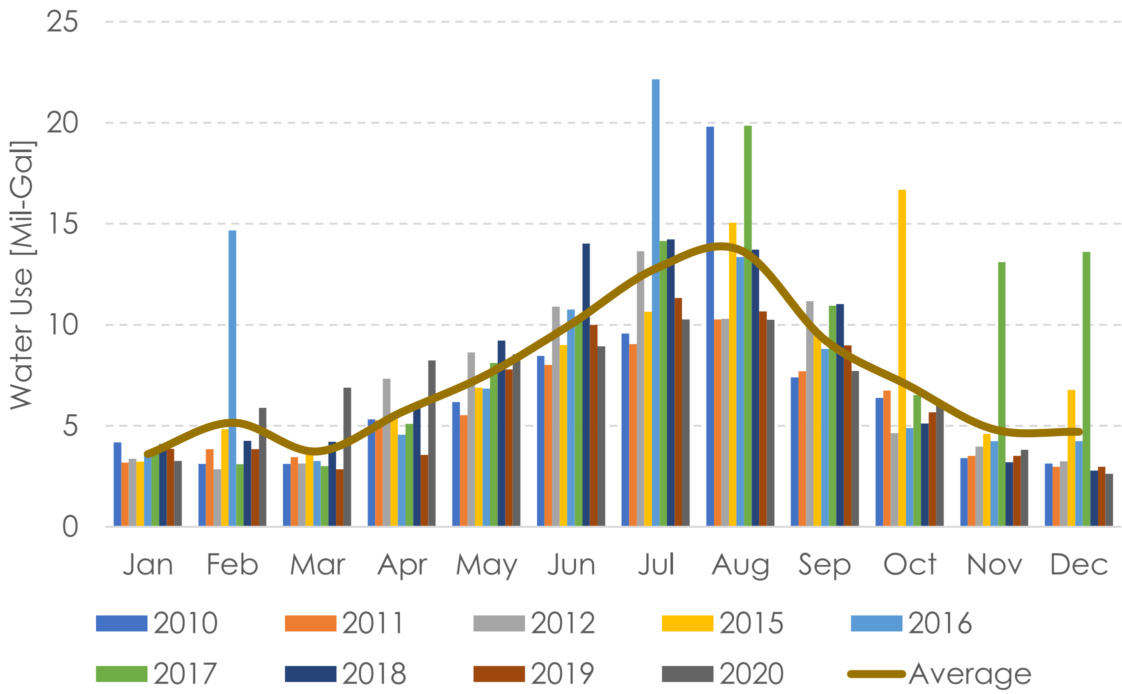


Figure 4: Average Historical Water Use by Month. Bottom graph shows individual years.

2.2.2 Seasonal Variations and Peaking Factors

Water use in the BWSID water system follows a similar pattern to other water systems in the region. Water use is lower during cooler months and higher during warmer months due to irrigation and other outdoor use. Peak water use typically occurs during the months of July and August.

2.2.3 Billing Records

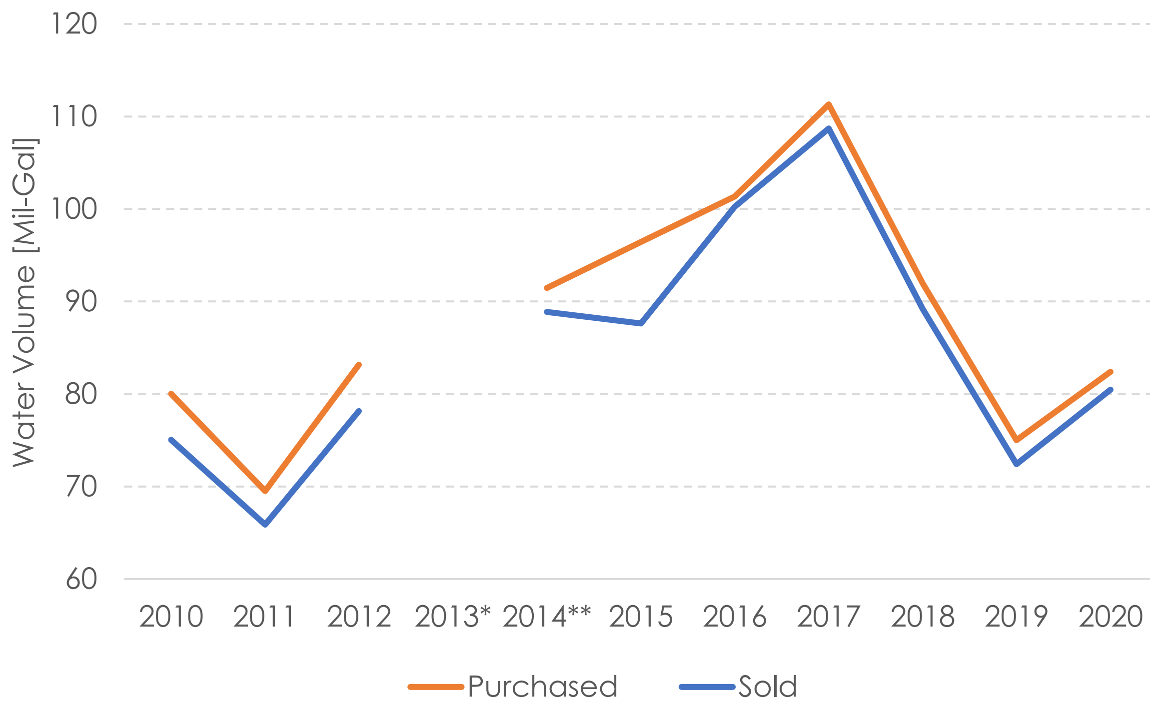
Water use data by meter for January of 2010 through August of 2021 was received from BWSID for use in creating this master plan. This data reports water-use per service meter for each month, providing a useful measure of water use.

2.2.4 Non-Revenue Water

A major concern for water systems is non-revenue water. Non-revenue water is the difference between the water flowing into the system and the water flowing out of the system that is metered. In other words, non-revenue water is water sold subtracted from water purchased. For 2020, non-revenue water was reported as 2.38%.

*The DWRi report for 2013 is not available. All values for this year come from metered data received from the District.
**The DWRi report for 2014 does not report water use. Use and Flow values for this year come from meter data received from the District.

Figure 5 illustrates non-revenue water. Non-revenue water can be attributed to leaks in the system or inaccuracy in measurements. It should be noted that data reported to the DWRi was not available for 2013 as the District switched out existing meters for radio read technology.



