



## PUBLIC WORKS DEPARTMENT

MAYOR: Lauren McLean | DIRECTOR: Stephan Burgos

# MEMO

**TO:** Mayor and Council  
**FROM:** Steve Burgos, Public Works Director  
**CC:** Courtney Washburn  
**DATE:** 9/1/2020  
**RE:** Water Renewal Utility Plan: Recommended Approach

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### EXECUTIVE SUMMARY

This memo is the final memo in a series of six memos that Water Renewal Services will deliver to city council in order to provide background information on the elements that comprise the Water Renewal Utility Plan (Utility Plan). City council action on the Utility Plan will be requested based on the background information provided and the analysis summarized in this memo. The following memo outlines the evaluation process used to develop a recommended approach for the future of Boise's water renewal resources.

The Utility Plan is recommending a fundamental shift in the management of resources. Current, the city treats all used water it receives to a high level and then releases it in the Boise River to flow downstream without any further use by our community. This shift will include pursuing the use of recycled water in parts of the city to address the impacts of climate change and water scarcity and provide resiliency for our future. It will also include investing in approaches that enhance water quality and the Boise River's habitat to provide continued improvement for decades.

As described in previous memos, the public engagement process was central to helping us understand community expectations for their water resources. This process iteratively tested potential approaches to management of our water renewal resources that were informed by feedback from the community. The end result of these efforts were combinations of potential approaches, referred to as portfolios, that represented different ways of meeting the community's expectations.

Building on community engagement, a thorough business case evaluation (BCE) process was conducted. The BCE is a proven method for determining how to meet community expectations, financial and regulatory parameters and the capacity needs of our system, all at the lowest long-term cost. The process quantified the benefits and risks of each portfolio and evaluated them further using sensitivity analyses and scenario planning. This made the evaluation as accurate and resilient to future unknowns as

possible. Because of the evaluation process, the recommended approach is supported by a well-documented and extensive analysis.

The primary objectives of the Recommended Approach are to:

- Enhance the health and uses of the Boise River
- Reinvest in our existing infrastructure
- Support our local economy through industrial reuse
- Combat the pressures of climate change by adding recycled water to the aquifer for future use
- Balance affordability for our community

This approach is a steppingstone for the future, a scalable shift that adds recycled water capacity and provides flexibility to best manage our water in the future.

## **INTRODUCTION**

Water Renewal Services is fully committed to protecting public health, keeping the Boise River safe and clean, and planning for the future in a way that reflects our community's values. It is these principles that have guided the development of the Utility Plan to where we are today—a recommended path forward.

Over the last five weeks, memos have been presented to the city council describing the drivers for the Utility Plan (e.g. aging infrastructure, capacity demands, increasingly stringent regulatory requirements, and the impacts of climate change), outlining the extensive community engagement efforts to shape the planning effort, and describing how these investments could be funded. This information was used to craft the Utility Plan. The Utility Plan creates the long-term strategic direction for Water Renewal Services and will reinforce the city's position as a national environmental leader and innovator. The following pages outline the process we used to arrive at this recommendation and describe the benefits of the recommended approach.

## **BACKGROUND AND APPROACH:**

Working closely with the Advisory Group, which was described in the Public Involvement and Community Expectations memo, and drawing on extensive community outreach efforts, our general approach for developing the recommended plan included:

1. developing a list of potential investment options and using those to shape different types of project portfolios; testing those portfolios according to costs, benefits, and risks using a robust business case evaluation process combined with additional sensitivity and scenario planning analyses; and
2. selecting the portfolio that best meets community expectations.

These methods and what we learned are described in more detail below.



## Investment Option Summary

The community engagement process identified several priority areas for our community.

- Prioritize the health of the Boise River
- Maximize the environmental benefits of water use and recycling
- Decentralize assets to provide system resiliency
- Develop localized solutions that maximize resource recovery
- Create solutions for future generations
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The previous memo on public involvement and community expectations described the process used to narrow down options in the planning effort. A wide range of possibilities were initially presented to the public and then incrementally narrowed based on public feedback. After several rounds of feedback, the following options were developed in close coordination with a community advisory group. These options were used to shape portfolios for the Utility Plan and can be summarized as follows:

