CENTRAL IRON COUNTY
WATER CONSERVANCY
DISTRICT

Pine Valley Water Supply and Conservation Project

FINANCIAL BUSINESS PLAN AND WATER NEEDS ASSESSMENT

FINAL | June 2023

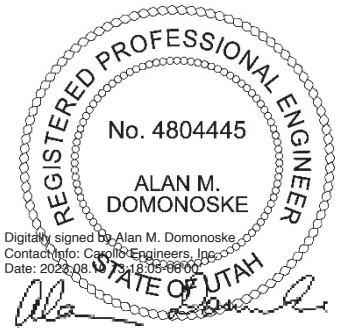
carollo

CENTRAL IRON COUNTY
WATER CONSERVANCY
DISTRICT

Pine Valley Water Supply and Conservation Project

FINANCIAL BUSINESS PLAN AND WATER NEEDS ASSESSMENT

FINAL | June 2023



Digitally signed by Alan M. Domonoske
Contact Info: Carollo Engineers, Inc.
Date: 2023.08.14 13:18:05-06'00'

Contents

Appendices

Tables

Figures

Abbreviations

AFY	acre-feet per year
BPA	Bonneville Power Authority
Carollo	Carollo Engineers, Inc.
Cedar City	Cedar City Corporation
cfs	cubic feet per second
CICWCD	Central Iron County Water Conservancy District
District	Central Iron County Water Conservancy District
DNR	Department of Natural Resources
DWR	Division of Water Rights
FBPWNA	Financial Business Plan and Water Needs Assessment
GMP	Groundwater Management Plan
GOMB	Governor's Office of Management and Budget
gpcd	gallons per capita per day
GPI	Kem C. Gardner Policy Institute
gpm	gallons per minute
Kgals	thousands of gallons
LEPA	Low Energy Precision Application
LESA	Low Elevation Sprinkler Application
N/A	Not Applicable
O&M	operation and maintenance
PVWS	Pine Valley Water Supply
SRF	State Revolving Fund
WIFIA	Water Infrastructure Finance and Innovation Act

-This Page Intentionally Left Blank-

Chapter 1
INTRODUCTION

1.1 Study Goals

Monitoring of the Cedar Valley Aquifer has shown that water table levels have dropped anywhere from 10 feet to over 100 feet in some areas over the past 80 years. While agricultural demands drive much of the area's groundwater use, communities in Iron County are continuing to grow and drive a portion of the demands on this local resource. Because water is currently withdrawn from the aquifer at a rate that exceeds recharge, the Utah Division of Water Rights (DWR) developed a Groundwater Management Plan (GMP) for the Cedar City Valley (DWR 2021). The GMP calls for a series of significant cutbacks in water rights for users throughout the basin, with a goal of reducing net depletion use of local groundwater to sustainable levels. This will directly impact the ability of public water supply providers in Iron County to meet projected demands.

The Central Iron County Water Conservancy District (CICWCD) is proactively taking action to address the anticipated water supply shortfall. Agricultural irrigation is by far the largest use of water from the Cedar Valley Aquifer. The CICWCD has undertaken steps to support agricultural efficiency, including upgrading agricultural irrigation equipment in the valley to Low Energy Precision Application (LEPA) and Low Elevation Sprinkler Application (LESA) technologies as detailed in Chapter 2 – Integrated Water Resource Plan. The CICWCD has also invested in construction of facilities to increase the amount of water recharged to the aquifer from local surface water sources.

The CICWCD has implemented aquifer storage and conservation projects, as well as acquired water rights outside of the Cedar Valley Basin from basins in western Iron County and western Beaver County. These water rights will support groundwater development projects that will import water into the Cedar Valley and help provide a more resilient water future. The Pine Valley Water Supply and Conservation (PVWS) project includes development of wells and design and construction of a new pipeline from the Pine Valley wellfield to delivery points in the Cedar City Valley.

An economic and fiscal analysis study commissioned by the CICWCD in 2019 (Applied Analysis 2019) documented the financial benefits of the PVWS project, including estimates of employment generated by the project. Modeling conducted in the 2019 study found that constructing the PVWS (estimated at $254 million at the time of the analysis) would generate over $366 million in economic output and more than 3,100 person-years of employment, considering direct, indirect, and induced employment. Excerpts from the Applied Analysis economic report are included as Appendix A, and a link to the full report is provided in Chapter 5 – References.

This Financial Business Plan and Water Needs Assessment (FBPWNA) is an element toward making the CICWCD's vision a reality. First written in 2020, this updated edition of the FBPWNA report updates factors that have evolved since the initial analyses were completed. Most

notably, this includes analysis of a range of potential future population projections in Iron County and updated calculations that reflect rapidly escalating costs for purchasing in-basin groundwater rights that are being experienced in the Cedar Valley. Additionally, the District had Zions Public Finance conduct a finance study to evaluate bonding capacity and water rates.

The PVWS is envisioned as a regional project that can supply water to the vast majority of Iron County, consistent with the CICWCD's service area that covers more than 90 percent of the County's population. It is anticipated that with the PVWS in place, the CICWCD would serve a portion of the demands through direct retail service. The remainder of PVWS supply would be made available via wholesale deliveries to Cedar City, Enoch City, and Kanarraville. These communities are conducting ongoing evaluations in support of their potential participation in the project. This report provides information to support informed decision-making by the CICWCD and each of these key stakeholders.

This report outlines analyses conducted to assess the amount and timing of water needed to avoid a future supply gap (Water Needs Assessment) and the financial implications of implementing the project via cost sharing and outside funding opportunities (Business Plan). The Business Plan demonstrates how the project could be financed and funded, in light of incurring debt for the project, the revenues needed to cover that debt, and the associated changes to customers' water rates to provide the needed revenue.

1.2 Key Stakeholders

The CICWCD is leading efforts to plan the PVWS project. Key stakeholders that participated in the development of this FBPWNA are the same entities that could be future wholesale customers of CICWCD. The key stakeholders referenced throughout this report include:

- Cedar City Corporation (Cedar City).
- Enoch City.
- Town of Kanarraville.

Implementation of the project would include development of interlocal agreements between the CICWCD and participating key stakeholders.

Ensign Engineering has supported PVWS planning, including development of preliminary layouts of Pine Valley well field facilities, routing of the pipeline from Pine Valley to the Cedar City Valley, estimating capital costs for the PVWS infrastructure, and supporting permitting efforts initiated by the CICWCD.

1.3 Basis of Planning

Implementation of the PVWS project will require significant capital investment over the course of several years. For purposes of FBPWNA analyses, it was originally assumed that the CICWCD would issue and carry all debt to fund the project, and revenue for debt service would be a result of PVWS project water sales, primarily received from Cedar City and Enoch City. Revenue will include a combination of direct water sales to CICWCD's retail customers in addition to wholesale water sales to key stakeholders. It is important to note, a reputable local economist, Dr. David Tufte, reviewed the financial model for accuracy and reasonableness including underlying assumptions, financial factors, and methods used to conduct financial analyses in development of the initial 2020 report.

The updated study assumes that the CICWCD and key stakeholders would each start paying their proportionate share of the debt service (from 2025 through 2029) based on their respective projected future water demands (most importantly during construction of the project, as necessary), until they begin receiving water (i.e., purchasing water from CICWCD through the PVWS project) in 2030. Beginning in 2030 and beyond, the respective cities would pay for their proportionate debt service and all other wholesale related costs through their monthly fixed and volumetric rates charged to them by CICWCD. Variations on the project financing framework were not assessed in this study. Sources of outside funding (e.g., from state or federal-level grants or financing programs) were considered for their applicability and ability to moderate end-user rates.

Projections of water needs and future shortages are based on the methods and assumptions detailed in Chapter 2 of this report. Sources of information include information and studies published by state of Utah agencies, past studies and documents developed by the CICWCD and key stakeholders. A range of potential water supply strategies was evaluated, including options with and without construction of the PVWS project. It was generally assumed that new wells would be added as needed to meet demands until either the PVWS project comes on line or water rights constraints preclude further expansion of local groundwater use.

1.4 Related Studies

Planning for the PVWS project, including details of the wells and conveyance infrastructure needed to deliver water to the Cedar City Valley, is documented in the CICWCD's "Pine Valley Groundwater Development and Transmission Pipeline Project – Conceptual Plan of Development" (draft, Ensign Engineering September 2017). The CICWCD has also conducted previous studies to evaluate regional water needs and financial aspects of the project, such as the CICWCD's Water Master Plan (Ensign Engineering 2020) and the CICWCD's Water Resource Economic and Fiscal Analysis (working draft, Applied Analysis June 2019).

A fundamental basis for this FBPWNA study is an assumption that DWR will implement water rights cutbacks in the Cedar City Valley Aquifer on the schedule and in the amounts described in the GMP. Water use reports from CICWCD and key stakeholders demonstrate the historical demand trends, which were used as an initial basis of estimating future water demands in the study area. Conservation plans developed by Cedar City and Enoch City provide insights into future water use trends and conservation strategies. The amount and timing of water shortages identified in this FBPWNA report could be affected by any variations in the GMP quantity or timing, or by changes in the rate of water use in the CICWCD or key stakeholders' service areas.

A list of project reference materials is provided in Chapter 5 of this report.

-This Page Intentionally Left Blank-

Chapter 2

INTEGRATED WATER RESOURCE PLAN

2.1 Water Needs Assessment Overview

The CICWCD and key stakeholders face challenges in meeting future municipal water demands. Water demands are forecasted to increase due to population growth in the Cedar City Valley, even after achieving the regional conservation goals established by the state of Utah. Combined with agricultural water use in the valley, this will apply further pressure to limited local water resources. The CICWCD and key stakeholders rely primarily on groundwater from the Cedar Valley Aquifer and have implemented several projects to recharge the aquifer with available Coal Creek surface water when it is physically and legally available. Figure 2.1 provides a summary of Cedar City Valley aquifer use by sector (adapted from Utah DWR 2016).

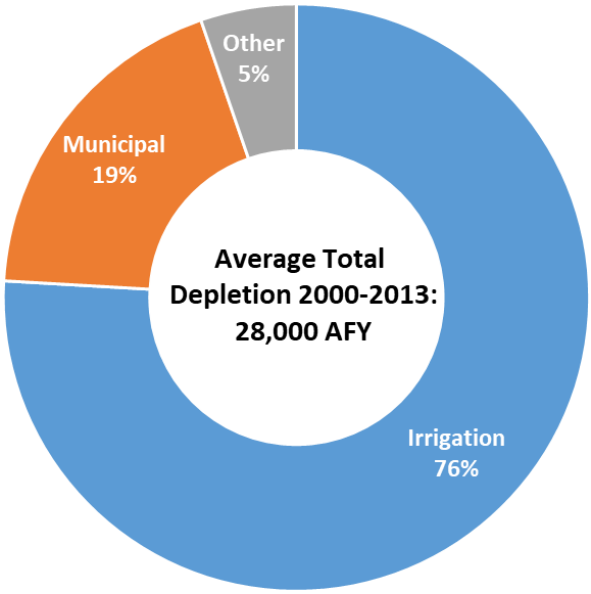


Figure 2.1 Cedar City Valley Aquifer Use by Sector

Despite these recharge efforts and ongoing conservation initiatives, data show that the combination of agricultural and municipal use of the Cedar Valley Aquifer has led to a declining water table for many years. Some areas in the valley have been reported to exhibit land subsidence as a result. A Utah Geological Survey 2014 study found that, "Lowering the potentiometric surface by groundwater pumping in excess of annual aquifer recharge has caused permanent compaction of fine-grained sediments of the Cedar Valley Aquifer. In response to the land subsidence, a minimum of 8.3 miles of earth fissures have formed in the south-western and northeastern parts of Cedar Valley."

The Utah DWR has developed a GMP for the Cedar City Valley. The GMP calls for a series of cutbacks in water rights for users throughout the basin, with a goal of reducing net depletion use of local groundwater to sustainable levels.

The combination of growing service area demands for the CICWCD and key stakeholders, combined with planned cutbacks in water rights, results in an anticipated future scenario where legally available supplies from the local aquifer will fall short of demands. The PVWS project will resolve this predicted shortage by providing a new water supply to the CICWCD and key stakeholders (Cedar City, Enoch City, and Kanarraville).

This chapter describes the forecasted demands and anticipated shortages identified through a water needs assessment for the CICWCD and key stakeholders. The analysis includes a depiction of water shortages that would be anticipated under a "no action" alternative, then it explores six different scenarios that could be used to avoid such shortages. This information was used to evaluate financial aspects of PVWS implementation in the FBPWNA, documented in Chapter 3 – Business Case Evaluation of this report.

2.2 Population Projections

Recognizing the uncertainty inherent in population projections, a range of historical and projected growth scenarios for Iron County, Utah are provided in Figure 2.2 and Table 2.1. The historical rate of population growth for Iron County in the 25 years from 1995 to 2020 was approximately 3 percent per year on average. Extrapolating that forward, the Iron County population would grow fivefold from 2020 to 2075.

Since 2015, the Kem C. Gardner Policy Institute (GPI) has produced long-term planning projections for the state of Utah and its counties. The recent 2022 Utah Long-Term Planning Projections include a baseline scenario considered the most likely, as well as high and low scenarios. Under both the baseline and low scenarios, growth rates are projected to moderate over the coming decades, resulting in a county population that nearly doubles between 2020 and 2075.

The 2012 Baseline Projection for the Utah Governor's Office of Management and Budget (GOMB) forecasts a county population that is expected to roughly triple from 2020 to 2075. In June 2022, the GPI looked at the accuracy of past population projections and found that this forecast most accurately projected the statewide as well as Iron County totals of 57,289 from the 2020 Census. Under this projection, a rate of growth similar to what occurred from 2010 and 2020 would continue in the long term. This projection is also the only one that includes city level figures, which are needed for calculating each entity's future water demands. For these reasons, the GOMB 2012 projections are the foundation of analyses in this FBPWNA. A comparison of the implications of different growth rates is provided in Section 2.6.

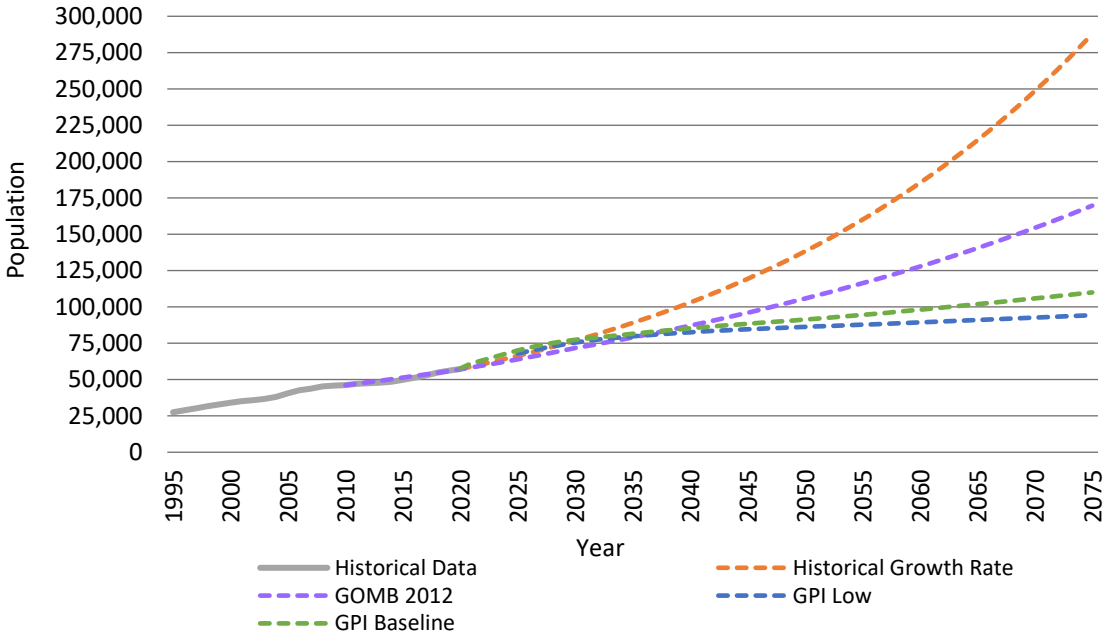


Figure 2.2 Historical and Projected Population in Iron County, Utah

Table 2.1 Population Growth Scenarios Iron County

	2025	2035	2045	2055	2065	2075
Historical Growth Rate(1)	66,344	88,973	119,320	160,019	214,600	287,798
GOMB 2012(2)	63,954	79,019	95,995	116,277	140,454	169,658
GPI 2022 Baseline(3)	70,028	81,511	88,403	94,492	101,904	109,965
GPI 2022 Low(3)	67,963	79,743	84,624	87,761	90,956	94,290

Notes:
(1) Growth extrapolated using average annual rate of population change from Census figures for 1995-2020.
(2) Iron County population projections per GOMB 2012.
(3) GPI State and County Projections Scenarios 2025-2060 (2022). 2065 and 2075 populations extrapolated from 2050-2060 growth percent.

Municipal (public water supply) water use is directly correlated to service area population. Historical and projections of population for the CICWCD and key stakeholders are presented in Tables 2.2 and 2.3, respectively. Projections were made through 2075 using GOMB 2012, consistent with statutory direction for a 50-year planning horizon.

Table 2.2 Historical Service Area Population

	2017	2018	2019	2020	2021
CICWCD Retail(1)	2,128	2,376	2,545	2,982	3,827
Cedar City(2)	31,655	32,994	34,764	35,254	37,206
Enoch City(2)	6,731	7,024	7,180	7,544	8,016
Kanarraville(2)	395	400	407	449	461
Total Service Area(3)	**40,909**	**42,794**	**44,896**	**46,229**	**49,510**

Notes:
(1) Source: CICWCD annual water reports.
(2) Source: 2020 United States Census Bureau estimate.
(3) Sum of rows may not equal total shown due to rounding of decimals.

