CEDAR CITY

2022

WATER REPORT

To The Honorable Mayor

Garth O. Green

and

The City Council of Cedar City, Utah

Transmitted herewith is the City Engineer's Report on the water used by Cedar City for the year 2022

2022 CEDAR CITY WATER REPORT

Table of Contents **Page #**

2022 CEDAR CITY WATER REPORT

I. INTRODUCTION

The annual report of the water use and system information for Cedar City, Utah is herewith submitted to all concerned. The information included in this report is an accurate record of water usage and system information for the calendar year of 2022. Also included in this report are water usage and system information trends for previous years.

II. SYSTEM INFORMATION & TRENDS

The present water system serves a population of approximately 38,505 people, covering an area of 23,242.62 acres or 36.32 square miles. The water system (culinary water and pressurized irrigation) has a maximum supply capacity of 19,228,400 gallons per day (GPD) with 18,000,000 GPD to be supplied from wells and 1,228,400 GPD from springs. On years where surface water is available to the 200 North Pump Station, the pressurized irrigation system may be augmented with up to 2,592,000 GPD.

Of the total supply capacity, 13,324,400 GPD is for culinary water and 5,904,000 GPD is for pressurized irrigation water. No water that is delivered to a property in an irrigation ditch is included in this capacity. The water system's storage is composed of eleven (11) storage tanks with a capacity of 18,690,537 gallons for culinary water, the Lake at the Hills with a capacity of 32,246,000 gallons for irrigation water, and one pond at the golf course with a capacity of 2,914,100 gallons for irrigation water. The water system has a total of 261.6 miles of pipelines that includes **62.4** miles of transmission lines, located out of the City limits, **190.4** miles of pipelines located inside the City limits, and **8.8** miles of irrigation lines.

2022 CEDAR CITY WATER REPORT

SYSTEM INFORMATION TRENDS

Year	Population[1]	Area Served (Sq. Mi.)	Peak Supply Capacity			Storage	
			Total (GPD)	Culinary (GPD)	Irrigation (GPD)	Culinary (Gal.)	Irrigation (Gal.)
2013	29,118	36.01	20,808,000	14,904,000	5,904,000	17,570,000[2]	33,246,000
2014	29,162	36.01	20,808,000	14,904,000	5,904,000	19,602,284[3]	33,246,000
2015	29,483	36.01	20,088,000	14,184,000[4]	5,904,000	19,602,284	33,246,000
2016	30,184	36.04	20,088,000	14,184,000	5,904,000	19,602,284	33,246,000
2017	31,223	36.01	20,088,000	14,184,000	5,904,000	19,602,284	33,246,000
2018	31,806	36.034	20,088,000	14,184,000	5,904,000	19,602,284	33,246,000
2019	33,055	36.048	21,960,000	16,056,000[5]	5,904,000	19,602,284	33,246,000
2020	35,078[6]	36.11	21,960,000	16,056,000	5,904,000	19,602,284	35,160,100[7]
2021	37,206[8]	36.27	19,228,400[9]	15,912,000	5,904,000	18,690,537[10]	35,160,100
2022	38,505[11]	36.34	19,228,400	15,912,000	5,904,000	18,690,537	35,160,100

PIPELINES

Year	Total Miles	Transmission Lines (miles)	Lines in City limits (miles)	Irrigation Lines (miles)
2013	235.8	61.7	165.3	8.8
2014	236.4	61.7	165.9	8.8
2015	237.4	61.7	166.9	8.8
2016	238.9	61.7	168.4	8.8
2017	240.8	61.7	170.3	8.8
2018	242.2	61.7	171.7	8.8
2019	246.9	61.7	176.5	8.8
2020	249.7	61.7	179.2	8.8
2021	253.3	62.4	182.1	8.8
2022	261.6	62.4	190.4	8.8

1 - Population prior to 2010 is based on estimates from the Utah Governor's Office of Planning and Budget (GOPB). Population for 2010 is based on the official count taken by the U.S. Census Bureau during the 2010 census. Population for 2011 and 2012 was estimated based on Census data for Iron County. Population starting in 2013 is based on the population for Cedar City listed in the Utah Sales Tax Distribution report for December of each year.

2 - The decrease in total culinary storage for 2013 is due to the demolition of the South Concrete Tank.

3 - The increase in total culinary storage for 2014 is due to the construction of the new Cedar Canyon Tank.

4 - The decrease in culinary capacity for 2015 is due to Quichapa Well #1 not being in use.

5 - The increase in culinary capacity for 2019 is due to Quichapa Well #1 being put back into service; also, the capacity for Enoch Well #1 was increased based on 2019 flow meter data.

6 - Population for 2020 has been corrected to reflect the U.S. Census Bureau statistics.

7 - The increase in irrigation storage in 2020 is due to the new pond at the Golf Course.

8 - Population for 2021 is as reported by the U.S. Census Bureau.

9 - Reflects lower amount being produced by springs.

10 - A previous reporting error for storage capacity was revealed while verifying Cedar City Water Storage Tanks. The Redman Tank was previously evaluated at 1,928,325 gal. storage capacity was found to provide 1,016,578-gals (911,747-gals reduction). The amount reported for 2021 reflects this correction.

11 - Population for 2022 is estimated from Kem C. Gardner Policy Institute.

III. WATER RIGHTS INFORMATION & TRENDS

At the end of 2022 the City owned 20,880.95 acre-feet (A.F.) of total water rights including 14,224.58 A.F. of underground water rights, 4,848.70 A.F. of spring water rights, and 1,807.67 A.F. of surface water rights. In 2022, the City acquired 160.294 A.F. of water rights including 146.56 A.F. of underground water rights, -0- A.F. of spring water rights, and 13.734 A.F. of surface water rights. Appendix B lists the water rights currently owned by Cedar City, as adjudicated by the State Engineer. It is important to note that the State Engineer may reduce the total flow of a water right when it is changed from irrigation use to municipal use.

2022 CEDAR CITY WATER REPORT

WATER RIGHTS TRENDS

Year	Ground Water (A.F.)	Surface Water (A.F.)	Springs (A.F.)	Total (A.F.)	Future Year	Cedar City Water Rights Obsoleted by Utah DWR[1] (A.F.)	Future Groundwater Rights Currently Owned (A.F.)	Future Groundwater Rights Needed[2] (A.F)	Future Required Water[4] (A.F.)	Future Projected Population[5]	Future % of Estimated Allowable Aquifer Yield to produce Required Water[6]	Future % of Estimated Total Safe Aquifer Yield to Produce Water[7]
					2035	2.496	14,222.08	11,943.31	13,195.65	50129	26%	57%
					2050	5198.076	9,026.50	13,527.98	14,780.32	56149	35%	64%
2011	13249.23	1345.13	4778.44	19372.80	2051		9,026.50	13,625.63	14,877.97	56520	36%	65%
2012	13,459.46	1,424.63	4,778.44	19,662.53	2052		9,026.50	13,725.66	14,978.00	56900	36%	65%
2013	13,489.66	1,425.11	4,778.44	19,693.21	2053		9,026.50	13,829.11	15,081.45	57293	36%	66%
2014	13,490.66	1,425.22	4,778.44	19,694.32	2054		9,026.50	13,935.72	15,188.06	57698	36%	66%
2015	13,490.66	1,435.30	4,778.44	19,704.40	2055		9,026.50	14,044.97	15,297.31	58113	37%	67%
2016	13,682.60	1,424.37	4,847.76	19,954.73	2056		9,026.50	14,156.84	15,409.18	58538	37%	67%
2017	13,683.40	1,455.33	4,847.76	19,986.49	2057		9,026.50	14,271.35	15,523.69	58973	37%	68%
2018	13,750.87	1,490.11	4,847.76	20,088.74	2058		9,026.50	14,388.75	15,641.09	59419	38%	68%
2019	13,762.77	1,521.590	4,848.70	20,133.06	2059		9,026.50	14,508.26	15,760.60	59873	38%	69%
2020	14,010.87	1,521.590	4,848.70	20,381.16	2060	9547.45	4,677.13	14,628.56	15,880.90	60330	50%	69%
2021	14,078.02	1,793.940	4,848.70	20,720.66	2061		4,677.13	14,749.38	16,001.72	60789	50%	70%
2022	14,224.58	1,807.674	4,848.70	20,880.95	2062		4,677.13	14,870.99	16,123.33	61251	51%	70%
					2070	10518.232	3,706.35	16523.18	17,296.04	65706	73%	78%
					2080	10756.888	3,467.69	17745.80	18,477.43	70194	84%	84%

1 - Cedar City Valley Draft Groundwater Management Plan, is adopted and is reflected in this table. The plan obsoletes water rights based on priority dates. The plan may be found at: https://waterrights.utah.gov/groundwater/ManagementReports/CedarValley/CedarCityValleyGWMP20210111.pdf

2 - Future Ground Water Rights Needed is determined based on:

a. Surface Water Rights are not a source for culinary water.

b. Spring Rights are considered at their average production rates for the last 5 years - 1252.3 A.F. (The Springs do not produce water at their recorded rate of 4848.7 A.F.)

c. Future Ground Rights Needed = Future Total Rights Required - Spring Production Rate

3 - Future Total Rights Required = Current Surface Water Rights (Used for Recharge) + Current Springs Rights + Future Ground Water Rights Needed

4 - Future Required Water is based on the average demand of the most current 5 years usage +5% = 235gpd

5 - Future Projected Population is determined from the Kem Gardner Report: https://gardner.utah.edu/demographics/population-projections/

6 - Per the Groundwater Management Plan for Cedar City Valley, the aquifer is currently being pumped at a rate of 28,000 A.F. annually, and is produced with 50,000 A.F. of valid water rights. These 50,000 A.F. of water rights are to be reduced to 45,530 A.F., 38,200 A.F., 29,386 A.F., 22,625 A.F., and finally 21,107 A.F. in the years 2035, 2050, 2060, 2070, and 2080 respectively. In 2022, Cedar City pumped 7,080 A.F. ; this represents 25% of all water produced from the aquifer. Future Percentages are calculated based on the reduced amounts given.

7 - This Percentage is based on Cedar City Predicted Future Ground Water Rights Needed and the safe aquifer depletion rate of 21,107 A.F. annually.

IV. WATER USAGE INFORMATION & TRENDS

2022 CEDAR CITY WATER REPORT

In 2022 the City delivered a total of 7,955 A.F. of culinary water and pressurized irrigation water, including 7,066 A.F. of well water, 888.7 A.F. of spring water, and 0 A.F. of surface water. Additionally, the City purchased 14.3 A.F. of water from the Central Iron County Water Conservancy District (C.I.C.W.C.D.) The City's culinary water system served 9,778 connections and delivered 7,259 A.F. of water, including 6,370 A.F. of well water and 889 A.F. of spring water.

The City's pressurized irrigation system delivered 696 A.F. of water. The pressurized irrigation system was supplemented with 14.3 acre-feet of culinary water that was delivered to the Lake at the Hills. The pressurized irrigation system was used for irrigating the Cedar Ridge Golf Course, Cedar High School, Canyon View schools, Bicentennial Park and Soccer Field, the Cemetery, and Southern Utah University.

The average daily culinary and irrigation use per person per day was 184 gallons. July was the peak culinary usage month with 1,076.9 A.F. of water. June 28, 2022, was the peak culinary usage day with 44 A.F. of water. January 11, 2022 was the minimum culinary usage day with 5.5 A.F. of water.

The City and the Central Iron County Water Conservancy District (CICWCD) recharge water from Coal Creek during the winter months into recharge ponds near the airport and at Quichapa. The amount of recharge in 2022 was 1,449 A.F. of water.

WATER USAGE TRENDS

Year	Population	Connections	Total Water Usage		Type of Water (AF)		Culinary used in Pressurized Irrigation (AF)	Water Source (AF)			Per Capita (GPD)
			Gallons	AF	Culin.	Irrig.		Ground water	Springs	Surface water	
2012	29,275	8,233	2,426,794,699	7,448	6,878	570	18.7	5,595	1,738	115	227
2013	29,118	8,348	2,362,847,650	7,251	6,697	554	15.6	5,379	1,821	51	222
2014	29,162	8,499	2,465,196,000	7,565	7,059	506	21.6	6,064	1,461	40	232
2015	29,483	8,663	2,389,530,100	7,333	6,855	478	17.7	5,825	1,508	0	222
2016	30,184	8,801	2,589,421,400	7,947	7,257	690	7.7	6,304	1,638	5	234
2017	31,223	8,985	2,619,740,610	8,040	7,345	695	3.9	6,532	1,508	0	230
2018	31,806	9,226	2,771,126,900	8,504	7,744	760	3.2	7,174	1,330	0	239
2019	33,055	9,404	2,649,903,800	8,132	7,455	677	4.1	6,418	1,714	0	220
2020	35,078	9,562	3,179,367,415	9,757	8,333	1,425	0.6	8,420	1,337	0	248
2021	37,206	9,214	2,718,567,600	8,343	7,621	722	1.5	7,350	993	0	200
2022	38,505	9,778	2,592,046,500	7,955	7,259	696	14.3	7,066	889	0	184

WATER USAGE TRENDS, Cont.

2022 CEDAR CITY WATER REPORT

Year	Peak Day (Culinary)		Minimum Day (Culinary)		Average Day (Culinary)
	Date	Gallons	Date	Gallons	Gallons
2012	July 5	14,825,900	Mar 24	1,434,200	6,123,443
2013	June 29	14,227,900	Oct 31	1,585,000	5,979,117
2014	July 4	13,369,400	Nov 22	1,099,000	6,301,793
2015	June 27	13,592,700	Dec 21	1,207,400	6,120,059
2016	July 18	14,737,100	Dec 31	1,289,000	6,460,498
2017	July 7	14,729,100	Mar 25	2,077,000	6,557,433
2018	July 2	14,675,200	Nov 17	2,014,200	6,913,446
2019	July 18	14,740,500	Nov 17	1,091,500	6,655,319
2020	July 10	15,674,300	Mar 17	1,623,300	7,298,855
2021	July 4	13,237,100	Dec 14	2,287,500	6,803,976
2022	June 28	14,327,009	Jan 11	1,790,719	6,479,704

COAL CREEK RECHARGE

Year	Recharge using excess water from Coal Creek (ac-ft)
2017	420 ±
2018	448
2019	9,058
2020	2200
2021	423
2022	1,449[1]

1 - Data for 2022 was obtained from the Central Iron County Water Conservancy District (www.cicwcd.org/flow-map). Recharge breakdown is as follows for 2022: Schmidt pit = 0 AF; Horse Alley pit = 127.45 AF; Western Rock pit = 1311.252 AF; Quichapa pit (north of SR-56) – sensor broken – estimated at 10 AF.

2022 CEDAR CITY WATER REPORT

V. PUMPING COSTS INFORMATION AND TRENDS

Total power costs for Cedar City's Water Sources in 2022 was **$778,782**. The average cost to pump 1,000 gallons of water was **$0.34**. The average cost per kilowatt-hour (kWh) was **$0.068.** Enoch Well #3 was the most efficient source with an average pumping cost of $0.22 per 1,000 gallons and Quichapa Well #5 was the least efficient source with an average pumping cost of $0.50 per 1,000 gallons. Quichapa Well #8 was the least cost source per kWh at $0.063 per kWh and Northfield Well was the highest cost source per kWh at $0.083 per kWh. The revenue from metered water sales in 2022 was $4,342,998.

PUMPING COST TRENDS

Year	Total Pumping Costs	Average Pumping Costs (per 1,000 gal.)	Average Cost per kWh	Lowest Cost Sources		Highest Cost Sources	
				Cost/ 1,000 Gal.	Cost/kWh	Cost/ 1,000 Gal.	Cost/kWh
2012	$517,056	$0.28	$0.071	$0.19	$0.07	$0.37	$0.15
				Enoch #3	Q Well #8	Northfield & Q Well #6	200 N Pump
2013	$540,978	$0.31	$0.077	$0.12	$0.07	$0.44	$0.17
				Enoch #3	Q Wells #7 & #8	Q Well #6	200 N Pump
2014	$651,762	$0.33	$0.076	$0.22	$0.07	$0.69	$0.18
				Cemetery	Q Well #7	Q Well #6	200 N Pump
2015	$622,472	$0.31	$0.078	$0.22	$0.07	$0.54	$0.10
				Cemetery & Enoch #3	Q Well #6	Q Well #5	Northfield
2016	$678,278	$0.33	$0.078	$0.19	$0.07	$0.47	$0.10
				Cemetery	Q Well #5	Q Well #6	Northfield
2017	$668,058.50	$0.31	$0.075	$0.21	$0.07	$0.49	$0.09
				Enoch #3	Q Well #8	Q Well #6	Northfield & Enoch #1
2018	$695,834	$0.30	$0.070	$0.18	$0.07	$0.44	$0.09
				Enoch #3	Q Well #5	Q Well #6	Enoch #1
2019	$647,442	$0.28	$0.086	$0.177	$0.066	$0.41	$0.11
				Enoch #3	Q Well #5	Q Well #6	Enoch #1
2020	$818,670	$0.26	$0.086	$0.200	$0.063	$0.43	$0.18
				Enoch #3	Q Well #1	Q Well #6	200 N Pump
2021	$763,106	$0.32	$0.070	$0.212	$0.065	$0.42	$0.087
				Cemetery	Q Well #1 & #7	Q Well #5	Q Well #3
2022	$778,782	$0.34	$0.068	$0.22	$0.063	$0.50	$0.083
				Enoch #3	Q Well #8	Q Well #5	Northfield

METERED WATER REVENUE

Calendar Year	Metered Water Sales
2015	$3,886,428
2016	$4,156,131
2017	$4,223,869
2018	$4,395,966
2019	$4,343,018
2020	$4,952,627
2021	$4,561,585
2022	$4,342,998

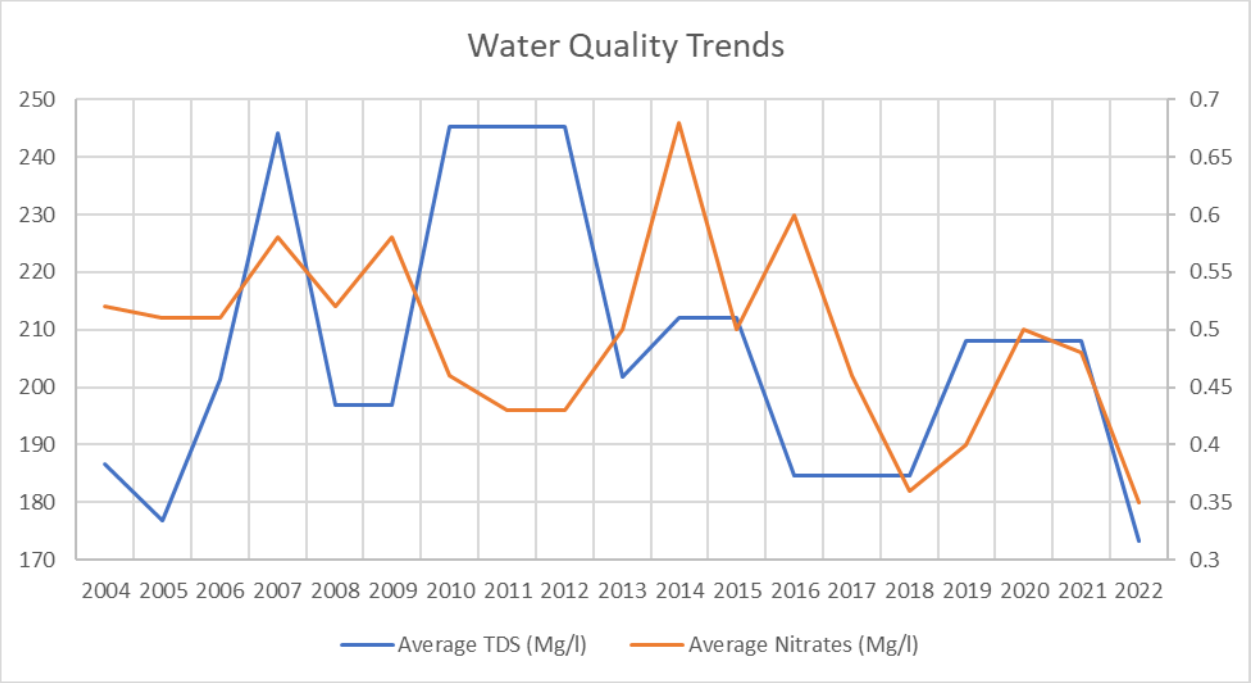
VI. WATER QUALITY INFORMATION AND TRENDS

Water quality for the Cedar City Culinary Water System was well within the standards of the Utah Drinking Water Regulations for all water supplied to the system. The weighted average for Total Dissolved Solids (TDS) and Nitrates was **173.3** and **0.35 mg/L** respectively. Nitrate data will be collected every year for public information.

