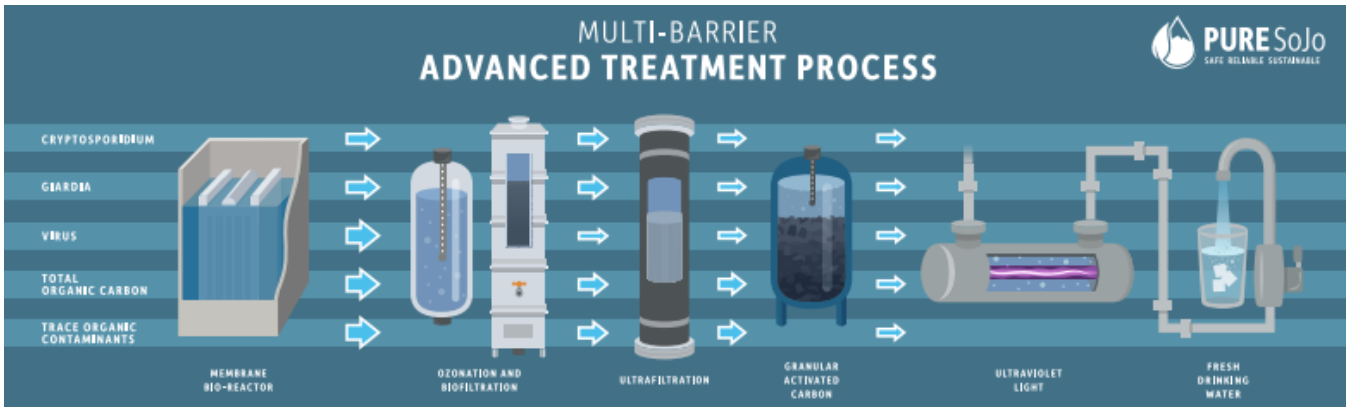
City of South Jordan

Water Reuse Feasibility Study



WaterSMART:
Development of Feasibility Studies under the Title XVI Water Recycling and Desalination Program for Fiscal Year 2023

Applicant:
City of South Jordan
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1. TECHNICAL PROPOSAL AND EVALUATION CRITERIA

1.1 Executive Summary

Date: February 28, 2023

Applicant Name: City of South Jordan

Applicant Unique Entity Identifier (UEI): JW5NL49AQ2N8

City, County, and State: South Jordan, Salt Lake, Utah

The City of South Jordan (City) is currently piloting a direct potable reuse (DPR) facility (PureSoJo) to determine if water recycling can and should be part of the City's future water supply. The City is interested in conducting a feasibility study and preparing pre-design for a full-scale DPR facility through the Bureau of Reclamation's WaterSMART program. The proposed Reuse Feasibility Study (Study) and pre-design will include a Title XVI feasibility study, preparation of preliminary cost estimates, development and evaluation of project alternatives, environmental and cultural resource compliance, and other pre-design efforts to support the recommended alternative. The Study will include investigating:

- Water supply needs in the project area including existing source supply, demand projections, and supply vs. demand comparison
- Water supply alternatives
- Economic, social, and financial challenges associated with water reuse
- Reuse treatment technology and water quality goals
- Conveyance requirements
- Permitting requirements and regulatory issues
- Cost estimates including equipment, O&M costs, and capital cost comparisons
- Potential environmental impacts
- Legal and institutional requirements

The proposed Reuse Feasibility Study and pre-design efforts are anticipated to take a maximum of 24 months. If the study begins in December of 2023, the project is expected to be completed by the end of November of 2025. The proposed planning efforts are not for a project on a federal facility, and do not include a federal facility or the use of federal land. No grant funds will be used to construct or operate a pilot; the City has paid for, and will continue to pay for, the pilot themselves.

1.2 Project Location

South Jordan is one of the fastest growing cities in the state of Utah. It is located in the southwest area of the Salt Lake Valley and is home to approximately 80,000 residents. It covers an area of approximately 22 square miles and has grown rapidly since 1960, when the City had a population of 1,345. As of July 2021, the United State census estimated the population to be

80,139. With about 30% of the City's total land area still undeveloped, the City is expected to continue growing. Forecasts presented in South Jordan's General Plan indicate that the City will reach 32,000 housing units by 2030. The project population in 2030 is anticipated to be approximately 95,000. The total build-out estimate for households in South Jordan is 35,785 and the corresponding population will be just over 106,000. Figure 1 displays the city limits for South Jordan and facilities relevant to the project.

Figure 1 – Project Location

The City of South Jordan buys 100% of its water from the Jordan Valley Water Conservancy District (JVWCD) and has no local potable water source of its own. Most drinking water for the City is supplied from the Jordan Valley Water Treatment Plant (JVWTP) approximately 7 miles southwest of the city. The underground aquifer in the area is contaminated, and JVWCD has an additional groundwater treatment plant that treats this source to supplement surface water supplied by the JVWTP.

South Jordan has always made it a top priority to provide clean, safe, drinking water to its residents and businesses. As population continues to grow, the City wants to properly plan and develop their own future water supply by investigating other sources. The City designed, constructed, and is operating, a pilot for a DPR treatment facility called PureSoJo. PureSoJo involves purifying reclaimed water to meet and exceed drinking water standards. The pilot project will be used to demonstrate advanced water purification technology that may be part of the answer to long-term water supply needs for the City.

In the pilot, approximately 10 gallons per minute (gpm) of reclaimed water from the Jordan Basin Water Reclamation Facility (JBWRF), owned and operated by South Valley Sewer District (SVSD), is treated through an advanced purification process that produces water that meets drinking water standards. JBWRF is located in Bluffdale, Utah, on the southern end of the Salt Lake Valley and approximately 5 miles south of the City of South Jordan. The facility is finished and has been running since March 2022. The City has been working closely with the State of Utah Division of Drinking Water (DDW) and Division of Water Quality (DWQ) on this project. DDW has issued a special permit for the City to operate this project and purify the reclaimed water for demonstration purposes.

1.3 Technical Project Description

The City will perform the following tasks as part of this Project:

- Task 0, Grant Management: City staff will manage the project and administer the grant, including all reporting and invoicing requirements.
- Task 1, Project Management: City staff will competitively select a qualified engineering firm or firms to conduct the Study, prepare environmental and cultural compliance documents, and perform Pre-Design for the recommended alternative. The purpose of this task is to manage the project, including scope, schedule, budget, and Project requirements.
- Task 2, Reuse Feasibility Study: The selected engineering firm(s) will prepare a feasibility study meeting the requirements defined under section 1604 of Pub. L. 102-75 and conforming to the suggested outline found in WTR 11-01.
- Task 3, Environmental and Cultural Compliance: The selected engineering firm(s) will prepare documents to address environmental and cultural compliance.
- Task 4, Pre-Design: The selected engineering firm(s) will prepare Pre-Design for the recommended alternative to provide further definition of the Project and to support a detailed Class 3 cost estimate per Association for the Advancement of Cost Engineering (AACE) guidelines.