Table 2.3 Projected Service Area Population (GOMB 2012)

	2025	2035	2045	2055	2065	2075
CICWCD Total County Service Area[1]	58,822	72,551	88,136	106,728	128,347	155,034
CICWCD % of Service Area Connected[2]	65%	75%	85%	95%	100%	100%
CICWCD Retail[3]	6,356	8,189	10,104	11,822	9,913	12,078
Cedar City[4]	40,239	49,630	60,292	73,010	87,799	106,055
Enoch City[5]	8,309	11,502	15,457	20,773	30,135	36,401
Kanarraville[6]	495	500	500	500	500	500
Total Service Area[7]	**55,400**	**69,821**	**86,353**	**106,106**	**128,347**	**155,034**

Notes:
(1) Estimated as 91.4 percent of total Iron County population, based on CICWCD estimates of potential future service area (including retail and wholesale supply). Iron County population projections per GOMB 2012.
(2) Percent of total CICWCD potential retail service area that will be connected to the CICWCD system in the year indicated. Estimates provided by CICWCD and Ensign Engineering staff, October 2019.
(3) CICWCD total county service area at estimated percent connected, minus the population of the CICWCD's potential wholesale customers (Cedar City, Enoch City, and Kanarraville).
(4) Projections through 2060 per GOMB 2012; 2050-2060 growth percent used to estimate 2075 population.
(5) Projections through 2055 per Enoch City 2018 Impact Fee Plan; 2065 and 2075 populations extrapolated from 2050-2060 growth percent for Iron County per GOMB 2012.
(6) Projections through 2025 per GOMB 2012. Population in 2035 and beyond was assumed constant at 500 per Kanarraville policy of ceasing further annexations.
(7) Total population that could potentially be served by the PVWS, including CICWCD direct retail customers and wholesale deliveries to Cedar City, Enoch City, and Kanarraville. Sum of rows may not equal total shown due to rounding of decimals.

Future population projections show that the CICWCD's retail service area will grow substantially over the coming decades through a combination of organic growth and new customers via adding connections to residential areas not currently supplied by the municipalities. Not all subscribers of the PVWS are known at this time, and there is a potential that agriculture or another industrial user could subscribe to the project. However, based on today's economics, it is unlikely that current crop farmland could afford the cost of imported water.

The forecasted population of the CICWCD's retail customer base was estimated by taking the total Iron County population, multiplied by 91.4 percent of the county population that CICWCD anticipates being able to ultimately serve, and subtracting the population of Cedar City, Enoch City, and Kanarraville that could be served via wholesale connections to the CICWCD's system. The population of the total service area that could be supported by the PVWS project is the sum of the CICWCD's retail population and the key stakeholders' population that could be supplied water through a wholesale connection to the CICWCD's system.

2.3 Demand Forecast

The forecasted demands for the potential PVWS service area were based on a per-capita approach using data unique to the CICWCD and each of the key stakeholders.

2.3.1 Total and per Capita Historical Water Use

Historical water demands were used as an initial foundation for projecting future use in the service area. Historical total water use is shown in Table 2.4 in terms of total "diversion" use, not accounting for net returns of water to the aquifer (which would reflect total "depletion" use). These demands reflect the water use of all customers.

Table 2.4 Historical Diversion Water Use

	Total Diversion Use (acre-feet per year [AFY])				
Entity	**2017**	**2018**	**2019**	**2020**	**2021**
CICWCD Retail[(1)]	467	535	579	745	681
Cedar City	7,345	7,751	7,472	8,377	7,869
Enoch City	1,337	1,498	1,584	1,547	1,417
Kanarraville	177	175	182	187	142
Total	**9,327**	**9,959**	**9,817**	**10,857**	**10,110**

Notes:
(1) Based on DWR Annual Reports for the CICWCD Main, Chekshani, Cedar High, and Sunset service areas.

Trends in recent years' per capita water use for each entity are depicted in Figure 2.3. Variability in per capita demands from one community to another are expected because of the unique characteristics of each community's customer base and service area. The highest per capita diversion water use from 2017 through 2021 for each entity is highlighted in Figure 2.3. Per capita demands typically vary from year to year based on climatic conditions and use patterns in the service area. Data limitations on annual population for Kanarraville may affect the accuracy of Kanarraville per capita values, but the overall planning impact is minor because Kanarraville's population (and thus, projected future demand) is projected to remain a small fraction of the total area considered in this study.

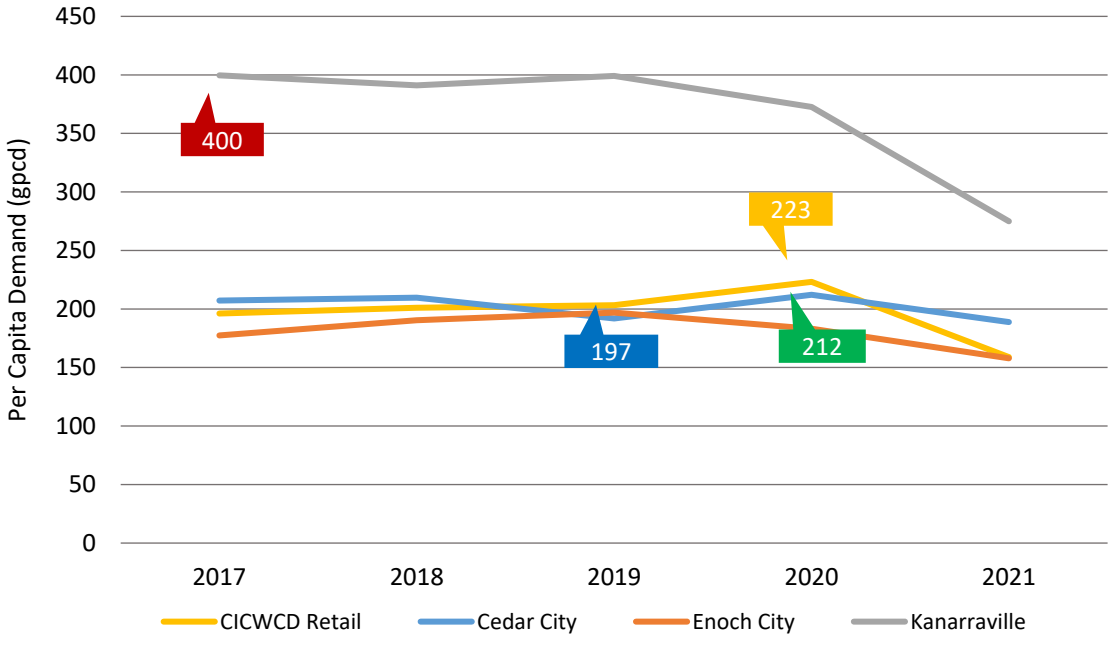


Figure 2.3 Trends and Maximum Values in Recent per Capita Water Use

The highest per capita value from 2017 to 2021 for each entity was used as the initial basis for future demands to reflect this variability. Doing so provides a level of conservatism in demand planning, essentially planning for a future scenario that may be similar to the peak in recent per capita demands. Ongoing enhancements to the CICWCD and key stakeholders' water conservation programs and State-issued conservation goals were subsequently used to adjust these values, as discussed later in this chapter.

2.3.2 Diversion and Consumptive Demands

Total diversion demands were forecasted for the CICWCD and each key stakeholder by multiplying the forecasted population by the recent maximum per capita demand for each entity. The resulting demand forecast, by decade through 2075, is provided in Figure 2.4. The CICWCD and key stakeholders' total water diversions would grow from 13,205 AFY in 2025 to 36,472 AFY in 2075 if no further water conservation enhancements were achieved. Alternative approaches for meeting the projected demands are outlined later in this chapter.

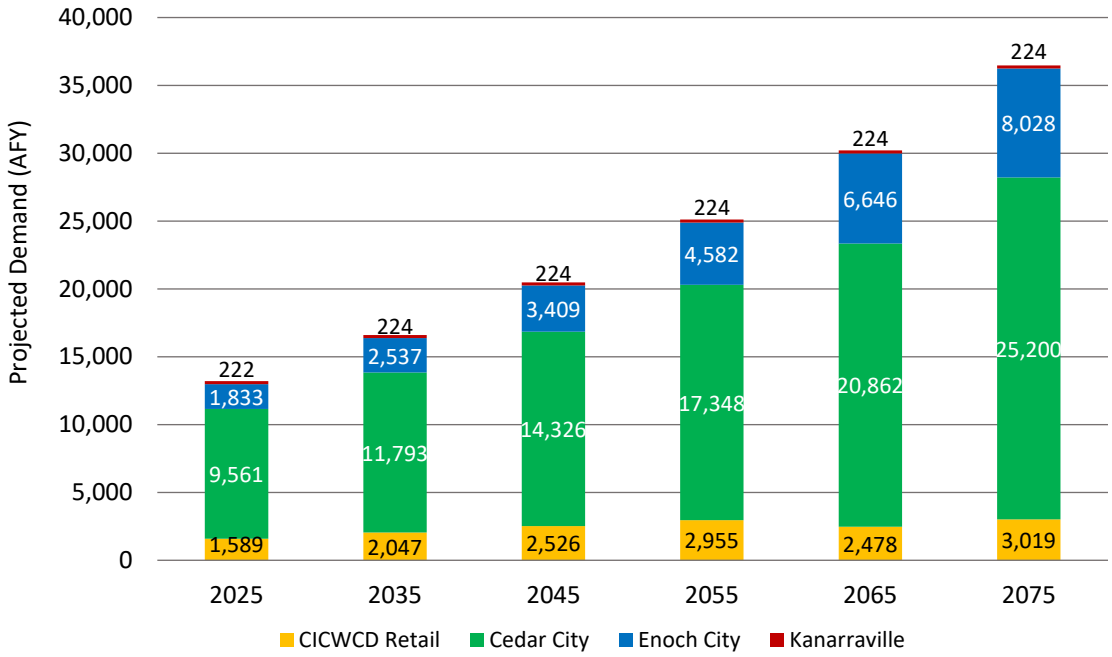


Figure 2.4 Forecasted Diversion Water Use without Additional Future Conservation

2.3.2.1 Municipal Water Conservation

The CICWCD and key stakeholders' planning reflects that additional water conservation will be an important component of meeting future demands. It is also recognized that the projected demands are most useful when expressed as a depletion value instead of a total diversion value, since the DWR GMP is expressed in terms of aquifer depletion values.

The following steps were taken to reflect those planning considerations:

- Per capita demand values were reduced to reflect future water conservation targets.
- Diversion water use forecasts were converted to depletion water use.

Future water conservation targets were assumed to be consistent with per-capita reductions proposed in the Utah Department of Natural Resources (DNR) document titled, "Utah's Regional

M&I Water Conservation Goals" (November 2019). Specifically, per capita water use reductions were assumed to match the reduction targets established by DNR in 2030, 2040, and 2065 relative to 2015 per capita demands for the "Lower Colorado River North" region of Utah, which includes all of Iron County.

For purposes of the current study, the reduction percentages shown in Table 2.5 were assumed to apply to the highest 2017 to 2021 per capita water use rate for each entity because per capita demands vary by year, often driven largely by annual and seasonal weather, though affected by many factors. The Utah DNR projections indicate conservation targets that some may consider being relatively aggressive. DNR does not provide clear guidance for how to meet those targets, but the CICWCD and most of the key stakeholders are already below the average unit water use value for the region. The resulting net projected diversion demand after additional future water conservation is summarized in Figure 2.5. The CICWCD and key stakeholders' water diversions will total about 26,260 AFY in 2075 if the conservation targets are achieved.

Table 2.5 Additional Future Conservation Targets and Revised per Capita Use

	Per Capita Demand Goals Relative to Baseline Plan (percent or gpcd)					
	2025	2035	2045	2055	2065	2075
Reduction[(1)]	0%	19%	24%	24%	28%	28%
CICWCD Retail	223	181	170	170	161	161
Cedar City	212	172	161	161	153	153
Enoch City	197	159	150	150	142	142
Kanarraville	400	324	304	304	288	288

Notes:
(1) Per Utah DNR conservation goals for the Lower Colorado River North, November 2019. Applied to highest per capita demands from 2017-2021 for each entity (shown here as 2025 per capita demands).
gpcd gallons per capita per day

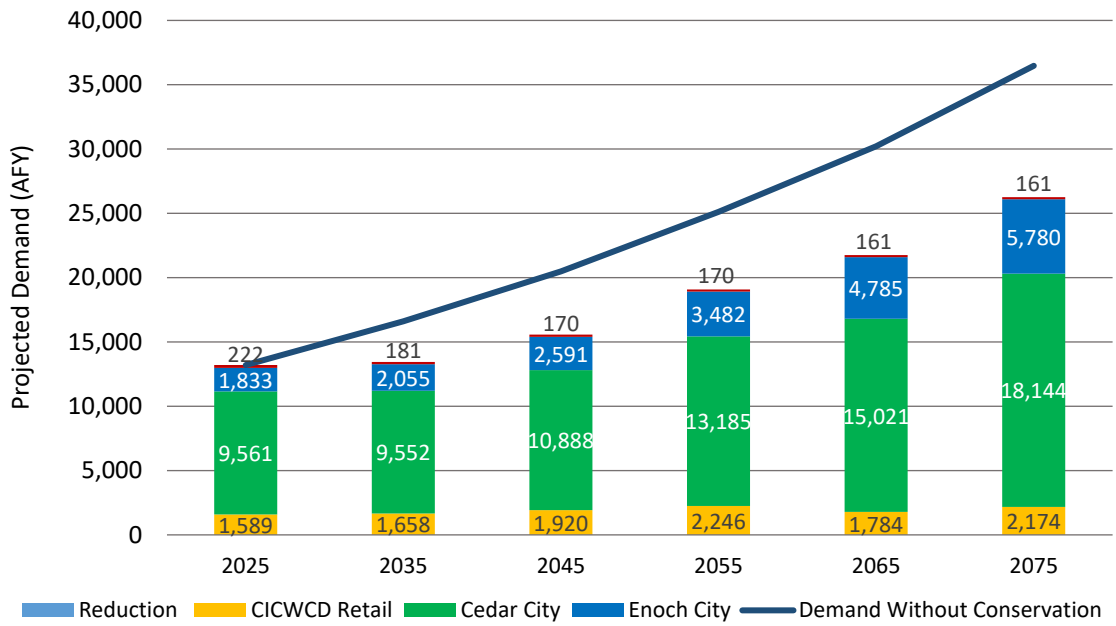


Figure 2.5 Forecasted Diversion Water Use with and without Additional Future Conservation

Water consumption in Cedar City Valley has reduced by 18 percent since 1995. Iron County ranked as the 4th county in the state for low water usage according to the State's 2019 Regional Conservation Goals Report. However, the CICWCD continues to emphasize conservation in the spirit of continuous improvement. Current efforts of the District to achieve residential conservation include:

- The CICWCD urges the community to "Water Less" and promotes many water wise programs for residents, including providing Localscapes waterwise landscaping classes, partnering with the State to provide water wise rebates for smart sprinkler controllers and toilets, and partnering with Utah State University Extension to provide free home water checks.
- The CICWCD holds annual community events to help educate the community about water conservation and local water issues. These events include the 5th Grade Water Fair field trip for Iron County School District and the annual community Water Festival.
- The CICWCD promotes conservation in development through the use of the District's Water Right Exchange Policy which restricts lawn size in new development.
- The CICWCD promotes cash incentives for conservation by replacing fixtures such as old toilets or sprinkler control systems, and lawn replacement with drought-tolerant landscaping.

For reference, Figure 2.6 shows an example of a residential property with water-efficient landscaping, including limited turf grass (limited to 2,300 square feet of the half-acre lot in this example). This type of landscaping would be an important component in meeting the water conservation goals summarized in Figure 2.3.

Figure 2.6 Example Residential Property with Water-Efficient Landscaping

2.3.2.2 Diversion versus Depletion

Forecasted water demands were converted from total diversion values to depletion values in order to provide a direct comparison to GMP water rights requirements. The DWR online database of water rights (https://waterrights.utah.gov/researchDB/Cedar_WRListing.asp) was used to estimate a ratio of depletion to diversion for each entity. DWR tracks each water right in Utah in terms of both a diversion right and a depletion right. The overall ratio for each entity was estimated by summing all diversion water rights (in AFY) for the entity and dividing it by the sum of the depletion rights (in AFY) for the entity. The resulting ratios were used to convert forecasted diversion water use to forecasted depletion water use (Figure 2.7). Total depletion water use by the CICWCD and key stakeholders will reach about 21,600 AFY in 2075 with additional conservation savings.

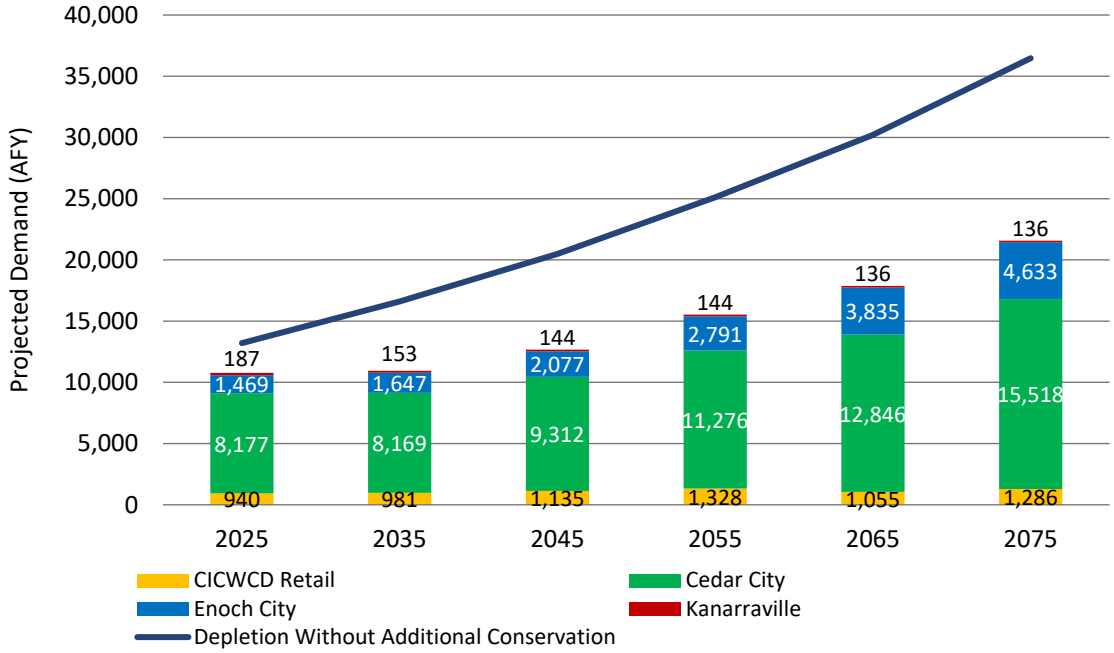


Figure 2.7 Forecasted Depletion Water Use with and without Additional Future Conservation

2.3.2.3 Agricultural Water Conservation

As the largest water use sector in the Cedar Valley, agricultural conservation can yield a significant benefit to regional water supplies. CICWCD estimates indicate that there are currently about 8,000 acres of farmland served by center pivots in Cedar Valley, irrigating 2 to 2.5 AFY per acre for a total use of 16,000 to 20,000 AFY. CICWCD also estimates that there are 1,560 acres of farmland in wheel-lines or flood irrigation, irrigating 3 to 4 AFY per acre for a total of 4,680 to 6,240 AFY. It is unclear how much of the wheel-line and flood irrigation is supplied by surface water versus groundwater. All told, agricultural irrigation is estimated to use upwards of 20,000 AFY in the valley, consistent with Utah DWR estimates of 21,400 AFY of agricultural depletion use of the local aquifer (Utah DWR 2016).