*The DWRi report for 2013 is not available. All values for this year come from metered data received from the District.
**The DWRi report for 2014 does not report water use. Use and Flow values for this year come from meter data received from the District.

Figure 5: Non-Revenue Water

2.3. Service Area

2.3.1 Existing Service Area

The existing system provides service to approximately 480 active connections within the service area. The Estimated Residential Connections (ERC) for the district was 550. The population of approximately 1,155 is distributed primarily in residential and agricultural areas with commercial and industrial areas along Highway 40 through Ballard. Some of the residential users have secondary irrigation systems or private wells for watering gardens and landscaping, reducing the required demand.

The average annual daily demand over the eleven-year period averages 566 gallons per day per connection. The average annual use in acre-feet per connection is 0.63. The peak month demand was 1,750 gallons per day per connection in August of 2010.

Compliance with the Utah Division of Drinking Water requires an analysis of the peak monthly demand, peak daily demand, and peak instantaneous demand. See the Hydraulic Modeling section (3.5) for an explanation of how these demands were obtained. *Table 4* summarizes the current demands. The 2020 reported Peak Day Demand is 0.43 million gallons per day (MGD). The existing system was analyzed to determine if elements (pipes, valves, pressure reducing valves, etc.) within the system have the capacity to accommodate current demand based on the connections.

Table 4: Demand Summary from 2020 BWSID Water System

	gal/day/ERC	gal/min/ERC
Peak Monthly Demand	602	0.42
Peak Daily Demand	782	0.54
Peak Instantaneous Demand*	938	0.65
	Acre-ft	**Acre-ft**
Average Annual Use	283	0.63

*Peak Instantaneous Demand = Peak Day Demand x 1.20

Additionally, the fire flow demand was computed, under the direction of the fire marshal. The largest fire demand comes from the 61,196 square foot Best Western Plus Hotel building. The 2018 International Fire Code, Table B105.1(2), Type V-B construction requires 6,750 gallons per minute for 4 hours.

2.3.2 Future Service Area

Due to the service area being bounded by other public water systems, and pressure being controlled by elevation, limited expansion is projected. The system is expected to grow primarily though infill of available vacant lots. Lots may be divided and further service definition comes through the zoning of the lots. Commercial, Industrial, and Institutional uses all place greater demand on the system than residential uses.

2.4. Existing Residential and Non-Residential Demands

Each water account was designated as residential or a variety of non-residential uses. Non-residential accounts include retail and commercial users along with municipal accounts such as City parks and any industrial or institutional customers. The future system demand is projected by using current population estimates with a projected growth factor to determine future population estimates.

2.4.1 Population

In the U.S. census reports for the past 10 years the recorded population in Duchesne County, Uintah County, and Roosevelt all increased. The growth rate for the 3 municipalities raged from 0.5-1.1% in the past 10 years. For 2020, the population in the district was estimated to be 1,155 people.

The population of Ballard has historically grown and shrunk which impacts the growth percentages of the city because of the relatively small population. Ballard shares a similar economy as Duchesne County, which it borders, and Uintah County.

2.4.2 Per Capita Demands

Utah Code 19-4-104-(1)-(c)-4 requires all water systems serving a population of 500 or more to collect and submit accurate water use data to the Division of Water Rights (DWRi). The 2020 DWRi report for Ballard City is included in this report for reference as Appendix A. One of the water use measures that is reported to the state annually is number of equivalent residential connections for retail service (ERC). This measure provides a method to normalize the comparison of different types of water use within a system. In 2018, the DWRi introduced a new standard for calculating ERC. In the 2020 DWRi Report for the BWSID system, ERC was calculated to be 550 connections.

The DWRi method for calculating ERC for a system is based on the data reported by the water system into the DWRi's online water use data reporting program. Detailed findings are given in Table 5. In summary, 76% of water purchased was residential, 24% was non-residential.

Table 5: BWSID 2020 ERC by type

Meter Type	Meters	ERC
Residential	418	418
Commercial	51	80
Industrial	5	25
Institutional	6	27
Total	**480**	**550**

2.5. Future Residential and Non-Residential Demands

2.5.1 Population Projections

Demand on a water system is determined by the residential population and commercial customers connected to the system. Many population projections have been made with wide-ranging conclusions making it a challenge to predict the infrastructure required to meet projects demands. Ballard borders Uintah and Duchesne Counties. Uintah County's population is much larger than Duchesne County and small changes in population do not have as large of an impact to growth percentages.

Population figures provided by the University of Utah's Kem C. Gardner Policy Institute in 2015 estimate the growth in Utah and its counties for 50 years. From the University of Utah's data, the projected population growth for Duchesne and Uintah Counties are 1.0% and 1.3%, respectively, over the projected 50 years. This study by the University of Utah is used by the Governor's Office of Planning and Budget.

The U.S Census Bureau has data for Duchesne County, Uintah County, and Roosevelt City for 2010 and 2020. Additionally, looking at historic growth reported for Ballard City, since the turn of the century Ballard City has grown from 1058 people in 2000 to 1,367 in 2020 indicating a 20-year growth rate of about 2.6%. The average growth rate for each county, Roosevelt. and Ballard is shown in Table 6.

Table 6: Population Growth Rates in percent

Municipality	2010 Population	2020 Population	U.S. Census [%]	U of U [%]
Ballard	1,058	1,367	2.6	-
Roosevelt	6,046	6,747	1.1	-
Duchesne County	18,607	19,596	0.52	1.0
Uintah County	32,588	35,620	0.9	1.3

2.5.2 Future Water Use

For the future water system analysis, a steady annual growth rate of 2.6% was used to project the number of connections to the system in the years 2025, 2030, 2040. Table 7 shows the projected water needs through the year 2040.

Fire suppression storage is based on the *2018 International Fire Code*, Appendix B, Table B105.1(2), Type V-B area. The required fire flow for the Best Western Plus building is 6,750 gallons per minute for 4 hours or 1.62 million gallons.

Average Daily Water Use is the Average Annual Demand divided by 365 days for the entire system. In the DWRi's 2020 calculation they refer to the Average Daily Water use as Equalization storage. The assumption was made that the average use per connection would remain constant over time.