The Work will take 2 years and approximately $1,487,808 to complete. The City is seeking 50 percent of the total project cost, or $743,904, from the Bureau of Reclamation funding opportunity number R23AS00076, WaterSMART: *Water Recycling and Desalination Planning*. Title XVI funds would enhance South Jordan's Study by facilitating more robust analysis evaluating water market conditions, water rights, climate change, and water treatment technologies with low energy consumption.

1.3.1 Task 0, Grant Management

City staff will manage the project and administer the grant, including all reporting and invoicing requirements. This task will span the duration of the project (2 years) and has an anticipated budget of $67,987. These costs will be an in-kind contribution by the applicant as part of the City's non-federal cost share. The City is seeking 50 percent of the task cost, or $33,993.

1.3.2 Task 1, Project Management

City staff will competitively select a qualified engineering firm or firms to conduct the Study, prepare environmental and cultural compliance documents, and perform Pre-Design for the recommended alternative. This task will span the duration of the project (2 years) and has an anticipated budget of $129,160. The City is seeking 50 percent of the task cost, or $64,580.

1.3.3 Task 2, Feasibility Study Scope of Work

The Study will be conducted and drafted to meet the requirements of a feasibility study as defined under section 1604 of Pub. L. 102-75 and will conform with the suggested outline found in WTR 11-01. This task will take approximately 12 months to complete and has an anticipated budget of $152,730. The City is seeking 50 percent of the task cost, or $76,365.

The study is anticipated to include the following sections and information:

- Section 1 – Introduction
    - Identification of the non-Federal project sponsor(s).
    - Description of the study area and an area/project map.
    - Definition of the study area.
- Section 2 – Statement of Problems and Needs
    - Description of the problem and need for water recycling.
    - Description of current and projected water supplies and demands.
    - Description of any water quality concerns.
- Section 3 – Water Recycling Opportunities
    - Description of all uses for reclaimed water, or categories of potential uses.
    - Description of the water markets available to utilize reclaimed water.
    - Discussion of considerations which will prevent implementing a water reclamation or recycling project.
    - Identification of all the water and wastewater agencies that have jurisdiction in the potential service area or over the sources of reclaimed or recycled water.
    - Description of potential sources of water to be reclaimed or recycled.
    - Description and location of the source water facilities.
    - Description of any current water reclamation or recycling in the area.
    - Summary of any water reclamation or recycling technology currently in use in the study area, and opportunities for development of improved technologies.
- Section 4 – Description of Alternatives
    - Description of the non-Federal funding condition and the reasonably foreseeable future actions that would be taken if Federal funding were not provided.
    - Statement of the objectives all alternatives are designed to address.
    - Description of the proposed water reclamation or recycling project.
    - Description of waste-stream discharge treatment and disposal water quality.

    - Description of one or more alternative technologies.
- Section 5 – Economic Analysis
    - Description of the conditions that exist in the area and projections of the future with, and without, the project.
    - Cost comparison of alternatives.
    - Description of other water supply alternatives considered.
    - Description of project benefits.
- Section 6 – Selection of the Proposed Water Recycling Project
    - Justification of why the proposed project is the selected alternative.
- Section 7 – Environmental Consideration and Potential Effects
    - Information required for NEPA, and any other applicable Federal Laws.
- Section 8 – Legal and Institutional Requirements
    - Analysis of any water rights issues and the resolution.
    - Discussion of legal and institutional requirements.
    - Discussion of the need for multi-jurisdictional or interagency agreements.
    - Discussion of permitting procedures required.
    - Discussion of any unresolved issues associated with the project.
    - Identification of current and projected wastewater discharge requirements.
    - Description of rights to wastewater discharges.
- Section 9 – Financial Capability
    - Proposed schedule for project implementation.
    - Discussion of the City's financial ability to support the project.
    - A plan for funding the proposed water recycling project's construction, operation, maintenance, and replacement costs.
    - Description of all Federal and non-Federal sources of funding.
- Section 10 – Research Needs
    - Description of research needs associated with the project.
    - Description of the basis for Reclamation participation in the research.
    - Identification of the parties who will administer and conduct research.
    - Identification of the timeframe necessary for completion of necessary research.

1.3.4 Task 3, Environmental and Cultural Compliance

The selected engineering firm(s) will prepare documents to address environmental and cultural compliance. This task will take approximately 6 months to complete, will overlap with Task 4, Pre-Design, and has an anticipated budget of $79,080. The City is seeking 50 percent of the task cost, or $39,540. Subtasks include:

- Detailed environmental review of the recommended alternative's impacts on the Great Salt Lake as required by State code.
- National Environmental Policy Act (NEPA) clearance; assumes the BOR will be the lead agency. A CATEX is anticipated for work at the WRF and a FONSI is anticipated for conveyance work.

1.3.5 Task 4, Pre-Design

The selected engineering firm(s) will prepare Pre-Design for the recommended alternative to provide further definition of the Project and to support a detailed Class 3 cost estimate per Association for the Advancement of Cost Engineering (AACE) guidelines. This task will take approximately 12 months to complete, will begin after Task 2, Reuse Feasibility Study, and has an anticipated budget of $944,420. The City is seeking 50 percent of the task cost, or $472,210. Subtasks include:

- Basis of Design Report (BODR) for the recommended alternative. The BODR will further define WRF operational data (water quantity and quality), siting and conveyance options (alignment study), design criteria, and implementation plan.
- Pre-Design, DRAFT (30% submittal). Pre-Design Report (PDR) adding further definition to the BODR, drawings (select general, civil, structural, electrical, and process & instrumentation diagrams [P&IDs]). A Class 3 cost estimate will be prepared and submitted to the City for review with the Pre-Design Documents.
- Pre-Design, FINAL (30% submittal). Review comments will be addressed as the draft documents are revised and finalized.

1.3.6 Applicant Category

South Jordan is seeking $743,904 in federal funds under Funding Group I.

1.3.7 Eligibility of Applicant

The City of South Jordan is a municipality (local authority) located in Utah meeting the eligibility requirements under Funding Group 1. The City is requesting funding for the planning, preliminary design, preliminary cost estimates, and environmental compliance of a full-scale DPR facility and has the financial capability to cost-share 50 percent of the total project costs with the BOR. The cost share will be made through cash and costs contributed by the City. The City council has authorized this project and has passed an official resolution approving this application.

The reuse feasibility study will include site-specific analysis to gather design data for the development and evaluation of project alternatives. The reuse feasibility study will not include any ground disturbing activities or construction and will not fund pilot or demonstration testing of treatment processes.

1.3.8 Goals

The City's goal is to maintain a high-quality, sustainable water supply for today's community and future generations. The City has initiated this effort to address the following water supply concerns:

- The City does not currently own any water rights and purchases all water from JVWCD.
- Increasing population densities in the City's service area over time will require more water, more efficient use of water, and an expanded portfolio of alternative water supplies.
- The City has also experience periodic prolonged droughts in the past during which water supply sources were threatened and natural systems experienced added stress.