The CICWCD has undertaken steps to support agricultural efficiency. In 2019, it upgraded nearly 2,000 acres of center pivot irrigation equipment (approximately 25 percent of agricultural irrigation land in the valley) to LEPA and LESA technologies and since then an additional 500 acres have been converted to the water saving technology.

The Bonneville Power Authority ([BPA] 2020) describes LEPA and LESA technologies as follows:

> *"LEPA places the emitter type sprinkler on or just above the soil surface. LESA has the sprinklers located three feet or less above the soil surface and uses spray type sprinklers. LEPA and LESA both double the number of sprinklers on a center pivot.*
>
> *Both technologies improve the sprinkler system application efficiency, reduce the direct evaporation from the sprinkler, reduce moisture loss from wet leaves, and require less pressure to operate; thus reducing the pump power consumption per acre-foot delivered. Although the technology is primarily used on pivots, it can also be used with lateral move irrigation systems. Washington State University and the University of Illinois found water savings of 5 to 15 percent. WSU and the U of I found that LESA's system may also reduce fertilizer requirements and has the potential to improve crop quality and yield."*

Measurement of the increased efficiency and associated water savings from CICWCD's 2019 LEPA/LESA retrofit program is ongoing. It is anticipated that LEPA/LESA conversion of center pivots could reduce irrigation water use from the traditional 2 to 2.5 AFY per acre to around 1.7 to 2.1 AFY per acre. The state of Utah approved the Agricultural Optimization Bill in 2018 to study these impacts. The study is currently underway in partnership with Southern Utah University, Utah State University, and the CICWCD; 2022 was the 4th year of data collection. The research will determine if there is an equal or increased yield while diverting less water. New evapotranspiration equipment has been used to determine the amount of water that is used by the plant and lost to evaporation. Yield analysis of crops and a water diversion/depletion analysis is ongoing as well.

By comparison, CICWCD estimates that the rate of agricultural water use is similar on a per-acre basis to municipal water use. CICWCD estimates that existing residential customers of CICWCD, Cedar City, and Enoch City use about 0.75 AFY per connection. Under the state of Utah's proposed regional conservation goals (Table 2.5), that rate would drop to about 0.54 AFY per connection by 2065, or about 2.16 AFY per acre for a typical 0.25-acre residential lot size. This is very comparable to the 1.7 to 2.1 AFY per acre used by center pivots after LEPA/LESA conversion, or 2 to 2.5 AFY per acre for traditional center pivot irrigation.

2.4 Supply Assessment

2.4.1 Existing Sources

The analysis of available supplies initially considered preparing an inventory of the capacity of the CICWCD and key stakeholders' existing physical infrastructure to produce water from the Cedar Valley Aquifer. Historical practice for the CICWCD and key stakeholders has largely consisted of acquiring sufficient groundwater rights and constructing and operating enough wells to meet demands.

Absent any driver to do otherwise, it is likely that these practices would continue indefinitely as the CICWCD and key stakeholders seek to meet growing demands over time. That is, new wells would be added over time to meet demands on an as-needed basis, and the water providers would continue to make sure that they secured enough water rights to meet the demand.

In reality, the water rights cutbacks detailed in the GMP will eventually become the limiting factor in using the local aquifer to meet demands. At some point, increasing demands will exceed the declining water rights available for use under the GMP, and the CICWCD and key

stakeholders will be legally unable to withdraw enough groundwater from the Cedar Valley Aquifer – no matter how much well capacity is physically in place to pump water from the aquifer. Recognition of this "legal availability" shortage shifted the focus of the Water Needs Assessment away from physical infrastructure capacities and on to legal availability (groundwater rights) over time under the GMP.

2.4.2 Groundwater Management Plan

The GMP for the Cedar City Valley, adopted January 2021, sets a path for reducing depletion of the aquifer to 21,107 AFY. The GMP defines depletion as follows:

> *Depletion due to municipal use will be the groundwater diversion minus any return flow resulting from the groundwater portion of wastewater effluent returning to the groundwater system and minus any return flow resulting from the groundwater portion of water used for lawn and garden irrigation and any other municipal purposes.*

CICWCD's and key stakeholders' depletion water rights in the Cedar Valley Aquifer are summarized in Figure 2.8, starting with existing rights in 2025 and showing a summary of water rights that are expected to be remain ("not cut" by DWR) as the GMP is phased in over time.

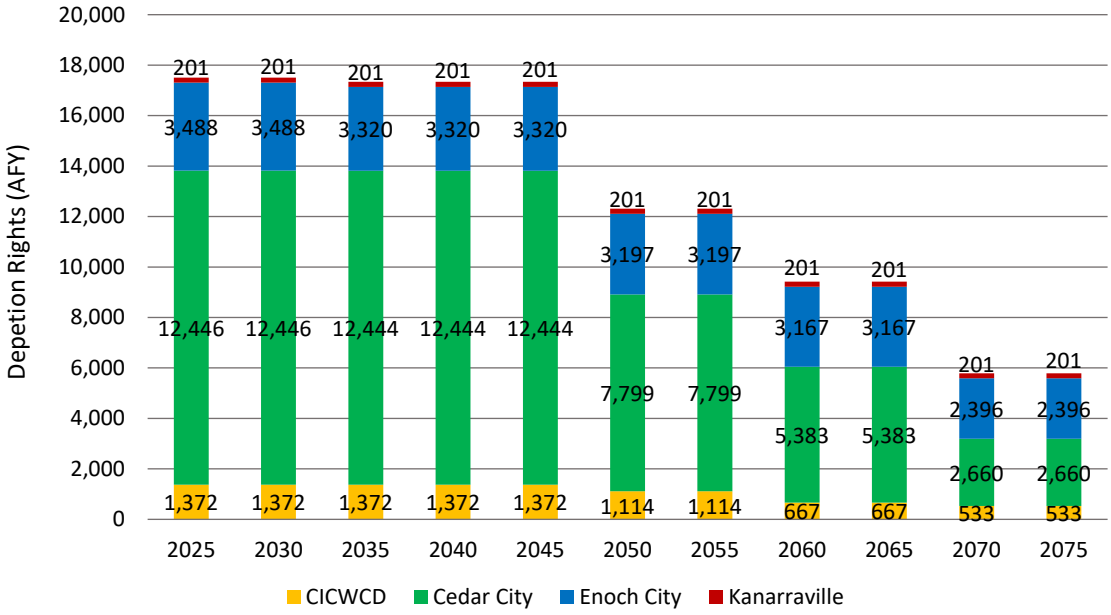


Figure 2.8 CICWCD and Key Stakeholders' Depletion Water Rights Under Draft GMP

2.5 Aquifer Recharge

The CICWCD and key stakeholders have implemented several projects to recharge the aquifer with available Coal Creek surface water when it is physically and legally available for such use. Current practices include operating the recharge projects during the irrigation off-season, when the CICWCD and key stakeholders' water rights are in priority.

Looking forward, it is expected that the CICWCD and key stakeholders will continue to take maximum advantage of recharge opportunities when they arise, in order to offset groundwater pumping activities and preserve water table levels. It is unclear whether DWR would grant a one-for-one credit, where every acre-foot of water recharged would be credited toward additional

depletion withdrawals from the aquifer. However, for the purpose of this study, recharge was tallied and added to the water budget as a net gain in the recharge to the basin.

In later 2019, CICWCD staff conducted an analysis of historical Coal Creek flows from October 1999 through April 2019 to assess recharge potential. That analysis found that seasonal Coal Creek flows (from November through April, the irrigation off-season months) averaged 7,682 AFY, with seasonal flows ranging from 3,822 AFY to 13,748 AFY over this 20-year analysis period.

Clearly, there is some practical limit to the peak flow capacity that constructed facilities can be constructed or physically expected to be able to recharge the aquifer. For purposes of this analysis, a maximum recharge rate of 100 cubic feet per second (cfs) was assumed as a cap on recharge rates, based on input from CICWCD and Ensign Engineering. Flows above 100 cfs were assumed unavailable for recharge, from a physical capacity standpoint. Adding this physical limit to recharge reduced the potential seasonal Coal Creek recharge flows only by about 5 percent, from 7,683 AFY (November through April) to 7,297 AFY (November through April).

CICWCD staff assumed that between 2 and 3 cfs of water is needed to satisfy senior stock watering rights in the irrigation off-season. Assuming that 2.5 cfs of senior stock watering demand exists continuously, 896 AFY is seasonally needed to satisfy that need over the November through April timeframe.

For November through April, subtracting 896 AFY of senior stock watering rights from the 7,297 AFY of Coal Creek flows (capped at 100 cfs) results in a maximum recharge potential of about 6,400 AFY as a long-term average. Figure 2.9 shows the annual flows and the 20-year average Coal Creek seasonal recharge potential of about 6,400 AFY when capped at 100 cfs.

It should be recognized that prior to the urbanization of Cedar Valley water would delta out and was broadcast over fields during the winter and much of that water seeped into the groundwater system. As such it is acknowledged that there is uncertainty and it is unlikely that the DWR would grant the right to withdraw the full 6,400 AFY of recharged water, beyond base depletion rights. Also, no effort was made to allocate the 6,400 AFY of recharge potential to participating utilities. Rather, it was assumed that recharge projects (including existing and future recharge facilities) would be constructed and operated as a regional effort with regional benefits by and for the municipal water suppliers. Perhaps more significantly, climate variability and long-term changes could affect the amount of surface water available for recharge, such that the CICWCD may not be able to reliably access, recharge, and retrieve the full 6,400 AFY on a long-term average, even if DWR does allow full credit for recovering the water that was recharged via the CICWCD's efforts.

Since 2017, available flows for recharge have trended lower, resulting in a significant reduction in annual average recharge volumes. In winter 2022-2023, the area received one of the highest snowpacks on record (approximately 300 percent of average). With current facilities and a strong snowpack, the CICWCD was able to recharge only about 6,000 acre-feet. The District also found that it can only sustain flows of about 35 cfs or 70 acre-feet per day into its two main pits (Schmidt and Western Rock); it plans to increase recharge capacity to the degree feasible through private partnerships and permitting.

Given the uncertainty in the future availability of water for recharge and the amount that would be credited to the CICWCD, the model reflects an assumed net gain of 50 percent of the high-snowpack 2022-2023 recharge amount of 6,000 AFY, or 3,000 AFY. For purposes of the present

analysis, a long-term average recharge rate was considered appropriate (rather than the minimum or maximum, for example), since the aquifer would buffer variability between recharge rates and pumped water use from year to year.

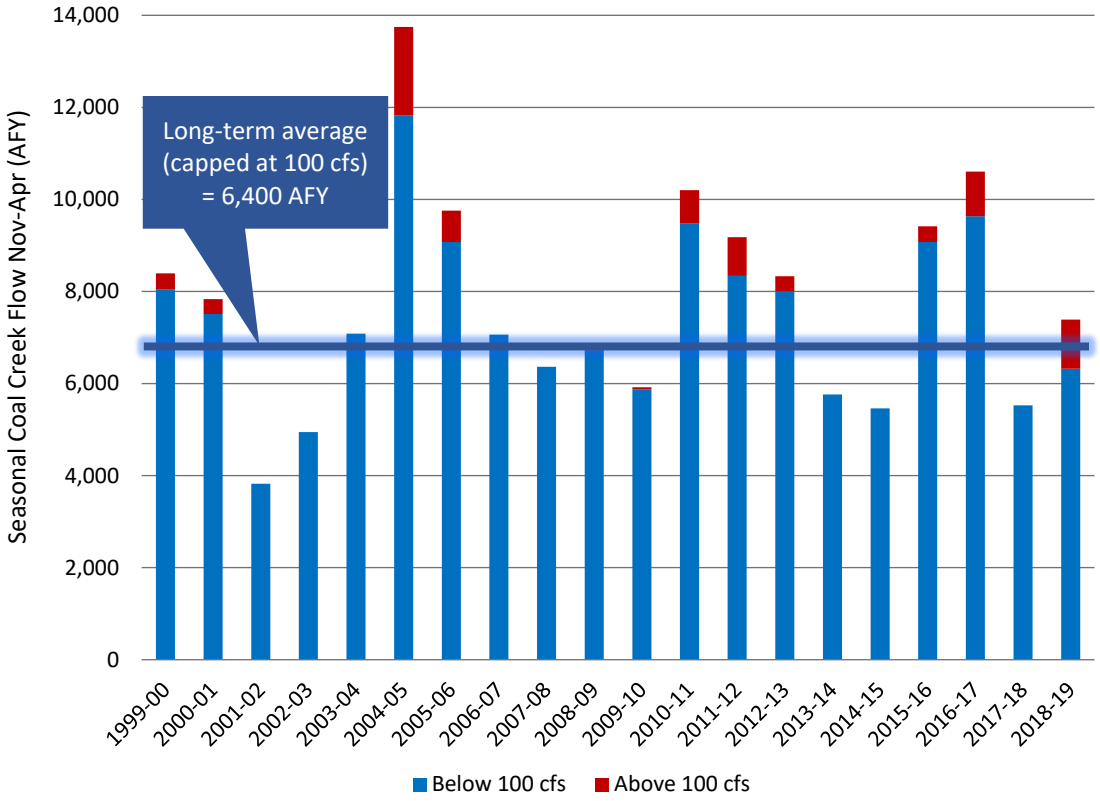


Figure 2.9 Historical Seasonal Coal Creek Flows (November through April)

2.6 Anticipated Supply Shortages and PVWS Implementation Timeline

Anticipated supply shortages were analyzed on a regional level via the following analysis:

- Subtract projected depletion demands (after additional conservation, Figure 2.7) from available depletion rights (Figure 2.8).
- Add credit for regional recharge projects, assuming up to 3,000 AFY of recharge can be credited directly toward groundwater rights, allowing pumping of up to 3,000 AFY more water than the GMP specifies on a regional basis (recognizing that this amount could differ in the future, as discussed above).
- A range of demand from the alternative population growth scenarios.

The net result of this analysis depicts the water shortages that can be anticipated if no action is taken to increase water supply, as shown in Figure 2.10. As the GMP is implemented, and if a regional recharge credit of 3,000 AFY is applied to offset municipal groundwater pumping, water rights would begin to fall short of demands in the Cedar City Valley between 2050 and 2055. This shortage grows to 12,782 AFY in 2075 and will continue to expand to the degree that demands continue to grow. If no recharge credit was available (whether due to recharge supply availability, recharge infrastructure, or permitting constraints), the regional shortage would first be encountered about 5 years sooner.

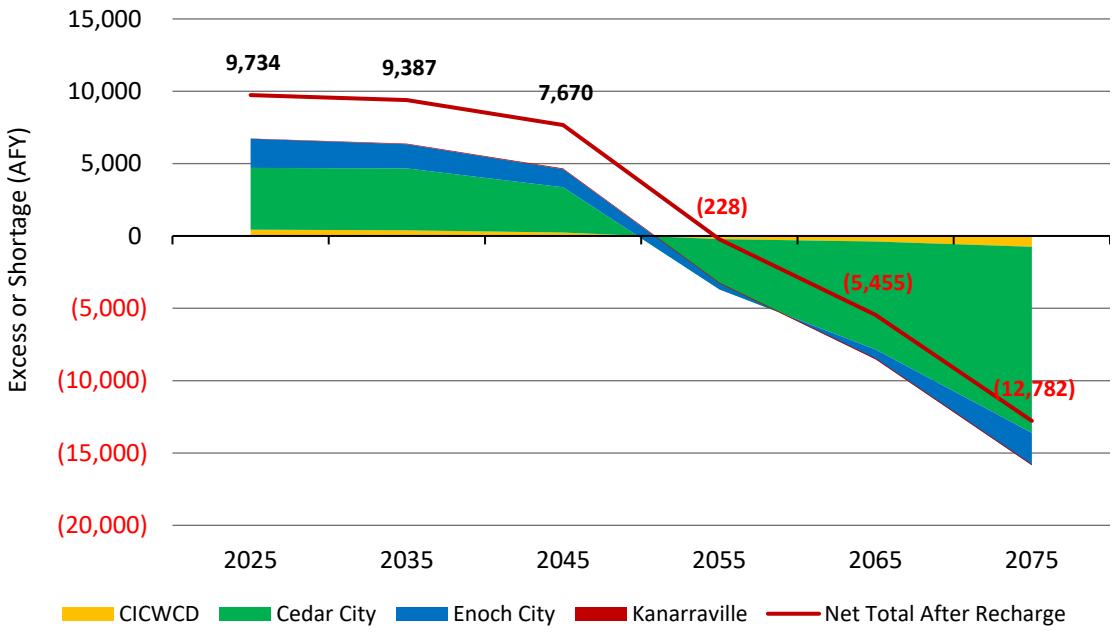


Figure 2.10 Projected Future Supply Surplus or Shortage with No Action

The anticipated water shortages are also estimated using the alternative population growth scenarios, presented in Table 2.6. These scenarios also assume that the GMP is implemented without further changes, and a regional recharge credit of 3,000 AFY is applied to offset municipal groundwater pumping. Under this range of scenarios, water rights would fall short of demands in the Cedar City Valley in 2051 under the Historical Growth scenario, 2060 under the GPI 2022 Baseline scenario, and beyond 2075 under the GPI 2022 Low scenario. The shortage grows to 27,804 AFY in 2075 under the Historical Growth Rate scenario where county population grows by 3 percent per year.