Table 7: Projected Water Needs Ballard City Water System

Year	ERCs	Average Daily Water Use[1] [MG]	Required Storage[2] [MG]
2020	550	0.23	1.85
2025	621	0.26	1.88
2030	693	0.29	1.91
2040	836	0.35	1.97

[1]Average Daily Water Use = ERC x Average Annual Demand/365 days

[2]Required Storage = Average Daily Water Use + Fire Suppression

2.6. Summary

BWSID's water system serves the residents and commercial facilities within the City and surrounding area. Of the water sold by the system, 81% is used by residential meters and 19% is used by non-residential meters. The number of residential connections is 87% of the total system connections and non-residential connections comprise 13% of the total system connections. Non-revenue water accounted for 2.6% of the water purchased.

Population projections are based on the U.S. Census Bureau's data and University of Utah's Population projections. For this report, the system is projected to grow at 2.6% per year. Over the next 20 years the water demand is expected to grow from 550 ERC's to 836 ERC's, almost doubling the demand of the water system.

3. System Analysis

3.1. Introduction

The analysis of the BWSID water system under existing and future conditions evaluates the hydraulic adequacy of the system and identifies resulting deficiencies. A set of criteria have been utilized in accordance with state and local standards to evaluate the system. The future water use requirements projected in Section 2.5 for the 5-year, 10-year, and 20-year planning horizons are applied to the system to identify and potential deficiencies under future conditions. This section describes the analysis of the supply, storage, and distribution capacity of the system for existing, 5-year, 10-year, and 20-year planning horizons and provides the basis for recommended system improvements presented in Section 5.

3.2. Evaluation Criteria

The water distribution system needs to be capable of operating within certain performance limits under varying customer demand and operational conditions. The criteria are based on the requirements of the Utah Department of Environmental Quality's Department of Drinking Water (DDW) requirements. Table 8 summarizes the minimum water pressure outlined in DDW's R309-105-9 that was used for the analysis.

Table 8: Water System Standards

Condition	Pressure	Demand
Peak Day	40 psi	Peak Day
Peak Instantaneous	30 psi	Peak Instantaneous
Fire Flow - Residential	20 psi 1000 gpm	Peak Day
Fire Flow - Commercial	20 psi 1500 gpm	Peak Day

The water storage requirements were also from the Division of Drinking Water R309-510-8. The storage is sized to satisfy the average day demand and the fire flow storage volume.

3.3. Water Rights

BWSID does not own or lease any water rights. This is critical to note since the district is wholly reliant on water provided by the UTDWS.

3.4. Storage Analysis

Storage in the system is intended to serve three purposes: operational, equalization, and fire suppression. The total distribution storage required is the sum of these three components.

The system storage has two active tanks. The adequacy of storage in the system was determined by comparing the tank volume in millions of gallons (MG) to the total of the required storage components. Table 9 shows the two tanks and how they feed the system.

Table 9: Storage Analysis

Tank	Pressure Zone	Storage [MG]
Montes Creek	Upper, Middle, Lower, Hidden Valley	0.5
Hilltop	Middle, Lower,	1.0

Utah Division of Drinking Water rule R309-510-8 requires storage volume in the system to satisfy the average day demand and fire suppression needs. BWSID's 2020 average day demand was 0.23 MG. Requirements for fire suppression storage were calculated according to the International Fire Code. The 61,196 square foot Best Western Plus building was used for the calculation, and a Type V-B construction was assumed. With this calculation and consultation with the Uintah County Fire Marshall, it was determined that the required fire suppression storage was 1.62 MG.

The total required storage for BWSID is 1.85 MG, or 123% of the current storage capacity in the system. BWSID has about 81% of the required storage. In the past, the fire code allowed storing 75% of the required fire flow but that exception has now been removed from the Fire Code. Currently additional fire flow resources exist, in the case of insufficient storage, such as Fire Tenders and the water supply trucks owned by the Fire District.

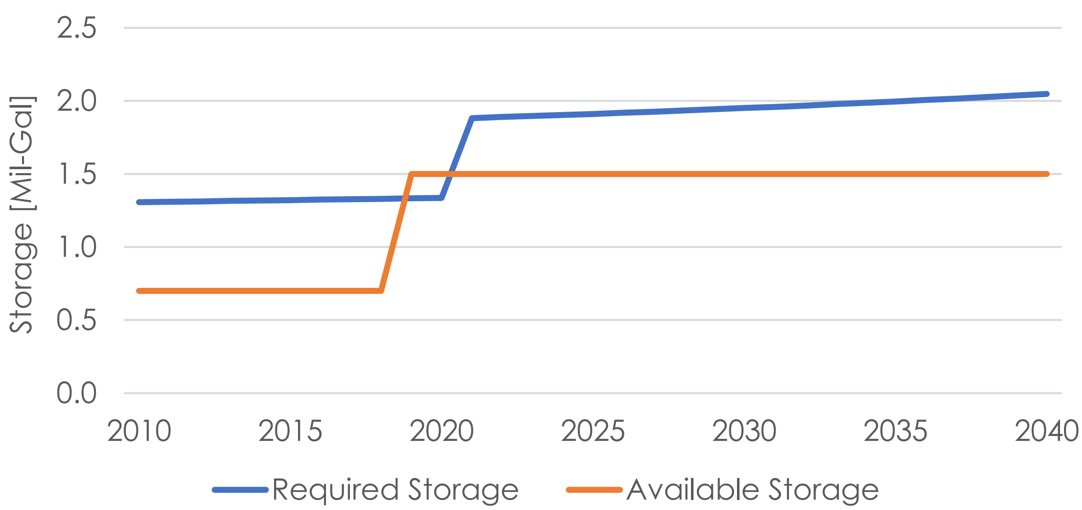


Figure 6: Water storage capacity and total required storage

Figure 6 shows the projected storage needs over the next 20 years. The current system provides 1.5 MG of storage, which does not meet the current or projected requirement.

3.5. Distribution System Analysis

Distribution system performance was assessed based on the service pressure criteria summarized in Table 8. Pressures should not fall below 40 psi under peak daily demand, nor under 20 psi under peak daily demand plus fire flow conditions.

3.5.1 Hydraulic Model

Utah Division of Drinking Water requires that all Utah entities that provide water have a working hydraulic model. The model must show the current system and be able to predict how the new development will impact the district's water system. The modeling software used for the Ballard Water and Sewer Improvement District Water Master Plan was Bentley's WaterCAD V8i software. This modeling process will benefit BWSID in the future by allowing the City to see the potential impacts to the water system prior to approving large developments that could have an adverse impact on the water system.