WATER QUALITY TRENDS

Year	Average TDS (mg/L)	Average Nitrates (mg/L)
2012	No Data	0.43
2013	201.7	0.50
2014	212.0	0.68
2015	No Data	0.50
2016	184.7	0.60
2017	No Data	0.46
2018	No Data	0.36
2019	208.0	0.40
2020	No Data	0.50
2021	No Data	0.48
2022	173.3	0.35

2022 CEDAR CITY WATER REPORT



VII. UNACCOUNTED-FOR WATER INFORMATION AND TRENDS

During the past year, **8.5% of the culinary water produced by the City was unaccounted-for.** Unaccounted-for water includes the following un-metered water uses: leakage, firefighting, main flushing, misread meters, un-metered connections, inaccurate meters and City usage. Based on an evaluation of tank level readings, **3.6% of the culinary water produced was lost due to leakage.** The annual average amount of leakage from the Lake at the Hills in 2022 was -0- gal/hour.

UNACCOUNTED-FOR WATER TRENDS

Year	Culinary Water Unaccounted %	Culinary Water Leakage %	The Lake at the Hills Annual Average Leakage (gal/hour)
2011	6.7	5.8	1,023
2012	9.7	2.1	906
2013	11.2	2.0	961
2014	13.0	4.4	543
2015	13.2	6.5	424
2016	12.4	5.0	1,833
2017	5.4	3.5	282
2018	5.3	4.4	0
2019	11.1	10.2	0
2020	9.4	4.7	0
2021	10.5	9.2	0
2022	8.5	3.6	0
10-year average	10%	5.4%	404.3

2022 CEDAR CITY WATER REPORT

VIII. AQUIFER TRENDS

The following table and charts provide information concerning trends in the Cedar Valley aquifer, including snowpack, static water level in the aquifer, and City water use.

CEDAR VALLEY AQUIFER TRENDS

Year	Total City Water Use[1] (acre-feet)	Peak Snow Water Equivalent (SWE)* at Webster Flat[2]	Date	Water Level in aquifer in Quichapa area[3] (feet below land surface)	Water Level in aquifer in Enoch area[4] (feet below land surface)
2008	7,504	21.6	19-Mar	91.03	64.66
2009	7,573	17.4	10-Mar	94.83	66.52
2010	7,325	27.1	10-Apr	96.83	66.68
2011	7,065	34.2	13-Apr	97.70	67.81
2012	7,448	9.6	20-Mar	92.18	68.51
2013	7,251	12.6	14-Mar	95.80	68.55
2014	7,565	7	8-Mar	96.34	61.97
2015	7,333	10.5	7-Mar	101.60	68.63
2016	7,947	13.4	24-Feb	104.25	71.70
2017	8,040	21.7	9-Mar	107.65	74.67
2018	8,504	13.2	17-Mar	111.76	74.49
2019	8,132	26.7	23-Mar	114.63	79.17
2020	9,757	19.7	1-Apr	115.03	77.00
2021	8,343	10.3	29-Mar	119.25	81.65
2022	7,955	35.5	8-Apr	124.94	87.90

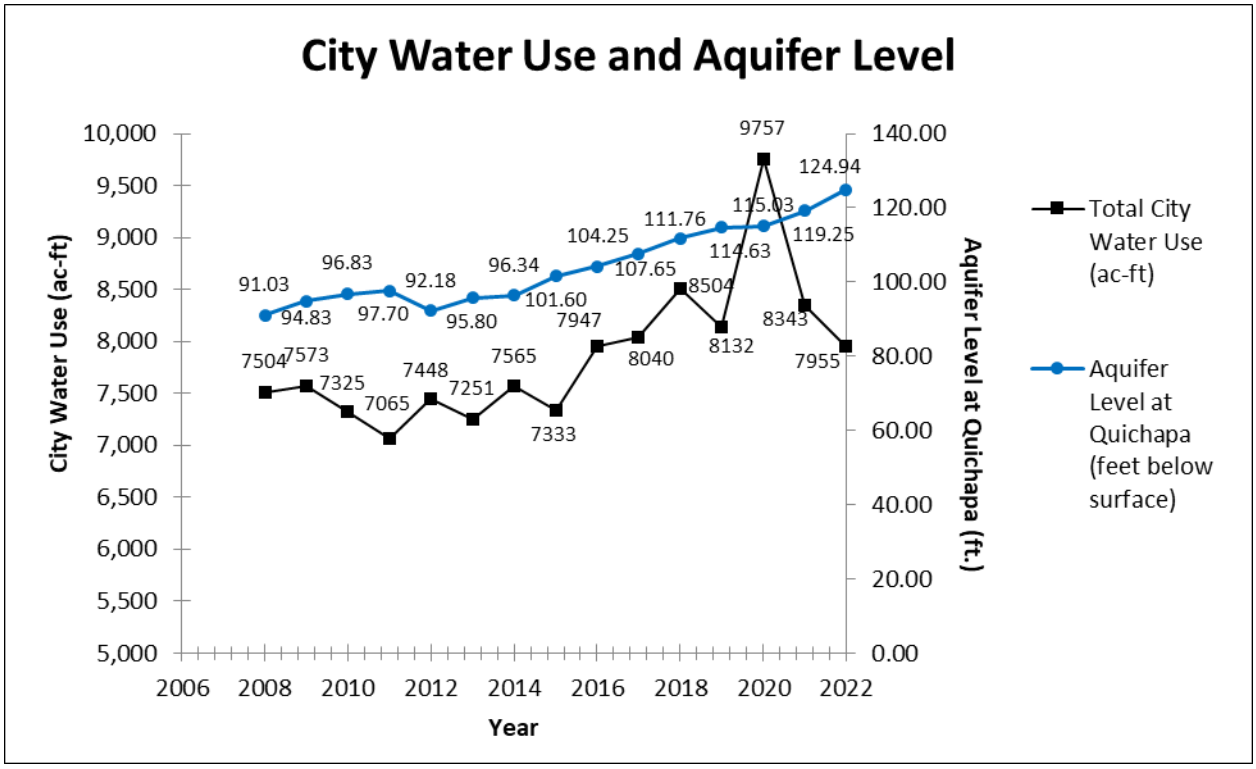
[1]- This column lists the total City water use for the calendar year. This information tracks the effect of the City's usage on the aquifer levels.

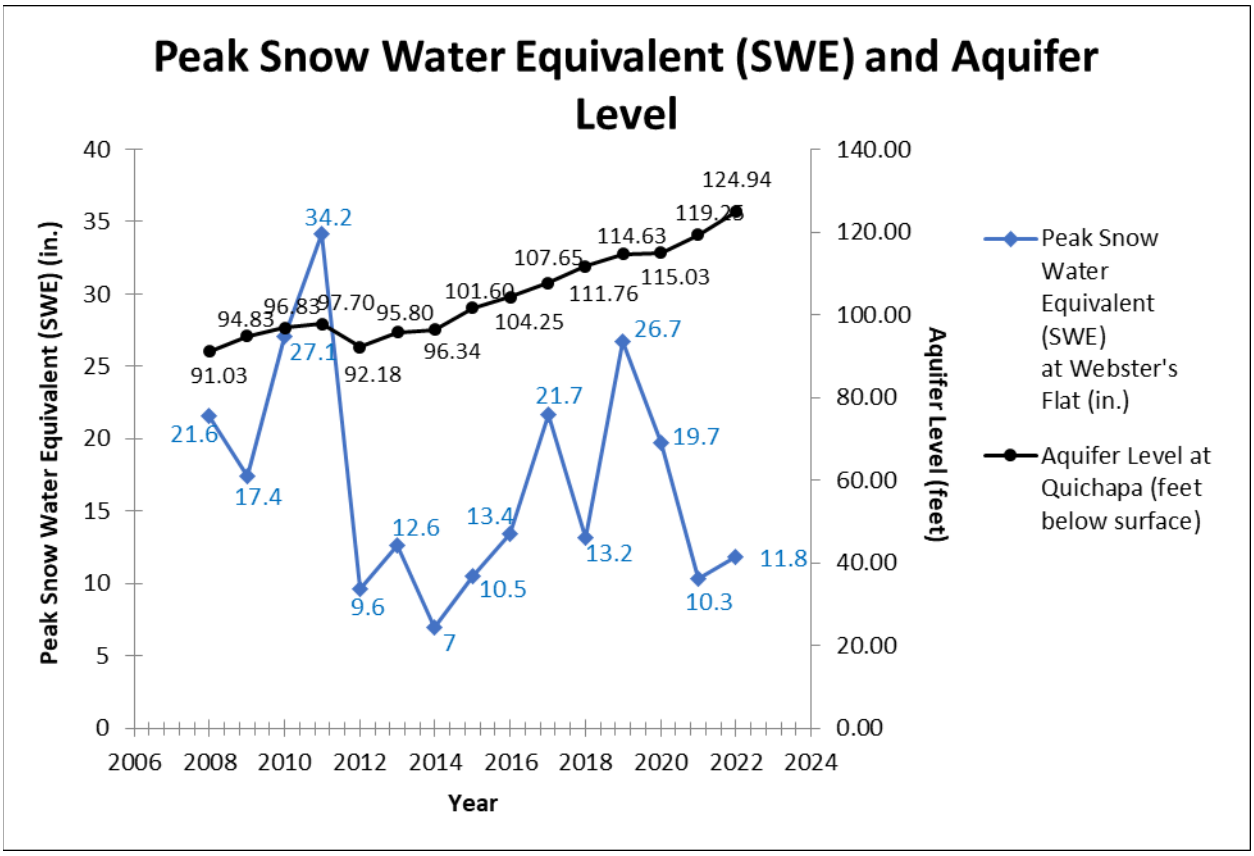
[2]- This data may be obtained from: https://www.nrcs.usda.gov/Internet/WCIS/AWS_PLOTS/siteCharts/POR/WTEQ/UT/Webster%20Flat.html

[3]- This column lists the measured water level in a USGS monitoring well on the west side of Quichapa Lake that is located at approximately 3200 South 8100 West. The depth in the monitoring well is measured in March of each year by the USGS. The water level data is taken from USGS monitoring well 373742113100801 (C-36-12)35adc- 1. (https://nwis.waterdata.usgs.gov/nwis/gwlevels?site_no=373742113100801&agency_cd=USGS&format=html)
*NOTE: First recorded depth of well listed is for the year 1977 - well depth was 75.16'

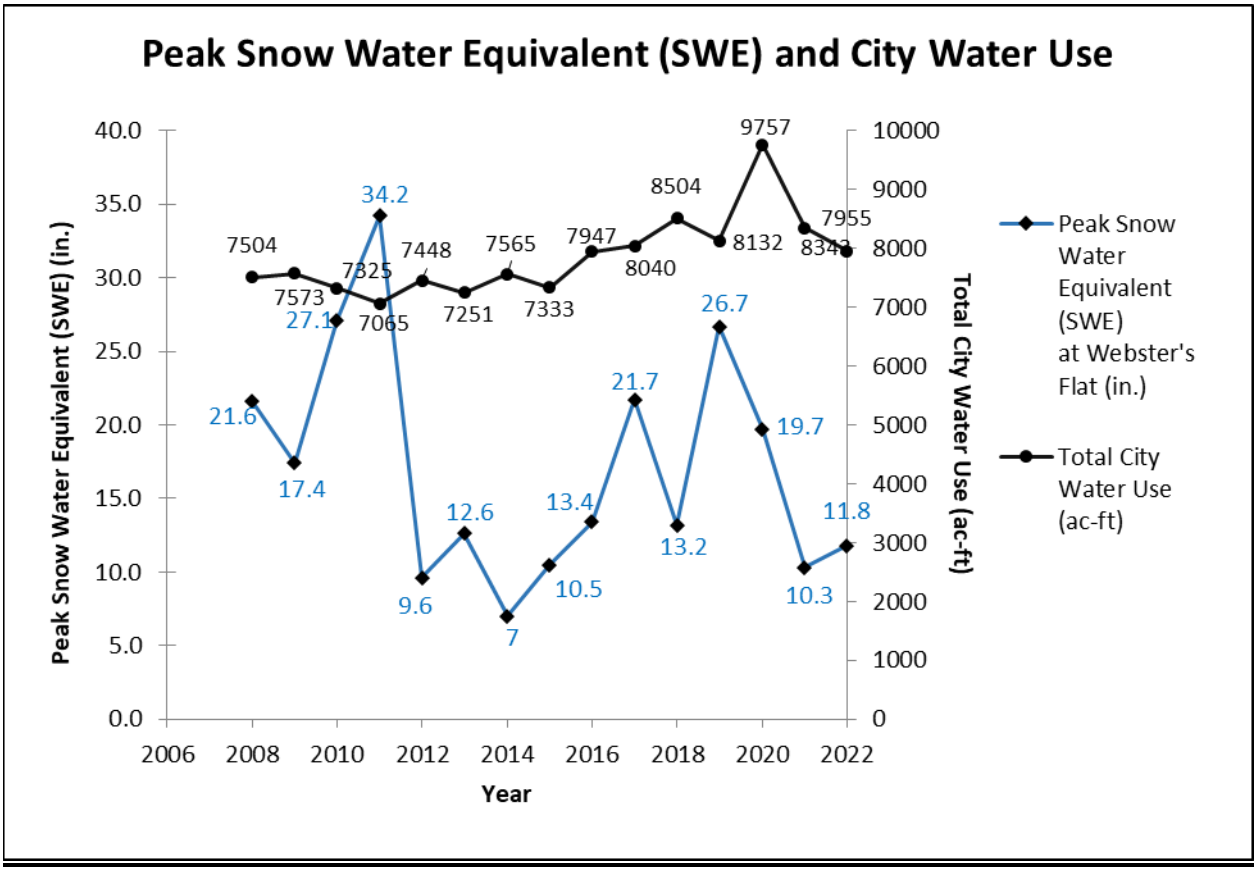
[4]- This column lists the measured water level in a USGS monitoring well in Enoch that is located at approximately 1000 East Midvalley Road. The depth in the monitoring well is measured by the USGS. The water level data is taken from USGS monitoring well 374554113020801 (C-35-11)12dcd-1. (https://nwis.waterdata.usgs.gov/nwis/gwlevels?site_no=374554113020801&agency_cd=USGS&format=html)
*NOTE: First recorded depth of well listed is for the year 1973 - well depth was 33.67'

2022 CEDAR CITY WATER REPORT





2022 CEDAR CITY WATER REPORT



IX. WATER RATES

A. Fixed Charge.

There is a fixed charge each time a bill is rendered as follows:
Monthly Fixed Charge. $17.00

B. Quantity Charge for Culinary Water Use.

In addition to the fixed charge, there is a charge for all culinary water used for each 1,000 gallons as follows:

Single-family Residential (Monthly per Account)

Block 1	First 8,000 gallons or any part thereof	$1.00
Block 2	8,001 to 20,000 gallons or any part thereof	$1.50
Block 3	20,001 to 35,000 gallons or any part thereof	$2.50
Block 4	Over 35,000 gallons	$3.00

Multi-family Residential (Monthly Per Occupied Dwelling Unit)

Block 1	First 5,000 gallons or any part thereof	$1.00
Block 2	5,001 to 10,000 gallons or any part thereof	$1.50
Block 3	10,001 to 15,000 gallons	$2.50
Block 4	Over 15,000 gallons	$3.00

Non-residential (Monthly Per Account)

- First 20,000 gallons $1.00
- 20,001 to 50,000 gallons $1.40
- Over 50,000 gallons $1.71
- Excess Irrigation Usage $2.00

C. Conservation Rates.

Monthly Fixed/Base Charge: $17.00

Residential Conservation Rate

- First 8,000 gallons (per occupied dwelling unit) $1.00
- 8,001 to 12,000 gallons (per occupied dwelling unit) $2.93
- 12,001 to 20,0000 gallons (per occupied dwelling unit) $6.08
- Over 20,000 gallons (per occupied dwelling unit) $6.58

Commercial, Industrial, and Multifamily Conservation Rate

- First 2,000 gallons (per usage unit) $1.00
- 2,001 to 3,000 gallons (per usage unit) $1.50
- 3,001 to 4,0000 gallons (per usage unit) $12.73
- Over 4,000 gallons (per usage unit) $13.23

D. Quantity Charge for Pressurized Irrigation Water Use.

In addition to the fixed charge, there is a monthly charge for all pressurized irrigation water used for each 1,000 gallons as follows:

All Usage	$0.68
Excess Irrigation Usage*	$1.36

*Applies to All Large Irrigation Users as defined.

2022 CEDAR CITY WATER REPORT

X. CAPITAL IMPROVEMENT RECOMMENDATIONS

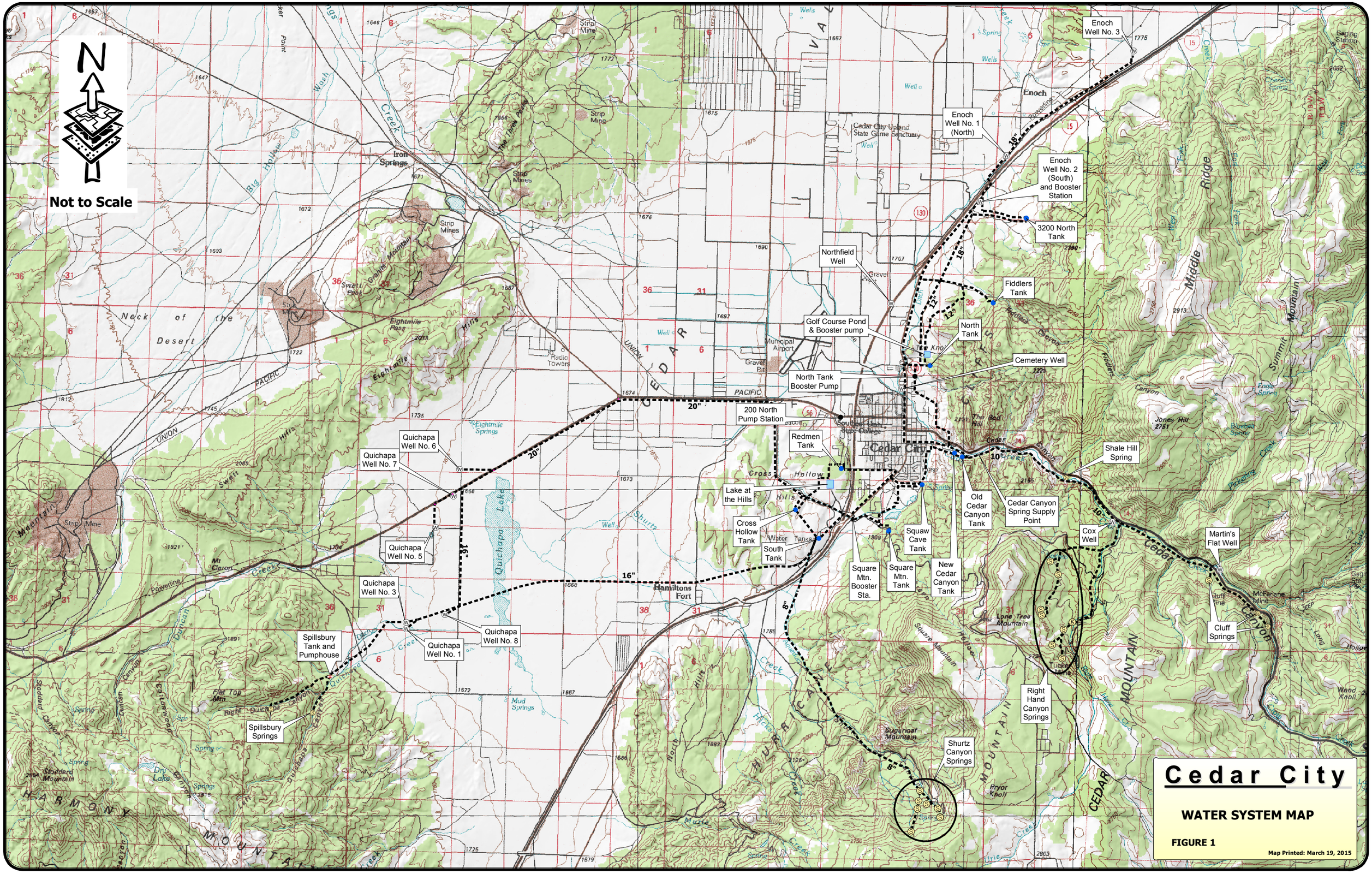
No.	Capital Item (anticipated year of completion) (* - New projects added in this year's report are marked with an asterisk.)	Estimated Cost
1	Water Line Upsizing for master-planned water lines	As needed
2	Purchase Water Rights	Based on offers
3	Water Master Plan update (2023)	$175,000
4	North Tank Interior Re-coating/Floor Replacement (2023 & 2024)	$750,000
5	Groundwater exploration project – 2 Test Wells (2023)	$1,000,000
6	Right Hand Canyon Springs surge box (2023)	$35,000
7	450 West Waterline Replacement – 200 S. to 600 S. (2023)	$738,000
8	College Ave. Waterline Replacement – Main St. to 200 E. (2023)	150,000
9	Cedar Canyon Water Tank Stabilization (2023)	337,000
10	Water Rights Assessment (2023)	$120,000
11	Culinary Production Well (2023)	$1,950,000
12	Culinary Production Well (2023)	$2,000,000
13	1700 West Waterline Loop/Replacement (2023)	$255,000
14	Chlorination System for Wells (2023)	$70,000
15	Industrial Road Water Improvements (2023)	$330,000
16	Groundwater Exploration - 2 additional Test Wells (2023)	$900,000
17	WWTP Effluent Re-use (2023)	$1,300,000
18	Culinary Production Wells (2) – 1 East side & 1 SE side (2024)	$4,000,000
19	North Water Basin Exploration (2024)	$400,000
20	Cedar Canyon Waterline – Milt's to Tank (2024)	$5,200,000
21	Quichapa South Line Cathodic Protection (2024)	$250,000
22	Aime Avenue Waterline re-location (2023)	$28,000
23	Groundwater Exploration - 2 Test Wells in Shurtz Canyon (2024)	$800,000
24	Culinary Production Wells (2) – Shurtz Canyon (2024)	$5,000,000
25	Culinary Production Well – Martin's Flat A (202)	$2,000,000
26	North Watershed Well Siting Study	$400,000
27	Groundwater Exploration – Test Well near WWTP (2024)	$400,000
28	Effluent pump box at WWTP (2024)	$800,000
29	New 5 mil. gallon Water Tank (2025)	$5,000,000
30	Groundwater Exploration – 5 Test Wells in north area (2025)	$2,000,000
31	WWTP Effluent pipeline & recharge (2025)	$10,000,000
32	New 5 mil. gallon Water Tank (2026)	$6,000,000
33	Culinary Production Wells (3) – North watershed (2026)	$6,000,000
34	Pipeline from North watershed to Cedar City (2026)	$6,000,000
35	College Ave. waterline replacement – 200 E. to 400 E.	$150,000
36	Install waterlines per Master Plan/Waterline replacements	$400,000 annually
37	Fiddlers Tank Interior Re-coating	$700,000
38	Redmen Tank Interior Re-coating	$700,000
39	Square Mountain Tank Interior Re-coating	$700,000
40	Cross Hollow Tank interior Re-coating	$700,000
41	CICWCD inter-connection	$1,750,000