Table 2.6 Alternative Projected Future Supply Surplus or Shortage with No Action

	2025	2035	2045	2055	2065	2075
Historical Growth Rate(1)	9,332	8,008	4,592	(6,074)	(14,890)	(27,804)
GOMB 2012	9,734	9,387	7,670	(228)	(5,455)	(12,782)
GPI 2022 Baseline(1)	8,711	9,042	8,672	2,683	(549)	(5,192)
GPI 2022 Low(1)	9,059	9,287	9,171	3,583	844	(3,199)

Notes:
(1) Future demands in the alternative population growth scenarios are estimated using the average region wide gallons per capita water use with conservation as developed under the GOMB 2012 Municipal Level Growth scenario.

Clearly, such shortages would be unacceptable. In Section 2.7, six different approaches (scenarios) for mitigating these shortages are defined and characterized. Four of those employ combinations of local water supply strategies to completely avoid the projected shortages, while the other two consider using the PVWS project to head off shortages. The PVWS project would add 15,000 AFY of new water supply to the Cedar City Valley, offsetting the projected shortages through at least 2075.

Consideration was given to the potential for demand reduction to mitigate and avoid the projected water supply shortage, whether driven by intentional conservation measures or by consumer reactions to escalating water costs. The projections used in this analysis reflect the State's regional long-term goal of reducing per capita demands by 28 percent, for a weighted average demand in the CICWCD service area of 153 gpcd. In order to completely avoid the 2075 shortage under the GOMB 2012 growth scenario, per capita demands would instead need to be reduced by over 70 percent to 62 gpcd. It is extremely unlikely that this degree of demand reduction could be realized in practice. Under alternate growth scenarios, the timing of the shortage varies, but severe cutbacks in water use affecting the quality of life in the CICWCD service area would still be necessary.

All of the water supply scenarios described in Section 2.7 mitigate the shortages shown in Figure 2.10. The net impact on the Cedar Valley Aquifer with and without the PVWS project is depicted in Figure 2.11. The timing of PVWS implementation is yet to be established; this figure shows PVWS (15,000 AFY from Pine Valley) coming online around 2050 to head off projected water rights shortages.

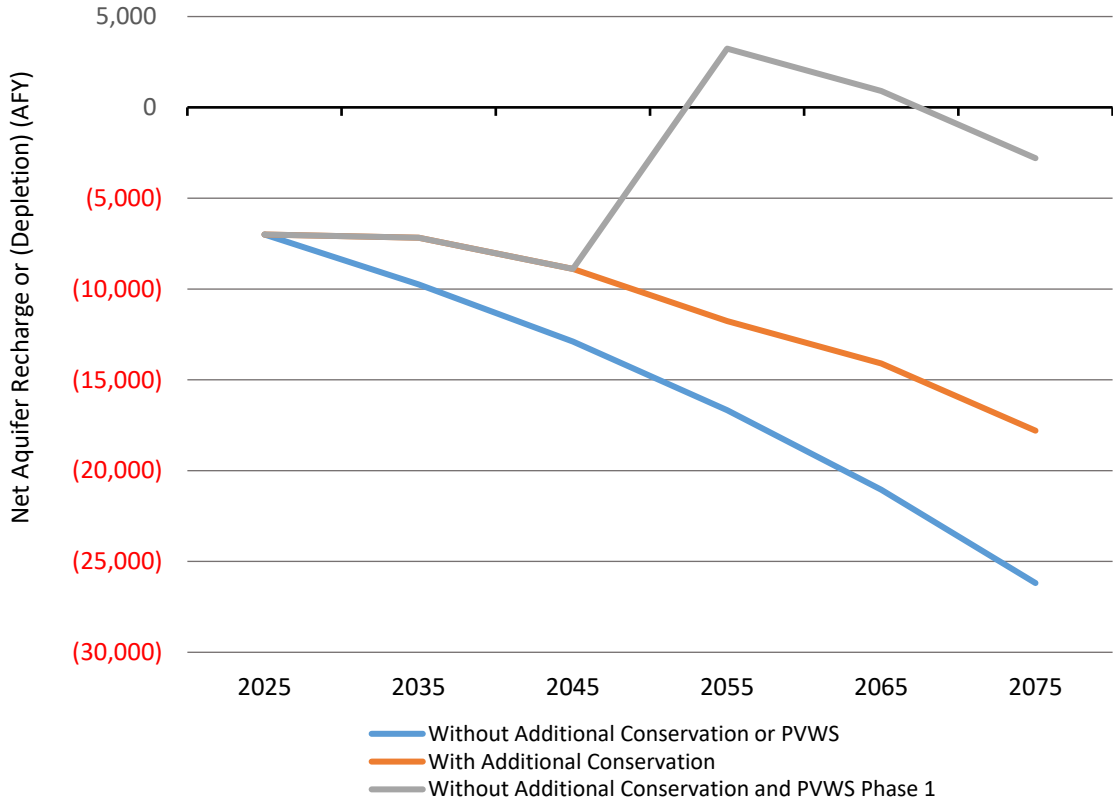


Figure 2.11 Net Recharge or Depletion of Cedar Valley Aquifer with and Without PVWS Project

2.7 Alternate Water Supply Scenarios

Several alternative approaches for avoiding or mitigating the projected water supply shortages were characterized, so they could be evaluated in the Business Case Analysis. These included the following scenarios:

- Scenario 1: 100% Local Well Supply (purchase agricultural groundwater rights, no additional conservation, no recharge, no reuse).
- Scenario 2: Local Wells + Conservation (no recharge, no reuse).
- Scenario 3: Local Wells + Conservation + Recharge (no reuse).
- Scenario 4: Local Wells + Conservation + Recharge + Reuse.
- Scenario 5: Accelerated PVWS (with additional conservation and recharge, no reuse).
- Scenario 6: PVWS at Shortage (with additional conservation and recharge, no reuse).

Each of these scenarios would completely offset the projected water shortages described earlier in this chapter. Scenarios 1 through 4 would do so without the PVWS project, while Scenarios 5 and 6 would use the PVWS project to mitigate the anticipated shortages. A summary of the components included in each of the six scenarios is provided in Table 2.5.

Table 2.7 Overview of Components Comprising Scenarios 1 through 6

	Additional Conservation	Purchase Local Ground-water Rights	Aquifer Recharge	Water Reuse	Accelerated PVWS	PVWS at Shortage
Scenario 1: 100% Local Well Supply		✓				
Scenario 2: Local Wells + Conservation	✓	✓				
Scenario 3: Local Wells + Conservation + Recharge	✓	✓	✓			
Scenario 4: Local Wells + Conservation + Recharge + Reuse	✓	✓	✓	✓		
Scenario 5: Accelerated PVWS	✓		✓		✓	
Scenario 6: PVWS at Shortage	✓		✓			✓

All six scenarios assumed that new wells would be constructed when needed to meet demand, starting in 2025 and continuing either indefinitely (Scenarios 1 through 4) or until the PVWS is constructed and online (Scenarios 5 and 6). Capital costs were based on unit costs provided by CICWCD and Ensign Engineering highlighted in Table 2.6.

Table 2.8 Capital Cost Factors

Item	Value (2022 $)	Source / Notes
Cost of typical new groundwater well in the Cedar City Valley	$1,170,000	Escalated from 2019 costs per Ensign Engineering, personal communication 10/28/19.
Yield of typical new groundwater well in the Cedar City Valley	1,000 gallons per minute (gpm)	Estimate per Ensign Engineering, personal communication 10/28/19.
Cost of new groundwater rights in the Cedar City Valley	$20,000 per AFY	Hymas & Associates 6/27/22 valuation for purchases July 25, 1934, or senior rights of 10 acre-feet or more; costs are expected to escalate more rapidly than construction costs

Key assumptions in the analysis included:

- Existing groundwater wells can meet demand until 2025; new wells will be needed to meet demand in 2026 and beyond. To the degree that existing wells can meet demands beyond 2025, the construction of new wells could be deferred.
- Groundwater rights in the Cedar Valley Aquifer would be available for purchase and would be purchased as needed to offset the demand in Scenarios 1 through 4. Groundwater rights purchases would likely come from agricultural irrigators in the Cedar City Valley. Water rights conversions from agricultural to municipal use were assumed to not require purchase of the associated agricultural land by the CICWCD or key stakeholders, as that land could be transitioned to dryland farming, grazing, municipal development, or other uses.
- Conservation goals established by DNR could be achieved, but in lieu of studies detailing the methods necessary to achieve those goals, unit costs for additional conservation are assumed based on reference studies from Colorado for Scenarios 2 through 6.
- Alternatives that include reuse did not evaluate the potential reduction in aquifer recharge associated with reduced discharge from the Cedar City Wastewater Treatment Plant.
- Reuse system in alternatives that include reuse was based on Alternative 5R (seasonal agricultural irrigation in Enoch Graben) per the Cedar City 2018 Water Reuse Feasibility Study (offsets 2,023 AFY of water demand).
- Cost of water reuse system is $17.4 million in 2018 dollars per the 2018 Water Reuse Feasibility Study. Reuse system costs were escalated to 2022 dollars at 3 percent per year through 2021 and 10 percent for 2022. Engineering/legal/administrative costs were added at 15 percent of capital. Reuse project implementation assumed design and construction over a 3-year period starting in 2025.
- Under Scenario 5, CICWCD would be responsible for issuing all debt to fund the cost of the PVWS project while Cedar City and Enoch City pay their own proportionate share (based on their respective projected future water demands) of the debt service until they begin receiving water from the project in 2030. It is further assumed beginning in 2030 and beyond, Cedar City and Enoch City would pay their proportionate share of the debt service and all other retail service related costs (i.e., purchased water costs to CICWCD) through a combination of the monthly fixed and volumetric rates charged by CICWCD to each city.

- PVWS project implementation assumed design and construction over a 5-year period.
- Earliest possible PVWS design/construction initiation would be complete by 2030 (for Scenario 5, "PVWS ASAP"), when the Environmental Impact Statement Record of Decision is anticipated. In Scenario 6 ("PVWS at Shortage"), PVWS design/construction would be complete by 2051 so it would be online in time to prevent shortages.
- Once the PVWS is online (Scenarios 5 and 6), no new local wells would be constructed and no further groundwater rights purchases would be made, rather than investing in both the PVWS and new local groundwater infrastructure and supplies.

Multi-year capital projects were assumed to follow a typical capital project design and construction expenditure schedule, as shown in Table 2.7.

Table 2.9 Assumed Capital Project Design and Construction Cost Expenditure Schedule

Project Duration (years)	Percent of Capital Cost Incurred Each Year				
	1	2	3	4	5
1	100%				
2	30%	70%			
3	10%	45%	45%		
4	10%	35%	35%	20%	
5	1%	9%	35%	35%	20%

A summary of water supply components and cost factors for each of the six scenarios is provided in Table 2.8.

Table 2.10 Overview of Groundwater Components in Scenarios 1 through 6

	Number of New Wells 2025-2075	Amount of Purchased Groundwater Rights 2025-2075 (AFY)
Scenario 1: 100% Local Well Supply	12	24,200
Scenario 2: Local Wells + Conservation	7	15,800
Scenario 3: Local Wells + Conservation + Recharge	7	12,800
Scenario 4: Local Wells + Conservation + Recharge + Reuse	7	10,800
Scenario 5: Accelerated PVWS	1	0
Scenario 6: PVWS at Shortage	3	0

Under the GMP, a total of about 23,298 AFY of groundwater rights currently held by municipal, irrigation, and stockwatering/mining/other users would remain available ("not cut" by DWR) after all reductions are in place. Of that amount, about 17,900 AFY is currently held by irrigation and stockwatering/mining/other users. As such, purchasing 24,200 AFY of water rights under Scenario 1 from other (non-municipal) users in the basin is not a viable option. Under Scenarios 2 through 4, in theory, there would be sufficient water rights that could be purchased and converted to municipal use, with varying degrees of impact on agriculture in the Cedar City Valley.

Capital costs for the six scenarios were calculated in unescalated 2022 dollars, serving as the foundation for the business case analyses presented in Chapter 3. A summary of capital costs for the six scenarios is presented in Figure 2.12. Notably, these costs assume escalation rates for groundwater rights purchases in the Cedar Valley Aquifer. In lieu of studies detailing the methods necessary to achieve DNR conservation goals, costs for additional conservation were based on unit costs for conservation from reference studies and included in the costs of Scenarios 2 through 6. Additional conservation was estimated at $6,700 per AFY of demand reduction, based on estimates by the Colorado Water Conservation Board and communities with established conservation programs.

While Scenario 1 is not technically viable (due to limits on total water rights availability under the GMP), Scenarios 2 through 4 would require purchase of between about 60 to 88 percent of the remaining non-municipal and non-domestic water rights in the Cedar Valley Aquifer after GMP cutbacks are complete. Based on experience in other parts of the United States, purchases would likely have significant negative effects on the agricultural economy in the Cedar City Valley and could change the course of the valley's rich agricultural heritage.

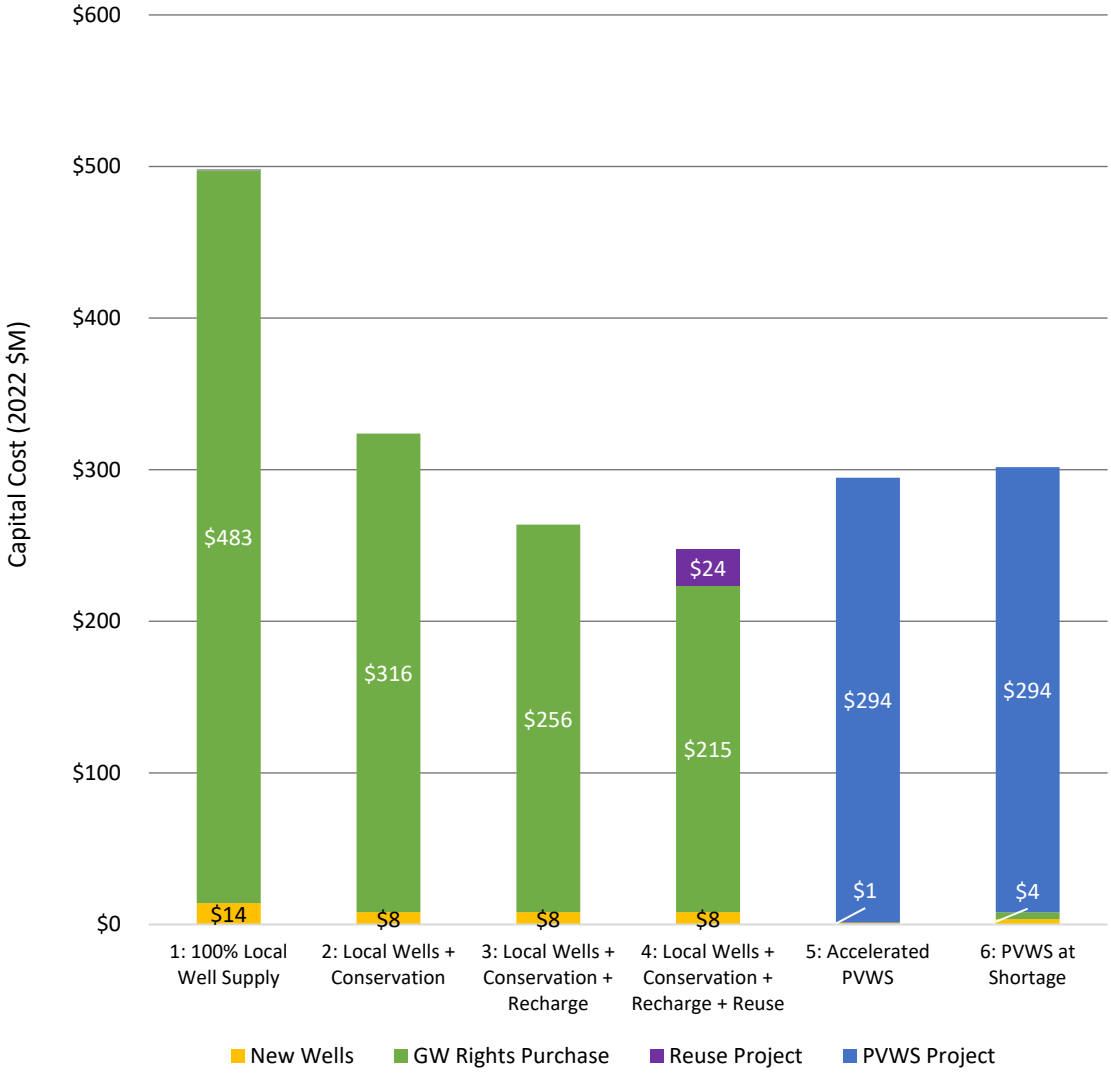


Figure 2.12 Capital Costs for Water Supply Scenarios 1 through 6

-This Page Intentionally Left Blank-

Chapter 3
BUSINESS CASE EVALUATION

3.1 Introduction

Subsequent to identification of water demands, as ascertained from the Water Needs Assessment portion of this analysis, Carollo Engineers (Carollo) was tasked with providing a real-time dynamic financial model that analyzed the financial impact of potential partnerships on the CICWCD and key stakeholders for which financial data were made available (Cedar City and Enoch City). This business case evaluation includes identification of potential outside funding opportunities and their respective financing costs as well as operation and maintenance (O&M) and capital cost projections throughout the study period. The financial model incorporates cash flows from three specific entities – CICWCD, Cedar City, and Enoch City (herein referred to as the collaborating partners) – and presents annual revenue increases as well as comparative annual customer bill impact analyses under each of the identified scenarios.