Historic data from BWSID was used to obtain a representative peak instantaneous demand to be used in a hydraulic model of the distribution system. The peak instantaneous demand was assumed to be 120% of the peak day demand while the peak day demand was the value reported to the DWRi. Calculations are as follows:

Peak Day Demand per ERC = 0.54 gpm

Peak Instantaneous Demand = Peak Day Demand X 120%
= 0.54 gpm X 120%
= 0.65 gpm per ERC

The Hydraulic Model demands are divided into the meter billing categories of Residential, Commercial, Industrial, Institutional, and Landscape demands to better represent the demands throughout the system. Table 10 shows the demands calculated per connection and number of meters for residential and commercial meters.

Table 10: Modeled Demands

Meter Type	Customer Meters	Unit Demand Per Meter [gpm]
Residential	418	0.65
Commercial	51	0.68
Industrial	5	3.14
Institutional	6	1.57
Landscape	1	9.81

A steady-state hydraulic network analysis model was used to evaluate the performance of the existing distribution system under existing and future demand conditions to identify deficiencies and proposed improvements. The purpose of the model is to determine pressure and flow relationships throughout the distribution system for a variety of demand, supply, and emergency conditions. The district's existing WaterCAD Model was updated to reflect the current system and used for the analysis. The model operates under steady state conditions and was calibrated with the fire flow tests conducted throughout the system.

3.5.2 Modeling Conditions

Three scenarios were run to verify the system's compliance with Drinking Water's rules: peak day demand (0.54 gal/min/ERC) with 40 psi minimum pressure, peak day demand with fire flow (2000 gal/min added at fire hydrants) with 20 psi minimum pressure, and peak instantaneous demand (0.65 gal/min/con) with 30 psi minimum pressure. The hydraulic model used peak demands to analyze compliance with drinking water requirements during the highest water use of the year. The assumption was made that if the system performs acceptably during peak demands, it will function acceptably during normal demands.

System analysis was performed under existing, 5-year, 10-year, and 20-year demand conditions. Additionally, the average daily demand, peak daily demand, and the fire flow conditions were used in the analysis.

3.5.3 Distribution System Results

The steady state hydraulic model was used to analyze the distribution system. A GIS interactive water system model has been provided to the District as part of the master plan project. The map includes the pressure and flow data for the current hydraulic model. As the GIS data is updated, the water model should be updated accordingly. More detailed or current information can be obtained from CRS Engineers upon request.

Under the modeled conditions, the model showed areas of concern. The model shows that 10 hydrants throughout the system receive less than 1500 gallons per minute. The model showed that the pipes sourcing the water to the failed hydrants are undersized for the flow needed. Additionally, several areas in the system have low pressures during the existing peak daily scenario. These results are consistent for the 5, 10, and 20-year results.

3.6. Summary

BWSID should consistently be seeking to add water rights for future growth and to not rely on a single source of water.

The existing storage that Ballard is required to have is 1.85 MG. The 1.5 MG of existing storage is about 81% of the required storage. The district should consistently be seeking to add storage capacity for future growth.

System analysis showed several failing hydrants, low pressure areas, and undersized pipes that lead to the failing hydrants. Resulting from the distribution system analysis, several recommendations for system improvements are included in Section 5.

4. Operations & Maintenance and Water Quality

4.1. Introduction

After completing the system analysis, the water quality, operation and maintenance were viewed as a whole. Pipelines, water quality, water loss, regulations, and process improvements were recommended.

4.2. Pipe and Water Meter Replacement Program

An inventory of the BWSID's distribution system was conducted with information from GIS and the district. Table 1 shows the pipeline lengths by diameter by material type.

PVC Pipe manufacturers traditionally indicate the life expectancy of PVC pipe to be around 40-years. This industry average would require 2 ½% of the system to be replaced annually. As identified in Table 1, the district has 141,044 feet of pipeline, which would average 3,500 feet of pipe replacement per year. It should be noted that the life expectancy of the pipe depends greatly on the quality of the design and installation. Pipe that is sized and installed properly will last longer than pipe placed in a careless manner or undersized for its use.

BWSID should consider the following factors when prioritizing the pipe replacement:

- Known condition issues
- Pipe material
- Pipeline age
- Pipe Capacity
- State and local standards
- Coordination with planned street improvement projects
- Cost
- Constructability

The district has been cataloging information on main breaks in a local system that the manager uses to keep tabs on pipe condition. It is recommended that the district merge this system into the GIS system invested in for this master plan update. This information is valuable for determining trends for what type and age of pipe is breaking and should be scheduled for replacement. With this information the district can determine a proactive approach for pipe replacement.

The district replacement program replaces their meters after about 5 million gallons of flow. By replacing the meters at about their design life the district regularly updates the older meters out of the system and avoids having to replace a large portion of the meters in a single year. The meter replacement is included as regular maintenance to the system.

4.3. Water Loss

In the 2020 report to the Division of Water Rights, the district reported a water loss of approximately 2.38%. In general, the State of Utah considers water losses less than 10% to be acceptable. Although the district is excelling in water retention within the system, it is always recommended that water loss be monitored.

4.4. Regulations

The Safe Drinking Water Act (SDWA) is a federal law that was passed to protect public health by regulating the nation's water supply. It establishes the National Primary Drinking Water Regulations (NPDWR) and National Secondary Drinking Water Regulations (NSDWR).

The BWSID water system presently delivers Water from the UTDWS to the Ballard area. BWSID routinely monitors for contaminants in the drinking water in accordance with Federal and State Law.-The district regularly tests for lead and copper, chemical contaminates, coliform, arsenic, and radionuclides. The test results are reported and published in an annual Consumer Confidence report. Additionally, the district publishes and distributes Annual Drinking Water Quality Reports.

4.5. Recommended Process Improvements

In section 3 water rights, system storage, and the distribution system, were reviewed to evaluate the condition of the district's drinking water system. In general, the drinking water system is in good condition. There are some low-pressure areas that need to be prioritized for improvement. It is recommended that smaller size pipes (6 inches or less) be replaced and that flow to hydrants be improved.

The district's pipe network was analyzed to compare the improvements to the system since the last master plan. The GIS records were updated, based on the updates received from the water district. The updates included adding hydrants, changing pipe sizes and materials based on updated information from the district. Condition and break records were not available for the analysis. By setting up the districts GIS system, the district is well positioned to record condition and breaks in the future.