- **River Discharge:** Continues the city's current approach with renewed water being discharged to the Boise River.
- **Enhance the River:** Prioritizes investments that would enhance the health and uses of the Boise River beyond current regulatory requirements. This includes river restoration and additional treatment at the water renewal facilities. This would protect and preserve the river which is viewed as a vital social, environmental and economic asset to the community.
- **Industrial Reuse:** Provides recycled water to local industries for use at their facilities. This recycled water would offset the use of potable (drinking) water and support the city's economic development vision.
- **Aquifer Recharge:** Recharges groundwater with recycled water to provide a more resilient water supply. This would combat future water shortages and position Boise as a leader in climate change resiliency.
- **Local Food Production:** Utilizes recycled water to grow crops for local consumption. This would increase food resiliency and offset a portion of the irrigation demand on our existing water resources.
- **Closed-Loop System:** Maximizes the use of water within homes and businesses by providing recycled water to use multiple times for non-potable uses such as toilet flushing.
- **Decentralized Management:** Implements a "community-scale" water renewal process in targeted locations. These small water renewal facilities would produce recycled water for localized use at a neighborhood scale, such as for irrigation of parks or lawns.

## **Portfolio Summary**

Water Renewal Services used the options above to shape a series of different portfolios. A portfolio included a combination of investment options and was used to describe how and where the water would be renewed and ultimately used. The portfolios were developed on a spectrum that ranged from the least change to the most change.



On the least-change end of the spectrum was the “Status Quo” portfolio, which assumed pursuing continued river discharge for all renewed water while meeting capacity and regulatory requirements. On the other end of the spectrum was a portfolio that represented the most change from the status quo, incorporating all the investment options described above and producing the most recycled water. In between these , the differing factors between portfolios included the amount of water treated in each new or existing water renewal facility, the amount of renewed water distributed for various uses such as aquifer recharge or irrigation, and a centralized versus decentralized approach to capacity management. Finally, a “Do Nothing More” alternative was also considered to compare the risks of doing nothing to increase capacity or meet new regulations. This was not a viable alternative but was part of the analysis purely for comparison.

The portfolios were explicitly developed to test the tradeoffs of the community's stated interests. For example, the interest in local food production needs to be balanced with the cost to scale up to use a meaningful amount of water to be financially viable as a renewed water strategy. The interest in high volumes of recycled water also needs to consider the cost of reducing or eliminating use of existing infrastructure.

Excluding the “Status Quo” and “Do Nothing” options, which do not meet community expectations, the portfolios evaluated can be summarized as follows:

- **Portfolio A:** Most closely represents combined advisory group feedback and incorporates all options
- **Portfolio B:** Delivers recycled water for new capacity only
- **Portfolio C:** Focuses on scaling local food production
- **Portfolio D:** Most closely represents combined advisory group feedback without neighborhood-scale solutions

Following the completion of the community advisory group, two additional portfolios were added to the analysis to test how adding small, neighborhood facilities compare to focusing on our existing large assets:

- **Portfolio B.2:** Delivers recycled water on new capacity only, without neighborhood-scale solutions
- **Portfolio C.2:** Focuses on scaling local food production without neighborhood - scale solutions

## **ANALYSIS AND ADAPTATION:**

### **Business Case Evaluation Process**

The business case evaluation process is a proven method that Water Renewal Services has used on many planning activities to objectively compare project alternatives. The



evaluation process integrates community expectations as the foundation of the evaluation, quantifies future risks and benefits, and focuses on total cost of ownership. The process also allows for adjustments over time to meet changing conditions and delivers the least total cost while meeting community expectations.

Figure 1, below, presents the total expected cost for each of the portfolios considered including risks and benefits. Notably, Portfolio B.2, which prioritizes shifting newly added capacity towards recycled water, has the lowest expected cost. This result is driven by several factors:

- Portfolios B and B.2 have the lowest capital cost, nearly 25% lower than the next closest portfolios (see Figure 2).
- Portfolios that prioritize sending more water to recycled water and aquifer recharge, such as Portfolio C.2, better manage regulatory risks (see Figure 3). However, the cost for implementing this must be balanced with increasing pressure on affordability for these options.
- Portfolios that provide more uses of the water, such as Portfolio A, bring with them higher benefits (see Figure 4). However, similar to the discussions on risks, these benefits must be balanced with the overall costs and the related pressure on affordability.