As discussed previously in Section 2.7, Carollo evaluated six scenarios for this Business Case Evaluation:

- **Scenario 1:** 100% Local Well Supply (purchase agricultural groundwater rights, no additional conservation, no recharge, no reuse).
- **Scenario 2:** Local Wells + Conservation (no recharge, no reuse).
- **Scenario 3:** Local Wells + Conservation + Recharge (no reuse).
- **Scenario 4:** Local Wells + Conservation + Recharge + Reuse.
- **Scenario 5:** Accelerated PVWS (with additional conservation and recharge, no reuse).
- **Scenario 6:** PVWS at Shortage (with additional conservation and recharge, no reuse).

While Scenario 1 is not technically viable (due to limits on total water rights availability under the GMP), it is included as a basis of comparison against the other scenarios.

Scenario 4 evaluates estimated annual water supply shortages for each of the three collaborating partners. In any given year, where water shortages are shown for Cedar City (2050 through 2075) and/or Enoch City (2060 through 2075), it was assumed that water would be purchased from the CICWCD. Additionally, Scenario 4 assumes the CICWCD issues all proposed debt and each of the collaborating partners pays their proportionate share of annual debt service based on 2025 net projected demands after additional conservation savings (i.e., CICWCD retail at 12.0 percent of the total demand, Cedar City at 72.4 percent, Enoch City at 13.9 percent, and the remaining 1.7 percent assumed to be allocated to Kanarraville) until all proposed debt issuances have been retired, regardless of timing of water demands and/or physical deliveries.

Scenario 5 assumes the CICWCD issues all proposed debt to fund the cost of the PVWS project, although each of the three collaborating partners is responsible for their respective and proportionate share of the annual debt service at the time of issuance (projected issuance in 2026 and 2029) and until final maturity, regardless of project completion and timing of physical

water deliveries. Other wholesale related costs will be shared proportionally by Cedar City and Enoch City through their monthly fixed and volumetric rates charged by the CICWCD.

Similar to Scenario 5, Scenario 6 assumes the CICWCD issues all proposed debt to fund the cost of the PVWS project although each of the three collaborating partners is responsible for their respective and proportionate share of the annual debt service at the time of issuance (projected issuance occurs in 2053 to fund construction after using available cash reserves) and until final maturity, regardless of project completion and timing of physical deliveries. Other wholesale related costs will be shared proportionally by Cedar City and Enoch City through their monthly fixed and volumetric rates charged by the CICWCD.

The six scenarios presented in this Business Case Evaluation are merely a starting point for further discussion and consideration as the PVWS project timeline and requirements become further solidified. Ultimately, the actual scenario selected for implementation may or may not be one presented in this evaluation. This FBPWNA study sought to provide the CICWCD with scenarios from varying ends of the spectrum in order to provide a more comprehensive starting point for further evaluations. Additionally, the real-time dynamic financial model developed in this study provides the CICWCD and other key stakeholders with the ability to update information as it becomes available.

3.2 Assumptions

Carollo worked closely with staff from the CICWCD, Cedar City, and Enoch City to acquire and integrate into the financial model the most recent information available. As such, Carollo relied on data provided by each entity and cannot verify its validity or accuracy for the purposes of this analysis. The financial model incorporated budget information and historical data and forecasts from each of the three collaborating partners.

The following items were provided by each entity:

- 2019 Budget (including O&M and capital costs).
- Outstanding Debt Service Schedules (annual principal and interest payments by issuance).
- Annual Water Sales (total revenue and total usage in thousands of gallons [Kgals]).
- Number of Customers (connections to the system; customers receiving a monthly bill).

Carollo also assumed the following inflation rates throughout the financial model:

- General Inflation Rate: 3.0%
- Property Tax Rate: 3.0%
- Connection and Impact Fee Rate: 3.0%
- Interest Income Rate (Cash Balances): 1.0%
- Groundwater Rights Inflation Rate: 7.5%
- Typical Bill Impact Inflationary Trend: 3.0%

Growth rates vary annually by entity. These rates originated from United States Census Bureau data provided by decade and were then calculated annually based on exponential interpolation. The following rates, by entity, provide ranges of growth used throughout the financial model:

- CICWCD: 3.0% to 0.0%
- Cedar City: 2.1% to 1.9%
- Enoch City: 3.8% to 1.9%

Additionally, Carollo, in conjunction with Ensign Engineering, applied preliminary estimates of O&M costs as well as capital costs under each scenario for inclusion, evaluation, and analysis within the financial model.

Lastly, in development of revenues under existing rates for all entities, Carollo assumed a simple average rate (dollars per Kgals) even though each entity's rate structure may include an inclining block rate. As an example, if one of the participating entities received $750,000 in total revenue for the year and recorded 500,000 thousand gallons of usage, Carollo would subtract monthly fixed charges for the year (assume $250,000 in this case) and divide the remaining revenue ($500,000) by the actual recorded usage (500,000 thousand gallons) to calculate the average unit water rate or $1.00 per Kgals in this example.

3.3 Outside Funding Opportunities

In development of the business case evaluation, Carollo researched a comprehensive list of potential outside funding opportunities, which could assist the CICWCD in funding the PVWS project. For the purposes of this analysis, funding opportunities were classified into two separate groups: loans or grants. Loans must be repaid in full under the terms and conditions set forth by the respective program requirements and within the specified timeframe. Conversely, grants are one-time distributions provided to the CICWCD that do not require repayment. Each funding program provides advantages and disadvantages. Of note is that the selection of certain programs can potentially disqualify the CICWCD from other programs so careful consideration should be given to provide the most optimal funding combination.

Appendix B provides a summary description of potential funding options by program, agency, and type of funding. Additionally, Appendix B provides deadlines and contact information by program and agency.

3.4 Optimal Funding by Scenario

For purposes of this study, funding strategies were required to fully evaluate and compare those scenarios that required capital financing. It is noted that the total combined federal funding sources should not exceed 80 percent of total project cost. The estimated optimal funding opportunity is presented in Table 3.1.

Table 3.1 Estimated Optimal Funding Opportunity

Program	Type	Interest Rate	Term	Percent of Funding	Debt Service Coverage Ratio
Water Infrastructure Finance and Innovation Act (WIFIA)	Loan	3.15%	30	~49%	130x
State Drinking Water State Revolving Fund (SRF) Loan	Loan	2.00%	20	~25%	130x
Revenue Bonds	Loan	5.00%	30	~25%	130x
Cash Reserves	Cash	N/A	N/A	~<1%	N/A

Notes:
(1) Numbers may not total due to rounding.
N/A Not Applicable

Carollo assumed, conservatively, proposed annual debt service coverage (i.e., parity coverage on all debt) of 130x. Stated another way, the CICWCD would be required to have $1.30 in annual net revenue (calculated as total revenue minus O&M expenses) for every $1.00 in annual debt service. Similarly, Cedar City and Enoch City are assumed to concurrently maintain an annual debt service coverage ratio of 130x.

It is also important to note that for the purposes of this analysis, grants were excluded, as they tend to have greater uncertainty of being acquired and tend to be smaller in quantity and more sporadically and arbitrarily distributed. Clearly, any acquisition of grant funding would help reduce the financial impact to rate payers for the CICWCD and other key stakeholders. Carollo recommends the CICWCD apply early and frequently (typically annually, on the schedule unique to each opportunity) for all available grants. If the CICWCD chooses to do so, Carollo could assist with completing paperwork in pursuit of potential grant funding opportunities.

3.5 Financial Model Purpose and Background

Carollo's Excel-based financial model incorporated and evaluated cash flows for CICWCD, Cedar City, and Enoch City, as all three entities are assumed to be reliant on one another for execution and delivery of the PVWS project. For the purposes of this analysis, it is assumed that CICWCD will issue all debt related instruments regarding design and construction costs for the PVWS project. Furthermore, Carollo's model assumes Cedar City and Enoch City purchase water directly from CICWCD under Scenarios 4, 5, and 6. These water purchases (sold by CICWCD) are shown as expenses to Cedar City and Enoch City and conversely shown as a revenue source to the CICWCD. Revenue received by the CICWCD through purchased water and inclusive of other miscellaneous revenues will be used to pay down principal and interest on proposed issued debt while simultaneously meeting debt service coverage covenants (130x). If any cash flow (CICWCD, Cedar City, or Enoch City) results in an annual deficit in their respective ending fund balances or a resulting debt service coverage ratio falls below 130x, revenue increases to user rates (water sales) are required to meet the greatest deficiency.

Additionally, and as discussed earlier in this chapter, Scenarios 4, 5, and 6 require each collaborating partner to pay their own proportionate share (based on respective projected future water demands) of the proposed annual debt service at issuance and until final maturity, regardless of timing of water demands and/or physical deliveries. Other wholesale related costs will be shared proportionally by Cedar City and Enoch City through their monthly fixed and volumetric rates charged by the CICWCD.

3.6 Cash Flow Analysis Results

Cash flows were developed for all three of the assumed participating entities (CICWCD, Cedar City, and Enoch City) to gain a broad understanding of the potential financial implications of each of the six scenarios. Each entity has its own individual cash flow that considers their respective 2019 Budgets, growth, and water demands. Under certain scenarios, more specifically Scenarios 4 through 6, Cedar City's and Enoch City's wholesale water rate is entirely dependent upon the rate charged by the CICWCD. These scenarios in turn require revenue adjustments through revenue increases, as appropriate, to remain financially viable. The following subsections highlight results of the cash flow analysis and the potential revenue increases and associated typical monthly bills for each entity's customers under all six scenarios.

3.6.1 Central Iron County Water Conservancy District

Results of the CICWCD's cash flow analysis vary by scenario and result in varying degrees of annual revenue increases and customer bill impacts throughout the study period. As such, the CICWCD's cumulative (compounded) increases and typical monthly bills under each scenario are presented in Table 3.2.

Table 3.2 CICWCD Cash Flow Analysis Results

	Existing	Projected					
	2019	2025	2035	2045	2055	2065	2075
Inflationary Trend							
Cumulative Increase	0.0%	3.0%	38.4%	86.0%	150.0%	236.0%	351.5%
Bill Impact	$41.56	$42.81	$57.53	$77.32	$103.91	$139.65	$187.69
Scenario 1							
Cumulative Increase	0.0%	0.0%	0.0%	0.0%	238.3%	634.0%	634.0%
Bill Impact	$41.56	$41.56	$41.56	$41.56	$140.58	$305.05	$305.05
Scenario 2							
Cumulative Increase	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
Bill Impact	$41.56	$41.56	$41.56	$41.56	$41.56	$41.56	$41.56
Scenario 3							
Cumulative Increase	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
Bill Impact	$41.56	$41.56	$41.56	$41.56	$41.56	$41.56	$41.56
Scenario 4							
Cumulative Increase	0.0%	5.5%	17.4%	17.4%	17.4%	17.4%	17.4%
Bill Impact	$41.56	$43.85	$48.80	$48.80	$48.80	$48.80	$48.80
Scenario 5							
Cumulative Increase	0.0%	30.5%	0.0%	0.0%	0.0%	0.0%	0.0%
Bill Impact	$41.56	$54.24	$41.56	$41.56	$41.56	$41.56	$41.56
Scenario 6							
Cumulative Increase	0.0%	3.0%	38.4%	86.0%	150.0%	150.0%	150.0%
Bill Impact	$41.56	$42.81	$57.53	$77.31	$103.90	$103.90	$103.90

As a baseline case, which can provide a more easily understood starting point when comparing multiple scenarios, Carollo created an "Inflationary Trend" scenario that assumes annual increases of 3.0 percent throughout the study period and applied it to the typical monthly bill impact only. It is imperative to recognize the "Inflationary Trend" scenario was excluded from an actual cash flow analysis and may or may not be financially viable under each of the six scenarios. However, this scenario was created to illustrate the cumulative increase required and effect on typical monthly bills for customers. Under this "Inflationary Trend" scenario, CICWCD customers would experience a cumulative increase in their monthly bill of 150.0 percent in 2075. Under this scenario, a CICWCD customer's typical monthly bill would increase from $41.56 in 2019 to $103.91 in 2075, an increase of $62.35 per month.

Scenario 1 requires that CICWCD commence incurring capital costs through drilling additional wells to service and support a combination of growth, water demands, inadequate groundwater rights, and conservation requirements. It is important to note that under this scenario, CICWCD customers do not begin feeling the impact of the aforementioned components, through increases to their rates, until 2055 and throughout the remainder of the study period. Consequently, CICWCD customers would experience a cumulative increase in their monthly bill of 634.0 percent by 2075, moving from typical monthly bill of $41.56 in 2019 to $305.05 in 2075, an increase of $263.49 per month.

Scenarios 2 and 3 are identical in Table 3.2 and exclude water sales made to Cedar City and Enoch City. Under each of these scenarios, CICWCD customers would be unaffected, experiencing no monthly bill impact.

Scenario 4 requires CICWCD provide wholesale water service to both Cedar City and Enoch City as their water demands begin exceeding their available and allowable supply (projected to commence in 2050 and 2059, respectively). Under this scenario, CICWCD would incur significant upfront costs (2025 through 2027) for reuse projects, which are in addition to drilling additional wells and purchasing additional groundwater rights if they are even available that far into the future. As a result, this scenario requires proposed debt issuances under three debt instruments (as illustrated in Table 3.1, a combination of WIFIA at ~49 percent, SRF at ~25 percent, and Revenue Bonds at ~25 percent) totaling $30.1 million in bond proceeds in 2025 and requires three consecutive 5.5 percent annual revenue increases beginning in 2025 through 2027. Annual debt service totals approximately $1.951 million and is allocated among all three collaborating partners based on their 2025 net projected water demands with additional conservation savings (i.e., CICWCD retail at 12.0 percent of the total demand, Cedar City at 72.4 percent, Enoch City at 13.9 percent, with the remaining 1.7 percent assumed to be allocated to Kanarraville) until all proposed debt issuances have been retired regardless of timing of water demands and/or physical deliveries. Scenario 4 would see CICWCD customers experience a cumulative increase in their monthly bill of 17.4 percent by 2027 and throughout the remainder of the study period. Customers' typical monthly bills would increase from $41.56 in 2019 to $48.80 in 2075 (beginning in 2027 throughout the study period), an increase of $7.24 per month.

Scenario 5 requires CICWCD to provide wholesale water service to both Cedar City and Enoch City in 2030 and beyond as a result of completion of the PVWS project. With significant capital investment costs projected over the course of 5 years (2026 through 2030), the CICWCD is forced to issue sizeable debt instruments (WIFIA, SRF, and Revenue Bonds) to keep the cash flow viable, which requires an optimal mix of debt issuances and revenue increases over a long-term timeframe. Each collaborating partner would be required to pay their own proportionate share of the annual debt service (based on their respective and projected future water demands) from each and all debt issuances through their respective maturities. Additionally, each collaborating partner would be required to increase their own rates to support annual debt service coverage ratios, as necessary to meet required rate covenants. Under this scenario, the CICWCD begins collecting purchased water revenues from Cedar City and Enoch City in 2030 and as a result is able to decrease their water rates (beginning in 2031) to both retail and wholesale customers (Cedar City and Enoch City in this case) all while maintaining a positive ending fund balance and simultaneously meeting required debt service coverage ratios. This scenario requires proposed debt issuances under three debt instruments in 2026 and 2029 (as illustrated in Table 3.1, a combination of WIFIA at ~49 percent, SRF at ~25 percent, and Revenue Bonds at ~25 percent)

totaling $374.3 million in bond proceeds and a par amount of $420.6 million. Annual debt service totals $24.3 million and is allocated among all three collaborating partners based on their respective projected annual water demands. Scenario 5 would see a CICWCD customer's typical monthly bill increase from $41.56 in 2019 to $197.41 in 2030, an increase of $155.85 per month. However, as a result of the rate reduction in 2031, a CICWCD customer's typical monthly bill is projected to remain at the 2019 level of $41.56 per month throughout the remainder of the study period.

Scenario 6 requires that CICWCD provide wholesale water service to both Cedar City and Enoch City in 2055 and beyond as a result of completion of the PVWS project. Under this scenario, the CICWCD is forced to issue three debt instruments (WIFIA, SRF, and Revenue Bonds) in 2053 to keep the cash flow viable, which requires an optimal mix of debt issuances and revenue increases over a long-term timeframe. Each collaborating partner would be required to pay their own proportionate share of the annual debt service (based on their respective and projected future water demands) from each and all debt issuances through their respective maturities. Additionally, each collaborating partner would be required to increase their own rates to support annual debt service coverage ratios, as necessary to meet required rate covenants. Under this scenario, the CICWCD begins collecting purchased water revenues from Cedar City and Enoch City in 2055. This scenario requires a single proposed debt issuance under three debt instruments in 2055 (as illustrated in Table 3.1, a combination of WIFIA at ~49 percent, SRF at ~25 percent, and Revenue Bonds at ~25 percent) totaling $663.0 million in bond proceeds and a par amount of approximately $745 million. Annual debt service totals approximately $43 million and is allocated among all three collaborating partners based on their respective projected annual water demands. CICWCD customers would experience a cumulative increase in their monthly bill of 150.0 percent in 2055 to $103.90 from $41.56 in 2019, an increase of $62.34. The goal under this scenario was to increase rates at the same amount as the "Inflationary Trend" scenario and issue the optimal amount of debt instruments to support the cash flow and the projected annual debt service coverage ratios. Note, additional rate increases are unnecessary beyond 2055 to keep the CICWCD financially viable.

3.6.2 Cedar City

Results of the Cedar City cash flow analysis vary by scenario and result in varying degrees of annual revenue increases and customer bill impacts throughout the study period. As such, Cedar City's cumulative (compounded) increases and typical monthly bills under each scenario are presented in Table 3.3.