XI. OTHER

- Design and Construction for many of the necessary upgrades and maintenance of Cedar City's Water System were considered, scheduled, designed and constructed. Among projects that were started or completed in 2022 are:

    - North Tank Interior Re-coating
    - Water Rights Assessment
    - 800 South Water Tank Design
    - Update Water Master Plan
    - 500 West Waterline Replacement
    - Test Wells Project
    - Right Hand Canyon Springs Surge Box

XII. SYSTEM MAP



Cedar City

WATER SYSTEM MAP

FIGURE 1

Map Printed: March 19, 2015

APPENDIX A

SYSTEM INFORMATION

CULINARY SUPPLY DATA

WELL	DEPTH (FT)	CASING DIAMETER (INCHES)	DDW SOURCE CAPACITY[1] (GPM)	MAXIMUM CAPACITY FOR CONSUMPTION[2,3] (GPM)
Enoch Well #1	875	16	1300	1000
Enoch Well #3	1030	16	1461	1750
Quichapa Well #1	900	16	1100	1100
Quichapa Well #3	697	16	1300	1100
Quichapa Well #5	1006	16	1267	1300
Quichapa Well #6	604	16	1333	1200
Quichapa Well #7	1020	16	1500	1300
Quichapa Well #8	960	16	1391	1450
Shurtz Cnyn. Springs	N/A	N/A	181	350 (215)
Cedar Cnyn. Springs	N/A	N/A	441	400 (440)
Spilsbury Springs	N/A	N/A	101	200 (310)
		Total =	**11,375**	**11,150**

PRESSURIZED IRRIGATION SUPPLY DATA

WELL OR PUMP STATION	DEPTH (FT)	CASING DIAMETER (INCHES)	FLOW CAPACITY (GPM)	MAXIMUM CAPACITY FOR CONSUMPTION (GPM)
Cemetery Well	670	14	1400	1400
Northfield Well	865	12	900	900
200 North Pump Station	N/A	N/A	1800	1800
			Total =	**4,100**

Total Supply = <u>15,250 gpm</u>

[1] This column is the allowable source capacity per the Division of Drinking Water (DDW) minimum sizing requirements. Refer to data submitted by Jonathan Stathis to Chris Martin of DDW by email on January 23, 2020.
[2] This column is the typical maximum capacity available at each source during peak summer months. Quichapa Well #1 was put back in service in 2019. The capacity for Enoch Well #1 was changed in 2019 from 800 to 1,000 gpm based on flow meter data.
[3] Spring Values in parenthesis are the average of the last 5 years' annual production rate.

CULINARY WATER TANK DATA

Tank	Volume (gal.)	Base Elevation (ft)	Height (ft)	Overflow Elevation (ft)	Diameter (ft)	Radius (ft)	Circum-ference (ft)
North Tank	2,086,858	5,975.78	32	6,007.78	105.36	52.68	331
Canyon Tank (Old)	1,522,468	5,993.70	30	6,021.70	92.95	46.48	292
Canyon Tank (New)	2,033,472	5,977.80	32	6006.8	104	52	327
Squaw Cave Tank	945,189	6,059.00	35	6,092.00	67.8	33.9	213
Square Mt. Tank	2,159,787	6,262.31	28	6,288.31	114.59	57.3	360
Fiddlers Tank	2,159,787	6,159.78	28	6,185.78	114.59	57.3	360
Cross Hollow Tank	2,159,787	6,154.15	28	6,180.15	114.59	57.3	360
South Steel Tank	2,039,439	6,063.92	36	6,097.92	98.19	49.1	308
Redmen Tank	1,016,578	6,059.00	38	6,095.00	67.93	33.96	213
Spilsbury Tank	105,934	5,792.00	24	5,815.00	28	14	88
3200 North Tank	2,461,238	5,993.00	39.5	6,031.00	105	52.5	330
Total	**18,690,537**						

IRRIGATION RESERVOIR DATA

Reservoir	Storage Volume (Gal)	Base Elevation (ft)	Overflow Elevation (ft)
The Lake at the Hills	32,246,000	5994	6010
Golf Course Pond	2,914,100	5856	5871
Total	**35,160,100**		

Total Storage= 53,850,637 gallons

WATER CONNECTIONS FOR CEDAR CITY

Year	Total Connections	% Change
2012	8,233	0.97
2013	8,348	1.40
2014	8,499	1.81
2015	8,663	1.93
2016	8,801	1.59
2017	8,985	2.09
2018	9,226	2.68
2019	9,404	1.93
2020	9,862	4.87
2021	9,214*	
2022	9,778	6.12

*- reflects a change in system reporting proceedures. A reduction in connections did not occur, rather inactive and replaced connections were removed from the report.

2022 CULINARY WATER AVERAGE DEMAND
(2022 Population = 38,505)

Month	Culinary Water (per person/month)	
	AF	Gallons
January	0.009	2,839
February	0.008	2,658
March	0.009	2,930
April	0.011	3,697
May	0.022	7,225
June	0.026	8,633
July	0.028	9,113
August	0.019	6,272
September	0.022	7,183
October	0.015	4,916
November	0.009	3,025
December	0.009	3,051
Average	**0.016**	**5,129**

2022 - Pre-July CULINARY WATER SYSTEM RATES

Single-Family Residence	
1-month base rate	$17.00
0-8,000 gal	$0.90/1,000 gal
8-20,000 gal	$1.00/1,000 gal
20-35,000 gal	$2.00/1,000 gal
> 35,000 gal	$2.16/1,000 gal

2022 - Post-July CULINARY WATER SYSTEM RATES

Single-Family Residence	
1-month base rate	$17.00
0-8,000 gal	$1.00/1,000 gal
8-20,000 gal	$1.50/1,000 gal
20-35,000 gal	$2.50/1,000 gal
> 35,000 gal	$3.00/1,000 gal

2022 PIPE SUMMARY

Cedar City Area

23,242.62 acres

36.32 mi^2

WATER MAINS IN CEDAR CITY LIMITS (Feet)

SIZE	2014	2015	2016	2017	2018	2019	2020	2021	2022
2”	15,325	14,852	14,358	14,358	14,104	13,234	13,306	13,306	13,306
3”	6,081	6,101	6,101	6,101	6,116	6,116	6,164	6,164	6,164
4”	86,265	85,230	84,290	84,096	83,853	82,709	82,709	82,709	82,775
6”	241,687	242,320	242,816	243,221	244,284	244,047	244,709	245,050	246,863
8”	277,180	281,839	289,888	298,023	304,922	321,289	332,531	333,055	366,314
10”	82,395	82,405	82,405	82,405	82,405	82,498	82,498	85,949	87,857
12”	70,126	71,831	72,370	72,872	72,872	80,972	83,172	86,632	88,726
14”	13,834	13,834	13,834	13,834	13,834	13,834	13,834	18,999	20,648
16”	36,951	36,951	36,951	36,951	36,951	38,520	38,520	38,520	40,137
18”	25,274	25,274	25,274	26,587	26,587	27,142	27,142	27,142	27,490
20”	20,840	20,840	20,840	20,840	20,840	21,380	21,380	22,266	23,519

Totals (ft)	875,958	881,477	889,127	899,288	906,768	931,741	945,965	1,209,629	1,003,799
Totals (mi)	165.9	166.9	168.4	170.3	171.7	176.5	179.2	229.1	190.1

WATER MAINS OUT OF OUR CITY LIMITS (Miles)

2013	2014	2015	2016	2017	2018	2019	2020	2021	2022
61.7	61.7	61.7	61.7	61.7	61.7	61.7	61.7	61.7	61.7

APPENDIX B

WATER RIGHTS

WATER RIGHTS ACQUIRED IN 2022

Water Right No. or Irrigation Company	Source	Diversion Amount (ac-ft)	Date of Recording Water Right Deed	Date of Report of Conveyance or Certificate Date
73-1962	Onado Annexation	0.4	2/9/22	2/16/22
73-1969	Onado Annexation	46.16	2/9/22	2/16/22
73-190	Purchase from Sevy Land & Livestock	100.0	12/21/22	1/2/23
Underground Water Rights subtotal =		**146.56**		
North Field Irrigation Co.	Acquired from Heritage Land: Cedar Breaks Townhomes PUD 4.2 shares (Certificate #596)	13.734	N/A	9/28/22
Surface Water Rights subtotal =		**13.734**		
Total Water Rights Acquired in 2022 =		**160.294**		

APPENDIX C

WATER USAGE

DATE	January	February	March	April	May	June	July	August	September	October	November	December
1	3277219.13	3762678	3328646.806	2773201.2	7208411.52	12149809.1	9672343	7216170.74	7783465.833	6977922	3612635.1	3414280.71
2	2575719.13	3801478	2822246.806	3388701.2	9058311.52	8139409.13	10771543	8399070.74	10799565.83	6798622	4355235.1	3751980.71
3	3379919.13	3809078	2820346.806	4031001.2	8562611.52	9957009.13	11588043	9384970.74	10329465.83	7665122	4291635.1	3635780.71
4	2800119.13	3453178	4121446.806	4115601.2	10137911.5	10538509.1	11438843	6899670.74	10368365.83	6539422	3379235.1	4171780.71
5	3001119.13	2279078	3863146.806	3991201.2	8959911.52	9736309.13	12538243	7042570.74	10120365.83	6625222	4580435.1	4150080.71
6	2562419.13	3520078	3360246.806	4974501.2	6406111.52	9661509.13	11978543	5802570.74	11776765.83	7135722	4549435.1	4368180.71
7	3843919.13	3914278	2908546.806	3627801.2	8268611.52	10564009.1	11285443	8379970.74	11415165.83	7140622	4550235.1	3846080.71
8	4089719.13	4018078	2692046.806	4255201.2	8549511.52	10343209.1	11989243	8359470.74	10968465.83	6875022	4092435.1	3968380.71
9	4217619.13	2568078	3720346.806	4786901.2	7857311.52	13113409.1	12229943	9437270.74	10769365.83	7005122	4272035.1	4424280.71
10	3989019.13	4746778	3886546.806	4249201.2	8737211.52	9028509.13	11506943	10536670.7	8984365.833	7809722	3602835.1	3208080.71
11	1790719.13	4058778	3815946.806	4361601.2	7284911.52	11454709.1	13262643	9719270.74	10837865.83	6713622	3894635.1	4433680.71
12	5162819.13	3441078	3789746.806	3953401.2	7739111.52	10759109.1	11383243	9081270.74	9316765.833	7559622	4349835.1	4155980.71
13	4546319.13	2528878	2722446.806	4231301.2	7802411.52	12411009.1	12800643	7585370.74	10363565.83	7071122	3578735.1	3748680.71
14	2849519.13	3645978	3218346.806	5141301.2	8169711.52	11863909.1	11575643	5601370.74	9821365.833	6935022	4393135.1	3404880.71
15	4166819.13	3776878	3844846.806	3452501.2	8727711.52	10976109.1	11858243	6211470.74	7068565.833	6832922	4682335.1	3946380.71
16	4324819.13	3757078	4040146.806	4290501.2	9543611.52	10928409.1	10263443	6170270.74	5759265.833	6734022	4107735.1	4756080.71
17	3616119.13	3936478	3735546.806	4073501.2	9634011.52	10557409.1	10918043	7970570.74	8289665.833	6029722	3506035.1	4482080.71
18	2789719.13	3962078	3549946.806	4468501.2	6355711.52	11099509.1	12732443	8745370.74	8769565.833	7238522	3595635.1	4114580.71
19	2569819.13	2938478	3743146.806	4609401.2	7254211.52	12078309.1	11137343	6780070.74	8868365.833	6592522	4149535.1	3575580.71
20	3885719.13	2935778	3746846.806	5025601.2	9990711.52	10182309.1	11761243	7254270.74	8751865.833	6115022	3650335.1	5320280.71
21	4197119.13	3854278	3823846.806	6744401.2	10969011.5	11032109.1	12790143	4285070.74	7343865.833	6013622	3565235.1	2045180.71
22	4028819.13	4097378	4071746.806	5496301.2	12069511.5	11959209.1	10381143	4912970.74	8703265.833	6600122	3878835.1	4205480.71
23	3991419.13	4395578	3955246.806	6474901.2	9510211.52	12950309.1	11378743	7304770.74	9197565.833	5385922	4391035.1	4124580.71
24	3785819.13	3997178	3895446.806	6092601.2	9613311.52	10497709.1	11333243	8709170.74	8493465.833	3649522	3284935.1	2809080.71
25	3202719.13	4106778	3778946.806	5258801.2	10098711.5	12074509.1	11320843	8341770.74	8608765.833	4569622	3477135.1	3125680.71
26	3088919.13	3900678	3966946.806	5930501.2	10781011.5	10843409.1	12115043	8107470.74	8262265.833	4557122	3023735.1	3195580.71
27	4007619.13	3894078	3907746.806	5857301.2	9810911.52	11442009.1	10416443	7799170.74	9858465.833	4146122	3043035.1	3408980.71
28	2824519.13	3228478	4217046.806	4821301.2	10463011.5	14327009.1	10780043	5932370.74	8410365.833	4069122	3205635.1	3239680.71
29	3062319.13	0	3882346.806	5931901.2	9777011.52	9742209.13	8923243	9684670.74	9437065.833	3771322	3826435.1	3989280.71
30	3764619.13	0	4125046.806	5955901.2	8800811.52	12010209.1	8868243	9760070.74	7093665.833	3666522	3596035.1	3646780.71
31	3913319.13	0	3472246.806	0	10073911.5	0	9909443	10093570.7	0	4481222	0	2830080.71
									0			
TOTALS	109306393	102328684	112827151	142364836	278215457	332421174	350908633	241508793	276570975	189304882	116486153	117497502

WELL: DAILY TOTALS CULINARY YEAR: 2022 TOTAL IN GALLONS: 2,369,740,633

DATE	January	February	March	April	May	June	July	August	September	October	November	December
1												
2												
3												
4												
5												
6												
7												
8												
9												
10												
11												
12												
13												
14												
15												
16												
17												
18												
19												
20												
21												
22												
23												
24												
25												
26												
27												
28												
29												
30												
31												
TOTALS	0	0	0	0	0	0	0	0	0	0	0	0

WELL: ENOCH WELL #1 YEAR: 2022 TOTAL IN GALLONS: 0

DATE	January	February	March	April	May	June	July	August	September	October	November	December
1					1065600	2766700	1941700	878200				
2					2662700	1977000	2305300	1904100	2079800			
3					2272700	2075600	2402700	2500600	2570600			
4					2077400	2515600	2393300	2057700	2165600			
5					3135600	2296900	2618600		2396900			
6					1543000	2503300	2564900		2877200			
7					2393500	2395900	2407900		2381700			
8					2404700	2408100	2475100	374800	2405300			
9					3028400	2883700	2343400	2409000	2361400			
10					2592700	1799200	2376100	2415400	2353100			
11					2196800	2324200	2839700	2476900	2265500			
12					2104700	2420800	1849300	2063000	2618300			
13					2098700	2670100	2973500	2366500	2370700			
14					2377200	2968100	2002700		2374400			
15					2408800	2099800	2085800		445300			
16					2732900	2472000	2246400	381100	155800			
17					2822900	1886100	2409600	2501800	2339500			
18					2273700	2631300	2877400	2333100	2399400			
19					2453200	2468500	2717100	2088500	2830200			
20					1786900	2298200	1882700	2252500	2207700			
21					2398700	2420500	2871000					
22					2401500	2659300	1820200		1634700			
23					2778100	2266000	2296600	1526900	2010800			
24					2363900	2172800	2412000	2478100	2313300			
25					2338400	2296400	2403800	2373300	2378600			
26					2725800	2402200	2859000	2026000	1852100			
27					1760700	2587600	2514000	2278500	2183600			
28					2392600	3108500	2373500		1952800			
29					2399500	1736800	2289200	3103000	2179800			
30					2403100	2409700	2283000	2149700				
31					2749600		2402200	2449100				
TOTALS	0	0	0	0	73144000	71920900	74237700	47387800	58104100	0	0	0

WELL: ENOCH WELL #3 YEAR: 2022 TOTAL IN GALLONS: 324,794,500

DATE	January	February	March	April	May	June	July	August	September	October	November	December
1					1273200	1445700	1301600	812900	1165000	802500		
2					1395600	819700	1275400	1380800	1123900	738700		
3					1334700	1201500	1355000	1302200	1023000	715400		
4					1311900	1131000	1335800	1037700	1038600	542000		
5					1212600	1098400	1253600	967800	973300	804500		
6					95100	1289500	1012900	993400	934300	856900		
7					1201000	1365700	1074700	1085000	1021900	797900		
8					1252900	779100	1348100	1000200	1021300	537100		
9					1077200	1420900	1348500	1197400	966200	680300		
10					935000	1037000	1360400	1382400	683100	810800		
11					794000	1433900	1497100	1366400	871700	481600		
12					908500	1268200	1335800	1248300	767200	762300		
13					981900	1565300	1328600	837300	727300	736700		
14					1131300	1301400	1278500	832500	760900	742800		
15					1251300	1384100	1179600	923900	679700	782100		
16					1732200	1360500	943200	880600	561400			
17					1374500	1346600	1131000	1086600	608900	937900		
18					1156800	1291900	1478800	869300	831600	840600		
19					1411600	1552800	1053600	691600	971000			
20					1306200	1316800	1411000	705200	926700			
21				1432900	1167000	1360400	1325500	736700	895600			
22				1215200	912500	1412800	1262000	932900	656500			
23				1474300	943300	1461500	1295500	1088900	695600			
24				1321400	955600	1206100	1347100	1159600	692300			
25				1354800	907800	1253300	1346800	1072400	832900			
26				1289300	1015100	933600	1207400	1041800	965700			
27				1473100	1013900	1263900	971000	790500	915800			
28				974000	1026600	1390200	936700	1040900	763100			
29				1196800	1076000	1165700	747100	1226600	890000			
30				1286000	1137000	1357600	913800	1171200	787600			
31					1183800		901800	1207700				
TOTALS	0	0	0	13017800	34476100	38215100	37557900	32070700	25752100	12570100	0	0

WELL: QUICHAPA WELL #1 YEAR: 2022 TOTAL IN GALLONS: 193,659,800.00

DATE	January	February	March	April	May	June	July	August	September	October	November	December
1												
2												
3												
4												
5												
6												
7												
8												
9												
10												
11												
12												
13												
14												
15												
16												
17												
18												
19												
20												
21												
22												
23												
24												
25												
26												
27												
28												
29												
30												
31												
TOTALS	0	0	0	0	0	0	0	0	0	0	0	0