The goals of this project are as follows:

- Prepare a water reuse feasibility study
- Develop and analyze potential project alternatives
- Prepare construction cost estimates; annual operation, maintenance, and replacement cost estimates; and life cycle cost estimates
- Review the preferred selected alternative for environmental and cultural resource compliance
- Prepare a preliminary design

1.3.9 Approach

The approach for the development of this reuse feasibility study will include the following actions:

- Identify problems and needs
- Identify potential water recycling opportunities
- Develop project alternatives
- Perform an economic analysis
- Select the proposed water recycling project
- Consider potential environmental effects
- Review legal and institutional requirements
- Prepare a funding plan
- Identify research needs
- Prepare draft report for review
- Final Report Approval

Funding from the BOR would enable a substantially more robust analysis relating to the project rationale and justification work, specifically enhancing the study in the following areas:

- Developing a water market value impact study.
- Evaluating methods acceptable to the Utah Division of Water Rights to create and account for the necessary water rights.
- Evaluating if direct potable reuse enables the region's water resource portfolio with greater resiliency with respect to climate change.
- Evaluating less energy-intensive water treatment technologies suitable for DPR, compared to reverse osmosis.

1.4 Evaluation Criteria

1.4.1 Evaluation Criterion 1 – Project Planning and Analysis

1.4.1.1 Subcriterion 1a – Water Recycling Needs and Opportunities

Points will be award based on the extent to which the proposal demonstrates that the planning activities will explore opportunities for water reclamation and reuse in the area.

1. *Describe the problems and needs in the project area.*

South Jordan is home to over 80,000 residents and this population is expected to grow to 95,000 by 2030. The City does not currently own any water rights and purchases all water from JVWCD. Increasing population densities in the City's service area over time will require more water, more efficient use of water, and an expanded portfolio of alternative water supplies (groundwater, storm water, non-potable reclaimed water, and potable reuse). The City has also experienced periodic prolonged droughts in the past during which water supply sources were threatened and natural systems experienced added stress. Development of water reuse projects is a vital part of South Jordan's strategy to meet the water demands required by this expanding population.

Raw water supplied to JVWCD primarily comes from reservoirs which are filled by snowpack accumulated during the winter season. Although the regional effects of climate change are uncertain, experts predict more frequent and extended drought periods and a transition to lower snowpack on average and earlier spring runoff. The potential shift in precipitation patterns and earlier runoff may have dramatic impacts on future water planning due to the effects on water storage and quality.

2. *Describe the current and projected water supplies and demands in the project area; include a discussion on supply and demand imbalances. Additional consideration will be given to proposals that explain how the problems and needs in the area may be impacted by climate change, and/or if supply and demand projections will include climate change information.*

In addition to the challenge of providing water for a rapidly expanding population, the City is engaged in an effort to better understand how climate change will affect the existing water supply. The most significant water management impacts due to climate change will be the shift to an earlier runoff and possibly a reduced runoff volume, which threaten a water supplier's ability to meet constant summer demands. Water reuse has been identified by the City as a relatively drought resilient water supply and is therefore of interest to help meet water demands during future droughts.

The minimum annual volume of water that South Jordan City has agreed to purchase from JVWCD is 16,333 acre-feet. This represents the minimum volume of water that must be purchased by South Jordan City from JVWCD annually. The contract also has a provision which

allows South Jordan to exceed the minimum contract volume by 20 percent, if additional water is available. Adding 20 percent to the minimum contract volume brings the maximum volume to 19,600-acre feet. Based on the contract, the minimum volume will increase to 17,166 acre-feet in 2024 and 18,000 acre-feet in 2025. The annual water use for South Jordan is displayed in Figure 2 provided from the City's 2017 Drinking Water Master Plan and city data from the past five years.

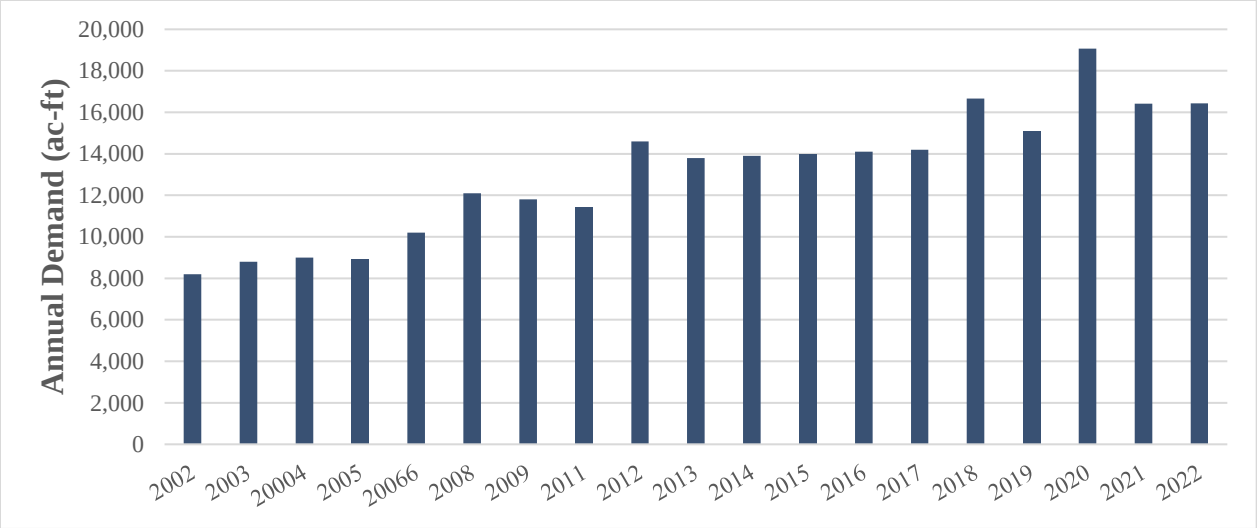

Figure 2 – South Jordan Annual Water Demand

Per the 2017 Drinking Water Master Plan, the average yearly drinking water demand requirement at build-out is projected to be 22,000 acre-feet. With contract minimum set to increase to 18,000 acre-feet in 2025, South Jordan will need to adjust their contract with JVWCD periodically in order to increase the amount of water that will be available to the City or pursue alternative water sources. Relying on JVWCD as the sole water-provider for the City has a level of uncertainty in the estimated quantities due to susceptibility to drought and climate change, and/or other potential environmental impacts. Direct potable reuse can be an effective method of increasing supplies in drought years and addressing the shift to earlier surface water runoff that is predicted with climate change.

3. *Describe how the planning activities will investigate potential uses and markets for reclaimed or desalinated water (e.g., environmental restoration, fish and wildlife, groundwater recharge, municipal, domestic, industrial, agricultural, power generation, and recreation)*

The Study will focus on direct potable reuse of reclaimed water to help meet the projected future municipal water demands for South Jordan. The market for reclaimed water in Utah is becoming more and more important as the population increases, and prolonged droughts continue. Many think the answer is to build more reservoirs, longer pipelines, and import additional water to the region. Understanding other, less expensive, options is key to this project. The City has made strides to educate its customers and to help users understand their water consumption and make

efforts to conserve. In the past, water reuse has been limited in Utah because of factors like public perception, water rights laws, and the cost to treat and deliver the water.

The requested feasibility study will allow South Jordan to develop an outreach effort to assure the public that the water is safe. It will also allow for an in-depth evaluation of the water rights and what will be required to reuse water. Cost estimates will be developed to better understand the cost of additional infrastructure needed at JBWRF and for the delivery system to get recycled water to the City's distribution system. The City feels that there is sufficient demand for recycled water that all of the water available could be used within their system.