Table 3.3 Cedar City Cash Flow Analysis Results

	Existing	Projected					
	2019	2025	2035	2045	2055	2065	2075
Inflationary Trend							
Cumulative Increase	0.0%	3.0%	38.4%	86.0%	150.0%	236.0%	351.5%
Bill Impact	$17.00	$17.51	$23.55	$31.66	$42.55	$57.18	$76.85
Scenario 1							
Cumulative Increase	0.0%	3.0%	38.4%	60.5%	60.5%	60.5%	60.5%
Bill Impact	$17.00	$17.51	$23.53	$27.28	$27.28	$27.28	$27.28

	Existing	Projected					
	2019	2025	2035	2045	2055	2065	2075
Scenario 2							
Cumulative Increase	0.0%	3.0%	34.4%	34.4%	48.4%	80.9%	84.5%
Bill Impact	$17.00	$17.51	$22.85	$22.85	$25.22	$30.75	$31.36
Scenario 3							
Cumulative Increase	0.0%	3.0%	34.4%	34.4%	48.4%	72.2%	99.8%
Bill Impact	$17.00	$17.51	$22.85	$22.85	$25.22	$29.27	$33.97
Scenario 4							
Cumulative Increase	0.0%	28.0%	58.5%	58.5%	58.5%	97.9%	141.3%
Bill Impact	$17.00	$21.76	$26.94	$26.94	$26.94	$33.64	$41.01
Scenario 5							
Cumulative Increase	0.0%	76.0%	516.5%	516.5%	516.5%	516.5%	516.5%
Bill Impact	$17.00	$29.92	$104.80	$104.80	$104.80	$104.80	$104.80
Scenario 6							
Cumulative Increase	0.0%	6.5%	99.9%	275.3%	540.0%	540.0%	540.0%
Bill Impact	$17.00	$18.11	$33.99	$63.80	$108.80	$108.80	$108.80

As a baseline case, which can provide a more easily understood starting point when comparing multiple scenarios, Carollo created an "Inflationary Trend" scenario that assumes annual increases of 3.0 percent throughout the study period and applied it to the typical monthly bill impact only. It is imperative to recognize the "Inflationary Trend" scenario was excluded from an actual cash flow analysis and may or may not be financially viable under each of the six scenarios. However, this scenario was created to illustrate the cumulative increase required and effect on typical monthly bills for customers. Under this "Inflationary Trend" scenario, Cedar City customers would experience a cumulative increase in their monthly bill of 351.5 percent in 2075. Under this scenario, a Cedar City customer's typical monthly bill would increase from $17.00 in 2019 to $76.85 in 2075, an increase of $59.85 per month.

Under Scenario 1, Cedar City customers experience an "Inflationary Trend" increase of 3.0 percent annually from 2025 through 2040. Subsequent increases beyond 2040 are unnecessary as the annual ending fund balances remain positive and annual debt service coverage ratios are met in all years throughout the study period. Under this scenario, a Cedar City customer's typical monthly bill would increase from $17.00 in 2019 to $27.28 in 2075 (occurring in 2040 and remaining at that level throughout the study period), an increase of $10.28 per month.

Under Scenario 2, Cedar City customers experience an "Inflationary Trend" increase of 3.0 percent annually from 2025 through 2034. Additional 2.0 percent annual increases are necessary from 2051 through 2066 due to ending fund balance shortfalls (below $0 in 2075). Subsequent increases beyond 2067 are unnecessary as the annual ending fund balances remain positive and annual debt service coverage ratios are met in all years throughout the study period. Under this scenario, a Cedar City customer's typical monthly bill would increase from $17.00 in 2019 to $31.36 in 2075, an increase of $14.36 per month.

Under Scenario 3, Cedar City customers experience an "Inflationary Trend" increase of 3.0 percent annually from 2025 through 2034. Additional 2.0 percent annual increases are necessary from 2051 through 2055 as well as 1.5 percent annual increases from 2056 through 2075 due to ending balance shortfalls (below $0). Under this scenario, a Cedar City customer's typical monthly bill would increase from $17.00 in 2019 to $33.97 in 2075, an increase of $16.97 per month.

Scenario 4 sees Cedar City customers experience increases of 28.0 and 10.0 percent in 2025 and 2026, respectively, due to cash flow deficiencies resulting in ending fund balances below zero. Similarly, 3.0 percent annual increases are necessary from 2027 through 2030 to maintain positive ending fund balances throughout the remainder of the study period. It is important to note that based on Carollo's water assessment, Cedar City is not expected to require CICWCD water until 2050, increasing their demands significantly throughout the remainder of the study period into 2075. Under this scenario, a Cedar City customer's typical monthly bill would increase from $17.00 in 2019 to $41.01 in 2075, an increase of $24.01 per month.

Scenario 5 requires Cedar City to pay its proportionate share of the CICWCD's proposed annual debt service to fund the PVWS project beginning in 2026. The portion Cedar City is responsible for is based on its future projected annual water demands. Beginning in 2030, Cedar City will purchase all its water from the CICWCD as a result of completion of the PVWS project and will remain responsible for paying its proportionate share of the debt service associated with the PVWS project as issued through the CICWCD. Cedar City would also be required to maintain a positive ending fund balance and an annual debt service coverage ratio of at least 130x throughout retirement of each debt issuance. Under this scenario, Cedar City customers experience two 76.0 percent increases in 2025 and 2026 to meet annual debt service coverage requirements of 130x. Additional increases of 27.0 percent from 2027 through 2030 are required to meet annual debt service coverage ratios; however, a rate reduction of 23.5 percent occurs in 2031 to alleviate some of the upward pressures on ratepayers from the previous years' increases. Scenario 5 would see Cedar City's customers' typical monthly bill increase from $17.00 in 2019 to $136.99 in 2030, an increase of $119.99 per month. However, because of the rate reduction in 2031, Cedar City's customers' typical monthly bill is projected to be reduced to $104.80 per month from 2031 throughout the study period, an increase of $87.80 per month when compared to the 2019 typical customer bill.

Scenario 6 requires Cedar City to pay its proportionate share of the CICWCD's proposed annual debt service to fund the PVWS project beginning in 2053 with expected physical water deliveries occurring sometime in 2055. The portion Cedar City is responsible for is based on its future projected annual water demands. Beginning in 2055, Cedar City will purchase all its water from the CICWCD as a result of completion of the PVWS project and will remain responsible for paying its proportionate share of the debt service associated with the PVWS project as issued through the CICWCD. Cedar City would also be required to maintain a positive ending fund balance and an annual debt service coverage ratio of at least 130x throughout retirement of each debt issuance. Under this scenario, Cedar City customers experience 6.5 percent annual increases from 2025 through 2047 with additional 6.0 percent annual increases from 2048 through 2054 to meet annual debt service coverage requirements of 130x. Scenario 6 would see Cedar City's customers' typical monthly bill increase from $17.00 in 2019 to $108.80 in 2075, an increase of $91.80 per month.

3.6.3 Enoch City

Results of the Enoch City cash flow analysis vary by scenario and result in varying degrees of annual revenue increases and customer bill impacts throughout the study period. As such, cumulative (compounded) increases and typical monthly bills in Enoch City under each scenario are presented in Table 3.4.

Table 3.4 Enoch City Cash Flow Analysis Results

	Existing	Projected					
	2019	2025	2035	2045	2055	2065	2075
Inflationary Trend							
Cumulative Increase	0.0%	3.0%	38.4%	86.0%	150.0%	236.0%	351.5%
Bill Impact	$29.00	$29.87	$40.15	$53.97	$72.53	$97.49	$131.01
Scenario 1							
Cumulative Increase	0.0%	9.5%	9.5%	9.5%	9.5%	9.5%	9.5%
Bill Impact	$29.00	$31.76	$31.76	$31.76	$31.76	$31.76	$31.76
Scenario 2							
Cumulative Increase	0.0%	9.5%	9.5%	9.5%	9.5%	9.5%	9.5%
Bill Impact	$29.00	$31.76	$31.76	$31.76	$31.76	$31.76	$31.76
Scenario 3							
Cumulative Increase	0.0%	9.5%	9.5%	9.5%	9.5%	9.5%	9.5%
Bill Impact	$29.00	$31.76	$31.76	$31.76	$31.76	$31.76	$31.76
Scenario 4							
Cumulative Increase	0.0%	53.5%	53.5%	53.5%	53.5%	53.5%	53.5%
Bill Impact	$29.00	$44.52	$44.52	$44.52	$44.52	$44.52	$44.52
Scenario 5							
Cumulative Increase	0.0%	90.0%	528.0%	528.0%	528.0%	528.0%	528.0%
Bill Impact	$29.00	$55.10	$182.11	$182.11	$182.11	$182.11	$182.11
Scenario 6							
Cumulative Increase	0.0%	9.5%	105.5%	278.6%	578.1%	578.1%	578.1%
Bill Impact	$29.00	$31.76	$59.61	$109.81	$196.65	$196.65	$196.65

As a baseline case, which can provide a more easily understood starting point when comparing multiple scenarios, Carollo created an "Inflationary Trend" scenario that assumes annual increases of 3.0 percent throughout the study period and applied it to the typical monthly bill impact only. It is imperative to recognize the "Inflationary Trend" scenario was excluded from an actual cash flow analysis and may or may not be financially viable under each of the six scenarios. However, this scenario was created to illustrate the cumulative increase required and effect on typical monthly bills for customers. Under this "Inflationary Trend" scenario, Enoch City customers would experience a cumulative increase in their monthly bill of 351.5 percent in 2075. Under this scenario, an Enoch City customer's typical monthly bill would increase from $29.00 in 2019 to $131.01 in 2075, an increase of $102.01 per month.

Under Scenarios 1 through 3, Enoch City must increase rates by 9.5 percent in 2025 to meet the minimum debt service coverage requirement of 130x. Subsequent increases beyond 2025 are unnecessary as the annual ending fund balances remain positive and annual debt service coverage ratios are met in all years throughout the study period. Under this scenario, an Enoch City customer's typical monthly bill would increase from $29.00 in 2019 to $31.76 in 2075 (occurring in 2025 and remaining at that level throughout the study period), an increase of $2.76 per month.

Under Scenario 4, Enoch City must increase rates by 53.5 percent in 2025 to meet the minimum debt service coverage requirement of 130x. Subsequent increases beyond 2025 are unnecessary as the annual ending fund balances remain positive and annual debt service coverage ratios are met in all years throughout the study period. It is important to note that based on Carollo's water assessment, Enoch City is not expected to require CICWCD water until 2065, increasing their demands ever so slightly annually throughout the remainder of the study period into 2075. Under this scenario, an Enoch City customer's typical monthly bill would increase from $29.00 in 2019 to $44.52 in 2075 (occurring in 2025 and remaining at that level throughout the study period), an increase of $15.52 per month.

Scenario 5 requires Enoch City to pay its proportionate share of the CICWCD's proposed annual debt service to fund the PVWS project beginning in 2026. The portion Enoch City is responsible for is based on its future projected annual water demands. Beginning in 2030, Enoch City will purchase all its water from the CICWCD as a result of completion of the PVWS project and will remain responsible for paying its proportionate share of the debt service associated with the PVWS project as issued through the CICWCD. Enoch City would also be required to maintain a positive ending fund balance and an annual debt service coverage ratio of at least 130x throughout retirement of each debt issuance. Under this scenario, Enoch City customers experience two 90.0 percent increases in 2025 and 2026 to meet annual debt service coverage requirements of 130x. Additional increases of 23.0 percent from 2027 through 2030 are required to meet annual debt service coverage ratios; however, a rate reduction of 24.0 percent occurs in 2031 to alleviate some of the upward pressures on ratepayers from the previous years' increases. Scenario 5 would see Enoch City's customers' typical monthly bill increase from $29.00 in 2019 to $239.62 in 2030, an increase of $210.62 per month. However, because of the rate reduction in 2031, Enoch City's customers' typical monthly bill is projected to be reduced to $182.11 per month from 2031 throughout the study period, an increase of $153.11 per month when compared to the 2019 typical customer bill.

Scenario 6 requires Enoch City to pay its proportionate share of the CICWCD's proposed annual debt service to fund the PVWS project beginning in 2053 with expected physical water deliveries occurring sometime in 2055. The portion Enoch City is responsible for is based on its future projected annual water demands. Beginning in 2055, Enoch City will purchase all its water from the CICWCD as a result of completion of the PVWS project and will remain responsible for paying its proportionate share of the debt service associated with the PVWS project as issued through the CICWCD. Enoch City would also be required to maintain a positive ending fund balance and an annual debt service coverage ratio of at least 130x throughout retirement of each debt issuance. Under this scenario, Enoch City customers experience an initial increase in 2025 of 9.5 percent to meet the annual debt service coverage ratio of 130x followed by 6.5 percent annual increases from 2025 through 2041. Additional 6.0 percent annual increases from 2042 through 2055 to meet annual debt service coverage requirements of 130x. Scenario 6 would see Enoch City's customers' typical monthly bill increase from $29.00 in 2019 to $196.65 in 2075, an increase of $167.65 per month.

-This Page Intentionally Left Blank-

Chapter 4

FINDINGS AND RECOMMENDATIONS

Carollo collaborated with the CICWCD, Cedar City, and Enoch City staff in development of the six scenarios presented in this report. Each of the selected scenarios represents a starting point for further dialogue and consideration as the PVWS Project timeline and requirements become further solidified. The purpose of the six scenarios was to provide the CICWCD, and its potential collaborating partners, with scenarios at varying ends of the spectrum, providing a more comprehensive starting point for further evaluations.

While Scenario 1 is not technically viable (due to limits on total water rights availability under the GMP), Scenarios 2 through 4 would require purchase of between 50 and 97 percent of the remaining non-municipal and non-domestic water rights in the Cedar Valley Aquifer after GMP cutbacks are complete. Based on experience in other parts of the United States, purchases would likely have significant negative effects on the agricultural economy in the Cedar City Valley and could change the course of the valley's rich agricultural heritage.

Selection of any of the local supply scenarios (Scenarios 2 through 4) would require policy-level consideration of the socioeconomic impacts of these actions. The feasibility, methods, and costs required to meet the Utah DNR proposed conservation goals have not been studied and would increase the costs shown in this report for Scenarios 2 through 6. Ultimately, the actual scenario selected for pursuit may or may not be one presented in this analysis.

However, the CICWCD and potential collaborating partners should consider moving forward with the PVWS Project and work towards completion of the project at some optimal point in time between 2030 and 2055. To facilitate this, each collaborating partner would enter into interlocal or intergovernmental agreements for water service to delineate roles and responsibilities for each collaborating partner. Under that arrangement, each collaborating partner should be required to provide a proportionate share, based on water demands, of capital contribution or debt service payments to design and construct the PVWS Project. Finally, it is recommended that a comprehensive cost of service rate study be conducted prior to first delivery of water service to each collaborating partner, to ensure all costs are appropriately allocated and recovered from each of the respective collaborating partners.

-This Page Intentionally Left Blank-

Chapter 5

REFERENCES

Applied Analysis, 2019. CICWCD Water Resource Economic and Fiscal Analysis (Working Draft). June. Available online at https://cicwcd.org/wp-content/uploads/2020/04/2019-6-27-CIC-Analysis-Update-DRAFT-v20.pdf (accessed April 9, 2020).

Bonneville Power Authority, 2020. https://www.bpa.gov/EE/Sectors/agriculture/Pages/LEPA%20and%20LESA.aspx. Accessed February 10, 2020.

Carollo Engineers, 2018. Cedar City Regional Wastewater Treatment Facility Return Effluent Reuse Feasibility Study. December.

Cedar City, 2018. Cedar City 2018 Water Report.

Cedar City, 2014. Water Conservation Plan for Cedar City, Utah. November.

Enoch City, 2014. 2014 Water Conservation Plan.

Ensign Engineering, 2020. CICWCD Water Master Plan. November.

Ensign Engineering, 2019. West Desert Pipeline Cost Estimate (Draft). April 24.

Ensign Engineering, 2017. Pine Valley Groundwater Development and Transmission Pipeline Project Conceptual Plan of Development (Draft). September.

Sunrise Engineering, 2019. Enoch City Culinary Water Impact Fee Facilities Plan. April.

Utah DNR, 2019. Utah's Regional M&I Water Conservation Goals (Draft). August.

Utah DWR, 2021. Groundwater Management Plan for the Cedar City Valley. https://waterrights.utah.gov/groundwater/ManagementReports/CedarValley/CedarCityValleyGWMP20210111.pdf. Accessed June 5, 2023.

Utah DWR, 2016. Public Meeting Concerning the Process for Developing a Groundwater Management Plan for Cedar Valley in Iron County. https://waterrights.utah.gov/meetinfo/m20160107/. Accessed February 10, 2020.

Utah Geological Survey, 2014. Investigation of Land Subsidence and Earth Fissures in Cedar Valley, Iron County Utah. Special Study 150.

Utah Governor's Office of Management and Budget, 2012. https://gomb.utah.gov/wp-content/uploads/2017/12/Subcounty-Pop-Projections-2013.xlsx. Accessed August 8, 2019.

-This Page Intentionally Left Blank

Appendix A

EXCERPT FROM 2019 PVWS ECONOMIC AND FISCAL ANALYSIS STUDY

Quantifying the Economic Impacts of the Alternatives

Two Key Considerations

Types of Economic Impacts Considered

1

POSITIVE IMPACTS

One-time construction impacts on the local economy that are sourced to new infrastructure investments (e.g., Pine Valley and Wah Wah Valley projects)

2

NEGATIVE IMPACTS

The recurring economic losses sourced to an insufficient water system in the event no infrastructure investments are made, limiting future growth potential

One-Time Economic Impact of Infrastructure Investments

Quantifying the Impacts

In addition to the broader implications of a reliable water supply system, there are one-time economic impacts associated with the development of new infrastructure

Economic Output

Impact of Total Spending within the Local Economy

Wages and Salaries

Impact on Personal Incomes for Local Residents

Employment

Impact on the Number of Jobs within the Local Economy

One-Time Economic Impact of Infrastructure Investments

Approach, Methodology, and Assumptions

IMPLAN Model:

- —1 of 3 nationally recognized impact analysis software tools
- —Developed by Minnesota IMPLAN Group, Inc. and used by more than 1,000 public and private institutions
- —IMPLAN is an input-output model that utilizes complex economic equations to explain how the “outputs” of one industry become the “inputs” of others, and vice versa
- —This relationship is sometimes referred to as the “multiplier effect”, illustrating how changes in one sector of the economy can affect other sectors
- —See IMPLAN.com

One-Time Economic Impact of Infrastructure Investments

Approach, Methodology, and Assumptions

IMPLAN Model:

- IMPLAN data contains 546 sectors representing all private industries in the United States (anything from grain farming to surgical appliance manufacturing) as defined by the North American Industry Classification System (NAICS) codes
- Employment, employee compensation, industry expenditures, commodity demands, relationships between industries, and more are collected to form IMPLAN's ever-growing database

One-Time Economic Impact of Infrastructure Investments

Approach, Methodology, and Assumptions

IMPLAN Model:

- Inputs: For purposes of this analysis, the inputs for the economic impact analyses were sourced to CICWCD's estimated development costs for the Pine Valley ($253.6 million) and Wah Wah Valley ($165.7 million) infrastructure projects for a total cost of $419.3 million
- Location: IMPLAN databases specific to Iron County, Utah were acquired and utilized to develop the economic impacts of the proposed investments

One-Time Economic Impact of Infrastructure Investments

Approach, Methodology, and Assumptions

IMPLAN Model:

- Industry: In addition to the cost and location details, industry-specific metrics were utilized that most closely resemble the type of development contemplated (Industry Code 58 - Construction of other new nonresidential structures)
- Multiplier Effect: The following multipliers were generated based on the location and industry classification:

	Direct	Indirect	Induced	Total	Multiplier Effect
Output (Per $1.00 of Direct Output)	1.00	0.27	0.17	1.44	1.44x
Labor Income (Per $1.00 of Direct Output)	0.23	0.06	0.04	0.33	1.46x
Employment (Per $1.0 Million of Direct Output)	7.82	2.77	1.69	12.28	1.57x

One-Time Economic Impact of Infrastructure Investments

Multiplier Effect

Total Impact

The sum of direct, indirect and induced impacts

Note: Indirect and induced impacts sourced to IMPLAN.