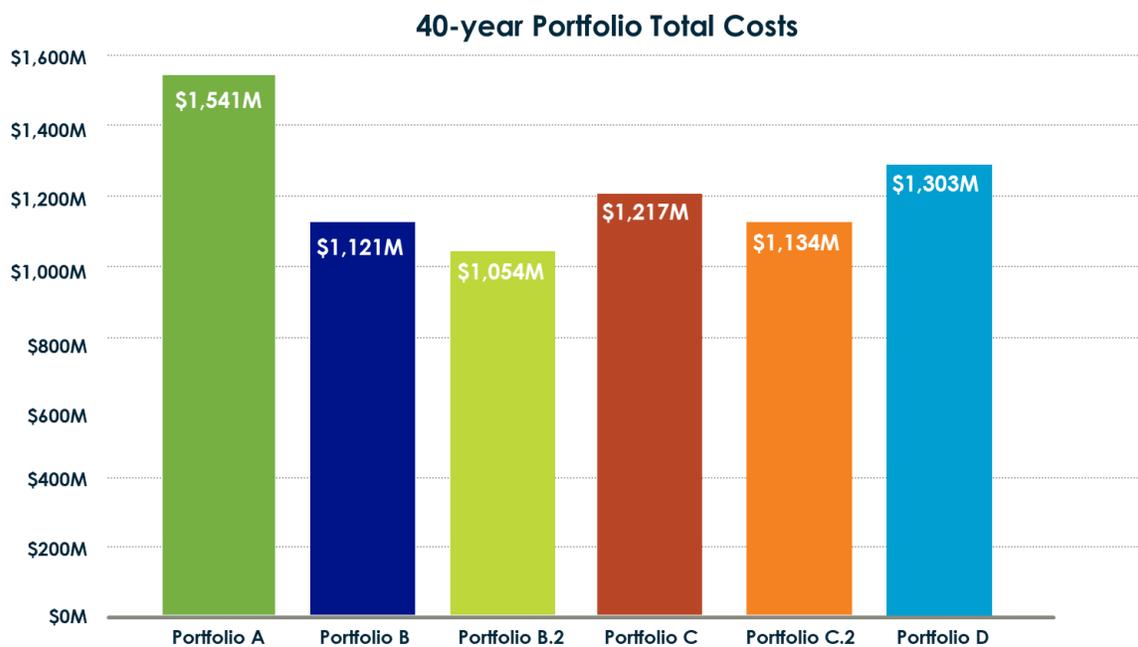


Figure 1. Business case evaluation results

### Total Capital Cost by Portfolio

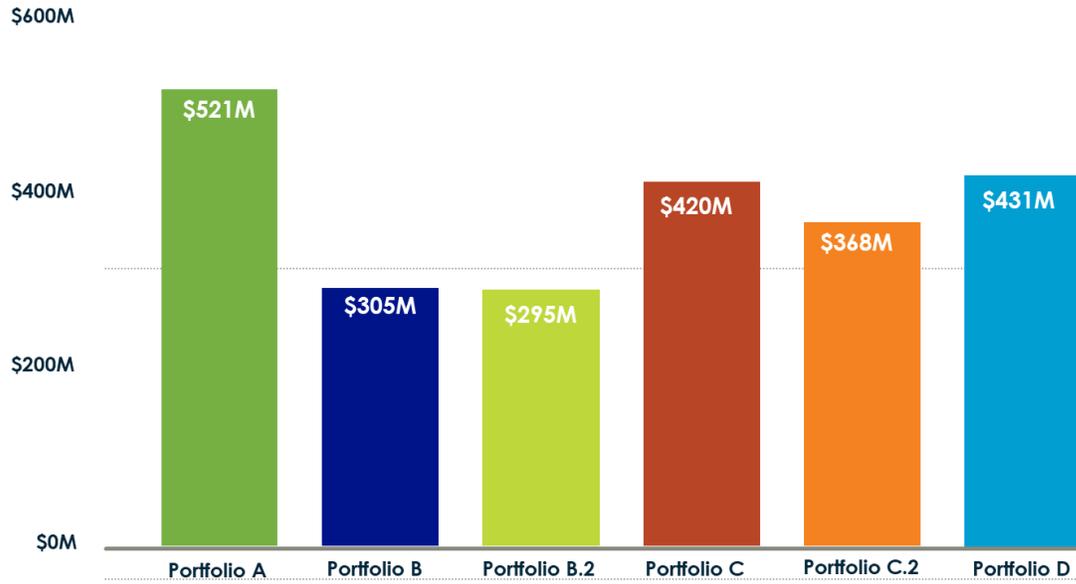


Figure 2. Total capital costs

### Total Risks

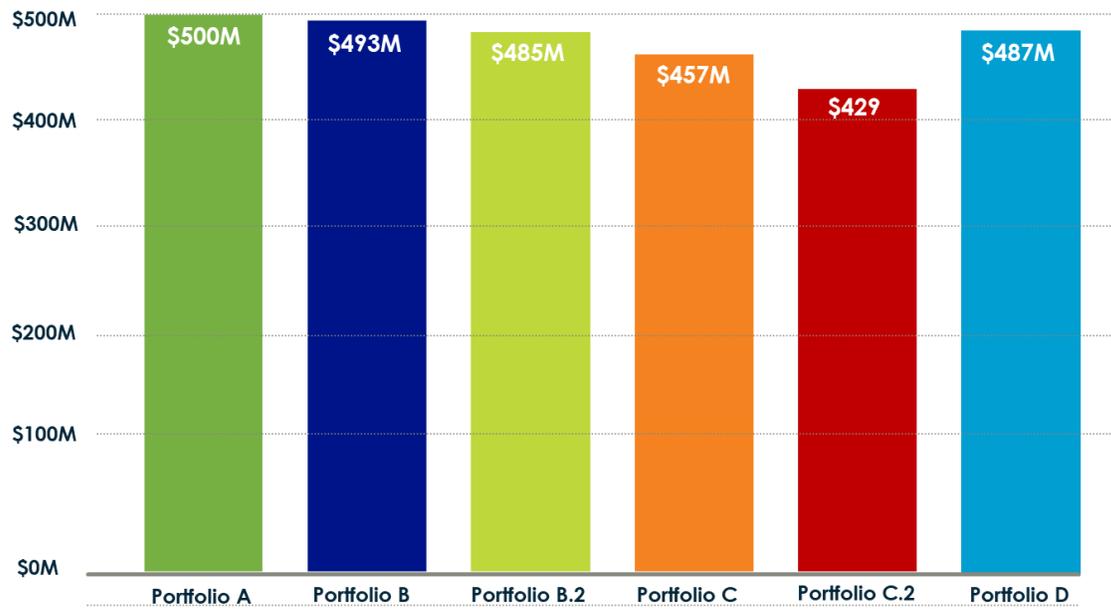


Figure 3. Total risks costs

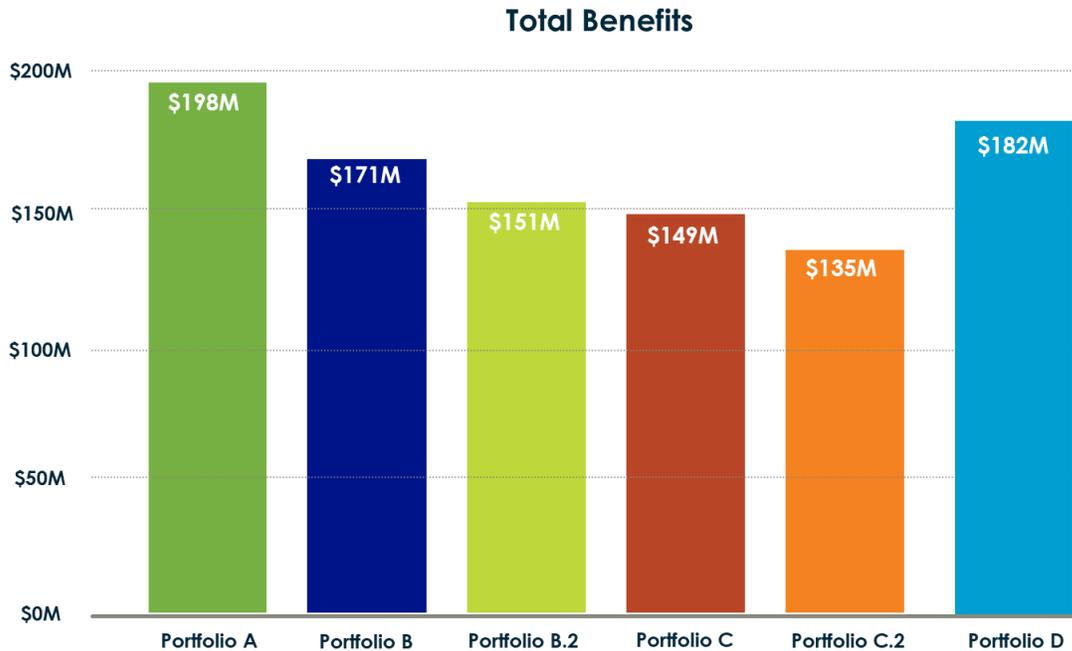


Figure 4. Total benefits

**Sensitivity Analysis and Scenario Planning**

Water Renewal Services conducted sensitivity analyses and scenario planning to evaluate each portfolio. These exercises tested our assumptions to ensure the Recommended Approach is as accurate and resilient as possible to future conditions. The magnitude and timing of these conditions is unknown, but the sensitivity analysis allows us to measure a range of outcomes based on what may occur. The sensitivity analysis tested the portfolios under the following conditions:

- Increasing and decreasing the expected capital costs
- Removing and doubling the value of the risks and benefits
- Increasing the value of groundwater relative to surface water
- Increasing and decreasing the likelihood of additional surface water regulations

Portfolio B.2 had the lowest total cost in all sensitivities, except if there were to be a decrease in discharge permit requirements which is unlikely to occur. However, the sensitivity on the value of groundwater provided interesting results. As the value of groundwater increases, the preferred portfolio shifted towards those that provide more recycled water (Portfolio C.2 and then Portfolio D). This is important to note because, as described later in this memo, Portfolio B.2 offers future flexibility. As the value of water increases, this portfolio allows for a shift to increase recycled water in the future.