4. *Describe the source water that will be considered for the project, including location, capacities, existing flows, treatment processes, and quantities of impaired water available to meet the new reclaimed, recycled, or desalinated water demands.*

The proposed DPR facility will treat reclaimed water from the Jordan Basin Water Reclamation Facility, located in Bluffdale, Utah, approximately five miles south of South Jordan. The JBWRF is a membrane bioreactor (MBR) treatment plant that incorporates biological phosphorus and nitrogen removal and micro-filtration. Disinfection is provided by an ultra-violet disinfection system. The 30-day average design flow of phase one of the water reclamation facility is 15 mgd with a peak hourly flow of 27 mgd. At build out, the facility will have a capacity of 30 mgd.

1.4.1.2 Sub Criterion 1b – Evaluation of Project Alternatives

Points will be award based on the extent to which the proposal demonstrates that the planning activities will develop and evaluate project alternatives.

1. *Describe the objectives that all alternatives will be designed to meet. What other water supply alternatives and project alternatives will be investigated?*

The objective of this project is to determine alternative water supplies for South Jordan that will assist in meeting the growing demands of the City. The study will utilize BOR funding to greatly broaden the DPR evaluation to include water rights, water markets evaluation, energy consumption, and climate change. These additional efforts require collaboration with multiple entities including JBWRF and JVWCD. This approach allows DPR to be more completely evaluated based upon viability, capital and operating costs, regional benefits, obstacles, public engagement, environmental impacts, etc.

Other water supply alternatives that may be investigated include indirect potable reuse, meeting irrigation demands with reclaimed water, treating lower-quality surface water, and treating impaired groundwater. The non-Title XVI alternative to be evaluated is increasing the water purchase agreement with JVWCD and continuing to rely on the water district as the sole water source for the city.

2. *Describe how the planning activities will develop project alternatives (water supply sources, reuse strategies, or treatment technologies) that have been or will be investigated.*

The proposed Study will include a cost-benefit analysis that will assist in identifying the alternatives that will be most effective. The alternatives will be evaluated by the following criteria:

- Cost per volume of water delivered
- The ability of the alternative to delay the need for additional water supplies
- Reliability of the water supply to offset or augment existing supplies (e.g., drought resistance, demand hardening)
- Project risk (e.g., associated with permitting and public acceptance uncertainties)
- Environmental impacts
- Energy efficiency

3. *Provide a general description of the selected project, including project features, benefits, anticipated costs, and analyses conducted.*

The selected project is a full-scale DPR facility that will treat effluent from the JBWRF. It is expected that intercepting flow within the JBWRF and prior to the discharge point will allow the City to use its consumptive water right on the treated effluent, which will be further coordinated with the Utah Division of Water Rights (DWRi) State Engineer. The proposed process train for the pilot facility was specifically designed to meet all applicable drinking water quality standards without reverse osmosis and the associated challenges of inland brine disposal.

The facility will be a permanent advanced water treatment system that receives unchlorinated, UV-disinfected MBR permeate from the JBWRF, which currently discharges to the Jordan River. The pilot facility includes ozone, biologically active filtration (BAF), ultrafiltration, granular activated carbon, and UV disinfection. The treatment process for the pilot facility is displayed in Figure 3. Sampling and analyses are being conducted for regulated contaminants with established maximum contaminant levels (MCLs), disinfection byproducts (DBPs), and pathogens. In addition, unregulated contaminants that are present in wastewater such as pharmaceuticals and personal care products (PPCPs), consumer chemicals, coatings, flame retardants, and others with potentially negative health impacts have been included in the sampling plan.

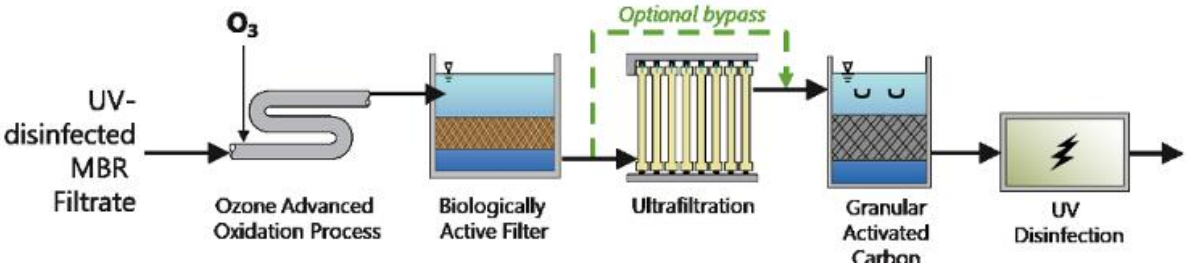

Figure 3 – Demonstration Facility Process Flow Diagram

The feasibility study will analyze the full-scale implementation of a DPR facility to utilize reclaimed water to meet the growing water demands of the City. Recycling water from the

JBWRF provides a drought-resistant water supply to the City that will not add additional strain to natural water systems in the region. This project can also assist in developing a regulatory path forward for direct potable reuse regulations for the State of Utah and encourage the development of additional DPR facilities throughout the state. The pilot facility is incorporating a public outreach program by offering tours and educating the public on potable reuse.

A planning level cost estimate was developed for a full-scale DPR facility. These estimates of probable cost of construction are considered Class 5 "Concept Screening" estimates. The expected accuracy range for Class 5 is within +100 percent to -30 percent. The full-scale cost estimate is for a 1-mgd DPR facility and is presented in Table 1.

Table 1 – Full Scale DPR Facility Estimated Construction Cost

Item	Description	Total
00	General Conditions(1)	$ 794,000
01	Sitework & Yard Piping	$1,190,000
02	DPR Bldg - CMU Block, Metal Roof, and HVAC	$2,125,000
03	Process Equipment, Piping and Installation	$2,833,750
04	Electrical, Instrumentation, Controls and Installation	$992,000
	Total Direct Cost(2)	$7,935,000
	Contingency (40%)(3)	$3,174,000
	Escalation to Mid-point (3%)(3)	$238,000
	General Contractor OH&P (15%)(4)	$1,702,000
	Bid Market Allowance (5%)(5)	$567,000
	Total Estimated Construction Cost	**$13,616,000**
	Engineering, Permitting and Administration (20%)	$2,723,000
	Total Estimated Project Cost	**$16,339,000**

Notes:
(1) Includes contractor administrative costs, bonds and insurance, materials testing, scheduling, site supervision, project management, mobilization/demobilization.
(2) Summary of items 00, 01, 02, 03, 04.
(3) Applied to Total Direct Cost.
(4) Applied to sum of Total Direct Cost and Contingency.
(5) Applied to sum of Total Direct Cost, Contingency and General Contractor OH&P.
(6) Sales Tax is not included.

A pre-design report was completed for the DPR demonstration facility which outlined the project goals for reuse in South Jordan and water quality requirements for a direct potable reuse pilot. A variety of water quality goals were evaluated including wastewater pathogen loading, regulated chemical constituents, disinfection byproducts, and unregulated constituents. The source water from the JBWRF was assessed and the process train for the demonstration facility was chosen. The necessary monitoring systems and a detailed sampling plan were also developed.