The district should maintain their GIS data, to ensure that it meets their needs. This may involve updating location information, changing the attribute values associated with features, or even developing new datasets. It is recommended the district regularly update their maintenance information and inventories unknown pipe material. This will allow for future prioritization of projects within the pipe replacement program. GIS based mobile applications can be used to keep track of the repairs, locations of system updates, and log information that the water department comes across daily. As district staff becomes familiar with using GIS technology and workflows, it will be beneficial to explore other uses of GIS.

4.6. Summary

Multiple sources of information were reviewed to evaluate the condition of the district's drinking water system. In general, the drinking water system is in good condition, with specific improvements recommended to upsize the smaller pipes and improve fire flow to hydrants around Ballard. It is recommended that all facilities be inspected every 5-years as part of the Water System Master Plan update process to continue to document condition and assess needed improvements.

The District's GIS records were analyzed to compare each pipeline's age. Additionally, the District has been keeping track of main line breaks and prioritizing pipeline replacements based on the number of breaks in an area within a short time. It is recommended that the district continue to catalog main break information utilizing their investment in the GIS system. The GIS data will provide ease in determining future prioritization of projects within the pipe replacement program.

Pipe replacement should start to be budgeted now to build a reserve of funds that will allow the City to pursue a regular replacement schedule. Service and lateral lines connected to the mains should also be replaced. The prioritization of pipe replacement can be based on age, material, condition, capacity, and road repair schedules, with additional factors being considered as available.

5. Capital Improvement Plan (CIP)

5.1. Introduction

This section describes the water system Capital Improvement Plan (CIP) for the BWSID service area to address deficiencies identified in the hydraulic model and by District maintenance personnel. It includes projects recommended for the next 5, 10 and 20-years. The recommended improvements projects are shown in Figure 7 and summarized in Table 11. The total cost of projects within the 1-year timeframe is approximately $4,100,000. The long-term project cost is estimated to be $9,050,000.

5.2. Cost Estimates

Total project costs will depend on actual labor and material costs, site conditions, competitive market conditions, regulatory requirements, project schedule, and other factors. During the design phase, final sizing, location, and project components should be verified and a Preliminary Engineering Report completed. As part of the Preliminary Engineering Report or predesign, the cost estimate should be refined. Project feasibility and any associated risks should be carefully reviewed prior to making specific financial decisions or establishing yearly project budgets to help ensure adequate project funding.

All project costs presented in this Water System Master Plan are developed in 2021 dollars, district input, construction costs for similar projects, and local contractor and supplier rates. The project costs include estimated construction charges, and allow for contingency, permitting, and engineering and administrative fees. Costs do not include any land or right-of-way acquisition and do not include any ongoing maintenance or operation expenses. Construction costs are based on the preliminary concepts and layouts of the water system components developed during the system analysis.

5.3. Project Descriptions

Projects are intended to address deficiencies related to hydraulic capacity and pipe conditions. Some projects address fire flow pipeline deficiencies. The district will coordinate with developers to update the system piping.

As the master plan is updated on a regular schedule, projects, especially those beyond the 5-year horizon should be evaluated relative to actual and updated projections for growth within the system.

Potential projects are listed in Table 11. The listed projects are approximate and specific locations will be determined during design. The projects are organized in two timeframes, those to be constructed over the next year, and projects that are needed in the future. In the future improvements grouping, the projects are placed in order of importance. For all projects, as the district annually reviews system growth, available budget, and other factors, the list of projects to be constructed will be determined and may vary somewhat from the recommendations in this section.

Of note, the connection to the Roosevelt Water System is in Progress.

Table 11: Capital Improvement Plan Summary

Priority	Description	Length	Location	Estimated Cost
1. Immediate Improvements (1 year)				
1.1	Roosevelt Connection	N/A	Lagoon Street and 1500 E	$200,000
1.2	1500 East Waterline	1 Mile	1500 E. from Hwy 40 to 1000 South	$700,000
1.3	2 Mile Water Line	2 Miles	Various locations within district	$2,000,000
1.4	Upper System Well	N/A	North of Upper Zone	$1,200,000
2. Future Improvements				
2.1	Water Rights Acquisition	N/A	District Wide	$500,000
2.2	Montes Creek Pump Station	N/A	Upper Zone	$400,000
2.3	Upper System 800k gal Tank	N/A	North of Upper Zone	$1,500,000
2.4	Upper System Waterline	2.5 Miles	Upper Zone	$2,500,000
2.5	3500 E 6" Waterline Replacement	1 Mile	3500 E from HWY 40 to 1000 N	$1,000,000
2.6	1750 N 6" Waterline upgrade	0.5 Miles	1750 N	$500,000
2.7	Old Victory Park Pipe Replacement	0.5 Miles	Old Victory Park	$500,000
2.8	Johnson Water Connection (including 2 pumps) and 6" Waterline upgrade	1 Mile	1500 E and 3000 S	$1,600,000
2.9	Master Plan Replacement	N/A	BWSID	$50,000
2.10	Hidden Valley Waterline	0.5 Miles	1350 North Street	$500,000

5.3.1 Roosevelt Connection

The connection to Roosevelt is in the process of engineering for construction in the spring of 2022. The connection helps BWSID meet the state requirement of having at least 2 different water sources. When used, the connection will meet demands in the Middle and Lower zones. The planned connection will be located on the 12-inch Roosevelt line under Lagoon Street.

5.4. Possible Funding Sources

There are several funding sources available for culinary water projects. The methods of funding sources range from loan, grant, and self-fund.

Table 12 shows the annual payment for different loan amounts at different rates for a 30-year loan for context when describing different loan types.

Table 12: Loan Payment Estimate

Loan Amount	Interest Rate	Annual Payment
$ 500,000	1 %	$19,500
$ 1,000,000	1 %	$39,000
$ 500,000	5 %	$32,500
$ 1,000,000	5 %	$73,000

5.4.1 Utah Department of Environmental Quality

The Utah Division of Water Quality offers low interest loans from the Federal State Revolving Funds (Federal SRF) and the State Revolving Funds (SRF). These are available to all political entities of the state. The typical interest rate ranges between 1.5-4% with a 20-year term.

The Federal SRF is provided to the states from the Environmental Protection Agency (EPA). These funds are federal dollars and require compliance with the Davis Bacon Wage Act, the American Iron and Steel Act (Buy America), and the other federal programs.