Scenario planning tested the outcomes even further. Scenarios highlight different futures the city could see with climate change, evolving community priorities, an economic downturn, and continued growth. These scenarios are further described



below. Portfolio B.2 was preferred in each of these scenarios further reinforcing the results of the initial business case evaluation.

#### *Climate Change & Resiliency*

Boise experiences a drought and water becomes increasingly scarce. The value of surface water and groundwater increase drastically, but the value of groundwater increases three times more than surface water due to storage capabilities and year-round accessibility. Water rates also increase and cause affordability concerns within the city.

#### *Changing Community*

Boise sees changes in demographics and political views. Public priorities shift away from investing in groundwater resources and there is less willingness to pay for aquifer recharge and industrial reuse. Surface water becomes more valuable than groundwater and the affordability risk decreases with less focus on low-income customers. Keeping rates low is now the community's top priority, not environmental benefit.

#### *Economic Downturn*

Boise experiences an economic downturn. Affordability concerns increase with more people unable to pay their utility bills. The public becomes dissatisfied with Water Renewal Services undertaking projects outside of its primary function of treating and renewing used water. However, the downturn also produces more competition in the local construction market and makes capital projects less expensive.

#### *Continued Growth*

Boise continues to see economic and population growth. Construction costs increase, but population growth puts more pressure on groundwater supplies and increases the value of water. The public is more supportive of Water Renewal Services and projects that raise the levels of service such as aquifer recharge and river enhancement.

### **RECOMMENDED APPROACH: A PLAN FOR BOISE, BUILT BY BOISE**

The planning effort encompassed in the Utility Plan considered a wide range of potential approaches to manage renewed water in our community. After years of technical analysis and community feedback, Water Renewal Services is proposing a shift in how renewed water is managed in Boise.

The Recommended Approach from the Utility Plan focuses new capacity on recycled water applications, specifically industrial recycled water and aquifer recharge. Additionally, community expectations suggest that investments should continue to be made that enhance the quality and use of the Boise River and go beyond meeting regulatory requirements. Figure 5 visually depicts the Recommended Approach with the emphasis on enhancing the Boise River, developing an industrial recycled water program, and pursuing aquifer recharge. This approach is presented as Portfolio B.2 in the previous sections.