WELL: QUICHAPA WELL #3 YEAR: TOTAL IN GALLONS: 0

DATE	January	February	March	April	May	June	July	August	September	October	November	December
1						2559700	1510200	585500	1762000	1646500		1365400
2						1269100	1344100		1550200	1490700		1580600
3						1029500	1018500		931300	1905400		1403800
4						954400	916500		896700	1628100		1715000
5						993700	1045400		561600	1484700		1806800
6						1161100	1288500		1238600	1753200		1557500
7						1879600	1169500		1510000	1725200	78000	1508900
8						1913000	1177800		1285100	1718900	1021600	1566500
9						2163700	1460900		2183300	1707100	1476200	1726200
10						1392300	1514400		45400	1864900	1006000	1130500
11						1858500	1236800		1320400	1709500	1117800	1600400
12						1634800	1428000		1363500	1846100	1243000	1402400
13						1969000	1570900		768900	1713700	1027900	1402400
14						1780700	1373400		567500	1683400	1318200	1103700
15						1782400	1576200		715000	1630200	2038700	1527300
16						1725700	825000		631100	1901600	1677200	2013100
17						1739700	746400		672600	892300	1164500	1860200
18						1684100	1015500		798900	1745900	1382000	1651400
19						1977200	800800		2053500	1793300	1720800	1191900
20					1554700	1750900	1632700		1968000	1704800	1371900	1297400
21					1860700	1750700	1497200		1742400	1364000	1028700	1335600
22					1423500	1101300	1300400		1770100	1740100	1556200	1725900
23					1513300	1493700	1299700		1680800	2054300	1812000	1554200
24					1888400	1375700	898500		1214200	1733800	1266600	848100
25					1382100	950000	917500		1099800	1978200	1303400	949300
26					1493100	928300	1095400		888200	1825400	960400	944000
27					1462900	1669400	858900		1751900	1702700	968000	1020600
28					1418500	1709100	770100		1575000	1764900	1047400	987400
29					852200	805300	673800	400	1750100	1506500	1343700	1414100
30					735300	1298100	955000	1586100	1671500	1358300	1436500	1450800
31					2047800		1082600	1746600		1374900		966000
TOTALS	0	0	0	0	17632500	46300700	36000600	3918600	37967600	51948600	30366700	43607400

WELL: QUICHAPA WELL #5 YEAR: 2022 TOTAL IN GALLONS: 267,742,700

DATE	January	February	March	April	May	June	July	August	September	October	November	December
1						2956000	1941000	2168000	2023000	1925000	1743000	
2						1409000	1914000	1995000	2005000	2099000	2250000	
3						2317000	2004000	2213000	1806000	2293000	2199000	
4						2136000	2021000	2134000	2048000	1979000	2173000	
5						2070000	2161000	1939000	2011000	2019000	2008000	
6						2362000	2095000	2120000	2015000	2043000	2270000	
7						2136000	1865000	2218000	1886000	2049000	2300000	
8						2165000	1836000	1997000	1920000	2016000	2364000	
9						2539000	1942000	2160000	1946000	2009000	2080000	
10						1670000	1998000	1907000	1828000	2162000	2086000	
11						2178000	2213000	2059000	1915000	2010000	2133000	
12						1923000	1897000	2145000	2202000	2211000	2392000	
13						2261000	1881000	1814000	1993000	2018000	1994000	
14						2231000	1881000	2067000	2073000	1955000	2151000	
15						2045000	1832000	2338000	2211000	1926000		
16						1968000	1863000	2046000	1835000	2232000		
17						2057000	2029000	2266000	2012000	2050000		
18						1989000	2260000	2079000	2087000	2040000		
19					0	2354000	2041000	2239000	2161000	2111000		
20					2131000	2043000	1820000	2037000	2191000	2005000		
21					2127000	2047000	1909000	2186000	2012000	1962000		
22					2128000	2081000	1950000	2359000	2086000	2164000		
23					2290000	2158000	1845000	2118000	2000000			
24					2158000	1836000	1986000	2214000	1975000			
25					2142000	1900000	2011000	2096000	2097000			
26					2209000	2047000	2047000	2201000	2216000			
27					2206000	2219000	2047000	2049000	2353000			
28					2111000	2326000	2086000	2133000	1819000			
29					2169000	1703000	1684000	2266000	2013000			
30					2254000	1971000	2113000	2118000	1977000			
31					2208000		2057000	1947000		520000		
TOTALS	0	0	0	0	26133000	63097000	61229000	65628000	60716000	45798000	30143000	0

WELL: QUICHAPA WELL #6 YEAR: 2022 TOTAL IN GALLONS: 352,744,000

DATE	January	February	March	April	May	June	July	August	September	October	November	December
1		2084800	2732800	2112100	2094500			1135300	38300			
2		2131600	2102900	2101800	2201800		865100	2040600	1616500			
3		2122400	2107700	2105100	2102700		2091400	2201600	1932900			
4		2098900	2036300	2134400	4108300		2096800	848100	2135600			
5	300	1781100	2034400	2104800	2020100		2277500	2002800	2089500			
6	1843800	2101400	2160900	2526700	2038100		2183500	657300	2169700			
7	1087500	2144400	2246700	1756500	2070100		1933500	2291100	2041900			
8	2117200	2254800	2121200	1918400	2124600		1954700	2073100	2041900			
9	2187100	2046100	2147700	2113100	2001400		2052900	2122400	1994800			
10	2310700	2046100	2033900	2057800	2184100		1302900	2016600	1920300			
11		2288900	2110600	2311600	1986700		2280100	1106800	2062600			
12	2223400	2050100	2049200	2103100	2101300		2032300	1487900	1058200			
13	2012700	2053900	2113600	2078100	2047800		2114800		2079600			
14	2195900	2038200	2192800	3132600	2073800		1940300		2031900			
15	1995600	2128800	1987800	1175000	2310000		2062100		2249700			
16	2097300	2102200	2343800	2057600	1845000		1931000		1935100			
17	2123300	2106100	1940400	1906700	2088700		2092800		2020800			
18	2231100	2197900	2000100	2103400			2329200		1915800			
19	2039200	1719000	2103600	2170000			1962600					
20	2094100	2126200	2111200	2085200			2123900					
21	2080600	2148600	2100900	2131200		784800	2022200					
22	2098100	2115300	2190300	1843700	2009500	2023800	1999400					
23	2084600	2276000	2144200	2206500		2168200	1955000					
24	2119000	2035100	1984400	2067400		933700	2055300					
25	2648800	2093100	2094300	2142900		2970400	2075900					
26	1587800	2035600	2114700	2105600		1688900	2150000					
27	2177500	2097600	2114500	2486100		274000	1418600					
28	2013200	1605200	2151600	1626900		2460100	2157000					
29	2122400		2117400	2100700		1776400	1303900					
30	2096700		2072800	2061600		2069700	48800					
31	2159100		2090000				845600					
TOTALS	51747000	58029400	65852700	62826600	39408500	17150000	55659100	19983600	33335100	0	0	0

WELL: QUICHAPA WELL #7 YEAR: 2022 TOTAL IN GALLONS: 403,992,000 ,

DATE	January	February	March	April	May	June	July	August	September	October	November	December
1	2435600	1163900	0	0	2147400	453800	1829500	705700	2034300	1918200	1168800	1399700
2	1934100	1148900	0	652800	2287500	933700	1707300		1751300	1792500	1512400	1580200
3	2527300	1163700	32300	1178800	2161800	1500500	1437100		1394800	2046600	1482800	1551800
4	2134500	879300	1411300	1225100	2087600	1889600	1439100	56600	1437000	1689600	638400	1744600
5	2218200		1222900	1238300	1996900	1660400	1711800	1446400	1338200	1673300	1937600	2207100
6		918700	469500	1754700	2125200	602700	1642400	1374300	1817100	1971900	1607600	1679500
7	2089800	1225900	0	1142200	2080300	1128900	1618500	1960300	1907800	1973800	1541400	1566000
8	1297900	1255300	0	1654700	2109600	1342100	1824200	2289800	1545000	1998300		1657700
9	1377900		914800	1943700	1175600	2458200	1873900	871900	626800	1991000		2095900
10	875700	2229700	1183800	1537300	2388700	1562100	1771800	2057700	1584600	2202300		1485400
11	1285100	1242900	1119500	1208900	1798700	2116200	1721600	2066600	1674800	1997800		2130100
12	2039800	891000	1017700	1218200	2021900	1872400	1734500	1490500	800700	2114500		2050400
13	1779000		0	1297100	2111300	2280700	1856500	1840000	1533200	2002000		1666100
14		1114800	313700	1324600	2095700	1990800	1812400	2016300	1343800	1983100	186100	1566000
15	1469600	1171100	1211200	1414400	2118900	2049900	1987200	2252000		1905900	2001800	1780900
16	1526900	1172900	1234500	1529800	2572800	1993300	1366500	2090000		1953700	1841700	2092800
17	886200	1325400	1095300	1407700	2107200	1986100	1318900	1434600		1656800	1650700	1951700
18		1258200	1130000	1658000	1771500	1927300	1466200	2747400		2019300	1592800	1791000
19		767500	1171700	1586300	2171700	2278900	1345900	1029400	84800	2085500	1854900	1690500
20	1288000	325600	1168800	2155300	1963200	1296500	1751600	1431000	793600	1864500	1634600	3267700
21	1621900	1217700	1203100	2198200	2047900	1201800	1911900	654800	1991000	2058900	1808700	74400
22	1455100	1455100	1180600	1847300	1641800	1288100	1050800	773500	2069100	2180300	1730800	1821400
23	1398200	1518600	1196200	2265000	354800	1903000	1621600	1817400	1943500	2721900	1858200	1810200
24	1117200	1395100	1149200	2116700	638700	1637500	1429000	2162900	1590800	1380000	1450500	1384800
25	41300	1444700	1109800	1256000	1621700	1408500	1443500	2059500	1532600	2137700	1587900	1543200
26	990500	1220100	1182400	1925500	1703300	1423500	1539900	2069100	1639400	2005000	1432500	1528400
27	1329500	1146500	1191400	1416000	1646700	1925200	1407600	1998600	1909300	1807700	1426200	1670200
28	299700	861300	1267600	1641300	1629600	1985200	1355400	2081900	1664600	1728500	1555400	1560100
29	470300		1159100	2115300	1418600	1229100	1091900	2248100	2080300	1650100	1788900	1845000
30	1166300		1323400	2115200	307700	1600200	1435300	2033500	1907700	1622500	1511700	1538800
31	1208600		748400				1574900	2027600		2062600		1226900
TOTALS	38264200	29513900	27408200	46024400	54304300	48926200	49078700	49087400	39996100	60195800	36802400	52958500

WELL: QUICHAPA WELL #8 YEAR: 2022 TOTAL IN GALLONS: 532,560,100

DATE	January	February	March	April	May	June	July	August	September	October	November	December
1	381000	338000	251000	305000	340000	1146000	765000	638000	272000	243000	258000	273000
2	300000	347000	325500	312000	355000	1087000	745000	668000	223000	257000	247000	259000
3	353000	355000	325500	330000	405000	1101000	776000	671000	267000	272000	262000	258000
4	335000	314000	312000	338000	403000	1193000	769000	335000	239000	256000	241000	267000
5	366000	332000	299000	319000	392000	1011000	849000	282000	253000	250000	246000	0
6	313000	334000	322000	330000	372000	1013000	740000	238000	271000	258000	266000	538000
7	361000	355000	312000	315000	376000	1035000	763000	294000	258000	237000	276000	267000
8	295000	340000	317000	348000	374000	1036000	798000	237000	257000	242000	255000	329000
9	336000	375000	347000	306000	418000	1015000	746000	254000	272000	251000	267000	218000
10	354000	300000	264000	324000	357000	983000	738000	259000	211000	331000	242000	267000
11	328000	353000	298000	327000	361000	948000	869000	252000	289000	191000	249000	250000
12	345000	338000	312000	319000	388000	976000	654000	255000	260000	260000	277000	292000
13	332000	317000	308000	322000	343000	1042000	674000	256000	249000	240000	237000	276000
14	341000	331000	316000	319000	357000	953000	715000	253000	259000	261000	284000	275000
15	315000	307000	309000	339000	353000	967000	714000	278000	262000	238000	253000	276000
16	336000	327000	311000	325000	364000	877000	674000	265000	248000	271000	256000	276000
17	338000	332000	311000	296000	355000	876000	720000	264000	248000	251000	255000	256000
18	359000	326000	287000	342000	351000	965000	762000	271000	260000	252000	248000	277000
19	355000	309000	312000	331000	353000	870000	769000	259000	273000	249000	249000	302000
20	330000	322000	309000	340000	337000	833000	639000	253000	254000	250000	259000	280000
21	324000	327000	325000	347000	530000	878000	717000	256000	254000	270000	281000	282000
22	324000	335000	303000	329000	651000	852000	668000	281000	275000	249000	259000	282000
23	337000	326000	315000	344000	744000	843000	655000	262000	234000	245000	263000	291000
24	357000	321000	340000	338000	785000	816000	682000	257000	246000	274000	240000	248000
25	336000	318000	259000	345000	869000	788000	685000	263000	257000	235000	258000	285000
26	340000	302000	315000	335000	915000	822000	742000	259000	275000	258000	262000	285000
27	339000	315000	306000	335000	954000	903000	683000	247000	251000	257000	260000	310000
28	331000	339000	359000	346000	1167000	801000	682000	256000	252000	235000	285000	288000
29	323000		303000	319000	1167000	769000	706000	278000	259000	245000	259000	288000
30	337000		309000	343000	1164000	805000	651000	260000	240000	253000	270000	294000
31	352000		322000		1190000		673000	274000		274000		286000
TOTALS	10473000	9235000	9604000	9868000	17490000	28204000	22423000	9375000	7668000	7855000	7764000	8575000

WELL: RT. HAND-CEDAR CANYON SPRINGS YEAR: 2022

INCLUDES CLUFF

TOTAL IN GALLONS: 148,534,000

DATE	January	February	March	April	May	June	July	August	September	October	November	December
1	0	17	0	21	286	1235	81	1258	125	58	31	63
2	0	2	0	23	290	1830	4552	406	883	1010	45	39
3	0	15	0	24	203	1192	4571	1551	101	20	26	36
4	110	14	25	7	8	1068	3895	51	1184	936	15	41
5	11	54	28	86	2	1714	113	955	3156	20	95	0
6	6	225	203	12	10	3112	1520	427	1647	82	111	40
7	7	152	5	16	2778	815	475	1220	1285	49	19	46
8	37	81	11	14	2435	3018	4914	38	1370	76	3	13
9	31	11	3	21	872	851	1058	1633	452	358	9	63
10	111	12	5	255	666	1847	1137	23	952	32	0	95
11	5	1	0	30	4	1899	1279	1153	76	49	39	74
12	44	46	248	95	39	2237	1101	18	1403	16	21	79
13	35	175	25	3	2	1709	1672	876	2912	11	95	43
14	78	79	10	3	2382	1207	1625	99	848	52	10	76
15	46	132	94	65	599	227	480	883	17	96	69	109
16	21	10	52	20	725	2084	1168	171	871	69	9	108
17	0	186	19	32	274	1861	526	863	118	41	0	98
18	1	16	14	17	776	671	3124	33	901	21	28	44
19	60	67	85	165	364	1174	669	858	3012	21	14	13
20	10	29	18	10	1451	2308	2448	23	982	25	24	60
21	38	51	13	10	427	248	483	955	30	13	51	33
22	17	52	15	0	1319	1087	1175	46	909	45	5	40
23	66	108	5	63	784	1675	943	860	2858	62	5	45
24	12	5	52	26	1050	1184	2686	266	1549	54	0	76
25	3	3	10	50	109	260	1855	826	202	11	0	0
26	0	32	97	61	1347	1633	1083	11	913	51	25	0
27	0	54	198	27	1312	887	113	904	2510	6	11	13
28	39	2	5	10	3463	3992	1219	152	884	7	22	181
29	118	0	29	8	2549	73	395	1074	67	50	3	110
30	69	0	91	122	1134	1266	1193	499	864	102	8	225
31	55	0	7	0	3040	0	337	921	0	108	0	148
TOTALS	1030	1631	1367	1296	30700	44364	47890	19053	33081	3551	793	2011

WELL: CLUFF SPRINGS YEAR: 2022 TOTAL IN GALLONS: 186,767

****INCLUDED IN RT. HAND-CEDAR CANYON** (from chlorinator report)

DATE	January	February	March	April	May	June	July	August	September	October	November	December
1	241000		178000	197000	278000	267000	49000	0	193000	197000	220000	137000
2	168000		238000	156000	146000	133000	293000	130000	183000	160000	141000	103000
3	286000		197000	249000	276000	176000	166000	216000	116000	157000	121000	198000
4	140000		204000	201000	140000	220000	127000	159000	134000	191000	117000	212000
5	234000		157000	195000	193000	130000	247000	125000	217000	144000	179000	133000
6	227000		239000	185000	223000	244000	127000	143000	157000	0	181000	127000
7	117000		176000	241000	138000	151000	125000	229000	131000	125000	121000	274000
8	221000		100000	143000	274000	216000	238000	123000	225000	126000	234000	134000
9	135000		138000	258000	147000	178000	142000	150000	145000	123000	145000	196000
10	251000		245000	140000	270000	132000	125000	224000	125000	125000	139000	106000
11			144000	285000	138000	168000	254000	125000	144000	133000	185000	244000
12	380000		251000	87000	205000	216000	127000	125000	228000	123000	206000	160000
13	245000		143000	335000	210000	140000	126000	205000	124000	125000	128000	166000
14	141000		219000	142000	125000	193000	204000	168000	146000	81000	218000	226000
15	234000		182000	288000	276000	199000	175000	124000	223000	125000	182000	131000
16	193000			163000	196000	131000	125000	229000	123000	121000	131000	146000
17	96000		233000	253000	225000	213000	164000	144000	114000	1000	227000	205000
18			0	135000	139000	175000	214000	162000	190000	107000	185000	168000
19				268000	178000	136000	125000	144000	189000	126000	135000	143000
20				139000	235000	230000	226000	189000	125000	63000	184000	251000
21			16000	276000	134000	149000	233000	124000	178000	120000	223000	130000
22		5000	252000	141000	213000	130000	46000	200000	193000	34000	141000	153000
23		95000	130000	179000	193000	251000	129000	175000	102000	121000	251000	240000
24		77000	264000	243000	178000	128000	231000	126000	201000	0	159000	136000
25		42000	131000	154000	227000	129000	144000	162000	141000	0	133000	129000
26		235000	251000	269000	133000	205000	153000	205000	135000	222000	190000	222000
27		167000	142000	141000	228000	175000	223000	141000	234000	138000	225000	172000
28		255000	264000	227000	173000	180000	125000	118000	123000	121000	135000	180000
29			138000	194000	151000	203000	140000	231000		145000	270000	219000
30			252000	144000	249000	127000	174000	145000	265000	202000	134000	133000
31			167000		134000		74000	126000		0		139000
TOTALS	3309000	876000	5051000	6028000	6025000	5325000	5051000	4867000	4804000	3456000	5240000	5313000

WELL: QUICHAPA/SPILSBURY SPRINGS YEAR: 2022

TOTAL IN GALLONS: 55,345,000

DATE	January	February	March	April*	May**	June	July	August	September	October	November	December
1	218000	174000	165000	153000		505000	309000	280000	277000	228000	219000	236000
2	172000	172000	154000	160000		461000	297000	268000	248000	243000	201000	226000
3	212000	166000	156000	162000		506000	312000	268000	269000	258000	223000	221000
4	189000	159000	156000	211000		449000	315000	259000	255000	236000	206000	230000
5	181000	164000	148000	128000		426000	349000	267000	261000	232000	206000	0
6	177000	164000	167000	172000		436000	299000	264000	278000	235000	221000	463000
7	187000	187000	172000	167000		422000	303000	290000	258000	215000	230000	227000
8	157000	166000	152000	185000		434000	312000	252000	249000	219000	214000	278000
9	180000	145000	171000	160000		405000	295000	260000	255000	226000	300000	185000
10	196000	169000	158000	184000		403000	295000	262000	215000	296000	126000	216000
11	176000	172000	142000	223000		378000	326000	254000	276000	173000	206000	206000
12	173000	160000	158000	220000		398000	300000	254000	0	225000	228000	248000
13	176000	156000	156000	193000		433000	250000	254000	499000	218000	188000	235000
14	170000	160000	175000	217000		396000	343000	252000	246000	211000	232000	231000
15	151000	168000	153000	230000		399000	221000	283000	264000	208000	203000	228000
16	170000	153000	149000	209000	91000	351000	264000	266000	251000	237000	198000	225000
17	171000	171000	154000	204000	651000	403000	281000	261000	255000	223000	205000	206000
18	198000	178000	131000	224000	654000	386000	304000	271000	268000	216000	184000	224000
19	174000	141000	154000	248000	677000	391000	297000	316000	287000	210000	186000	245000
20	172000	160000	156000	300000	667000	364000	249000	374000	267000	210000	197000	221000
21	169000	159000	177000	353000	694000	390000	278000	315000	252000	221000	220000	220000
22	150000	185000	144000	114000	679000	361000	259000	354000	0	215000	188000	220000
23	170000	178000	168000	0	684000	356000	256000	304000	512000	226000	203000	226000
24	191000	167000	156000		636000	342000	267000	299000	242000	244000	165000	189000
25	175000	207000	183000		601000	329000	268000	303000	251000	201000	191000	216000
26	169000	106000	102000		577000	343000	296000	293000	272000	229000	175000	213000
27	160000	166000	152000		529000	375000	268000	282000	241000	223000	160000	233000
28	179000	166000	173000		535000	317000	269000	290000	242000	202000	179000	221000
29	145000		163000		534000	304000	262000	319000	246000	207000	161000	220000
30	163000		166000		541000	322000	269000	284000	226000	213000	240000	227000
31	192000		143000		551000		273000	303000		232000		209000
TOTALS	5463000	4619000	4854000	4417000	9301000	11785000	8886000	8801000	7662000	6932000	6055000	6945000