The SRF is administered by the state and offers low interest loans (2-4%) and grants. Typically, only about 5% of the SRF are awarded as grants.

5.4.2 USDA Community Facilities Direct Loan & Grant

The USDA Community Facilities Direct Loan & Grant program provides affordable funding to develop essential community facilities in rural areas. These facilities provide an essential service to the local community for the orderly development of the community in a primary rural area populated with 20,000 residents or less.

5.4.3 Permanent Community Impact Fund Board (CIB)

The CIB is an entity of the state of Utah that receives mineral lease money and uses it to provide loans and grants to public projects in communities impacted by extraction of minerals. The typical conditions of a loan are a 20-30-year term at the going interest rate.

Because the system is in an energy producing county, the most likely source to leverage the most favorable and obtainable funding terms for the District's culinary water system infrastructure improvements is the CIB. The CIB may offer grant and loan combinations. To receive funding for these capital improvements, the District needs to maintain a current version of their capital improvements list and submit that list to the Uintah Basin Association of Governments (UBAOG). Additionally, the CIB has asked for a list of assets from cities, counties, and special service districts.

5.4.4 Agency Funding (Self-fund)

The Agency Funding or self-fund option is for the district to wholly fund the project. Although self-fund is the least expensive money over the life of the project, this option is least feasible for public agencies.

5.4.5 American Rescue Plan Act Fund (ARPA)

As part of the American Rescue Plan Act for 2021, Utah received almost $1.4 billion for infrastructure improvements. At the time of this writing, the State Legislature is still determining how the money will be distributed for public projects in the state.

5.5. Summary

The BWSID water system has served the community well for many years. Replacing aged Infrastructure will be a major contributor to the cost of the system over the next 10 years.

Other improvements will help the District monitor flows from sources and use throughout the system.

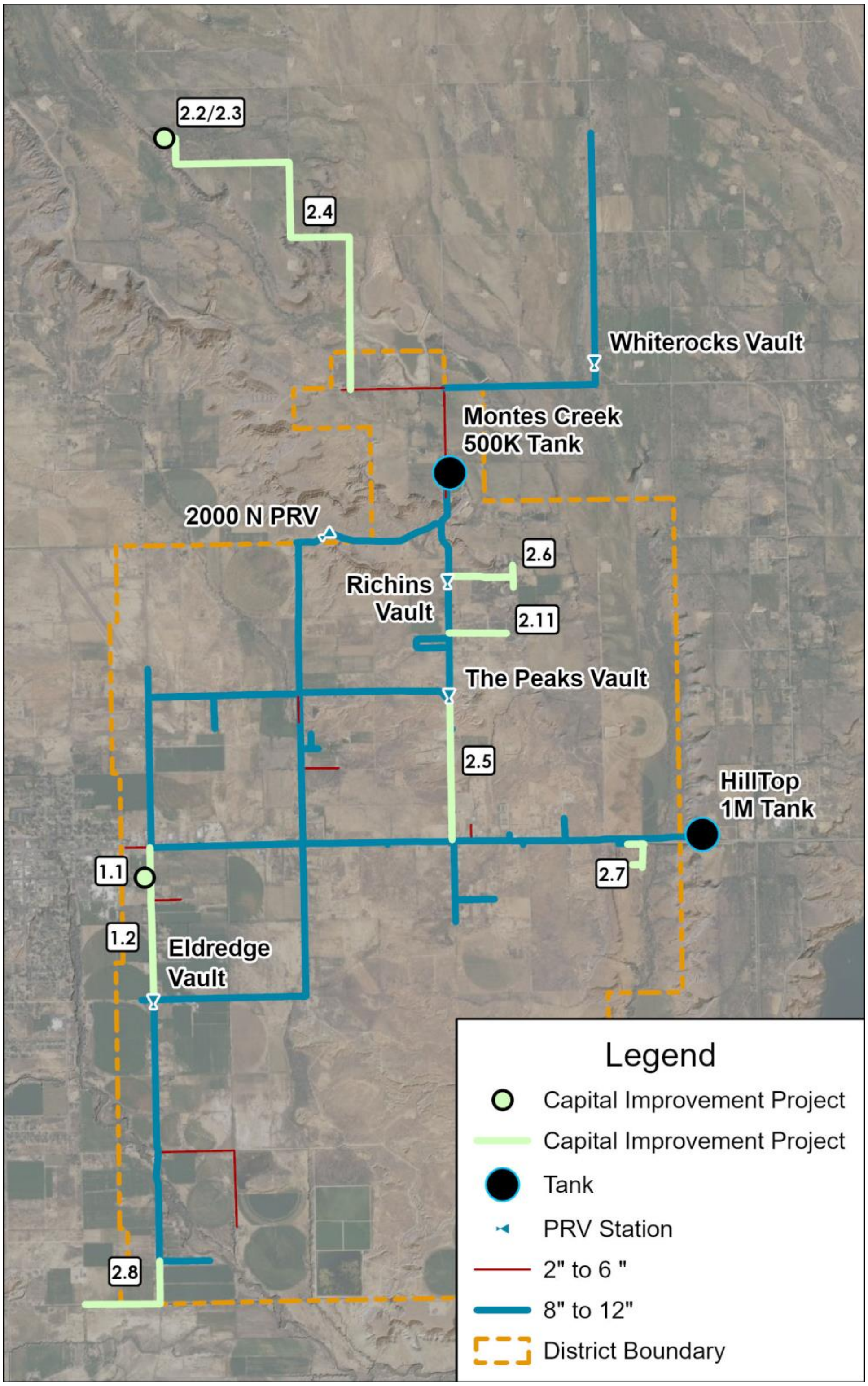


Figure 7: Ballard City Water CIP Map

Appendix A

2020 DWRi Report for Ballard City

Utah Public Water Supply Use Form
Data Year: 2020

System Name: Ballard Water Improvement District

(Water Rights ID: 1124)
(PWS ID: UTAH24001)

Supervisor: Ben Mower

Address: 2381 East 1000 South
Ballard, UT, 84066

County: Uintah

Operational Days: January 1 to December 31, (2020)

I. Summary Information

Contact Person: Anissa McDonald

Email Address: ballcity2@ubtanet.com

Contact Number: (435) 722-3393

Retail Population: 1,155

To the best of my knowledge all information is accurate and complete:
Name: Ben Mower
Certified Professional: Ben Mower
Certification Type: Water Manager
License Number:

Data must be completed and signed by a Drinking Water Certified Operator, Professional Engineer, or Water Manager.