4. *Include a preliminary schedule showing major tasks, milestones, and dates for the planning, design, and construction activities related to the project.*

The City anticipates the feasibility study and pre-design efforts to extend through 2025. BOR funded activities will occur and be completed within 24 months to comply with the funding requirements. The proposed schedule is displayed in Figure 4. Note that the schedule will slip to match funding; no work will begin until funding has been awarded.

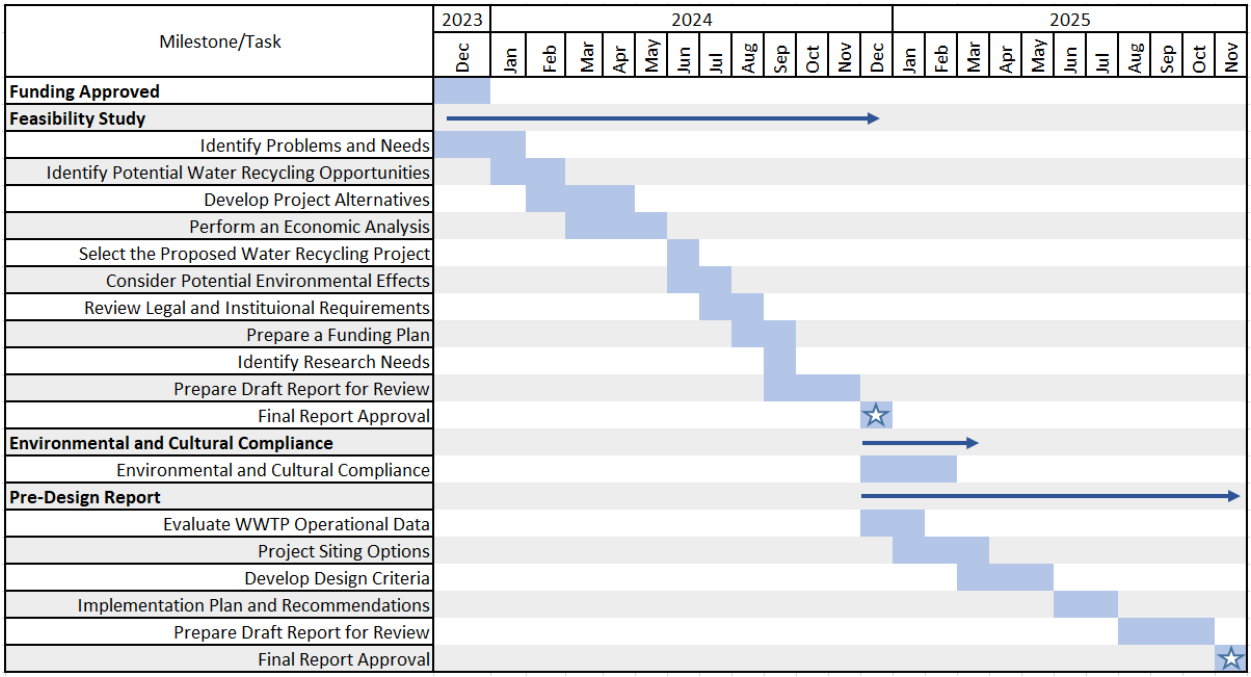

Figure 4 – Preliminary Project Schedule

1.4.2 Evaluation Criterion 2 – Stretching Water Supplies

Points will be award based on the extent to which the project being investigated will help to secure and stretch water supplies and contribute to a more sustainable water supply.

1. *Describe the potential for the project to reduce, postpone, or eliminate the development of new or expanded non-recycled water supplies.*

Forecasting through 2065 predicts that JVWCD will need additional water sources to meet growing regional demand, including construction of new pipelines, expansion of existing treatment facilities, construction of new treatment facilities, and implementation of wastewater reuse. By 2050 it is estimated that JVWCD will need to begin importing additional water to meet future demands. To meet projected water demands, JVWCD is engaged with other water districts in planning for the Bear River Development Project. The Bear River Project will divert and store water from the Bear River in northern Utah and ultimately transfer up to 100,000 acre-feet annually. Due to the high cost and other impacts of the Bear River Project, the Districts wish to postpone the project as long as possible. Water reuse has been identified as a critical water supply component to be developed before the Bear River Project is initiated.

Developing recycled water supplies can create more drought resilient sources and reduce the demand on non-recycled water supplies. Construction of a DPR facility for South Jordan would reduce the amount of water they are purchasing from JVWCD, which would reduce the need to import drinking water.

2. *Describe the potential for the project to alleviate pressure on existing water supplies and/or facilities. Please describe the existing water supplies, identify the supplies and/or facilities that will be impacted and explain how they will be impacted by the Project, including quantifications where applicable.*

Surface water sources used by JVWCD come primarily from the Provo River Watershed that begins in the Uinta Mountains with several Upper Provo Reservoirs which feed the Provo River. Water from the river is stored in Jordanelle Reservoir, which is part of the Central Utah Project, and Deer Creek Reservoir, which is part of the Provo River Project. Approximately 10% of JVWCD's supply is groundwater pumped from the underground aquifer, using wells located primarily in the southeast portion of the Salt Lake Valley. There are a limited number of potential new sources of water which can be developed; however, doing so will be expensive both financially and environmentally. The current water supply for JVWCD is summarized in Table 2, provided from the JVWCD 2019 Conservation Plan Update.

Table 2 – JVWCD Current Water Supply

NAME OF SUPPLY	NORMAL YEAR YIELD (AF)	RELIABLE DROUGHT YEAR YIELD (AF)
CENTRAL UTAH PROJECT [A]	50,000	50,000
PROVO RIVER WATER USERS COMPANY SHARES		
PROVO RIVER DIRECT FLOW	17,200	11,455
DEER CREEK STORAGE	11,300	8,881
ECHO STORAGE	3,500	3,206
WEBER RIVER DIRECT FLOW	0	826
UINTA LAKES	3,000	2,400
CONTAINED SHARES	7,600	5,000
CENTRAL WATER PROJECT (CWP)	11,680	10,500
WEST UNION CANAL RIGHT	5,300	3,070
HIGH QUALITY GROUNDWATER [B]	22,500	22,500
LOCAL MOUNTAIN STREAMS	3,000	2,000
SOUTHWEST GROUNDWATER PROJECT (ZONE B AND LOST USE) [C]	7,000	7,000
TOTAL:	142,080	126,838

References:

(a) Includes 6,300 AF currently turned back to CUWCD for instream fishery flows in the Provo River.
(b) Includes additional 1,500 AF yield from equipping Etienne Way, Murray-Holladay Road, and other new high-quality wells. Also includes 1,000 AF estimated yield from treating Casto and Dry Creek Springs.
(c) Includes additional groundwater development to support the third treatment train at SWGWTP.

South Jordan is purchasing between 16,000 and 19,000 acre-feet annually from JVWCD, which is approximately 12% of the current JVWCD water supply. Recycling water from JBWRF would reduce the amount of water the City needs to purchase from JVWCD. Development of the study will include coordination with the Utah Division of Water Rights to determine the water rights necessary for this reuse application. DPR may help to stabilize and better distribute water values by helping to decouple water supply from uncertain precipitation conditions. Direct potable reuse adds a source of water that is more secure than annual precipitation, the volume of water that can be treated and stored is not only dependent on annual precipitation.