WELL: SHURTZ CANYON SPRINGS YEAR: 2022 TOTAL IN GALLONS: 85,720,000

DATE	January	February	March	April	May	June	July	August	September	October	November	December
1	1619	1978	1847	6101	9712	49909	25343	12571	18866	17722	3835	3181
2	1619	1978	1847	6101	9712	49909	25343	12571	18866	17722	3835	3181
3	1619	1978	1847	6101	9712	49909	25343	12571	18866	17722	3835	3181
4	1619	1978	1847	6101	9712	49909	25343	12571	18866	17722	3835	3181
5	1619	1978	1847	6101	9712	49909	25343	12571	18866	17722	3835	3181
6	1619	1978	1847	6101	9712	49909	25343	12571	18866	17722	3835	3181
7	1619	1978	1847	6101	9712	49909	25343	12571	18866	17722	3835	3181
8	1619	1978	1847	6101	9712	49909	25343	12571	18866	17722	3835	3181
9	1619	1978	1847	6101	9712	49909	25343	12571	18866	17722	3835	3181
10	1619	1978	1847	6101	9712	49909	25343	12571	18866	17722	3835	3181
11	1619	1978	1847	6101	9712	49909	25343	12571	18866	17722	3835	3181
12	1619	1978	1847	6101	9712	49909	25343	12571	18866	17722	3835	3181
13	1619	1978	1847	6101	9712	49909	25343	12571	18866	17722	3835	3181
14	1619	1978	1847	6101	9712	49909	25343	12571	18866	17722	3835	3181
15	1619	1978	1847	6101	9712	49909	25343	12571	18866	17722	3835	3181
16	1619	1978	1847	6101	9712	49909	25343	12571	18866	17722	3835	3181
17	1619	1978	1847	6101	9712	49909	25343	12571	18866	17722	3835	3181
18	1619	1978	1847	6101	9712	49909	25343	12571	18866	17722	3835	3181
19	1619	1978	1847	6101	9712	49909	25343	12571	18866	17722	3835	3181
20	1619	1978	1847	6101	9712	49909	25343	12571	18866	17722	3835	3181
21	1619	1978	1847	6101	9712	49909	25343	12571	18866	17722	3835	3181
22	1619	1978	1847	6101	9712	49909	25343	12571	18866	17722	3835	3181
23	1619	1978	1847	6101	9712	49909	25343	12571	18866	17722	3835	3181
24	1619	1978	1847	6101	9712	49909	25343	12571	18866	17722	3835	3181
25	1619	1978	1847	6101	9712	49909	25343	12571	18866	17722	3835	3181
26	1619	1978	1847	6101	9712	49909	25343	12571	18866	17722	3835	3181
27	1619	1978	1847	6101	9712	49909	25343	12571	18866	17722	3835	3181
28	1619	1978	1847	6101	9712	49909	25343	12571	18866	17722	3835	3181
29	1619		1847	6101	9712	49909	25343	12571	18866	17722	3835	3181
30	1619		1847	6101	9712	49909	25343	12571	18866	17722	3835	3181
31	1619		1847		9712		25343	12571		17722		3181
TOTALS	50193	55384	57251	183036	301057	1497274	785633	389693	565975	549382	115053	98602

PURCHASED WATER-CICWCD-4BRanch YEAR: 2022

TOTAL IN GALLONS: 4,648,533

DATE	January	February	March	April	May	June	July	August	September	October	November	December
1	0	0	0	0	902000	891000	1145400	891800	0	0	0	0
2	0	0	0	1243000	0	1102600	127400	2149400	424000	0	0	0
3	0	0	940000	800	899000	1330800	1438000	2114600	0	0	0	0
4	0	0	1115000	1903200	1189000	1158000	0	2180300	0	0	0	0
5	0	0	939000	2433300	755000	899000	0	1367800	635000	0	0	0
6	0	0	0	1712300	1225000	1158000	0	2598100	635000	0	0	0
7	0	0	788000	2089600	1852700	772000	775000	2141000	0	0	0	0
8	0	0	921000	1170900	2393600	1043000	964000	1151300	0	0	0	0
9	0	0	469000	2200000	2260700	898000	0	2268100	1147000	0	0	0
10	0	0	727000	2239100	1985500	1079000	0	1138000	0	0	0	0
11	0	0	0	948700	2212300	1271300	0	1018800	0	0	0	0
12	0	0	0	2129600	2041200	2107700	0	2083600	1060000	0	0	0
13	0	0	0	2221200	2393100	1458700	0	1115000	0	0	0	0
14	0	0	533000	1176300	2582500	970000	667000	1108500	505000	0	0	0
15	0	0	876000	2086200	1055400	2216300	0	257900	463000	0	0	0
16	0	0	0	2437200	2080100	1554900	0	1029100	888000	0	0	0
17	0	0	1195000	2065000	1946600	2036300	0	1067200	524000	0	0	0
18	0	0	945000	2533400	2309200	2461000	0	2249700	0	0	0	0
19	0	0	724000	2071600	2309700	1589900	0	1764900	0	0	0	0
20	0	0	0	883400	1451600	2114700	0	1157500	0	0	0	0
21	0	0	0	1905500	2129600	2147800	0	1135700	0	0	0	0
22	0	0	0	2047500	1968400	2019200	0	2279000	0	0	0	0
23	0	436000	0	1329500	1973200	1086300	665000	1823500	0	0	0	0
24	0	873000	468000	2291400	1549600	1590700	0	0	0	0	0	0
25	0	939000	972000	1096600	2225200	1829300	927000	1150000	0	0	0	0
26	0	640000	0	1325000	2030800	1388400	1144000	465400	0	0	0	0
27	0	0	1244000	899000	2334200	1140200	0	0	0	0	0	0
28	0	0	1027000	1118000	2615600	1838000	946000	3173800	0	0	0	0
29	0	0	0	0	1863900	1715500	1161000	1171400	0	0	0	0
30	0	0	943000	0	2343700	1067800	883000	1091600	0	0	0	0
31	0	1128000	0	1211000	0	1103500	1160000	0	0	0	0	0
TOTALS	0	4016000	14826000	46768300	54878400	45038900	12002800	43143000	6281000	0	0	0

WELL: PRESSURIZED IRRIGATION TOTALS YEAR: 2022 TOTAL IN GALLONS: 226,954,400

DATE	January	February	March	April	May	June	July	August	September	October	November
1						902000	891000		871000		
2					1243000				1157000	424000	
3				940000		899000	1121000	1438000	898000		
4				1115000	985000	1189000	1158000		1155000		
5				939000	1119000	755000	899000		896000	635000	
6					721000	1195000	1158000		1174000	635000	
7				788000	905000	704000	772000	775000	981000		
8				921000		1157000	1043000	964000			
9				469000	726000	858000	898000		1175000	1147000	
10				727000	986000	1124000	1079000				
11						1102000	897000				
12					983000	898000	1208000		898000	1060000	
13					1198000	1129000					
14				533000		1112000		667000		505000	
15				876000	938000		1202000			463000	
16					1128000	894000	470000			888000	
17				1195000	917000	999000	899000			524000	
18				945000	1137000	1070000	1127000		1157000		
19				724000	876000	1123000	298000		468000		
20						383000	1159000				
21					725000	918000	899000				
22					896000	705000	1067000		1153000		
23			436000			897000		665000	897000		
24			873000	468000	1114000	447000	469000				
25			939000	972000		1126000	742000	927000	1150000		
26			640000		1325000	900000	30000	1144000	464000		
27				1244000	899000	1144000					
28				1027000	1118000	1157000	667000	946000	1146000		
29						985000	666000	1161000			
30				943000		1071000		883000			
31			1128000		1211000			1160000			
TOTALS	0	0	4016000	14826000	21150000	26843000	20819000	10730000	15640000	6281000	0

WELL: CEMETERY-GOLF COURSE AND POND

YEAR: 2022

TOTAL IN GALLONS: 120,305,000

DATE	January	February	March	April	May	June	July	August	September	October	November	December
1								1145400	20800			
2							1102600	127400	992400			
3					800		209800		1216600			
4					918200				1025300			
5					1314300				471800			
6					991300	30000			1424100			
7					1184600	1148700			1160000			
8					1170900	1236600			1151300			
9					1474000	1402700			1093100			
10					1253100	861500			1138000			
11					948700	1110300	374300		1018800			
12					1146600	1143200	899700		1185600			
13					1023200	1264100	1458700		1115000			
14					1176300	1470500	970000		1108500			
15					1148200	1055400	1014300		257900			
16					1309200	1186100	1084900		1029100			
17					1148000	947600	1137300		1067200			
18					1396400	1239200	1334000		1092700			
19					1195600	1186700	1291900		1296900			
20					883400	1068600	955700		1157500			
21					1180500	1211600	1248800		1135700			
22					1151500	1263400	952200		1126000			
23					1329500	1076200	1086300		926500			
24					1177400	1102600	1121700					
25					1096600	1099200	1087300					
26					0	1130800	1358400		1400			
27					0	1190200	1140200					
28					0	1458600	1171000		2027800			
29					0	878900	1049500		1171400			
30					0	1272700	1067800		1091600			
31					0		1103500					
TOTALS	0	0	0	0	25618300	28035400	24219900	1272800	27503000	0	0	0

WELL: Northfield Well YEAR: 2022 TOTAL IN GALLONS: 106,649,400

DATE	January	February	March	April	May	June	July	August	September	October	November	December
1												
2												
3												
4												
5												
6												
7												
8												
9												
10												
11												
12												
13												
14												
15												
16												
17												
18												
19												
20												
21												
22												
23												
24												
25												
26												
27												
28												
29												
30												
31												
TOTALS	0	0	0	0	0	0	0	0	0	0	0	0

WELL: 200 N. PUMP STATION YEAR: 2022 TOTAL IN GALLONS: 0

APPENDIX D

PUMPING COSTS

ENOCH WELL #1
PUMPING EFFICIENCY
$/1000 GALLONS

	January	February	March	April	May	June	July	August	September	October	November	December	AVERAGE	TOTAL
WATER PUMPED	0	0	0	0	0	0	0	0	0	0	0	0	0	0
POWER COSTS	$239.88	$208.75	$240.22	$176.92	$165.28	$139.27	$80.34	$60.27	$80.34	$33.39	$160.74	$219.61	$150.42	$1,805.01
METER READING DATE	1/4/2022	2/2/2022	3/3/2022	4/1/2022	5/2/2022	6/1/2022	6/30/2022	8/2/2022	8/31/2022	9/30/2022	10/31/2022	12/2/2022		
COST PER 1000 GALLONS PUMPED	0	0	0	0	0	0	0	0	0	0	0	0	0	$0.00
KW-HR USAGE	2,160	1,760	1,880	1,000	640	240	80	40	80	200	1,360	2,200	970	11,640
COST PER KW-HR	$0.11	$0.12	$0.13	$0.18	$0.26	$0.58	$1.00	$1.51	$1.00	$0.17	$0.12	$0.10	**$0.155**	**$0.155**

PUMP NAME - ENOCH WELL #1

PREVIOUS YEARS AVERAGE COSTS:

	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022
COST PER 1,000 GALLONS PUMPED	$0.31	$0.31	Not used	$0.28	$0.28	$0.26	$0.36	$0.23	$0.21	$0.00
COST PER KILOWATT-HOUR	$0.115	$0.092	Not used	$0.092	$0.092	$0.087	$0.110	$0.093	$0.093	$0.155

ENOCH WELL #3
PUMPING EFFICIENCY
$/1000 GALLONS

	January	February	March	April	May	June	July	August	September	October	November	December	AVERAGE	TOTAL
WATER PUMPED	0	0	0	0	70,394,400	70,524,000	78,384,200	42,088,200	63,626,100	2,179,800	0	0	27,266,392	327,196,700
POWER COSTS	$235.68	$225.58	$229.17	$231.18	$210.97	$12,281.04	$13,602.06	$14,673.71	$10,502.34	$12,814.18	$5,072.77	$284.14	$5,863.57	$70,362.82
METER READING DATE	1/3/2022	2/1/2022	3/4/2022	3/31/2022	4/29/2022	5/31/222	6/29/2022	8/1/2022	8/30/2022	9/29/2022	100/28/2022	12/1/2022		
COST PER 1000 GALLONS PUMPED	$0.00	$0.00	$0.00	$0.00	$0.23	$0.17	$0.17	$0.35	$0.17	$5.88	$0.00	$0.00	$0.22	$0.22
KW-HR USAGE	3,280	2,960	3,040	2,960	2,400	200,080	197,200	222,880	122,480	178,320	3,360	3,840	78,567	942,800
COST PER KW-HR	$0.07	$0.08	$0.08	$0.08	$0.09	$0.06	$0.07	$0.07	$0.09	$0.07	$1.51	$0.07	**$0.075**	**$0.075**

PUMP NAME - ENOCH WELL #3

PREVIOUS YEARS AVERAGE COSTS:

	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022
COST PER 1,000 GALLONS PUMPED	$0.15	$0.19	$0.21	$0.21	$0.21	$0.20	$0.20	$0.20	$0.23	$0.22
COST PER KILOWATT-HOUR	$0.085	$0.086	$0.081	$0.083	$0.084	$0.077	$0.074	$0.071	$0.078	$0.075

QUICHAPA WELL #1
PUMPING EFFICIENCY
$/1000 GALLONS

	January	February	March	April	May	June	July	August	September	October	November	December	AVERAGE	TOTAL
WATER PUMPED	0	0	0	0	34,849,100	38,054,800	38,108,300	32,151,000	29,831,400	20,665,200	1,778,500	0	16,286,525	195,438,300
POWER COSTS	$177.16	$116.30	$145.67	$88.61	$8,077.29	$11,645.39	$12,408.17	$11,057.99	$11,458.31	$8,002.99	$165.53	$173.90	$ 5,293.11	$63,517.31
METER READING DATE	1/21/2022	2/21/2022	3/22/2022	4/20/2022	5/19/2022	6/20/2022	7/20/2022	8/19/2022	9/20/2022	10/19/2022	11/18/2022	12/21/2022		
COST PER 1000 GALLONS PUMPED	$0.00	$0.00	$0.00	$0.00	$0.23	$0.31	$0.33	$0.34	$0.38	$0.39	$0.09	$0.00	$0.32	$0.32
KW-HR USAGE	2,240	1,840	1,520	78,240	131,520	104,320	186,240	133,680	137,520	114,240	33,600		84,087	924,960
COST PER KW-HR	$0.08	$0.06	$0.10	$0.00	$0.06	$0.11	$0.07	$0.08	$0.08	$0.07	$0.00	$0.00	**$0.06**	**$0.07**

PUMP NAME - QUICHAPA WELL #1

PREVIOUS YEARS AVERAGE COSTS:

	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022
COST PER 1,000 GALLONS PUMPED	Tested Only	Not Used	Not Used	Not Used	Not Used	Not Used	$0.25	$0.31	$0.30	$0.32
COST PER KILOWATT-HOUR	$0.012	Not Used	Not Used	Not Used	Not Used	Not Used	$0.067	$0.058	$0.070	$0.06

QUICHAPA WELL #3
PUMPING EFFICIENCY
$/1000 GALLONS

	January	February	March	April	May	June	July	August	September	October	November	December	AVERAGE	TOTAL
WATER PUMPED	0	0	0	0	0	0	0	0	0	0	0	0	0	0
POWER COSTS	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00
METER READING DATE	1/22/2020	2/20/2020	3/20/2020	4/20/2020	5/19/2020	6/18/2020	7/20/2020	8/19/2020	9/18/2020	10/19/2020	11/18/2020	12/20/2020		
COST PER 1000 GALLONS PUMPED	$0.00	$0.00	$0.00	$0.00	#DIV/0!	#REF!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	$0.00	$0.00	$0.36	
KW-HR USAGE	1,480	1,840	1,320	1,440	83,320	103,720	36,880	156,920	141,760	120,120	960	1,960	54,310	651,720
COST PER KW-HR	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	**$0.000**	

PUMP NAME - QUICHAPA WELL #3

PREVIOUS YEARS AVERAGE COSTS:

	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022
COST PER 1,000 GALLONS PUMPED	$0.28	$0.36	$0.32	$0.34	$0.27	$0.28	$0.36	$0.36	*	$0.36
COST PER KILOWATT-HOUR	$0.074	$0.086	$0.081	$0.080	$0.070	$0.069	$0.101	$0.084	$0.087	$0.000

*- meter broken

QUICHAPA WELL #5
PUMPING EFFICIENCY
$/1000 GALLONS

	January	February	March	April	May	June	July	August	September	October	November	December	AVERAGE	TOTAL
WATER PUMPED	2,597,700	0	0	0	0	49,100,700	37,733,100	11,934,600	26,156,700	46,984,700	34,659,000	47,562,600	21,394,092	256,729,100
POWER COSTS	$8,064.93	$369.28	$367.58	$348.91	$350.05	$19,892.52	$19,249.42	$11,901.27	$16,116.41	$18,190.97	$15,381.00	$17,548.34	$10,648.39	$127,780.68
METER READING DATE	1/21/2022	2/25/2022	3/22/2022	4/20/2022	5/19/2022	6/20/2022	7/20/2022	8/19/2022	9/20/2022	10/19/2022	11/18/2022	12/21/2022		
COST PER 1000 GALLONS PUMPED	$3.10	$0.00	$0.00	$0.00	$0.00	$0.41	$0.51	$1.00	$0.62	$0.39	$0.44	$0.37	$0.50	$0.50
KW-HR USAGE	31,520	5,120	4,480	4,400	4,320	300,400	271,280	98,720	194,000	281,040	206,320	282,240	140,320	1,683,840
COST PER KW-HR	$0.256	$0.072	$0.082	$0.079	$0.081	$0.066	$0.071	$0.121	$0.083	$0.065	$0.075	$0.062	**$0.076**	**$0.076**

PUMP NAME - QUICHAPA WELL #5

PREVIOUS YEARS AVERAGE COSTS:

	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022
COST PER 1,000 GALLONS PUMPED	$0.43	$0.41	$0.52	$0.43	$0.47	$0.39	$0.39	$0.40	$0.42	$0.50
COST PER KILOWATT-HOUR	$0.116	$0.074	$0.083	$0.070	$0.072	$0.066	$0.066	$0.068	$0.066	$0.076

QUICHAPA WELL #6
PUMPING EFFICIENCY
$/1000 GALLONS

	January	February	March	April	May	June	July	August	September	October	November	December	AVERAGE	TOTAL
WATER PUMPED	0	0	0	0	0	68,942,000	59,782,000	61,182,000	61,759,000	63,995,000	40,945,000	0	29,717,083	356,605,000
POWER COSTS	$372.80	$389.07	$317.55	$267.26	$183.39	$18,468.29	$18,293.79	$18,268.84	$19,000.68	$16,557.99	$12,322.12	$630.37	$ 8,756.01	$105,072.15
METER READING DATE	1/28/2022	2/25/2022	3/22/2022	4/20/2022	5/19/222	6/20/2022	7/20/2022	8/19/2022	9/20/2022	10/19/2022	11/18/2022	12/21/2022		
COST PER 1000 GALLONS PUMPED	$0.00	$0.00	$0.00	$0.00	$0.00	$0.27	$0.31	$0.30	$0.31	$0.26	$0.30	$0.00	$0.29	$0.29
KW-HR USAGE	0	0	0	0	0	282,720	261,440	261,440	280,400	254,560	153,520	0	124,507	1,494,080
COST PER KW-HR	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.07	$0.07	$0.07	$0.00	$0.00	$0.00	**$0.070**	**$0.070**