II. Retail Culinary Water Use Breakdown

Units Of Measurement: **Thousands of Gallons**
Method Of Measurement: **Meter**

Culinary Water Use Category	Retail Annual Quantity [Thousands	Number of Active Connections
Residential Use:	61,185.00	418.00
Commercial Use:	12,101.00	51.00
Industrial Use:	2,777.00	5.00
Institutional Use:	4,388.00	6.00
Total Use:	80,451.00	480.00

Unmetered Culinary Institutional Water Use

III. Equivalent Residential Connection Summary (ERC)

1. Estimated Equivalent Residential Connections:	**550.00**
2. Do you accept the estimated ERC value:	**Yes**

IV. AWWA Estimated Water Loss System Review

Have you completed a water audit of your system using the AWWA standard methodology?	**No**

V. Political Boundaries

1. Do you supply water outside your political boundaries?	**No**
2. If YES, are they included in the NUMBER OF ACTIVE CONNECTIONS above?	**No**
3. If YES, what are the total connections outside your political boundaries?	**0**

VI. Peak Demand Summary **(Water demand on the day of the highest water consumption in one year.)**

1. Are you able to accurately measure Source Peak Day Demand?	**Yes**
2. What day of the year did your source Peak Demand occur?	**2020-08-13**
3. Units Of Measurement for the source Peak Day Demand volume:	**Millions of Gallons**
4. What is your source Peak Day Demand volume?	**0.43 (Million Gallons / Day)**
5. The Peak Day Demand measurement includes:	**Both Indoor AND Outdoor Use**
6. Does the reported Source Peak Day Demand include wholesale water supplied to other water systems?	**No**

Peak Demand Comments:

daily reading are taken at our 2 purchase points, and then totaled together.

VII. Summary of Water Data

A. Total from all Sources of Water:		**82,409.00**
Water Total from all Diversions:	**0.00**	
Purchased Water:	**82,409.00**	
B. Sum of Retail Culinary Use:		**80,451.00**
C. Sum of ALL Wholesale Deliveries:		**0.00**
Estimated Water Loss (Loss, Unaccounted, or Unbilled) [A - (B + C)]:		**1,958.00**
Estimated Water Loss Percentage:		**2.38 %**

VIII. Source Inventory

Source Name: Purchased from Ute Tribal System (WS001)

USE TYPE:	[Water Supplier]
LOCATION:	[N 197 ft E 839 ft from S4 cor Sec 17 T2S R1E US]
WATER RIGHT(s):	[ ]
UNITS OF MEASUREMENT:	[Thousands of Gallons]
METHOD OF MEASUREMENT:	[Master Meter]
ANNUAL USE:	[82,409.00]
ACTIVE SOURCE:	[Yes]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
3,262.00	5,888.00	6,881.00	8,239.00	8,534.00	8,926.00	10,262.00	10,241.00	7,713.00	6,029.00	3,816.00	2,618.00

X. Secondary or Untreated Water Use Breakdown

1. Do you provide separate secondary untreated water to your culinary customers? **No**

2. Do other secondary districts and/or irrigation companies provide secondary water within the boundaries of your culinary water service area? **Yes**

3. What is the percentage of culinary customers using a seperate PRESSURIZED irrigation system for landscaping: **10 %**

4. Pressurized Irrigation System Company Data:

Dry Gulch Irrigation
Roosevelt, UT 84066
435-722-2204

5. What percentage (%) of your culinary customers use a separate DITCH irrigation system for their landscapes? **0 %**

Appendix B

Ballard Water Improvement District 2020 Annual Drinking Water Quality Report

Ballard Water Improvement District's
2020
Annual Drinking Water Quality Report

We're pleased to present to you this year's Annual Drinking Water Quality Report. This report is designed to inform you about the quality of the water and services we deliver to you every day. Our constant goal is to provide you with a safe and dependable supply of drinking water. We want you to understand the efforts we make to continually improve the water treatment process and protect our water resources. We are committed to ensuring the quality of your water. We purchase our water from the Ute Tribe Water System. We have requested the necessary data for this report from the Ute Tribe Water System.

The Drinking Water Source Protection Plan for the Ute Tribe Water System is available for your review. If you need any information, please contact us. It contains information about source protection zones, potential contamination sources and management strategies to protect our drinking water.

There are many connections to our water distribution system. When connections are properly installed and maintained, the concerns are very minimal. However, unapproved, and improper piping changes or connections can adversely affect not only the availability, but also the quality of the water. A cross connection may let polluted water or even chemicals mingle into the water supply system when not properly protected. This not only compromises the water quality but can also affect your health. So, what can you do? Do not make or allow improper connections at your homes. Even that unprotected garden hose lying in the puddle next to the driveway is a cross connection. The unprotected lawn sprinkler system after you have fertilized or sprayed is also a cross connection. When the cross connection is allowed to exist at your home it will affect you and your family first. If you'd like to learn more about helping to protect the quality of our water, call us for further information about ways you can help.

I'm pleased to report that our drinking water meets federal and state requirements.

If you have any questions about this report or concerning your water utility, please contact Ben Mower 435-722-3393. We want our valued customers to be informed about their water utility. If you want to learn more, please attend any of our regularly scheduled meetings. They are held on the Third Tuesday of each month at 5:30 p.m. at the Ballard Water District office.

Ballard Water Improvement District routinely monitors for constituents in our drinking water in accordance with the Federal and Utah State laws. The following table shows the results of our monitoring for the period of January 1st to December 31st, 2018. All drinking water, including bottled drinking water, may be reasonably expected to contain at least small amounts of some constituents. It's important to remember that the presence of these constituents does not necessarily pose a health risk.

In the following table you will find many terms and abbreviations you might not be familiar with. To help you better understand these terms we've provided the following definitions:

Non-Detects (ND) - laboratory analysis indicates that the constituent is not present.

ND/Low - High - For water systems that have multiple sources of water, the Utah Division of Drinking Water has given water systems the option of listing the test results of the constituents in one table, instead of multiple tables. To accomplish this, the lowest and highest values detected in the multiple sources are recorded in the same space in the report table.

Parts per million (ppm) or Milligrams per liter (mg/l) - one part per million corresponds to one minute in two years or a single penny in $10,000.

Parts per billion (ppb) or Micrograms per liter (ug/l) - one part per billion corresponds to one minute in 2,000 years, or a single penny in $10,000,000.