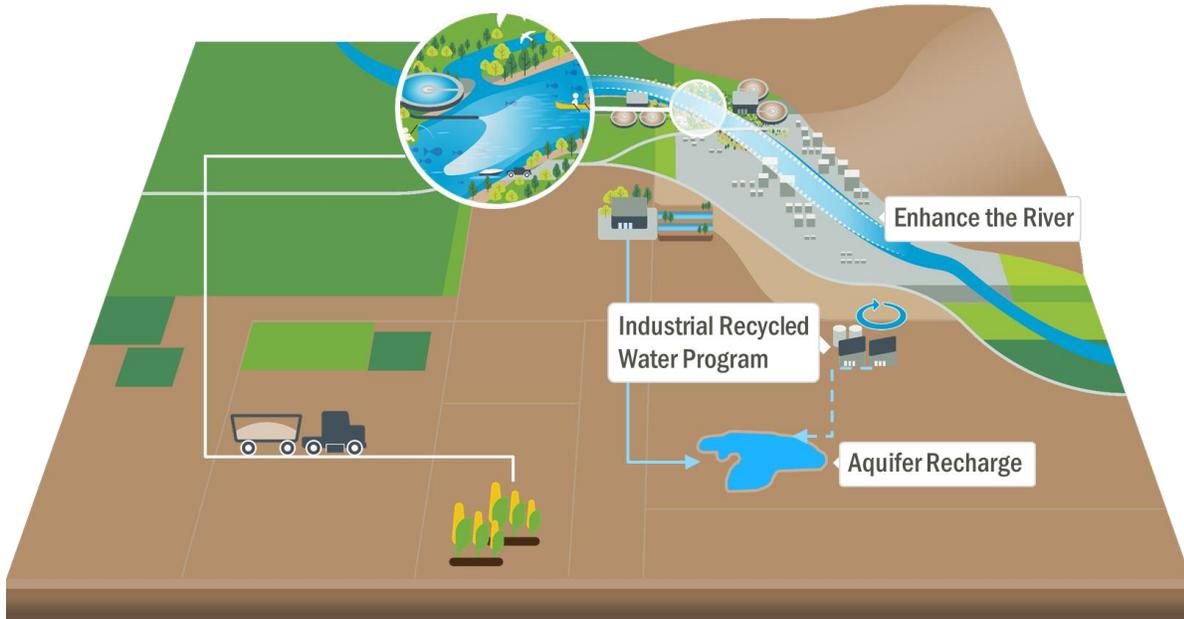


Figure 5. Recommended Approach overview

The Recommended Approach will manage and leverage growth in new ways. It is expected that proposed new water renewal facilities would be built closer to where growth is projected to occur and closer to areas for aquifer recharge and industrial reuse (see Figure 5). This decentralized approach to water renewal management satisfies public concerns around centralized risk, makes better use of our water resources, and lowers the cost to transport recycled water to areas where it can be beneficially used. Utilizing the existing infrastructure at the Lander Street and West Boise Water Renewal Facilities also allows the city to maximize previous investments.

The Recommended Approach also positions the city to respond to future water challenges by diversifying what the city does with its renewed water. The results of the business case evaluation demonstrated that this approach is the best option to manage near and long-term risks. It also allows the city to be flexible to best manage water resources in the future as conditions continue to change. This plan can be viewed as a steppingstone that positions Boise to address future challenges without overinvesting in the near-term.

Inherent with the Recommended Approach is the commitment by the city to continue to be guided by community values. The development of the Utility Plan was built with over 2,700 interactions with the community. These efforts highlighted the community's expectations to protect the Boise River, diversify our uses of renewed water, and find

economic solutions to our challenges. The recommended approach is the embodiment of these expectations.

### **Advisory Group and Public Works Commission Feedback**

Water Renewal Services has presented the Recommended Approach to both the community advisory group and the Public Works Commission. Some members of the advisory group thought the recommended approach did not go far enough to address future challenges but appreciated the city's work to balance cost and long-term benefits. The Public Works Commission saw the recommended approach as an evolution of the city's current approaches. Both groups fully endorsed the Recommended Approach and believe this should be the adopted direction for Water Renewal Services moving into the future.

### **CONCLUSION:**

The Utility Plan's Recommended Approach is a plan for Boise, built by Boise. It includes diversifying the uses of our water and enhancing the health and quality of the Boise River. This approach offers flexibility for the city to adapt its strategy as conditions change in the future. It allows for a scalable approach toward recycled water that will allow the city to efficiently expand its recycled water options as the value of water increases. Water Renewal Services believes this portfolio matches our community's values and will responsibly raise the level of service provided to our community for this and future generations.

### **REFERENCE DOCUMENTS:**

The following documents related to this topic are available upon request:

- Water Renewal Utility Plan