3. *Describe the potential for the project to make water available to address a specific concern. Explain the specific concern and its severity. Also explain the role of the project being investigated in addressing that concern and the extent to which the project will address it. Specific concerns may include, but are not limited to:*

    - *Water supply shortages, water supply reliability, groundwater depletion, water quality issues, natural disasters that may impact water supply infrastructure, heightened competition for water supplies, availability of alternative supplies, increasing cost of water supplies*

With increasing population and development, many communities in Utah are facing shortages of water for potable supply. Both the quality and quantity of conventional water supplies are increasingly affected by population growth, urbanization, prolonged severe droughts, and climate change. Direct potable reuse is an approach that can improve sustainability and reliability of water supplies by recovering drinking water from wastewater. Most potable reuse research has focused on large, coastal communities, which have different opportunities and constraints regarding water rights, treatment technologies, regulatory considerations, and costs than inland communities in arid environments. More research is needed on inland DPR, and the PureSoJo demonstration facility and reuse feasibility study provide the opportunity to further explore inland DPR applications.

Potable reuse is a more sustainable water supply, making more efficient use of existing water supplies by recycling a resource that would otherwise be discharged. Accordingly, potable reuse may decrease the amount of water imported to urban areas, reduce groundwater extraction, and minimize wastewater discharges in the environment. In turn, energy costs are lowered, groundwater overdrafts are limited, and the health of aquatic ecosystems that receive wastewater effluent is improved. Surface water supply in Utah is highly variable depending on winter snowpack and spring runoff, and reservoir levels can drop drastically during prolonged droughts. Potable reuse utilizes a local resource that is accessible for many water systems throughout the country, unlike sources such as seawater or brackish groundwater.

4. *Describe the potential for the project to help create additional flexibility to address drought. Will water made available by the project being investigated continue to be available during periods of drought? To what extent is the water made available by the project being investigated more drought resistant than alternative water supply options? Explain.*

Direct potable reuse would provide a secondary source of water for South Jordan in addition to purchasing water from JVWCD. Unlike conventional water sources, wastewater flows are fairly consistent regardless of drought conditions. Influent flow data from JBWRF shows flows increasing from around 8 mgd in 2012 to 13 mgd in 2020. The treated wastewater flows will continue to increase as population grows with a build-out flowrate of 30 mgd for JBWRF.

Alternatives such as expanding existing treatment plants, importing water, or constructing new treatment plants provide additional water but are susceptible to water shortages. Supply of surface water is also fixed by storage limitations in good years or diminished by drought and climate variability in bad years. There is a level of uncertainty associated with these water supplies due to susceptibility to drought and climate change, looming groundwater restrictions, and potential environmental impacts. Potable reuse is a drought-resilient water supply that would make South Jordan less dependent on traditional potable water supplies.

1.4.3 Evaluation Criterion 3 – Environment and Water Quality

Points will be award based on the extent to which the project being investigated will improve surface, groundwater, or effluent discharge quality; will restore or enhance habitat for non-listed species; or will provide water or habitat for federally listed threatened or endangered species. Indirect benefits of the project will also be considered under this criterion.

1. *Describe the potential for the project to improve the quality of surface water or groundwater.*

The project could potentially improve the quality of surface water by decreasing the nutrient load that would otherwise have been discharged by JBWRF to the Jordan River. The water in sections of the Jordan River is considered to be impaired or is not meeting state water quality standards. Sections of the river are currently impaired for low dissolved oxygen, as well as several other parameters of concern including dissolved copper, *E. coli*, phosphorous, and total dissolved solids. Reducing the diversion of water upstream could also result in higher volumetric flows of freshwater in the Provo River Watershed which may improve river water quality.

2. *Describe the potential for the project to improve effluent quality beyond levels necessary to meet State or Federal Discharge requirements.*

The Utah Division of Drinking Water does not currently regulate indirect potable reuse or direct potable reuse. In the absence of specific guidance or regulations for potable reuse, the basic water quality goals that correspond to the "industry standard" were applied to the demonstration facility. The DPR demonstration facility diverts a portion of the wastewater flow and uses an advanced treatment process to produce potable water. Ozone and biologically active filtration oxidize and degrade complex organic carbon compounds for total organic carbon (TOC) reduction, removal of trace organics, and pathogen reduction. Ultrafiltration provides additional removal of particulates and suspended solids and serves as a barrier to pathogens. Granular activated carbon removes additional TOC by adsorption, reduces taste and odor compounds, and removes trace pollutants. Finally, UV disinfection provides a final barrier to pathogens.

3. *Describe the potential for the project to improve flow conditions in a natural stream channel.*

One of the benefits of this project is to potentially allow, in the short-term, surface water that would be diverted from the Provo River watershed to remain within the watershed as reclaimed water would be used instead. In the long-term, this project would likely allow a delay to the implementation of the Bear River Project. The Bear River Project would move water from the Bear River watershed to Salt Lake County to be used for both potable and non-potable demands. The cost of this project is high, and the potential environmental impacts are significant.

4. *Describe the potential for the project to restore or enhance habitat for non-listed fish and wildlife species.*

Improved planning of available water resources can aid in management of instream surface water flows to meet the needs of sensitive ecosystems. As precipitation patterns shift as a result of climate change, a diversified portfolio of water sources can play a critical role to preserve and maintain ecosystems critical to threatened species. The Provo River is home to many species of riparian, wetland, highland, and aquatic vegetation as well as several key species such as the spotted frog, stonefly, and brown trout. The Jordan River is also home to many different species of native wildlife including deer, beaver, fox, and many more varieties of mammals, amphibians, reptiles, fish, and birds.

5. *Describe the potential for the project to provide water or habitat for federally listed threatened or endangered species.*

The Provo and Jordan rivers are home to the June Sucker, an endangered species of fish native to Utah. Many factors contributed to the June Sucker being listed as an endangered species including urban and industrial growth, water development projects, and changes to natural habitat. Reducing the amount of water that is diverted from these watersheds for human consumption protects and maintains the habitat of the fish.

1.4.4 Evaluation Criterion 4 – Department of the Interior Priorities

Points will be allocated based on the degree to which the project supports the priorities listed, and whether the connection to the priories is well supported in the application. ***Without repeating benefits already described in previous criteria, describe in detail how the proposed project supports priorities below.***

Climate Change: *Points will be awarded based on the extent the project will reduce climate pollution; increase resilience to the impacts of climate change; protect public health; and conserve our lands, waters, oceans, and biodiversity. Address the following as relevant to your project.*

E.O. 14008: Tackling the Climate Crisis at Home and Abroad, focuses on increasing resilience to climate change and supporting climate-resilient development. Please describe how the project will address climate change, including the following:

- *Please provide specific details and examples on how the project will address the impacts of climate change and help combat the climate crisis.*
- *Does this proposed project strengthen water supply sustainability to increase resilience to climate change? Does the proposed project contribute to climate change resiliency in other ways not described above?*

Throughout the western United States, heat waves are becoming more common, and snow is melting earlier in spring. In the coming decades, the changing climate is likely to decrease the flow of water in Utah's rivers and increase the need for water but reduce the supply. The reduced snowpack, an increased fraction of precipitation falling as rain rather than snow, and increased occurrence of high-intensity rainfall may lead to decreases in aquifer recharge and groundwater availability in the future. To meet future water demands, JVWCD is planning to expand their JVWTP and expand their Southwest Groundwater Treatment Plant (SWGTP) from 7 mgd to 14 mgd. Providing an alternative water supply through DPR that recycles water rather than diverting and discharging an additional supply would reduce the need to treat additional surface water and pump additional groundwater and could delay the expansion of the SWGTP. Reducing groundwater usage prevents excessive drawdown of groundwater levels and allows the aquifer to recharge through conjunctive use and water management.