PUMP NAME - QUICHAPA WELL #6

PREVIOUS YEARS AVERAGE COSTS:

	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022
COST PER 1,000 GALLONS PUMPED	$0.38	$0.41	$0.30	$0.47	$0.29	$0.45	$0.41	$0.43	$0.40	$0.29
COST PER KILOWATT-HOUR	$0.070	$0.095	$0.070	$0.097	$0.083	$0.074	$0.074	$0.077	$0.074	$0.070

QUICHAPA WELL #7
PUMPING EFFICIENCY
$/1000 GALLONS

	January	February	March	April	May	June	July	August	September	October	November	December	AVERAGE	TOTAL
WATER PUMPED	32,737,900	60,632,000	58,714,500	65,188,700	62,426,800	2,009,500	50,690,900	42,101,800	29,398,500	3,936,600	0	0	33,986,433	407,837,200
POWER COSTS	$ 14,621.89	$ 16,445.00	$ 15,842.00	$ 15,788.00	$ 16,004.00	$ 7,214.21	$ 17,263.46	$ 14,030.08	$ 13,130.40	$ 171.75	$ 418.09	$ 671.24	$10,966.68	$131,600.12
METER READING DATE	1/22/2020	2/20/2020	3/20/2020	4/20/2020	5/19/2020	6/20/2020	7/20/2020	8/19/2020	9/18/2020	10/19/2020	11/18/2020	12/22/2020		
COST PER 1000 GALLONS PUMPED	$0.45	$0.27	$0.27	$0.24	$0.26	$3.59	$0.34	$0.33	$0.45	$0.04	$0.00	$0.00	$0.28	
KW-HR USAGE	5,280	4,640	162,800	3,280	196,480	254,720	278,560	261,280	226,640	201,680	3,120	4,880	133,613	1,603,360
COST PER KW-HR	$2.77	$3.54	$0.10	$4.81	$0.08	$0.03	$0.06	$0.05	$0.06	$0.00	$0.13	$0.14	**$0.082**	

PUMP NAME - QUICHAPA WELL #7

AVERAGED ONLY JULY AND AUGUST FOR POWER USED

PREVIOUS YEARS AVERAGE COSTS:

	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022
COST PER 1,000 GALLONS PUMPED	$0.29	$0.28	$0.27	$0.26	$0.29	$0.29	$0.28	$0.28	$0.28	$0.28	$0.28
COST PER KILOWATT-HOUR	$0.070	$0.070	$0.067	$0.077	$0.076	$0.073	$0.067	$0.084	$0.068	$0.065	$0.082

QUICHAPA WELL #8
PUMPING EFFICIENCY
$/1000 GALLONS

	January	February	March	April	May	June	July	August	September	October	November	December	AVERAGE	TOTAL
WATER PUMPED	49,643,300	28,785,300	27,012,400	34,457,200	58,226,800	46,440,600	50,564,900	42,885,600	40,113,000	52,179,100	41,298,500	57,091,500	44,058,183	528,698,200
POWER COSTS	$ 13,690.10	$ 9,880.22	$ 7,112.63	$ 11,927.22	$ 15,738.14	$ 15,516.29	$ 16,312.11	$ 15,188.80	$ 15,287.30	$ 16,175.58	$ 12,903.91	$ 15,107.86	$ 13,736.68	$164,840.16
METER READING DATE	1/22/2020	2/21/2020	3/24/2020	4/20/2020	5/19/2020	6/18/2020	7/20/2020	8/19/2020	9/18/2020	10/19/2020	11/18/2020	12/22/2020		
COST PER 1000 GALLONS PUMPED	$0.28	$0.34	0.263309813	$0.35	$0.27	$0.33	$0.32	$0.35	$0.38	$0.31	$0.31	$0.26	$0.31	
KW-HR USAGE	287,120	263,680	1,760	181,200	252,640	273,360	235,280	237,520	236,240	275,680	200,160	188,880	219,460	2,633,520
COST PER KW-HR	$0.05	$0.04	$4.04	$0.07	$0.06	$0.06	$0.07	$0.06	$0.06	$0.06	$0.06	$0.08	**$0.063**	**$0.063**

PUMP NAME - QUICHAPA WELL #8

PREVIOUS YEARS AVERAGE COSTS:

	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022
COST PER 1,000 GALLONS PUMPED	$0.33	$0.30	$0.26	$0.31	$0.30	$0.28	$0.28	$0.30	$0.31	$0.31
COST PER KILOWATT-HOUR	$0.070	$0.069	$0.071	$0.074	$0.068	$0.067	$0.068	$0.064	$0.067	$0.063

Cemetery Well
PUMPING EFFICIENCY
$/1000 GALLONS

	January	February	March	April	May	June	July	August	September	October	November
WATER PUMPED	0	0	0	9,320,000	17,260,000	25,308,000	24,943,000	13,539,000	16,091,000	10,336,000	2,380,000
POWER COSTS	$115.07	$103.65	$167.42	$1,585.31	$3,340.36	$5,495.91	$6,641.49	$4,828.86	$5,238.78	$1,695.60	$482.71
METER READING DATE	1/17/2022	2/15/2022	3/16/2022	4/14/2022	5/13/2022	6/14/2022	7/14/2022	8/15/2022	9/14/2022	10/13/2022	11/14/2022
COST PER 1000 GALLONS PUMPED	$0.00	$0.00	#DIV/0!	$0.17	$0.19	$0.22	$0.27	$0.36	$0.33	$0.16	$0.20
KW-HR USAGE	2,480	2,560	192	1,360	640	81,280	92,400	85,280	560	90,640	800
COST PER KW-HR	$0.046	$0.040	$0.872	$1.166	$5.219	$0.068	$0.072	$0.057	$9.355	$0.019	$0.603

PUMP NAME - CEMETERY WELL

PREVIOUS YEARS AVERAGE COSTS:

	2013	2014	2015	2016	2017	2018	2019	2020
COST PER 1,000 GALLONS PUMPED	$0.22	$0.22	$0.21	$0.20	$0.20	$0.24	$0.26	$0.23
COST PER KILOWATT-HOUR	$0.085	$0.085	$0.089	$0.085	$0.087	$0.082	$0.086	$0.079

Northfield Well
PUMPING EFFICIENCY
$/1000 GALLONS

	January	February	March	April	May	June	July	August	September	October	November	December	AVERAGE	TOTAL
WATER PUMPED	0	0	0	0	0	25,618,300	28,035,400	25,365,300	0	27,503,000	0	0	8,876,833	106,522,000
POWER COSTS	$219.57	$223.82	$200.10	$200.97	$173.66	$6,312.81	$7,443.12	$7,167.13	$145.02	$7,333.12	$181.85	$264.31	$2,488.79	$29,865.48
METER READING DATE	1/5/2022	2/3/2022	3/4/2022	4/4/2022	5/3/2022	6/3/2022	7/1/2022	8/3/2022	9/1/2022	10/3/2022	11/1/2022	12/5/2022		
COST PER 1000 GALLONS PUMPED	$0.00	$0.00	$0.00	$0.00	$0.00	$0.25	$0.27	$0.28	#DIV/0!	$0.27	$0.00	$0.00	$0.28	$0.28
KW-HR USAGE	2,480	2,560	192	1,360	640	81,280	92,400	85,280	560	90,640	800	3,360	30,129	361,552
COST PER KW-HR	$0.089	$0.087	$1.042	$0.148	$0.271	$0.078	$0.081	$0.084	$0.259	$0.081	$0.227	$0.079	**$0.083**	**$0.083**

PUMP NAME - NORTHFIELD WELL

PREVIOUS YEARS AVERAGE COSTS:

	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022
COST PER 1,000 GALLONS PUMPED	$0.27	$0.32	$0.44	$0.32	$0.30	$0.33	$0.25	$0.29	$0.28	$0.28
COST PER KILOWATT-HOUR	$0.080	$0.086	$0.095	$0.097	$0.092	$0.080	$0.082	$0.083	$0.078	$0.083

200 N. PUMPSTATION
PUMPING EFFICIENCY
$/1000 GALLONS

	January	February	March	April	May	June	July	August	September	October	November	December	AVERAGE	TOTAL	
WATER PUMPED	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
POWER COSTS	$346.63	$335.31	$311.20	$167.48	$151.02	$123.94	$132.79	$85.08	$90.38	$35.14	$350.95	$424.50	$212.87	$2,554.42	NOT COUNTE
METER READING DATE															
1000 GALLONS PUMPED	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	**$0.00**		
KW-HR USAGE	4,880	4,280	2,840	2,000	280	320	2,120	2,120	1,800	1,080	880	840	1,953	23,440	
COST PER KW-HR	$0.071	$0.078	$0.110	$0.084	$0.539	$0.387	$0.063	$0.040	$0.050	$0.033	$0.399	$0.505	**$0.109**		

PUMP NAME - 200 N. PUMP STATION

PREVIOUS YEARS AVERAGE COSTS:

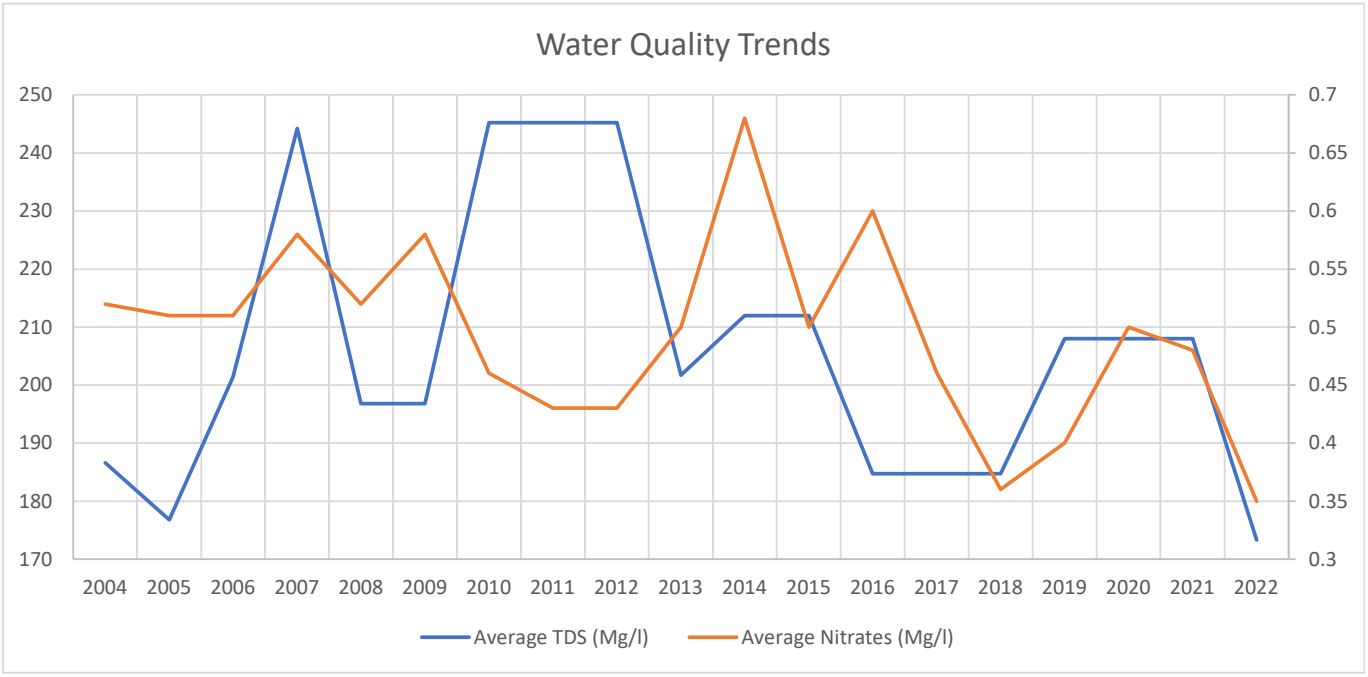
	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022
COST PER 1,000 GALLONS PUMPED	Not used	$0.26	$0.42	$0.58	Not used	$1.47	Not used	Not used	Not used	Not used	Not used	Not used
COST PER KILOWATT-HOUR	No Data	$0.151	$0.173	$0.178	Not used	$0.156	Not used	Not used	Not used	Not used	Not used	Not used

APPENDIX E

WATER QUALITY

WATER QUALITY TRENDS
AVERAGES

Year	Average TDS (Mg/l)	Average Nitrates (Mg/l)
2004	186.6	0.52
2005	176.8	0.51
2006	201.4	0.51
2007	244.2	0.58
2008	196.8	0.52
2009	196.8	0.58
2010	245.2	0.46
2011	245.2	0.43
2012	245.2	0.43
2013	201.7	0.5
2014	212	0.68
2015	212	0.5
2016	184.7	0.6
2017	184.7	0.46
2018	184.7	0.36
2019	208	0.4
2020	208	0.5
2021	208	0.48
2022	173.3	0.35



WATER QUALITY

NITRATES	Source Code	2015	2016	2017	2018	2019	2020	2020	2022
Cedar Canyon Springs	WS002	0.6	0.7	0.5	0.5	No Data	0.5	0.5	0.6
Shurtz Canyon Springs	WS001	0.4	0.5	0.4	0.4	0.4	0.5	0.5	0.4
Spilsbury Springs	SS158	0.3	0.3	0.3	0.2	0.2	0.2	0.2	0.2
Quichapa Well #1		*	*	*	*	*	*	*	*
Quichapa Well #3		*	*	*	*	*	*	*	*
Quichapa Well #5	SS261	0.3	0.5	0.2	0.3	0.2	0.2	0.2	0.2
Quichapa Well #6		*	*	*	*	*	*	*	*
Quichapa Well #7		*	*	*	*	*	*	*	*
Quichapa Well #8		*	*	*	*	*	*	*	*
Enoch Well #1	SS209	0.9	1	0.9	0.4	0.8	1.1	1.1	#
Enoch Well #3		*	*	*	*	*	*	*	*
Average		**0.50**	**0.60**	**0.46**	**0.36**	**0.40**	**0.50**	**0.50**	**0.35**
Cemetery Well		No Data	No Data	No Data	No Data	No Data	No Data	No Data	No Data
Northfield Well		No Data	No Data	No Data	No Data	No Data	No Data	No Data	No Data

T.D.S.	Source Code	2015	2016	2017	2018	2019	2020	2020	2022
Cedar Canyon Springs	WS002	No Data	No Data	No Data	No Data	No Data	No Data	No Data	No Data
Shurtz Canyon Springs	WS001	No Data	No Data	No Data	No Data	No Data	No Data	No Data	No Data
Spilsbury Springs	SS158	No Data	128	No Data	No Data	184	No Data	No Data	180
Quichapa Well #1		*	*	*	*	*	*	*	*
Quichapa Well #3		*	*	*	*	*	*	*	*
Quichapa Well #5	SS261	No Data	194	No Data	No Data	164	No Data	No Data	132
Quichapa Well #6		*	*	*	*	*	*	*	*
Quichapa Well #7		*	*	*	*	*	*	*	*
Quichapa Well #8		*	*	*	*	*	*	*	*
Enoch Well #1	SS209	No Data	232	No Data	No Data	276	No Data	No Data	208
Enoch Well #3		*	*	*	*	*	*	*	*
Average		No Data	**184.7**	No Data	No Data	**208**	No Data	No Data	**173.333**
Cemetery Well		No Data	No Data	No Data	No Data	No Data	No Data	No Data	No Data
Northfield Well		No Data	No Data	No Data	No Data	No Data	No Data	No Data	No Data

* - Beginning in 2005 the data for Enoch 1 & 3 are from the same samples, Quihipa 1 & 3 are from the same samples and Quichipa 5,6, & 7 are from the same samples.

#- Nitrates were Not Discernable

Beginning in 2008, TDS testing is performed every 3rd year

APPENDIX F

UNACCOUNTED-FOR WATER

Unaccounted-for Water (UAW) Calculations - 2022

Month	Metered Water Usage (gallons)	Water Produced (gallons)
January	96,991,000	109,306,393
February	89,131,000	102,328,684
March	85,458,000	112,827,151
April	159,038,000	142,364,836
May	114,764,000	278,215,457
June	301,255,000	332,421,174
July	383,351,000	350,908,633
August	225,327,000	241,508,793
September	296,283,000	276,570,975
October	262,263,000	189,304,882
November	78,524,000	116,486,153
December	75,942,000	117,497,502
Totals	2,168,327,000	2,369,740,633

% Unaccounted-for Water =	**8.5%**

Previous years percentage of unaccounted-for water:

2010	12.4%
2011	6.7%
2012	9.7%
2013	11.2%
2014	13.0%
2015	13.2%
2016	12.4%
2017	5.4%
2018	5.3%
2019	11.1%
2020	9.4%
2021	10.5%
2022	8.5%
10-year average =	10.0%

Leakage Calculations - 2022

Night Inflow Data	(from water usage monitoring data)	
Night inflow to water distribution system	598,176,601	gallons

Metered Usage Data		
Total annual residential usage	1,418,554,000	gallons
Total annual non-residential usage	749,473,000	gallons
Total Annual Metered Water Usage	2,168,027,000	gallons

Nighttime Usage		
Residential - 15% of metered usage	212,783,100	gallons
Non-residential - 40% of metered usage	299,789,200	gallons
Total Annual Nighttime Usage	512,572,300	gallons

Calculated Leakage		
Annual Leakage = Night inflow - Nighttime usage	85,604,301	gallons
Total annual production	2,369,740,633	gallons
% Leakage =	**3.6%**	

Previous years percentage of leakage:

2010	3.4%
2011	5.8%
2012	2.1%
2013	2.0%
2014	4.4%
2015	6.5%
2016	5.0%
2017	3.5%
2018	4.4%
2019	10.2%
2020	4.7%
2021	9.2%
2022	3.6%

10-year average = 5.1%

APPENDIX G

THE LAKE AT THE HILLS – MASS BALANCE SHEETS

LEIGH HILL RESERVOIR
MASS BALANCE LOG SHEET

Dam #UT53394

Cedar City, Utah

Month: January

Year: ~~2021~~ 2022

Name of Operator(s): Kurt

Name of Engineer:

PROCEDURE:

1. Prior to scheduling the mass balance procedure, check the weather forecast to make sure that there is no potential for rain or snow in the forecast.
2. Notify all customers on the pressurized irrigation system at least 24 hours before the study begins.
3. Perform the study during the nighttime hours from approximately 10:00 PM to 6:00 AM.
4. Turn off all pumps and wells that feed into the pressurized irrigation system.
5. If it is open, close the valve on the culinary water system.
6. Close the butterfly valve in the observation box to prevent any water from coming in or going out of the reservoir.
7. Record the water surface elevation at the beginning of the study period. (The SCADA system should also be monitoring the water levels.)
8. Record the water surface elevation at the end of the study period. (The SCADA system should also be monitoring the water levels.)
9. At the end of the study period, the valves can be re-opened and the pumps can be turned on again.
10. Provide a copy of this completed log sheet to the City Engineer.
11. The City Engineering Department will determine the volume of water loss during the study period based on the amount of drawdown.
12. The City Engineering Department shall keep a storage-elevation curve for the Leigh Hill Reservoir on file to be used in calculating the volume of water loss.
13. The City Engineering Department will send a copy of the mass balance study results to the State Engineer (Dam Safety).
14. If the volume of water loss exceeds the threshold stated in the SOP, then remedial actions will be taken based on direction from the State Engineer.

Record information in the following table:

WSE = Water Surface Elevation in Reservoir (read to the nearest 0.001 ft)

Start Date	1-2-~~2021~~ 2022	Start Time	17:45	Start WSE	6009.708
End Date	1-3-~~2021~~ 2022	End Time	01:45	End WSE	6009.708

NOTE: Return this sheet to the City Engineering Department after the results are recorded.

The following table is to be completed by the Cedar City Engineering Department:

Elevation difference		feet	Elev Difference = Start WSE - End WSE
Storage volume at Start WSE		gallons	Refer to the storage-elevation curve.
Storage volume at End WSE		gallons	Refer to the storage-elevation curve.
Volume of water lost		gallons	Water loss = Start WSE volume - End WSE volume
Time elapsed during test period		hours	
Water loss per hour		gal/hour	Water loss per hour = Total volume/Time elapsed
Allowable Leakage Rate (ALR)	6,188	gal/hour	
Is water loss less than ALR?		yes or no?	If no, then contact the State Engineer.

NOTE: A copy of this completed sheet should be kept for inclusion in the City's Annual Water Report.