Nephelometric Turbidity Unit (NTU) - nephelometric turbidity unit is a measure of the clarity of water. Turbidity in excess of 5 NTU is just noticeable to the average person.

Action Level (AL) - the concentration of a contaminant which, if exceeded, triggers treatment or other requirements which a water system must follow.

Treatment Technique (TT) - (mandatory language) A treatment technique is a required process intended to reduce the level of a contaminant in drinking water.

Maximum Contaminant Level (MCL) - (mandatory language) The “Maximum Allowed” (MCL) is the highest level of a contaminant that is allowed in drinking water. MCLs are set as close to the MCLGs as feasible using the best available treatment technology.

Maximum Contaminant Level Goal (MCLG) - (mandatory language) The “Goal” (MCLG) is the level of a contaminant in drinking water below which there is no known or expected risk to health. MCLGs allow for a margin of safety.

Maximum Residual Disinfectant Level (MRDL) - The highest level of a disinfectant allowed in drinking water. There is convincing evidence that addition of a disinfectant is necessary for control of microbial contaminants.

Maximum Residual Disinfectant Level Goal (MRDLG) - The level of a drinking water disinfectant below which there is no known or expected risk to health. MRDLGs do not reflect the benefits of the use of disinfectants to control microbial contaminants.

Date- Because of required sampling time frames i.e. yearly, 3 years, 4 years and 6 years, sampling dates “May” seem out of date.

TEST RESULTS							
6Contaminant	Violation Y/N	Level Detected ND/Low-High	Unit Measurement	MCLG	MCL	Date Sampled	Likely Source of Contamination
Microbiological Contaminants							
Total Coliform Bacteria	N	0	N/A	0	Presence of coliform bacteria in 5% of monthly samples	2020	Naturally present in the environment
Turbidity for Ground Water	N	.5	NTU	N/A	5	2008	Soil runoff
Inorganic Contaminants							
Asbestos	N	.2	MFL	7	7	2015	Decay of asbestos cement water mains; erosion of natural deposits
Barium	N	139	ppb	2	2	2020	Discharge of drilling wastes; discharge from metal refineries; erosion of natural deposits
Copper a. 90% results b. # of sites that exceed the **AL**	N	a. .765 b. 0	ppb	1300	AL=1300	2020	Corrosion of household plumbing systems; erosion of natural deposits
Fluoride	N	.47	ppb	4000	4000	2020	Erosion of natural deposits; water additive which promotes strong teeth; discharge from fertilizer and aluminum factories
Lead a. 90% results b. # of sites that exceed the **AL**	N	a. .0036 b. 0	ppb	0	AL=15	2020	Corrosion of household plumbing systems, erosion of natural deposits
Nitrate (as Nitrogen)	N	.3	ppb	10000	10000	2020	Runoff from fertilizer use; leaching from septic tanks, sewage; erosion of natural deposits
TDS (Total Dissolved Solids	N	266	ppm	1000**	1000**	2005	Erosion of natural deposits

Volatile Organic Contaminants							
TTHM [Total trihalomethanes]	N	7.1	ppb	0	80	2020	By-product of drinking water disinfection
Haloacetic Acids	N	ND	ppb	0	60	2020	By-product of drinking water disinfection
Chlorine	N	.04	ppb	4000	4000	2020	Water additive used to control microbes

Copper is an essential nutrient, but some people who drink water containing copper in excess of the action level over a relatively short amount of time could experience gastrointestinal distress. Some people who drink water containing copper in excess of the action level over many years could suffer liver or kidney damage. People with Wilson's disease should consult their personal doctor.

If present, elevated levels of lead can cause serious health problems, especially for pregnant women and young children. Lead in drinking water is primarily from materials and components associated with service lines and home plumbing. Ballard Water & Sewer Improvement District is responsible for providing high quality drinking water, but cannot control the variety of materials used in plumbing components. When your water has been sitting for several hours, you can minimize the potential for lead exposure by flushing your tap for 30 seconds to 2 minutes before using water for drinking or cooking. If you are concerned about lead in your water, you may wish to have your water tested. Information on lead in drinking water, testing methods, and steps you can take to minimize exposure is available from the safe Drinking Water Hotline or at http://www.epa.gov/safewater/lead.

All sources of drinking water are subject to potential contamination by constituents that are naturally occurring or are man made. Those constituents can be microbes, organic or inorganic chemicals, or radioactive materials. All drinking water, including bottled water, may reasonably be expected to contain at least small amounts of some contaminants. The presence of contaminants does not necessarily indicate that the water poses a health risk. More information about contaminants and potential health effects can be obtained by calling the Environmental Protection Agency's Safe Drinking Water Hotline at 1-800-426-4791.

MCL's are set at very stringent levels. To understand the possible health effects described for many regulated constituents, a person would have to drink 2 liters of water every day at the MCL level for a lifetime to have a one-in-a-million chance of having the described health effect.

Some people may be more vulnerable to contaminants in drinking water than the general population. Immuno-compromised persons such as persons with cancer undergoing chemotherapy, persons who have undergone organ transplants, people with HIV/AIDS or other immune system disorders, some elderly, and infants can be particularly at risk from infections. These people should seek advice about drinking water from their health care providers. EPA/CDC guidelines on appropriate means to lessen the risk of infection by cryptosporidium and other microbiological contaminants are available from the Safe Drinking Water Hotline (800-426-4791).

We at Ballard Water Improvement District work around the clock to provide top quality water to every tap. We ask that all our customers help us protect our water sources, which are the heart of our community, our way of life and our children's future.

Ballard Water Improvement District
2381 E 1000 S
Ballard, UT 84066

June 25, 2020

Brandi M.Smith
Utah Division of Drinking Water
Environmental Coordinator / Enforcement Department
195 N 1950 W
SLC, UT 84116

Dear Ms. Smith:

Subject: Consumer Confidence Report for the Ballard Water Improvement District #24001.

Enclosed is a copy of the Ballard Water Improvement District's Consumer Confidence Report. It contains the water quality information for our water system for the calendar year 2020 or the most recent sample data.

We have delivered this report to our customers by publishing in the local newspaper the availability of the report and or posting a notice of the availability of the report on our water bill and sending a copy to those that request a copy and allowing inspection of the report at the water system office.

If you have any questions, please contact me at 435-722-3393.

Sincerely,

Ben Mower
Ballard Water Improvement District

Enclosure