Disadvantaged or Underserved Communities: *Points will be award based on the extent to which the Project serves economically disadvantaged or underserved communities in rural or urban areas.*

- *Will the proposed project serve or benefit a disadvantaged or historically underserved community? Benefits can include, but are not limited to, public health and safety by addressing water quality, new water supplies, or economic growth opportunities.*
- *Please describe in detail how the community is disadvantaged based on a combination of variables that may include the following:*
    - *Low income, high and/or persistent poverty; high unemployment and underemployment; racial and ethnic residential segregation, particularly where the segregation stems from discrimination by government entities; linguistic isolation; high housing cost burden and substandard housing; distressed neighborhoods; high transportation cost burden and/or low transportation access; disproportionate environmental stressor burden and high cumulative impacts; limited water and sanitation access and affordability; disproportionate impacts from climate change; high energy cost burden and low energy access; job lost through energy transition; access to healthcare.*
- *If the proposed project is providing benefits to an underserved community, provide sufficient information to demonstrate that the community meets the underserved definition in E.O. 13985, which includes populations sharing a particular characteristic, opportunity to participate in aspects of economic, social, and civic life.*

Social vulnerability refers to the potential negative effects on communities caused by external stresses on human health. Such stresses include natural or human-caused disasters, or disease

outbreaks. Reducing social vulnerability can decrease both human suffering and economic loss. The CDC/ATSDR Social Vulnerability Index County Map depicts the social vulnerability of communities, at census tract level, within a specified county. CDC/ATSDR SVI 2020 groups sixteen census-derived factors into four themes that summarize the extent to which the area is socially vulnerable to disaster. The factors include economic data as well as data regarding education, family characteristics, housing, language ability, ethnicity, and vehicle access. Overall Social Vulnerability combines all the variables to provide a comprehensive assessment. Social vulnerability index scores in South Jordan range from 0.0254 to 0.7881. The Social Vulnerability scores for South Jordan and the CDC/ATSDR Social Vulnerability Index County Map for Salt Lake County are included in Appendix E.

Tribal Benefit: *Points will be award based on the extent to which the Project will honor the Federal government's commitments to Tribal Nations.*

- *Does the proposed project directly served and/or benefit a Tribe? Will the project improve water management for an Indian Tribe?*
- *Does the proposed project support Tribal resilience to climate change and drought impacts or provide other Tribal benefits such as improved public health and safety by addressing water quality, new water supplies, or economic growth opportunities?*

The project is not anticipated to benefit or improve water management for any Utah tribes. The project is also not anticipated to support Tribal resilience to climate change or drought impacts.

1.4.5 Evaluation Criterion 5 – Watershed Perspective

Points will be awarded based on the extent to which the project being investigated promotes or applies a watershed perspective by implementing an integrated resources management approach, implementing a regional planning effort, forming collaborative partnerships with other entities, or conducting public outreach.

1. *Will the proposed project implement a regional or state water plan or an integrated resource management plan? Explain.*

The Utah Water Conservation Act requires each water conservancy district and public water system with over 500 connections to submit a water conservation plan to the Division of Water Resources and update it every five years. South Jordan's Water Conservation Plan was updated in 2020 and JVWCD's Water Conservation Plan was updated in 2019. In 2021, the Utah Division of Natural Resource published a state-wide water resource plan. At the end of 2022, the Governor's Office, Department of Agriculture and Food, Department of Environmental Quality, Department of Natural Resources, and the Colorado River Authority of Utah worked together to create Utah's Coordinated Action Plan for Water.

The state-wide water resource plan focused on securing reliable water supplies through a variety of sources and preserving the health of watersheds. One aspect of water supply security is developing innovative water management strategies such as water reuse. The Coordinated Action Plan for Water encourages streamlined project approvals, rules, and regulations to encourage

innovation in Utah's water management, including water reuse. The report also highlights infrastructure investments to implement water reuse concepts by developing water treatment technology and delivery systems to transport recycled water. This water reuse feasibility study aligns with the strategies outlined in the regional and state water plans and will help form collaborative partnerships with the Department of the Interior (potential underlying water right holder), CUWCD, JVWCD, SVSD, and other State and local agencies.

2. *Will the proposed project help meet the water supply needs of a large geographic area, region, or watershed? Explain.*

The Provo River Watershed is one of Utah's most important watersheds because it provides millions of users with water for drinking, agriculture, and recreation purposes. JVWCD provides water for nearly one million people in Salt Lake County. By implementing DPR South Jordan would reduce the amount of water that is purchased from JVWCD which would reduce the amount of water diverted from the Provo River Watershed. Additionally, the Utah DDW does not currently regulate indirect potable reuse or direct potable reuse. The South Jordan DPR demonstration facility is an opportunity to present sufficient evidence to support DPR and develop regulations within Utah, including the use of full-scale components within the demonstration facility and set an example for reuse in Utah.

3. *Will the proposed project promote collaborative partnerships to address water-related issues? Explain. Describe stakeholder involvement in the project planning process.*

Pure SoJo is a collaborative project with multiple agencies including South Jordan City, JVWCD, Central Utah Water Conservancy District (CUWCD), and SVSD. Other partners include the Utah DDW and Utah DWQ. JVWCD purchases approximately 50,000 acre-feet of water per year from CUWCD and both water districts are interested in developing water reuse in Utah. JVWCD also plays a key role in the project because effluent from a full-scale DPR facility would be mixed with JVWCD water in the distribution system. SVSD owns and operates JBWRF where the demonstration facility is located and is working closely with the City on the piloting operations. The DWQ and DDW are providing regulatory guidance and working with the City to develop water reuse regulations.

4. *Will the proposed project include public outreach and opportunities for the public to learn about the project? Explain.*

South Jordan is one of a few utilities in the nation evaluating direct potable reuse treatment that uses an ozone-BAF (non-RO) process train. PureSoJo will be the first of its kind in Utah and provides tremendous value to the larger community. Successful project implementation requires an open and continuous dialogue with the community about the value of water and the safety of potable reuse. The City has already conducted several educational tours of the pilot for the public. The tours focus on the important role that water recycling can play to meet the state's water supply needs, how technology is used to purify recycled water, and how the economics of water recycling make sense to consider this source for future water supply.