LEIGH HILL RESERVOIR
MASS BALANCE LOG SHEET

Dam #UT53394

Cedar City, Utah

Month: February

Year: 2022

Name of Operator(s): KUH

Name of Engineer:

PROCEDURE:

1. Prior to scheduling the mass balance procedure, check the weather forecast to make sure that there is no potential for rain or snow in the forecast.
2. Notify all customers on the pressurized irrigation system at least 24 hours before the study begins.
3. Perform the study during the nighttime hours from approximately 10:00 PM to 6:00 AM.
4. Turn off all pumps and wells that feed into the pressurized irrigation system.
5. If it is open, close the valve on the culinary water system.
6. Close the butterfly valve in the observation box to prevent any water from coming in or going out of the reservoir.
7. Record the water surface elevation at the beginning of the study period. (The SCADA system should also be monitoring the water levels.)
8. Record the water surface elevation at the end of the study period. (The SCADA system should also be monitoring the water levels.)
9. At the end of the study period, the valves can be re-opened and the pumps can be turned on again.
10. Provide a copy of this completed log sheet to the City Engineer.
11. The City Engineering Department will determine the volume of water loss during the study period based on the amount of drawdown.
12. The City Engineering Department shall keep a storage-elevation curve for the Leigh Hill Reservoir on file to be used in calculating the volume of water loss.
13. The City Engineering Department will send a copy of the mass balance study results to the State Engineer (Dam Safety).
14. If the volume of water loss exceeds the threshold stated in the SOP, then remedial actions will be taken based on direction from the State Engineer.

Record information in the following table:

WSE = Water Surface Elevation in Reservoir (read to the nearest 0.001 ft)

Start Date	1-31-22	Start Time	2200	Start WSE	6009.588
End Date	2-1-22	End Time	0600	End WSE	6009.588

NOTE: Return this sheet to the City Engineering Department after the results are recorded.

The following table is to be completed by the Cedar City Engineering Department:

Elevation difference		feet	Elev Difference = Start WSE - End WSE
Storage volume at Start WSE		gallons	Refer to the storage-elevation curve.
Storage volume at End WSE		gallons	Refer to the storage-elevation curve.
Volume of water lost		gallons	Water loss = Start WSE volume - End WSE volume
Time elapsed during test period		hours	
Water loss per hour		gal/hour	Water loss per hour = Total volume/Time elapsed
Allowable Leakage Rate (ALR)	6,188	gal/hour	
Is water loss less than ALR?		yes or no?	If no, then contact the State Engineer.

NOTE: A copy of this completed sheet should be kept for inclusion in the City's Annual Water Report.

LEIGH HILL RESERVOIR
MASS BALANCE LOG SHEET

Dam #UT53394

Cedar City, Utah

Month: March

Year: 2022

Name of Operator(s): Kurt

Name of Engineer:

PROCEDURE:

1. Prior to scheduling the mass balance procedure, check the weather forecast to make sure that there is no potential for rain or snow in the forecast.
2. Notify all customers on the pressurized irrigation system at least 24 hours before the study begins.
3. Perform the study during the nighttime hours from approximately 10:00 PM to 6:00 AM.
4. Turn off all pumps and wells that feed into the pressurized irrigation system.
5. If it is open, close the valve on the culinary water system.
6. Close the butterfly valve in the observation box to prevent any water from coming in or going out of the reservoir.
7. Record the water surface elevation at the beginning of the study period. (The SCADA system should also be monitoring the water levels.)
8. Record the water surface elevation at the end of the study period. (The SCADA system should also be monitoring the water levels.)
9. At the end of the study period, the valves can be re-opened and the pumps can be turned on again.
10. Provide a copy of this completed log sheet to the City Engineer.
11. The City Engineering Department will determine the volume of water loss during the study period based on the amount of drawdown.
12. The City Engineering Department shall keep a storage-elevation curve for the Leigh Hill Reservoir on file to be used in calculating the volume of water loss.
13. The City Engineering Department will send a copy of the mass balance study results to the State Engineer (Dam Safety).
14. If the volume of water loss exceeds the threshold stated in the SOP, then remedial actions will be taken based on direction from the State Engineer.

Record information in the following table:

WSE = Water Surface Elevation in Reservoir (read to the nearest 0.001 ft)

Start Date	2-28-22	Start Time	2200	Start WSE	6009.499
End Date	3-1-22	End Time	0700	End WSE	6009.499

NOTE: Return this sheet to the City Engineering Department after the results are recorded.

The following table is to be completed by the Cedar City Engineering Department:

Elevation difference		feet	Elev Difference = Start WSE - End WSE
Storage volume at Start WSE		gallons	Refer to the storage-elevation curve.
Storage volume at End WSE		gallons	Refer to the storage-elevation curve.
Volume of water lost		gallons	Water loss = Start WSE volume - End WSE volume
Time elapsed during test period		hours	
Water loss per hour		gal/hour	Water loss per hour = Total volume/Time elapsed
Allowable Leakage Rate (ALR)	6,188	gal/hour	
Is water loss less than ALR?		yes or no?	If no, then contact the State Engineer.

NOTE: A copy of this completed sheet should be kept for inclusion in the City's Annual Water Report.

LEIGH HILL RESERVOIR
MASS BALANCE LOG SHEET

Dam #UT53394

Cedar City, Utah

Month: April

Year: 2022

Name of Operator(s): KVM

Name of Engineer:

PROCEDURE:

1. Prior to scheduling the mass balance procedure, check the weather forecast to make sure that there is no potential for rain or snow in the forecast.
2. Notify all customers on the pressurized irrigation system at least 24 hours before the study begins.
3. Perform the study during the nighttime hours from approximately 10:00 PM to 6:00 AM.
4. Turn off all pumps and wells that feed into the pressurized irrigation system.
5. If it is open, close the valve on the culinary water system.
6. Close the butterfly valve in the observation box to prevent any water from coming in or going out of the reservoir.
7. Record the water surface elevation at the beginning of the study period. (The SCADA system should also be monitoring the water levels.)
8. Record the water surface elevation at the end of the study period. (The SCADA system should also be monitoring the water levels.)
9. At the end of the study period, the valves can be re-opened and the pumps can be turned on again.
10. Provide a copy of this completed log sheet to the City Engineer.
11. The City Engineering Department will determine the volume of water loss during the study period based on the amount of drawdown.
12. The City Engineering Department shall keep a storage-elevation curve for the Leigh Hill Reservoir on file to be used in calculating the volume of water loss.
13. The City Engineering Department will send a copy of the mass balance study results to the State Engineer (Dam Safety).
14. If the volume of water loss exceeds the threshold stated in the SOP, then remedial actions will be taken based on direction from the State Engineer.

Record information in the following table:

WSE = Water Surface Elevation in Reservoir (read to the nearest 0.001 ft)

Start Date	4-3-22	Start Time	1930	Start WSE	6009.065
End Date	4-4-22	End Time	0330	End WSE	6009.065

NOTE: Return this sheet to the City Engineering Department after the results are recorded.

The following table is to be completed by the Cedar City Engineering Department:

Elevation difference		feet	Elev Difference = Start WSE - End WSE
Storage volume at Start WSE		gallons	Refer to the storage-elevation curve.
Storage volume at End WSE		gallons	Refer to the storage-elevation curve.
Volume of water lost		gallons	Water loss = Start WSE volume - End WSE volume
Time elapsed during test period		hours	
Water loss per hour		gal/hour	Water loss per hour = Total volume/Time elapsed
Allowable Leakage Rate (ALR)	6,188	gal/hour	
Is water loss less than ALR?		yes or no?	If no, then contact the State Engineer.

NOTE: A copy of this completed sheet should be kept for inclusion in the City's Annual Water Report.

LEIGH HILL RESERVOIR
MASS BALANCE LOG SHEET

Dam #UT53394

Cedar City, Utah

Month: May

Year: 2022

Name of Operator(s): Kurt

Name of Engineer:

PROCEDURE:

1. Prior to scheduling the mass balance procedure, check the weather forecast to make sure that there is no potential for rain or snow in the forecast.
2. Notify all customers on the pressurized irrigation system at least 24 hours before the study begins.
3. Perform the study during the nighttime hours from approximately 10:00 PM to 6:00 AM.
4. Turn off all pumps and wells that feed into the pressurized irrigation system.
5. If it is open, close the valve on the culinary water system.
6. Close the butterfly valve in the observation box to prevent any water from coming in or going out of the reservoir.
7. Record the water surface elevation at the beginning of the study period. (The SCADA system should also be monitoring the water levels.)
8. Record the water surface elevation at the end of the study period. (The SCADA system should also be monitoring the water levels.)
9. At the end of the study period, the valves can be re-opened and the pumps can be turned on again.
10. Provide a copy of this completed log sheet to the City Engineer.
11. The City Engineering Department will determine the volume of water loss during the study period based on the amount of drawdown.
12. The City Engineering Department shall keep a storage-elevation curve for the Leigh Hill Reservoir on file to be used in calculating the volume of water loss.
13. The City Engineering Department will send a copy of the mass balance study results to the State Engineer (Dam Safety).
14. If the volume of water loss exceeds the threshold stated in the SOP, then remedial actions will be taken based on direction from the State Engineer.

Record information in the following table:

WSE = Water Surface Elevation in Reservoir (read to the nearest 0.001 ft)

Start Date	5-1-22	Start Time	2230	Start WSE	6006.454
End Date	5-2-22	End Time	6:30	End WSE	6006.454

NOTE: Return this sheet to the City Engineering Department after the results are recorded.

The following table is to be completed by the Cedar City Engineering Department:

Elevation difference		feet	Elev Difference = Start WSE - End WSE
Storage volume at Start WSE		gallons	Refer to the storage-elevation curve.
Storage volume at End WSE		gallons	Refer to the storage-elevation curve.
Volume of water lost		gallons	Water loss = Start WSE volume - End WSE volume
Time elapsed during test period		hours	
Water loss per hour		gal/hour	Water loss per hour = Total volume/Time elapsed
Allowable Leakage Rate (ALR)	6,188	gal/hour	
Is water loss less than ALR?		yes or no?	If no, then contact the State Engineer.

NOTE: A copy of this completed sheet should be kept for inclusion in the City's Annual Water Report.

LEIGH HILL RESERVOIR
MASS BALANCE LOG SHEET

Dam #UT53394

Cedar City, Utah

Month: June

Year: 2022

Name of Operator(s): Kurt

Name of Engineer:

PROCEDURE:

1. Prior to scheduling the mass balance procedure, check the weather forecast to make sure that there is no potential for rain or snow in the forecast.
2. Notify all customers on the pressurized irrigation system at least 24 hours before the study begins.
3. Perform the study during the nighttime hours from approximately 10:00 PM to 6:00 AM.
4. Turn off all pumps and wells that feed into the pressurized irrigation system.
5. If it is open, close the valve on the culinary water system.
6. Close the butterfly valve in the observation box to prevent any water from coming in or going out of the reservoir.
7. Record the water surface elevation at the beginning of the study period. (The SCADA system should also be monitoring the water levels.)
8. Record the water surface elevation at the end of the study period. (The SCADA system should also be monitoring the water levels.)
9. At the end of the study period, the valves can be re-opened and the pumps can be turned on again.
10. Provide a copy of this completed log sheet to the City Engineer.
11. The City Engineering Department will determine the volume of water loss during the study period based on the amount of drawdown.
12. The City Engineering Department shall keep a storage-elevation curve for the Leigh Hill Reservoir on file to be used in calculating the volume of water loss.
13. The City Engineering Department will send a copy of the mass balance study results to the State Engineer (Dam Safety).
14. If the volume of water loss exceeds the threshold stated in the SOP, then remedial actions will be taken based on direction from the State Engineer.

Record information in the following table:

WSE = Water Surface Elevation in Reservoir (read to the nearest 0.001 ft)

Start Date	6-5-22	Start Time	1800	Start WSE	6007.193
End Date	6-6-22	End Time	0200	End WSE	6007.193

NOTE: Return this sheet to the City Engineering Department after the results are recorded.

The following table is to be completed by the Cedar City Engineering Department:

Elevation difference		feet	Elev Difference = Start WSE - End WSE
Storage volume at Start WSE		gallons	Refer to the storage-elevation curve.
Storage volume at End WSE		gallons	Refer to the storage-elevation curve.
Volume of water lost		gallons	Water loss = Start WSE volume - End WSE volume
Time elapsed during test period		hours	
Water loss per hour		gal/hour	Water loss per hour = Total volume/Time elapsed
Allowable Leakage Rate (ALR)	6,188	gal/hour	
Is water loss less than ALR?		yes or no?	If no, then contact the State Engineer.

NOTE: A copy of this completed sheet should be kept for inclusion in the City's Annual Water Report.

LEIGH HILL RESERVOIR
MASS BALANCE LOG SHEET

Dam #UT53394

Cedar City, Utah

Month: July

Year: 2022

Name of Operator(s): Kuhn

Name of Engineer:

PROCEDURE:

1. Prior to scheduling the mass balance procedure, check the weather forecast to make sure that there is no potential for rain or snow in the forecast.
2. Notify all customers on the pressurized irrigation system at least 24 hours before the study begins.
3. Perform the study during the nighttime hours from approximately 10:00 PM to 6:00 AM.
4. Turn off all pumps and wells that feed into the pressurized irrigation system.
5. If it is open, close the valve on the culinary water system.
6. Close the butterfly valve in the observation box to prevent any water from coming in or going out of the reservoir.
7. Record the water surface elevation at the beginning of the study period. (The SCADA system should also be monitoring the water levels.)
8. Record the water surface elevation at the end of the study period. (The SCADA system should also be monitoring the water levels.)
9. At the end of the study period, the valves can be re-opened and the pumps can be turned on again.
10. Provide a copy of this completed log sheet to the City Engineer.
11. The City Engineering Department will determine the volume of water loss during the study period based on the amount of drawdown.
12. The City Engineering Department shall keep a storage-elevation curve for the Leigh Hill Reservoir on file to be used in calculating the volume of water loss.
13. The City Engineering Department will send a copy of the mass balance study results to the State Engineer (Dam Safety).
14. If the volume of water loss exceeds the threshold stated in the SOP, then remedial actions will be taken based on direction from the State Engineer.

Record information in the following table:

WSE = Water Surface Elevation in Reservoir (read to the nearest 0.001 ft)

Start Date	7-3-22	Start Time	2100	Start WSE	6009.771
End Date	7-4-22	End Time	0500	End WSE	6009.771

NOTE: Return this sheet to the City Engineering Department after the results are recorded.

The following table is to be completed by the Cedar City Engineering Department:

Elevation difference		feet	Elev Difference = Start WSE - End WSE
Storage volume at Start WSE		gallons	Refer to the storage-elevation curve.
Storage volume at End WSE		gallons	Refer to the storage-elevation curve.
Volume of water lost		gallons	Water loss = Start WSE volume - End WSE volume
Time elapsed during test period		hours	
Water loss per hour		gal/hour	Water loss per hour = Total volume/Time elapsed
Allowable Leakage Rate (ALR)	6,188	gal/hour	
Is water loss less than ALR?		yes or no?	If no, then contact the State Engineer.

NOTE: A copy of this completed sheet should be kept for inclusion in the City's Annual Water Report.

LEIGH HILL RESERVOIR
MASS BALANCE LOG SHEET

Dam #UT53394

Cedar City, Utah

Month: August Year: 2022

Name of Operator(s): _____

Name of Engineer: _____

PROCEDURE:

1. Prior to scheduling the mass balance procedure, check the weather forecast to make sure that there is no potential for rain or snow in the forecast.
2. Notify all customers on the pressurized irrigation system at least 24 hours before the study begins.
3. Perform the study during the nighttime hours from approximately 10:00 PM to 6:00 AM.
4. Turn off all pumps and wells that feed into the pressurized irrigation system.
5. If it is open, close the valve on the culinary water system.
6. Close the butterfly valve in the observation box to prevent any water from coming in or going out of the reservoir.
7. Record the water surface elevation at the beginning of the study period. (The SCADA system should also be monitoring the water levels.)
8. Record the water surface elevation at the end of the study period. (The SCADA system should also be monitoring the water levels.)
9. At the end of the study period, the valves can be re-opened and the pumps can be turned on again.
10. Provide a copy of this completed log sheet to the City Engineer.
11. The City Engineering Department will determine the volume of water loss during the study period based on the amount of drawdown.
12. The City Engineering Department shall keep a storage-elevation curve for the Leigh Hill Reservoir on file to be used in calculating the volume of water loss.
13. The City Engineering Department will send a copy of the mass balance study results to the State Engineer (Dam Safety).
14. If the volume of water loss exceeds the threshold stated in the SOP, then remedial actions will be taken based on direction from the State Engineer.

Record information in the following table:

WSE = Water Surface Elevation in Reservoir (read to the nearest 0.001 ft)

Start Date	8-7-22	Start Time	~~2~~ 2200	Start WSE	6009.824
End Date	8-8-22	End Time	0600	End WSE	6009.824

NOTE: Return this sheet to the City Engineering Department after the results are recorded.

The following table is to be completed by the Cedar City Engineering Department:

Elevation difference		feet	Elev Difference = Start WSE - End WSE
Storage volume at Start WSE		gallons	Refer to the storage-elevation curve.
Storage volume at End WSE		gallons	Refer to the storage-elevation curve.
Volume of water lost		gallons	Water loss = Start WSE volume - End WSE volume
Time elapsed during test period		hours	
Water loss per hour		gal/hour	Water loss per hour = Total volume/Time elapsed
Allowable Leakage Rate (ALR)	6,188	gal/hour	
Is water loss less than ALR?		yes or no?	If no, then contact the State Engineer.

NOTE: A copy of this completed sheet should be kept for inclusion in the City's Annual Water Report.

LEIGH HILL RESERVOIR
MASS BALANCE LOG SHEET

Dam #UT53394

Cedar City, Utah

Month: September Year: 2022

Name of Operator(s):

Name of Engineer:

PROCEDURE:

1. Prior to scheduling the mass balance procedure, check the weather forecast to make sure that there is no potential for rain or snow in the forecast.
2. Notify all customers on the pressurized irrigation system at least 24 hours before the study begins.
3. Perform the study during the nighttime hours from approximately 10:00 PM to 6:00 AM.
4. Turn off all pumps and wells that feed into the pressurized irrigation system.
5. If it is open, close the valve on the culinary water system.
6. Close the butterfly valve in the observation box to prevent any water from coming in or going out of the reservoir.
7. Record the water surface elevation at the beginning of the study period. (The SCADA system should also be monitoring the water levels.)
8. Record the water surface elevation at the end of the study period. (The SCADA system should also be monitoring the water levels.)
9. At the end of the study period, the valves can be re-opened and the pumps can be turned on again.
10. Provide a copy of this completed log sheet to the City Engineer.
11. The City Engineering Department will determine the volume of water loss during the study period based on the amount of drawdown.
12. The City Engineering Department shall keep a storage-elevation curve for the Leigh Hill Reservoir on file to be used in calculating the volume of water loss.
13. The City Engineering Department will send a copy of the mass balance study results to the State Engineer (Dam Safety).
14. If the volume of water loss exceeds the threshold stated in the SOP, then remedial actions will be taken based on direction from the State Engineer.

Record information in the following table:

WSE = Water Surface Elevation in Reservoir (read to the nearest 0.001 ft)

Start Date	9-4-22	Start Time	1400	Start WSE	6006.249
End Date	9-5 22	End Time	0400	End WSE	6006.249

NOTE: Return this sheet to the City Engineering Department after the results are recorded.

The following table is to be completed by the Cedar City Engineering Department:

Elevation difference		feet	Elev Difference = Start WSE - End WSE
Storage volume at Start WSE		gallons	Refer to the storage-elevation curve.
Storage volume at End WSE		gallons	Refer to the storage-elevation curve.
Volume of water lost		gallons	Water loss = Start WSE volume - End WSE volume
Time elapsed during test period		hours	
Water loss per hour		gal/hour	Water loss per hour = Total volume/Time elapsed
Allowable Leakage Rate (ALR)	6,188	gal/hour	
Is water loss less than ALR?		yes or no?	If no, then contact the State Engineer.

NOTE: A copy of this completed sheet should be kept for inclusion in the City's Annual Water Report.

LEIGH HILL RESERVOIR
MASS BALANCE LOG SHEET

Dam #UT53394

Cedar City, Utah

Month: October

Year: 2022

Name of Operator(s): Shelby

Name of Engineer: _____

PROCEDURE:

1. Prior to scheduling the mass balance procedure, check the weather forecast to make sure that there is no potential for rain or snow in the forecast.
2. Notify all customers on the pressurized irrigation system at least 24 hours before the study begins.
3. Perform the study during the nighttime hours from approximately 10:00 PM to 6:00 AM.
4. Turn off all pumps and wells that feed into the pressurized irrigation system.
5. If it is open, close the valve on the culinary water system.
6. Close the butterfly valve in the observation box to prevent any water from coming in or going out of the reservoir.
7. Record the water surface elevation at the beginning of the study period. (The SCADA system should also be monitoring the water levels.)
8. Record the water surface elevation at the end of the study period. (The SCADA system should also be monitoring the water levels.)
9. At the end of the study period, the valves can be re-opened and the pumps can be turned on again.
10. Provide a copy of this completed log sheet to the City Engineer.
11. The City Engineering Department will determine the volume of water loss during the study period based on the amount of drawdown.
12. The City Engineering Department shall keep a storage-elevation curve for the Leigh Hill Reservoir on file to be used in calculating the volume of water loss.
13. The City Engineering Department will send a copy of the mass balance study results to the State Engineer (Dam Safety).
14. If the volume of water loss exceeds the threshold stated in the SOP, then remedial actions will be taken based on direction from the State Engineer.