One-Time Economic Impact of Infrastructure Investments

West Desert Supply Project

PINE VALLEY
15,000 ACRE FEET

Original Cost Estimate: **$150.0 Million**

Revised Cost Estimate: **$253.6 Million**

WAH WAH VALLEY
11,275 ACRE FEET

Original Cost Estimate: **$50.0 Million**

Revised Cost Estimate: **$165.7 Million**

TOTAL INVESTMENT: $419.3 MILLION

Source:CICWCD.

One-Time Economic Impact of Infrastructure Investments

Economic Impact Summary

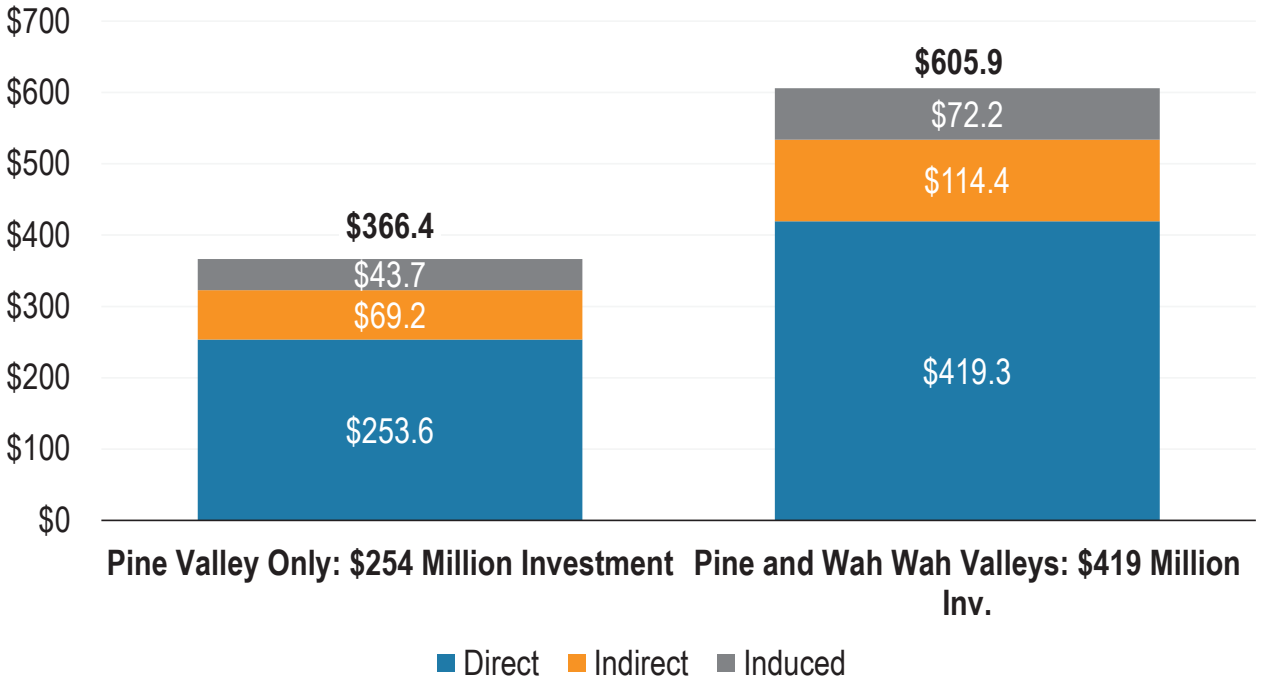
($ in Millions)	Direct	Indirect	Induced	Total
Pine Valley Only: $254 Million Investment				
Economic Output	$253.6	$69.2	$43.7	**$366.4**
Wages & Salaries	$58.2	$16.0	$10.6	**$84.9**
Employment	1,982	702	428	**3,113**
Pine and Wah Wah Valleys: $419 Million Investment				
Economic Output	$419.3	$114.4	$72.2	**$605.9**
Wages & Salaries	$96.3	$26.5	$17.5	**$140.3**
Employment	3,278	1,161	708	**5,147**

The potential economic impacts sourced to large-scale investment in infrastructure are significant with $606 million in output, supporting approximately $140 million in wages and an estimated 5,100 person-years of employment.

Note: Indirect and induced impacts sourced to IMPLAN; employment stated in person-years of employment (i.e., one person employed for an entire year).

One-Time Economic Impact of Infrastructure Investments

Economic Impact Summary: Economic Output

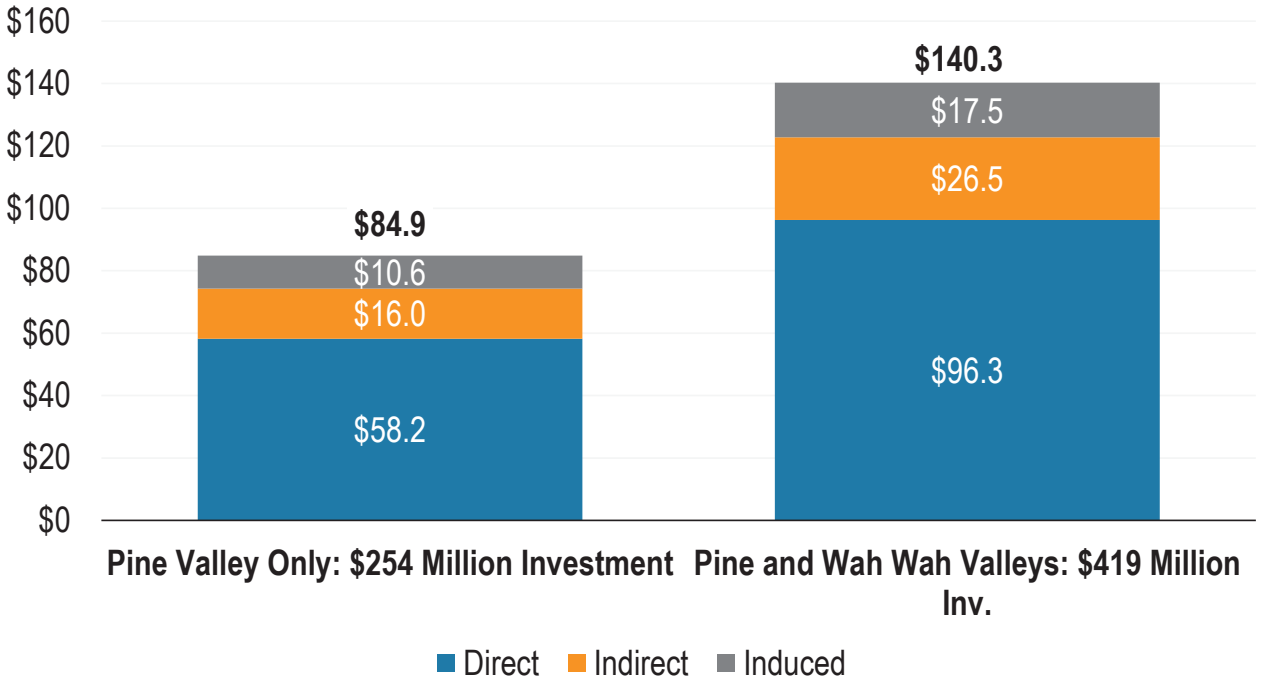


The potential economic impacts sourced to large-scale investment in infrastructure are significant with $606 million in output, supporting approximately $140 million in wages and an estimated 5,100 person-years of employment.

Note: Indirect and induced impacts sourced to IMPLAN; employment stated in person-years of employment (i.e., one person employed for an entire year).

One-Time Economic Impact of Infrastructure Investments

Economic Impact Summary: Wages and Salaries

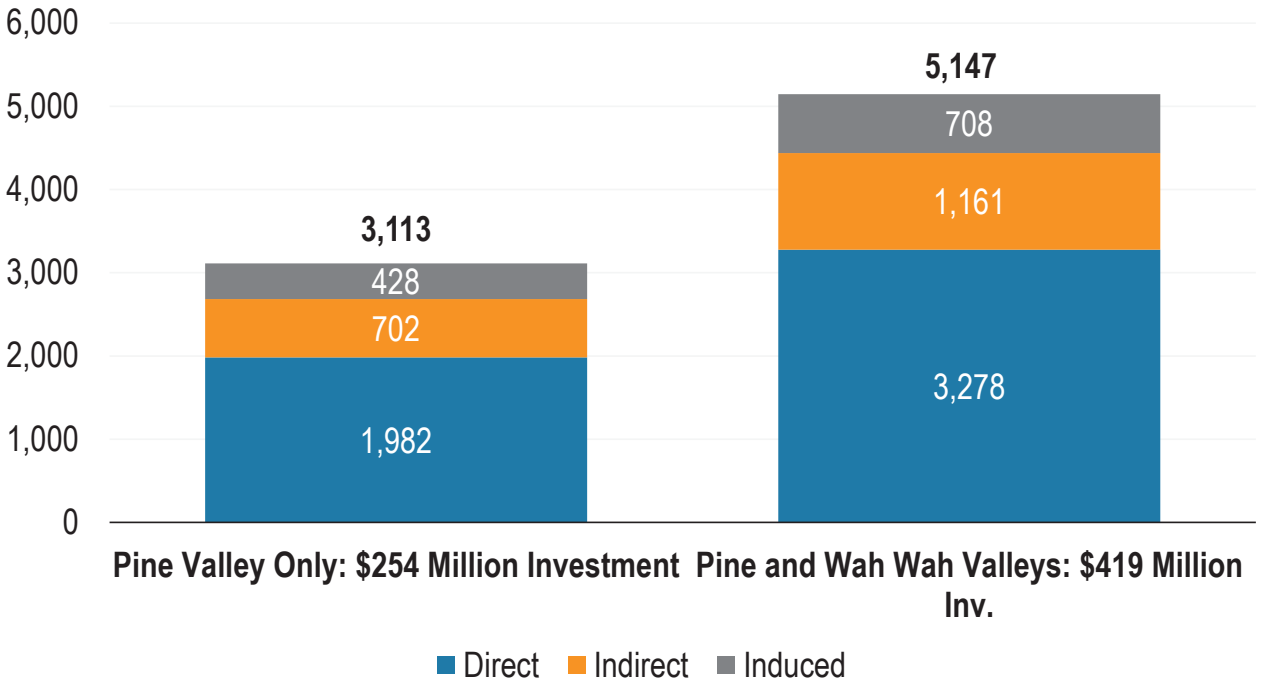


The potential economic impacts sourced to large-scale investment in infrastructure are significant with $606 million in output, supporting approximately $140 million in wages and an estimated 5,100 person-years of employment.

Note: Indirect and induced impacts sourced to IMPLAN; employment stated in person-years of employment (i.e., one person employed for an entire year).

One-Time Economic Impact of Infrastructure Investments

Economic Impact Summary: Employment



The potential economic impacts sourced to large-scale investment in infrastructure are significant with $606 million in output, supporting approximately $140 million in wages and an estimated 5,100 person-years of employment.

Note: Indirect and induced impacts sourced to IMPLAN; employment stated in person-years of employment (i.e., one person employed for an entire year).

Appendix B

FUNDING SOURCE INFORMATION

Overview

Funding sources investigated for the Pine Valley Water Supply project are summarized in Tables B.1 and B.2.

The larger funding programs, typically focused on implementation projects, provide the best opportunity to obtain large sources of funding. Smaller grants and loans can also be pursued for planning and design activities as they will be helpful in building relationships with funding agencies and reduce the financial burden on the Central Iron County Water Conservancy District (CICWCD). Viable Federal and State funding opportunities for Design, and/or Construction activities, include:

- United States Environmental Protection Agency (EPA) - Water Infrastructure Finance and Innovation Act (WIFIA) (Design/Construction Loan).
- State of Utah Department of Environmental Quality (DEQ) Drinking Water State Revolving Fund (DWSRF) Program – Planning/Design Advances.
- State of Utah DEQ, DWSRF Program – Construction Loan.
- Combination of DEQ's DWSRF Program and WIFIA Financing (Design/Construction Loan).
- Utah Department of Natural Resources (Division of Water Resources) (Design/Construction Loan).
- State of Utah Permanent Community Impact Fund (CIB).
- State Bonding Bill = Special Project.
- Private Equity Financing.

-This Page Intentionally Left Blank-

Table B.1 Funding Source Summary

Program	Agency	Type	Description	Deadline	Contact Information
Federal					
WIFIA *Potential funding program for the project.*	EPA	Loan	• Financing mechanism for water and wastewater infrastructure projects, which provides financing for large dollar-value water/wastewater projects. Projects must cost more than $20 million or $5 million for small community projects (25,000 of fewer) (projects can be combined and submitted as a group of projects). Program provides reimbursement of expenses incurred (similar to the State Revolving Fund [SRF] program). • Cover planning/design (retroactive) and construction activities. • Maximum amount of the loan cannot exceed 49% of the project costs. Requires 51% match (can include SRF or other programs). • The total WIFIA and other federal funding sources shall not exceed 80% of total project cost. • Single fixed rate established at closing – may receive multiple disbursements over several years. • Interest at a fixed rate, calculated by adding one basis point (0.01%) to the rate of securities of a similar maturity (based on the weighted-average life of the WIFIA Loan) as published, on the execution date of the WIFIA Loan Agreement, in the United States Treasury Bureau of Public Debt's daily rate table for State and Local Government Series (SLGS) securities, currently located on the Internet at https://www.treasurydirect.gov/GA-SL/SLGS/selectSLGSDate.htm. • Maximum loan term is 35 years (or useful life of the project). • Payments maybe deferred 5 years after substantial completion). Payments are semi or annual installments. • Customized repayment schedule to match anticipated revenues and expenses. • Application fees apply (average $300,000-$700,000 pending reviews and legal negotiations). • Reserve requirement – 1 year repayment. • Requires compliance with federal requirements (National Environmental Policy Act [NEPA], American Iron and Steel [AIS], Davis Bacon, etc.). • Project completion in 5 years (preferred) up to 7 years. • **Funding Use:** Design (includes environmental, legal, right of ways, etc.) and Construction.	Typical funding opportunity announcement (FOA) in spring Schedule: • Letter of Interest due April/July • Notification of Invitation to apply in late October/ early November • 1 year to submit complete application	Karen Fligger 202-564-2992 Jordan Dorfman 202-564-0614 https://www.federalregister.gov/documents/2017/01/10/2016-31828/notice-of-funding-availability-nofa-for-applications-for-credit-assistance-under-the-water

Program	Agency	Type	Description	Deadline	Contact Information
United States Bureau of Reclamation (USBR) Grants					
WaterSMART Water and Energy Efficiency Grants *Potential funding program for the project.*	USBR	Grant	• Eligible projects include projects that result in quantifiable and sustained water savings, increase renewable energy use and improve energy savings, and support broader water quality sustainability benefits. Does not cover reuse or recycled water implementation projects. Projects that benefit endangered and threatened species, support water sustainability benefits, or implement activities to address climate related impacts on water may apply. Requires a 50% cost share. Two funding limits: $300,000 (typically for projects completed within a year; and up to $1,000,000 (for projects to be completed in 3 years).*Total funding earmarked for Water Marketing and Water & Energy Efficiency Grants of $34 million for 2019.*	• Varies	Josh German 303-445-2839 https://www.grants.gov/web/grants/view-opportunity.html?oppId=290172
Drought Contingency Planning *Not applicable.*	USBR	Grant	• Provides grant funding to entities to support the development of a Drought Management Plan or to update an existing Drought Management Plan. Grant funding requires a 50/50 cost share. Funding up to $200,000. Sets an entity up for Drought Project FOA. • **Funding Use:** Drought Contingency Planning Document		Darion Mayhorn 303-445-3121
Drought Resiliency Projects *Potential funding program for the project.*	USBR	Grant	• Funding is for implementation projects building long-term resiliency to drought and reduce the need for emergency response actions that are identified in a Drought Contingency Plan. Projects eligible for funding should address at least one the following: serve to increase the reliability of water supply; improve water management; implement systems to facilitate voluntary water sales, transfers, or exchanges; and provide benefits for the environment are eligible. Types of projects include moving pipelines, small recycling, storage reservoir construction, and projects that increase flexibility in drought. Two Funding: Group 1 $300,000 (complete in 2 years); Group 2 $750,000 (complete in 3 years). • **Funding Use:** Implementation		Darion Mayhorn 303-445-3121
United States Department of Agriculture (USDA)					
Water and Waste Disposal Predevelopment Planning Grants in Utah *Not applicable - CICWCD does not meet population criteria. Included in case applicable to a community benefiting from project.*	Rural Develop.	Grants Loans	• This program assists low-income communities with initial planning and development of applications for USDA Rural Development Water and Waste Disposal direct loan/grant and loan guarantee programs. Requirements: – Population must be less than 10,000 people. – Median household income below the poverty line or less than 80% of the statewide non-metropolitan median household income. – Maximum grant amount of $30,000 or 75% of the predevelopment planning costs. 25% cost share from applicant or third-party sources. • **Funding Use:** Planning		Heath Price, Community Programs Director 801-524-4325 Pam Snedeger (435) 893-3349 https://www.rd.usda.gov/programs-services/water-waste-disposal-predevelopment-planning-grants/ut
Rural Water Loan Fund (RWLF) *Not applicable - Financing is too small in amount. Included in case applicable to a community benefiting from project.*	National Rural Water Association	Loan	• RWLF is a funding program specifically designed to meet the unique needs of small water and wastewater utilities. The RWLF provides low-cost loans for short-term repair costs, small capital projects, or pre-development costs associated with larger projects. The RWLF was established through a grant from the USDA/Rural Utilities Service, and repaid funds used to replenish the fund and make new loans. Loan amounts may not exceed $100,000 or 75% of total project cost, whichever is less. Loan offers below market interest rate and maximum repayment period of 10 years. • **Funding Use:** Planning		nrwarwlf@nrwa.org 1-800-332-8715