2. PROJECT BUDGET

2.1 Funding Plan

South Jordan is seeking $743,904 from the Bureau of Reclamation funding opportunity R23AS00076, WaterSMART: *Water Recycling and Desalination Planning*. As illustrated in Table 3, local matching funds would come from South Jordan City. South Jordan's contributions are cash on-hand, with funds allocated from the City's water enterprise fund. No additional funds will be provided by non-federal entities.

2.2 Letters of Funding Commitment

A letter of funding commitment for South Jordan City is attached in Appendix D.

2.3 Budget Proposal

Table 3 summarizes all the proposed funding sources for this project including both federal and non-federal sources.

Table 3 – Summary of Non-Federal and Federal Funding Sources

Funding Sources	Amount
Non-Federal Entities	
1. South Jordan City	$743,904
2. NA	
3. NA	
Non-Federal Subtotal	$743,904
REQUESTED Reclamation Funding	$743,904

Cost to be reimbursed with the requested federal funding include Tasks 0-4. South Jordan will contribute in-kind costs shown in Task 0. Project costs will not include third-party contributions. The total project costs are summarized in Table 4.

Table 4 – Total Project Cost table

Source	Amount
Costs to be reimbursed with the requested Federal funding	$743,904
Costs to be paid by the applicant	$743,904
Value of third-party contributions	NA
TOTAL Project Cost	$1,487,808

2.4 Budget Narrative

The budget proposal for the Project is included in Table 5. Project costs are anticipated to include work by city personnel including fringe benefits (fully burdened), travel, contractual costs, legal fees, and indirect costs. Descriptions of the estimated costs are included in section 2.4.1 through 2.4.9.

Table 5 – Budget Proposal

Budget Item Description	Computation		Quantity Type	Total Cost
	$/unit	Quantity		
Personnel				$ 45,617.00
Jason Rasmussen - Public Works Dir	$ 77.91	300	hour	$ 23,373.00
Ray Garrion - Public Works Asst. Dir	$ 59.77	300	hour	$ 17,931.00
Brandon Crookston - Water Manager	$ 43.13	100	hour	$ 4,313.00
Fringe Benefits				$ 22,370.00
Jason Rasmussen - Public Works Dir	$ 35.82	300	hour	$ 10,746.00
Ray Garrion - Public Works Asst. Dir	$ 30.37	300	hour	$ 9,111.00
Brandon Crookston - Water Manager	$ 25.13	100	hour	$ 2,513.00
Travel				$ 7,000.00
	$7,000.00	1	LS	$ 7,000.00
Equipment				$ -
Supplies				$ -
Contractual				$1,305,390.00
Project Management	--	520	hour	$ 129,160.00
Reuse Feasibility Study	--	773	hour	$ 152,730.00
Environmental and Cultural Compliance	--	384	hour	$ 79,080.00
Pre-Design Report	--	4692	hour	$ 944,420.00
Construction				$ -
Other				$ 104,431.00
Legal				$ 104,431.00
Indirect Charges				$ 3,000.00
Indirect Costs				$ 3,000.00
			Total Project Costs	$1,487,808.00

2.4.1 Personnel

South Jordan Staff that will be participating in the Project reflect the hours spent attending meetings, preparing and gathering required information, reviewing invoices and submitting documentation to the BOR, and general grant compliance and administration. The salaries are for Jason Rasmussen, Public Works Director at $77.91 an hour, Ray Garrison, Public Works Assistant Director at $59.77 per hour, and Brandon Crookston, Water Manager at $43.13 per hour. In-kind amount $45,617.

2.4.2 Fringe Benefits

Fringe benefits are anticipated to be 50% of South Jordan's staff wages and include FICA, SUI, 401K, Retirement, Workers' Compensation, Life Ltd, and Medical Insurance for fully-burdened rates. In-kind amount $23,370.

2.4.3 Travel

Approximately $7,000 in travel is allocated for national experts to assist in planning and pre-design activities.

2.4.4 Equipment

No equipment will be required.

2.4.5 Supplies

No materials or supplies will be required.

2.4.6 Contractual

The contractual costs of $1,305,390 is an estimate for hours and rates for each of the participating consultants for the planning projects. Costs for specialty subconsultants are included in that amount as allowances. The following are the rates and hours for the prime consultant to manage and complete the Project:

Table 6 – Project Staff Hours and Rates

Technical Advisor	$ 295.00	163	HR
Project Manager	$ 295.00	664	HR
Advanced Treatment Lead	$ 295.00	337	HR
Electrical Lead	$ 265.00	242	HR
Ozone Lead	$ 295.00	195	HR
Direct Potable Reuse Lead	$ 295.00	269	HR
Proc/Mech Lead	$ 215.00	438	HR
Project Engineer - Advanced Treatment	$ 175.00	672	HR
Project Engineer - Ozone	$ 155.00	988	HR
Staff Engineer - Direct Potable Reuse	$ 140.00	907	HR
Staff Engineer - Proc/Mech	$ 140.00	860	HR
Cost Estimator	$ 185.00	192	HR
NEPA Specialist	$ 180.00	144	HR
Admin	$ 115.00	298	HR

2.4.7 Construction

No construction will take place, or be funded by, this Project.

2.4.8 Other

Legal expenses are listed as other expenses and will include analyzing institutional and legal requirements, multi-jurisdictional and interagency aspects, and permitting requirements. Legal will also participate in a discussion of any unresolved issues pertaining to implementing the proposed project. These are estimated to be 8% of the contractual costs, in the amount of $104,431.

2.4.9 Indirect Charges

Approximately $3,000 in indirect charges is allocated for printing, document production, and other miscellaneous costs to support preparation of planning and pre-design deliverables.

3. REQUIRED PERMITS OR APPROVALS

Required permitting will be addressed and investigated with the Utah DWQ and the State Engineer's office. It is anticipated there will be one primary permit that will be required for the project to move forward – a water reuse agreement authorizing use of the underlying water right(s) for the reuse project. The City has authorized this project and will pass an official resolution approving this application and allocating matching funds. No additional permits or approvals are anticipated for this project at this time.

4. OVERLAP OR DUPLICATION OF EFFORT STATEMENT

There is no overlap between the proposed project and any other active or anticipated proposals or projects in terms of activities, costs, or commitment of key personnel. The proposal submitted for consideration under this program does not in any way duplicate any proposal or project that has been or will be submitted for funding consideration to any other potential funding sources.

5. UNIFORM AUDIT REPORTING STATEMENT

South Jordan was required to submit a single audit report for FY2022. The Employer Identification Number (EIN) for the audit report is 87-6113473 and the report is available through federal audit clearinghouse. No issues or discrepancies were found in the audit.

6. CONFLICT OF INTEREST DISCLOSURE STATEMENT

South Jordan staff are not aware of any conflict of interest between City personnel, Bureau of Reclamation personnel, lobbyists, or any other individuals that may have a conflict.

7. ENVIRONMENTAL AND CULTURAL RESOURCES COMPLIANCE

The proposed project will comply with the National Environmental Policy Act (NEPA) before any ground-disturbing activity may begin. The project will also comply with all State, Federal, and local environmental, cultural, and paleontological resource protection laws and regulations including, but not limited to, the Clean Water Act, Endangered Species Act, National Historic Preservation Act, consultation with potentially affected Tribes, and consultation with the State Historic Preservation Office.