Record information in the following table:

WSE = Water Surface Elevation in Reservoir (read to the nearest 0.001 ft)

Start Date	10/2/22	Start Time	18.00	Start WSE	6009.765
End Date	10/3/22	End Time	02.00	End WSE	6009.865

raised

NOTE: Return this sheet to the City Engineering Department after the results are recorded.

The following table is to be completed by the Cedar City Engineering Department:

Elevation difference		feet	Elev Difference = Start WSE - End WSE
Storage volume at Start WSE		gallons	Refer to the storage-elevation curve.
Storage volume at End WSE		gallons	Refer to the storage-elevation curve.
Volume of water lost		gallons	Water loss = Start WSE volume - End WSE volume
Time elapsed during test period		hours	
Water loss per hour		gal/hour	Water loss per hour = Total volume/Time elapsed
Allowable Leakage Rate (ALR)	6,188	gal/hour	
Is water loss less than ALR?		yes or no?	If no, then contact the State Engineer.

NOTE: A copy of this completed sheet should be kept for inclusion in the City's Annual Water Report.

LEIGH HILL RESERVOIR
MASS BALANCE LOG SHEET

Dam #UT53394

Cedar City, Utah

Month: November Year: 2022

Name of Operator(s): Chance / Shelby

Name of Engineer: _____

PROCEDURE:

1. Prior to scheduling the mass balance procedure, check the weather forecast to make sure that there is no potential for rain or snow in the forecast.
2. Notify all customers on the pressurized irrigation system at least 24 hours before the study begins.
3. Perform the study during the nighttime hours from approximately 10:00 PM to 6:00 AM.
4. Turn off all pumps and wells that feed into the pressurized irrigation system.
5. If it is open, close the valve on the culinary water system.
6. Close the butterfly valve in the observation box to prevent any water from coming in or going out of the reservoir.
7. Record the water surface elevation at the beginning of the study period. (The SCADA system should also be monitoring the water levels.)
8. Record the water surface elevation at the end of the study period. (The SCADA system should also be monitoring the water levels.)
9. At the end of the study period, the valves can be re-opened and the pumps can be turned on again.
10. Provide a copy of this completed log sheet to the City Engineer.
11. The City Engineering Department will determine the volume of water loss during the study period based on the amount of drawdown.
12. The City Engineering Department shall keep a storage-elevation curve for the Leigh Hill Reservoir on file to be used in calculating the volume of water loss.
13. The City Engineering Department will send a copy of the mass balance study results to the State Engineer (Dam Safety).
14. If the volume of water loss exceeds the threshold stated in the SOP, then remedial actions will be taken based on direction from the State Engineer.

Record information in the following table:

WSE = Water Surface Elevation in Reservoir (read to the nearest 0.001 ft)

Start Date	11-1-22	Start Time	0900	Start WSE	6007.767
End Date	11-1-22	End Time	1700	End WSE	6007.767

NOTE: Return this sheet to the City Engineering Department after the results are recorded.

The following table is to be completed by the Cedar City Engineering Department:

Elevation difference		feet	Elev Difference = Start WSE - End WSE
Storage volume at Start WSE		gallons	Refer to the storage-elevation curve.
Storage volume at End WSE		gallons	Refer to the storage-elevation curve.
Volume of water lost		gallons	Water loss = Start WSE volume - End WSE volume
Time elapsed during test period		hours	
Water loss per hour		gal/hour	Water loss per hour = Total volume/Time elapsed
Allowable Leakage Rate (ALR)	6,188	gal/hour	
Is water loss less than ALR?		yes or no?	If no, then contact the State Engineer.

NOTE: A copy of this completed sheet should be kept for inclusion in the City's Annual Water Report

LEIGH HILL RESERVOIR
MASS BALANCE LOG SHEET

Dam #UT53394

Cedar City, Utah

Month: December

Year: 2022

Name of Operator(s): Chance / Luke

Name of Engineer:

PROCEDURE:

1. Prior to scheduling the mass balance procedure, check the weather forecast to make sure that there is no potential for rain or snow in the forecast.
2. Notify all customers on the pressurized irrigation system at least 24 hours before the study begins.
3. Perform the study during the nighttime hours from approximately 10:00 PM to 6:00 AM.
4. Turn off all pumps and wells that feed into the pressurized irrigation system.
5. If it is open, close the valve on the culinary water system.
6. Close the butterfly valve in the observation box to prevent any water from coming in or going out of the reservoir.
7. Record the water surface elevation at the beginning of the study period. (The SCADA system should also be monitoring the water levels.)
8. Record the water surface elevation at the end of the study period. (The SCADA system should also be monitoring the water levels.)
9. At the end of the study period, the valves can be re-opened and the pumps can be turned on again.
10. Provide a copy of this completed log sheet to the City Engineer.
11. The City Engineering Department will determine the volume of water loss during the study period based on the amount of drawdown.
12. The City Engineering Department shall keep a storage-elevation curve for the Leigh Hill Reservoir on file to be used in calculating the volume of water loss.
13. The City Engineering Department will send a copy of the mass balance study results to the State Engineer (Dam Safety).
14. If the volume of water loss exceeds the threshold stated in the SOP, then remedial actions will be taken based on direction from the State Engineer.

Record information in the following table:

WSE = Water Surface Elevation in Reservoir (read to the nearest 0.001 ft)

Start Date	11-28	Start Time	0100	Start WSE	6009.293
End Date	11-28	End Time	0900	End WSE	6009.293

NOTE: Return this sheet to the City Engineering Department after the results are recorded.

The following table is to be completed by the Cedar City Engineering Department:

Elevation difference		feet	Elev Difference = Start WSE - End WSE
Storage volume at Start WSE		gallons	Refer to the storage-elevation curve
Storage volume at End WSE		gallons	Refer to the storage-elevation curve
Volume of water lost		gallons	Water loss = Start WSE volume - End WSE volume
Time elapsed during test period		hours	
Water loss per hour		gal/hour	Water loss per hour = Total volume/Time elapsed
Allowable Leakage Rate (ALR)	6,188	gal/hour	
Is water loss less than ALR?		yes or no?	

APPENDIX H

WATER CONVEYANCE TRACKING SHEET

WATER ACQUISITION TRACKING SHEET

Date Approved/ Purchased	Development/Seller's Name	Development/Acquisition Type	Area (Acres)	# of Lots/Units	Water Rights Transferred to City (acre-feet)				Conveyed	Deferred Convey	Acquisition Fees Paid	Wet Land	Dry Land	Agricultural Water Lease Back Area (Acres)	Comments
					Ground Water	Primary Surface	Secondary Surface	Total				(Acres)	(Acres)		
3/14/2006	Stanley	Purchase	N/A	N/A	141.85			141.85	X		X	N/A	N/A	N/A	
4/12/2006	Frank Benson	Purchase	N/A	N/A		0.09		0.09	X		N/A	N/A	N/A	N/A	
4/14/2006	Steffensen	Purchase	N/A	N/A		5.625	1.875	7.5	X		N/A	N/A	N/A	N/A	
4/30/2006	Cedar Willows Phase 3	Subdivision	5.16	18		5.161		5.161	X		$24,525.07	N/A	N/A	N/A	
5/15/2006	Tippetts Annex.	Annexation	493.7	N/A	260.28			260.28	X		N/A	493.70		Agreement with City	
5/25/2006	Hunter Glenn #1	Subdivision	37.66	94	0	0	0	0		X	$0.00	N/A	N/A	N/A	
6/6/2006	Hunter Glenn #3	Annexation	40.74		0	0	0	0		X		40.74	N/A		
6/6/2006	Bauer Annex(1600 S W of Westview)	Annexation	160.9	0	0	0	0	0		X	$0.00		160.90	N/A	
6/6/2006	Bauer Annex(1600 S E of Westview)	Annexation	7.43	0	0	0	0	0		X			7.43	N/A	
6/19/2006	DeMille Phase 2	Subdivision		6	0	0	0	0	N/A	N/A	$35,064.00	N/A	N/A	N/A	
6/21/2006	Middleton South I-15 area	Annexation	915.61	N/A	0	0	0	0		X	$0.00		915.61	N/A	
6/21/2006	Cosmic 4800 W Center	Annexation	242.95	N/A	3.734		80.43	84.164	X		$0.00	194.00	48.00	N/A	
6/28/2006	Sevy 5200 W 800 N	Annexation	727.38	N/A	258.22		96.384	354.604	X		$0.00	733.00			Agreement with City
6/30/2006	Carmel Canyon Phase 3	Subdivision	15.46	35	0	0	0	0	N/A	N/A	$111,312.00	N/A	N/A	N/A	
8/7/2006	Trailside PUD	PUD	6.57	92	0	0	0	0		X	$0.00	N/A	N/A	N/A	
8/11/2006	Cedar Park Townhomes 1 & 2	PUD	4.51	52	7.47	4.8	3.9	16.17	X		$0.00	N/A	N/A	N/A	
8/30/2006	H & B Capitol Joel Hansen	Annexation	7.43	N/A	0	0	0	0		X	$0.00		7.43	N/A	
9/27/2006	Forrest & Ruby Bauer Westview Dr.	Annexation	160.92	N/A	0	0	0	0		X	$0.00		160.92	N/A	
10/13/2006	Cedar Park Townhomes #2	PUD	4.51	52	5.215	1.345	0.66975	7.22975	X		$22,904.64	4.51	N/A	N/A	
10/13/2006	Crescent Heights PUD	PUD	3.39	24	0	0	0	0	N/A	N/A	$24,408.00	N/A	3.39	N/A	
11/30/2006	Hidden Hills Estates/Hunter	Subdivision	10.37	17	5.185	2.725		7.91	X		$15,183.36	10.37	N/A	N/A	
12/26/2006	Coal Creek Industrial #4	Subdivision	6.64	11	0	0	0	0		X	$0.00		6.64	N/A	to be at bldg. Permit
1/20/2007	Esplin Ranch	Annexation	1719.6	N/A	0	0	0	0		X	$0.00		1719.60	N/A	
1/30/2007	Darla and Amy Allen	Purchase	N/A	N/A	31			31	X		N/A	N/A	N/A	N/A	
2/21/2007	Hibler/Whittingham 5600 W U-56	Annexation	132.37	N/A	0	0	0	0		X	$0.00		132.37	N/A	
2/21/2007	Cottonwood South 3000 N	Annexation	54.67	N/A	0	0	0	0		X	$0.00		54.67	N/A	
3/1/2007	Bella Monte PUD	PUD	3.03	39	0	0	0	0			$21,816.00	N/A	3.03	N/A	
4/15/2007	Cordero Annex	Annexation	2255.16	N/A	558			558	X		N/A	2255.16	N/A	N/A	
4/24/2007	Sage Springs 1	Subdivision	2.72	9	1.36	4.78	10	16.14	X		$0.00	2.72		N/A	
4/25/2007	Heap	Purchase	N/A	N/A	2			2	X		N/A	N/A	N/A	N/A	
4/26/2007	Meadow Crest PUD	PUD	6.3	52	0	0	0	0	N/A	N/A	$32,161.00	N/A	6.30	N/A	
5/10/2007	Hidden Hills Cove 1/Peterson	Subdivision	6.88	24	6.88	0	0	6.88	X		$0.00	6.88	N/A	N/A	
8/14/2007	Cedar Ridge Townhomes PUD	PUD	5.35	40	0	0	0	0	N/A	N/A	$30,024.00	N/A	5.35	N/A	
8/14/2007	Sycamore Trail PUD 1	PUD	8.01	33	8.013	16		24.013	X		$0.00	8.01	N/A	N/A	
3/3/2008	Joe Burgess	Purchase	N/A	N/A	7.47	4.944	4.793	17.207	X		$0.00	N/A	N/A	N/A	
8/20/2007	Levine	Annexation	42.08	N/A		33.644		33.644	X		$0.00	42.08	N/A	N/A	
7/2/2008	Hidden Hills Cove Phase 2/Meisner	Subdivision	6.88	31	16.38	8.921	11.97	37.271	X		$0.00	6.88	N/A	N/A	
8/1/2008	Fort Cedar commerce Cntr. PUD	PUD	3	6	0	0	0	0		X	$0.00		3.00	N/A	
8/7/2008	Van DeCar	Purchase	N/A	N/A	2				X		N/A	N/A	N/A	N/A	
8/27/2008	Benzie Annex.	Annexation	21.3	N/A	0	0	0	0		X		13.86	7.46	N/A	
2/17/2009	Thatcher	Purchase	N/A	N/A	1.3				X		$0.00	N/A	N/A	N/A	
3/21/2009	Meisner/Judd Annex 3300 W 1900 N	Annexation	57.6	N/A	0	0	28 Shares coal Creek	0	X				57.60	N/A	
8/14/2009	Donahue	Purchase	N/A	N/A	3				X		N/A	N/A	N/A	N/A	
9/23/2009	Jack Burns	Purchase	N/A	N/A	4		4 Shares Coal Creek		X		N/A	N/A	N/A	N/A	
12/29/2009	Miller Annex	Annexation	6.4	N/A	3.41		5 NF Irrig.		X		N/A	6.40	N/A	N/A	
3/17/2010	Engres	Purchase	N/A	N/A	0.85				X		N/A	N/A	N/A	N/A	
8/13/2010	Kleinshcmidt	Purchase	N/A	N/A	5				X		N/A	N/A	N/A	N/A	
10/1/2010	Cottonwood Grove (3000 N Bulldog)	Annexation	31.47	N/A	73.58			73.58	X		N/A	31.47	N/A	N/A	
c	Jett	Purchase	N/A	N/A	19				X		N/A	N/A	N/A	N/A	
12/17/20100Je	Jett	Purchase	N/A	N/A	22				X		N/A	N/A	N/A	N/A	
4/12/2011	JDL Investment	Purchase	N/A	N/A	18.706				X		N/A	N/A	N/A	N/A	
5/2/2011	EID Investments	Purchase	N/A	N/A	37				X		N/A	N/A	N/A	N/A	
7/8/2011	Shumway	Purchase	N/A	N/A			.41 S & W		X		N/A	N/A	N/A	N/A	
4/4/2012	Cosmic/Heritage	Annexation	243.33		288.3		106		X		N/A	N/A	N/A	N/A	
9/27/2012	Rossing	Purchase			6.5			6.5	X		N/A	N/A	N/A	N/A	
10/26/2012	Elmer Ent. (meryl Prince)	Purchase	N/A	N/A	200				X		N/A	N/A	N/A	N/A	
3/15/2013	Sean Wilson	Purchase	N/A	N/A			0.446	0.466	X		N/A	N/A	N/A	N/A	
5/9/2013	Paydirt Annex. - 1600 N	Annexation	142.9	N/A	105	16.5		121.5	X		$0.00	142.90		N/A	
8/19/2013	Preston Nelson	Purchase	N/A	N/A	25.2			25.2	X		N/A	N/A	N/A	N/A	
9/23/2013	IDR Inv. (N of 1600 N, 4200 W)	Annexation	20.37	N/A	0	0	0	0	X		$0.00		20.37	N/A	
12/6/2013	Doug Hall	Purchase	N/A	N/A			0.2	0.2	X		N/A	N/A	N/A	N/A	
2/25/2014	Chet Perkins	Purchase	N/A	N/A			0.143	0.143	X		N/A	N/A	N/A	N/A	
4/26/2014	Chet & Kathy Perkins	Purchase	N/A	N/A	1.0				X		N/A	N/A	N/A	N/A	

Missing a few years

This spreadsheet is starting again on 4/6/2018

4/6/2018	Spencer Jones	Development	N/A	N/A		0.2		0.2	X		N/A	N/A	N/A	N/A	
4/6/2018	Robert L. Stratton	Purchase	N/A	N/A		0.9		0.9	X		N/A	N/A	N/A	N/A	
1/3/2018	Coca Cola Bottling	Purchase	N/A	N/A		31.25		31.25	X		N/A	N/A	N/A	N/A	
1/3/2018	Coca Cola Bottling	Purchase	N/A	N/A		14		14	X		N/A	N/A	N/A	N/A	
6/1/2018	Sam Dodd	Purchase	N/A	N/A	10.0			10	X		N/A	N/A	N/A	N/A	
4/27/2018	MJB-Cedar City LLC	Purchase	N/A	N/A	30.6			30.635	X		N/A	N/A	N/A	N/A	
3/17/2018	Murray & Gay Sorensen	Purchase	N/A	N/A	26.8			26.828	X		N/A	N/A		N/A	
3/27/2019	Harold Thompson	Purchase	N/A	N/A	0	0.8918 (0.26 shares)	0	0.8918	X	N/A	N/A	N/A	N/A	N/A	Checked by JAS
4/16/2019	Blake Cozzens	Purchase	N/A	N/A	0	1.029 (0.30 shares)	0	1.029	X	N/A	N/A	N/A	N/A	N/A	Checked by JAS
6/26/2019	Mark Meisner Annexation	Annexation	8.413	N/A	6.39	0	38.9064 (37.41 shares)	45.2964	X	N/A	N/A	N/A	N/A	N/A	Checked by JAS
8/14/2019	Northfield Townhomes PUD Phase 1 and Northfield Apartment Subdivision/ Joe Burgess	PUD & Subdivision	8.84	37	4.42	4.4145 (1.35 shares in North Field)	4.425 (0.75 shares in North Field) 1.1492 (1.105 shares	14.4087	X	N/A	N/A	N/A	N/A	N/A	Checked by JAS
2/14/2020	MJB-Cedar City LLC	Purchase	N/A	N/A	30.0 (WR #73-4226) 1.148	0	0	31.148	X	N/A	N/A	N/A	N/A	N/A	Checked by JAS
3/26/2020	Canyon Loft Townhomes PUD/ Joe Burgess	PUD	2.17	20	1.09	1.0791 (0.33 shares in North Field)	1.121 (0.19 shares in North Field) 0.28392 (0.273 shares	3.57402	X	N/A	N/A	N/A	N/A	N/A	Checked by JAS
10/15/2020	Hunter Family Living Trust	Purchase	N/A	N/A	217.0	0	0	217.0	X	N/A	N/A	N/A	N/A	N/A	Checked by JAS
1/25/2021	Iron West Subdivision (first 158 lots)/ Joe Burgess	Subdivision	24.1	158	12.05	12.07 (3.69 shares)	12.05 (2.043 shares)	36.17	X	N/A	$ 695.16	N/A	N/A	N/A	
2/9/2021	Northfield Townhomes PUD Phase 2/ Joe Burgess	PUD	7.71	60	3.43	3.56 (1.09 shares)	3.57 (0.605 shares)	10.56	X	N/A	$ 205.80	N/A	N/A	N/A	
2/9/2021	Iron West Commercial and R-3 Property/ Joe Burgess	Subdivision	37.23	unknown	17.84	18.61 (5.69 shares)	18.64 (3.16 shares)	55.09	X	N/A	$ 1,073.40	N/A	N/A	N/A	
?	Fiddlers Canyon Hills PUD/ Joe Burgess	PUD	58.7613		33.33				X			N/A	N/A	N/A	
2/10/2021	Christopher D. or Jenni Grider	Purchase	N/A	N/A	0	0.686 (0.2 shares)	0	0.686	X	N/A	N/A	N/A	N/A	N/A	
2/17/2021	Norma Stratton Thompson	Purchase	N/A	N/A	0	34.3 (10.00 shares)	0	34.3	X	N/A	N/A	N/A	N/A	N/A	
4/1/2021	Jan Parke	Purchase	N/A	N/A	0	1.715 (0.5 shares)	0	1.715	X	N/A	N/A	N/A	N/A	N/A	
8/10/2021	Heath Sartini	Building Permit	N/A	1	0.50	0.0	0	0.5	X	N/A	$3,000.00	N/A	N/A	N/A	
2/9/2022	Onado Annexation	Annexation	40.02	N/A	46.56	0.0	0	46.56	X	N/A	$5,813.54	40.02	0.00	N/A	
9/28/2022	Heritage Land Holdings, LLC (Cedar Breaks PUD - Phase 1)	PUD	3.14	46	0.00	13.734 (4.2 shares)	0	13.74	X						Signed Certificate in Files
1/2/2023	Sevy Land & Livestock	Purchase	N/A	N/A	100.00	0	0	100	X	N/A	N/A	N/A	N/A	N/A	