Program	Agency	Type	Description	Deadline	Contact Information
Rural Utilities Service Offices *Project element specific – perhaps for pumping facilities. Low award amounts.*	Electric Program Energy Efficiency and Conservation Loan Program High Energy Cost Grant Program	Loan	• Provides financing for basic infrastructure including electricity, telecommunications and water/waste systems. The Electric Program offers loans and loan guarantees for generation, transmission, and distribution facilities serving rural areas. The Energy Efficiency and Conservation Loan Program expands the types of projects that can be supported by the Electric Program to include energy efficiency activities, including distributed generation for on or off grid renewable energy systems. The High Energy Cost Grant Program offers competitive grants for community energy facilities, including renewable energy systems and energy efficiency projects serving extremely high energy cost rural communities.		
Department of Energy					
Energy Efficiency Block Grants	Energy Efficiency and Renewable Energy	Loans, Grants or Incentives	Provides funds for energy efficiency and conservation programs and projects communitywide, as well as renewable energy installations on government buildings. This grant program is funded through the 2009 American Recovery and Reinvestment Act and its availability varies from year to year and, depending on the timing, this funding may or may not be available.		https://www.energy.gov/eere/wipo/energy-efficiency-and-conservation-block-grant-program
State					
State Drinking Water SRF Loan Program *Potential funding program for construction of the project.*	Utah DEQ - SRF Program Administered by Utah Division of Water Quality	Loan	• Utah's DWSRF provides low interest loans to public water systems to finance the cost of infrastructure projects needed to achieve or maintain compliance with SDWA requirements in Utah. Projects funded through the SRF may receive funding from the following: (a) SRF Capitalization Grants; (b) SRF loan repayments; and (c) State matching funds. Currently projects are awarded funding based on readiness to proceed (based on current demand), however there is a foreseeable demand on the program through 2025 due to several large projects requesting funding. As monies are from both Federal and State sources - federal requirements apply including NEPA, A&E Procurement, AIS, Davis Bacon, and other requirements. Requires Engineering Report. • The Program can fund Planning, Design, and Construction. Planning and Design are Advances/Grants and Construction funds are provided as low Interest loans. • Scored and given a priority point. • Low interest 2-4%. • 20 year loan term (or life of project). • Up to 18 months prior to first repayment. Payment schedule is likely annual. • Origination fee of 1% (normally paid at closing – 1 time). • Debt service reserve account – Annual (at a min) deposits to an account in the amount of one-tenth of the annual payment on the bond(s) purchased by the Board. Continue until the total amount in the debt service reserve fund is equal to the annual payment. • Capital Facilities Replacement Reserve account – 5% of agency's drinking water system's annual operating budget including debt service and depreciation until bond is redeemed. • No early pre-payment penalty. **Funding Use:** Construction or Design/ Construction	Ongoing	Michael Grange 801-536-0069 mgrange@utah.gov https://deq.utah.gov/drinking-water/state-revolving-fund-srf-drinking-water

Program	Agency	Type	Description	Deadline	Contact Information
State Drinking Water SRF - Planning and Design Advances *Potential funding program for the planning and design of the project.*	Utah DEQ - Program - Division of Water Quality	Grant	• Through the SRF Program, Utah's Division of Water Quality may provide advance funding for the Planning and Design of SRF applicable projects (especially to help smaller communities). As the project progresses from the Planning to the Design phase, the advances are rolled into the SRF Construction loan for repayment (in order to recapture the Planning/Design grants). Projects that do not proceed to design and/or construction are still required to repay the advance. • No match - however, if a match is provided, it demonstrates a strong community investment in the project under consideration. • **Funding Use:** Planning and Design	Ongoing	Michael Grange 801-536-0069 mgrange@utah.gov
Green Project Reserve (GPR)	Utah (DEQ) - Program Administered by Utah Water Quality Board and Division of Water Quality	Grant	• To the extent there are sufficient eligible project applications, not less than 20% of the SRF funds shall be for projects, or portions of projects, that include green infrastructure, water or energy efficiency improvements or other environmentally innovative activities. GPR projects must address water or energy efficiency, mitigate stormwater runoff, or encourage sustainable project planning, design and construction. Loan principal forgiveness is available for GPR projects with a forgiveness limit of 50% for construction costs and 75% for planning costs. • **Funding Use:** Construction and Planning	Ongoing	
Financial Assistance Program - Revolving Construction Fund, Cities Water Loan Fund and Conservation and Development Fund *Potential funding program for construction of the project.*	Utah Department of Natural Resources (Division of Water Resources)	Loan	• Three revolving construction loan programs (**Revolving Construction Fund, Cities Water Loan Fund** and **Conservation and Development Fund**). Funding is available for projects that conserve, protect, or more efficiently use present water supplies, develop new water, or provide flood control (e.g., agricultural projects, canal lining, flood control, dam construction, water facilities, etc.). Cities Water Loan Fund provides assistance to districts for the construction of municipal water projects. The Conservation and Development Fund helps finance large construction projects, e.g., dams and large municipal drinking water systems. To be eligible, the project cannot be routine operation and maintenance, not sponsored by a developer or private entity, and cannot be for a domestic water system where less than half of residents live in the service area year round. Funds cannot be used for construction of treatment facilities but can be used for infrastructure, storage, and land application). • Provides for zero to low-interest (around 3% or less) funding (loans or bonds) for water projects statewide. • Loan term is generally less than 25 years. • Requires a 15-25% cost share (match) from applicant. • Grants are only provided for dam repair projects. • Program is funded by the state of Utah (do not have to comply with federal compliance requirements including architecture and engineering (A&E) procurement, AIS, Davis Bacon, etc.). • **Funding Use:** Design and Implementation	Ongoing *(however, set application deadlines to prepare for Board Meeting)*	Todd Stonely 801-538-7277 Joel Williams 801-538-7249 https://water.utah.gov/funding.html
Permanent Community Impact Fund *Potential funding program for the project.* ***Perhaps pursue for planning and design phase?***	Permanent Community Impact Fund Board	Loans and Grants	• The Permanent CIB is a program which provides loans and/or grants to state agencies and subdivisions of the state which are or may be socially or economically impacted, directly or indirectly, by mineral resource development on federal lands. CIB can fund the following types of activities: planning, construction and maintenance of public facilities, and provision of public services. **Total participation in any given project will generally be limited to a maximum of $5,000,000 regardless of grant/loan mix**. Planning, study or design requests require 50% match (match cannot be donated labor or staff time; has to have a demonstrated value (e.g., real property)). • **Funding Use:** Planning, Design and Implementation (pending County)	Funding cycles by trimester: 1st Trimester - June 1 2nd Trimester - Oct. 1 3rd Trimester - Feb 1	Candace Powers, CIB Program Manager 801-468-0131 cpowers@utah.gov https://jobs.utah.gov/housing/cibl

Program	Agency	Type	Description	Deadline	Contact Information
Community Development Block Grants	Housing & Community Development	Grant	• The Community Development Block Grant program provides grants to Cities of <50,000 or Counties <200,000. • *Small Cities Program* is targeted to assist in developing viable communities by providing decent housing and a suitable living environment and expanding economic opportunities, principally for persons of low and moderate incomes. Grants range $25,000 to $200,000.		https://jobs.utah.gov/housing/community/cdbg/index.html
U-Save Energy Efficiency Fund	Governor's Office of Energy Development	Loan	• Finances energy efficiency improvements, including retrofits and new construction enhancements, for public buildings owned by school districts, cities, and counties.		Shawna Cuan scuan@utah.gov
Other					
Wattsmart Business Program	Rocky Mountain Power	Grant	• To provide planning and design advances to communities in need of assistance (e.g. when the cost of water or wastewater improvements increase rates above 1.4% modified adjusted gross income [MAGI]). These advances turn into grants and do not need to be repaid. • **Funding Use:** Planning and Design		
Private Equity Funding	Private Industry/ Company	Loan	• Ridgewood Infrastructure – private investment group that partners with public agencies to provide private equity funding for water and energy infrastructure in the United States. • Provides financing for planning, design and construction. Full or specific aspects of projects. • Project costs minimum is $50M-$200M; can fund CICWCD Project. • Loan term flexible –20-30-year note. • Repayment structure is flexible to fit CICWCD needs (semi-annual or annual); can repay interest only or interest and capital. • Interest rate is comparable to the market rate (8-10%). • No early payment penalty. • No strings or requirements (e.g., NEPA, federal requirements, etc.). • Ridgewood would be more involved in project design, construction, and potentially operations (could be P3 or hybrid). • Potential conflict with other funding sources due to private financing.		
Long Term Effort or Track Future Funding					
Water Infrastructure Restricted Account (WIRA)	State of Utah - Legislature/ Governor's Bonding Bill/Budget	Loan	• Pursuit of project financing via Governors special projects or legislative action (via local State Representative) such as: – SB281 – Water Infrastructure Restricted Account (WIRA) - Designated for financing the Bear River Project and the Lake Powell Pipeline Project; and for issuing revolving loans to repair and replace some existing federal water infrastructure. One time appropriation from the General Fund for $5 million has been placed in the account. Financed through bonds issued by the State for the development of waters of the Bear and Colorado Rivers. Administered by the Division of Water Resources.	Long-term pursuit but worth investigating if broader range of benefits – Discuss with State and/or legislative lobbyist.	
Special Appropriation Act Projects	EPA	Grant	• Difficult to secure.	Discuss with Federal Legislative Lobbyist as to feasibility	
America's Water Infrastructure Act 2018 Programs	EPA	Loans/ Grants	• H.R. 3387 Drinking Water System Improvement Act of 2017. Pending appropriations there maybe potential funding programs for the CICWCD Project.		

Table B.2 Funding Source Details

Program	Agency	Type	Description
Federal			
WIFIA	EPA	Loan	• Funding for Planning and Design (retroactive is okay) and Construction Activities. • Program provides for the reimbursement of incurred expenses. • Requires compliance with federal requirements (NEPA, AIS, Davis Bacon, etc.). • 49% of the eligible project costs; 51% match by agency (total federal funding < 80% of project cost). • Loan term is 35 years (or useful life of the project); Payments maybe deferred 5 years after substantial completion. • Single fixed interest rate set at closing. Rate is calculated by adding one basis point (0.01%) to the rate of securities of a similar maturity (based on the weighted-average life of the WIFIA Loan). • Customized repayment schedule to match anticipated revenues and expenses (typ. semi or annual installments). • Application fees apply (average $300,000-$700,000 pending reviews and legal negotiations). • Reserve requirement – 1 year. • Project completion in 5 years (preferred) up to 7 years. • Annual application cycle (April-July period).
WaterSMART Water and Energy Efficiency Grants	USBR	Grant	• Projects that result in quantifiable and sustained water savings, increase renewable energy use and improve energy savings, and support broader water quality sustainability benefits. • Two funding limits: $300,000 (typically for projects completed within a year or $1,000,000 (for projects to be completed in 3 years). • Match requirement of 75%.
Drought Resiliency Plans	USBR	Grant	• Funding to support the development of a Drought Management Plan or to update an existing Drought Management Plan. • Funding up to $200,000. • Match requirement of 50%.
Drought Resiliency Projects	USBR	Grant	• Funding for the implementation of projects that build long-term resiliency to drought/reduce the need for emergency response actions. Projects must be identified in a Drought Contingency Plan or similar. • Two Funding: Group 1 $300,000 (complete in 2 years); Group 2 $750,000 (complete in 3 years). • Match requirement of 75%.
Water & Waste Disposal Pre- development Planning Grants	USDA - Rural Develop.	Grant/ Loans	• Funding assistance for low-income communities for initial planning and development of applications for USDA Rural Development Water and Waste Disposal programs. • Population must be less than 10,000 people. • Median household income below the poverty line or less than 80% of the statewide non-metropolitan median household income. • Maximum grant amount of $30,000 or 75% of the predevelopment planning costs. • Match Requirement: 25% cost share from applicant or third-party sources.
Rural Water Loan Fund (RWLF)	USDA - National Rural Water Assoc.	Loan	• Program provides small water and wastewater utilities with low-cost loans for short-term repair costs, small capital projects, or pre-development costs associated with larger projects. • Maximum loan amounts $100,000 or 75% of total project cost, whichever is less. • Below market interest rate. • Maximum repayment period of 10 years.

Program	Agency	Type	Description
State			
State Drinking Water State Revolving Fund Loan Program (SRF)	Utah DEQ - Utah Division of Water Quality	Loan	• Funding for Planning, Design, and Construction activities for public water systems to finance the cost of infrastructure projects. • Requires compliance with federal requirements apply (NEPA, A&E Procurement, AIS, Davis Bacon, and others). • Interest rate varies 2-4% and based on community. • Loan term – 20-40 years or life of project (pending Disadvantaged Community etc.) rkempe@sbcglobal.net. • Up to 18 months prior to first repayment. Annual payment schedule. • One-time origination fee of 1% (normally paid at closing). • Debt service reserve account – Required to deposit in the amount of one-tenth of the annual payment on the bond(s) purchased by the Board until the amount in the reserve fund is equal to the annual payment. • Capital Facilities Replacement Reserve account – 5% of agency's drinking water system's annual operating budget including debt service and depreciation until bond is redeemed. • No early pre-payment penalty. • On-going application cycle.
State Drinking Water SRF - Planning and Design Advances	Utah (DEQ) - Division of Water Quality	Grant	• Advances (loan forgiveness) for Planning and Design activities of SRF applicable projects. As the project progresses from the Planning to the Design and eventually construction phase, the advances are rolled into the SRF Construction loan for repayment. • No Match – however, if a match is provided, it demonstrates a strong community investment in the project under consideration. • Projects that do not proceed to design and/or construction are still required to repay the advance.
Green Project Reserve (GPR)	Utah (DEQ) - Water Quality Board and Division of Water Quality	Grant	• SRF grant funding for projects that include green infrastructure, water or energy efficiency improvements or other environmentally innovative activities. GPR projects must address water or energy efficiency, mitigate stormwater runoff, or encourage sustainable project planning, design and construction. • Loan principal forgiveness of 50% for construction costs and 75% for planning costs. • Program capacity is 20% of total SRF funds.
Financial Assistance Program - Revolving Construction Fund, Cities Water Loan Fund and Conservation and Development Fund	Utah Department of Natural Resources (Division of Water Resources)	Loan	• The Revolving Construction Fund, Cities Water Loan Fund and Conservation and Development Fund provide loan funding for projects that conserve, protect, or more efficiently use present water supplies, develop new water, or provide flood control. Cities Water Loan Fund provides assistance to districts for the construction of municipal water projects. Conservation and Development Fund helps finance large construction projects, like dams and large municipal drinking water systems. • Public entity. • Provides for zero to low-interest (around 3% or less) funding. • Loan term: less than 25 years. • Requires a 15-25% cost share (match) from applicant. • Grants are only provided for dam repair projects. • State funds so does NOT have to comply with federal compliance requirements.
Permanent Community Impact Fund	Permanent Community Impact Fund Board	Loans and Grants	• Provides loans and/or grants to state agencies and subdivisions of the state, which are or may be socially or economically impacted, directly or indirectly, by mineral resource development on federal lands. • Types of activities: planning, construction and maintenance of public facilities, and provision of public services. • Maximum award of $5,000,000 regardless of grant/loan mix. • Planning, study or design requests require 50% match (match has to have a demonstrated value).
Community Development Block Grants	Housing & Community Development	Grant	• *Small Cities Program* is targeted to assist in developing viable communities by providing decent housing and a suitable living environment and expanding economic opportunities, principally for persons of low and moderate incomes. • Grants to Cities of <50,000 or Counties <200,000. • Grants range $25,000 to $200,000.

Program	Agency	Type	Description
Other			
Wattsmart Business Program	Rocky Mountain Power	Grant	• To provide planning and design advances to communities in need of assistance (e.g., when the cost of water or wastewater improvements increase rates above 1.4% MAGI). These advances turn into grants and do not need to be repaid.
Private Equity Funding	Private Industry/ Company	Loan	• Ridgewood Infrastructure – private investment group which partners with public agencies to provide private equity for water and energy infrastructure in the United States. • Provides financing for planning, design and construction. Full or specific aspects of projects. • Project costs minimum is $50M-$200M; can fund CICWCD Project. • Loan term flexible – 20-30-year note. • Repayment structure is flexible to fit CICWCD needs (semi-annual or annual); can repay interest only or interest and capital. • Interest rate is comparable to the market rate (8-10%). • No early payment penalty. • No strings or requirements (e.g. NEPA, federal requirements, etc.). • Ridgewood would be more involved in project design, construction and potentially operations (could be P3 or hybrid). • Potential conflict with other funding sources due to private financing.
Water Infrastructure Restricted Account (WIRA)	Utah Governor's/Legislature/ Bonding Bill/Budget	Loan	• Pursuit of project financing via Governors special projects or legislative action (via local State Representative) such as – *SB281 – Water Infrastructure Restricted Account (WIRA).*
Special Appropriation Act Projects	EPA	Grant	• Funds dedicated to project via a special appropriation. Difficult to secure.
America's Water Infrastructure Act 2018 Programs	EPA	Loans/ Grants	• Track to see what programs are funded through H.R. 3387 Drinking Water System Improvement Act of 2017. Pending appropriations there maybe potential funding programs for the CICWCD Project.