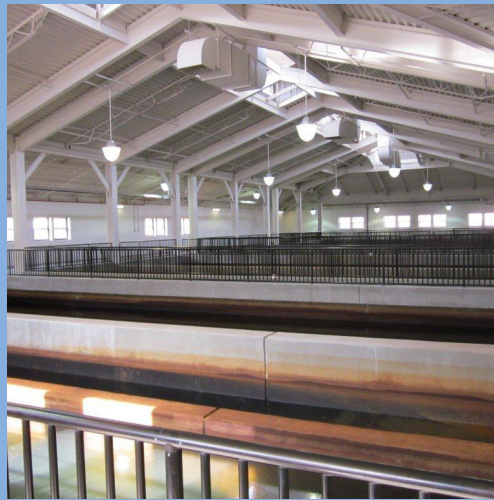


# WEBER BASIN WATER CONSERVANCY DISTRICT

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## Water Reuse Feasibility Study



WaterSMART:  
Development of Feasibility Studies under the Title XVI  
Water Reclamation and Reuse Program for Fiscal Year 2017

### APPLICANT

Weber Basin Water Conservancy District  
2837 E. Highway 193, Layton, Utah 84040

### PROJECT MANAGER

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# TECHNICAL PROPOSAL AND EVALUATION CRITERIA

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## Executive Summary

**Date:** January 4, 2017

**Applicant name:** Weber Basin Water Conservancy District

**City, county, and state:** Layton, Davis, Utah

**Project Name:** Weber Basin Water Conservancy District Reuse Feasibility Study

**Project Manager:** *Name:* Darren Hess, P.E., Assistant General Manager, Weber Basin Water Conservancy District

*Address:* 2837 E. Highway 193, Layton, Utah 84040

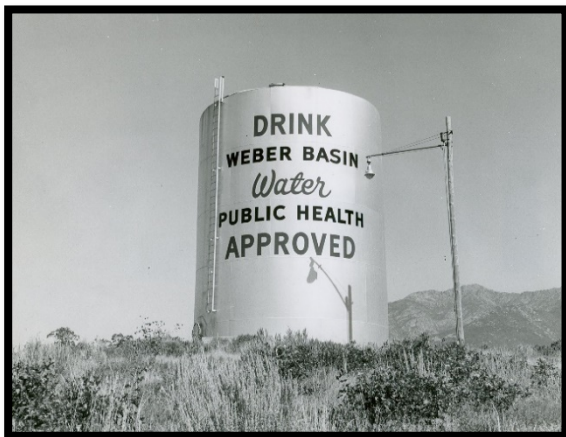
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## Project Summary

The Weber Basin Water Conservancy District (WBWCD or the District) covers over 2,500 square miles in five counties: Davis, Weber, Morgan, Summit and part of Box Elder. As one of

Photo 1 Historical Photo from WBWCD



Utah's largest water districts it provides potable, secondary, and irrigation water to over 240,000 customers. The WBWCD Reuse Feasibility Study (Study) will allow the WBWCD to evaluate and collaborate with five wastewater treatment facilities (WWTF) within the District on ways to help develop greater resiliency and diversity of their water portfolio. The District is currently preparing a Drought Contingency Plan to evaluate the present water supply and its vulnerability to uncontrolled factors, which include drought, climate change, limited water rights, and water quality limits. In the initial stages of the Drought

Contingency Plan, it was revealed that alternatives to augment the water supply would be necessary to help build resiliency and sustainability. The proposed WBWCD Reuse Feasibility Study will include an engineering feasibility and cost-benefit analysis that will assist in identifying a combination of alternatives that will be most effective at increasing water supply, improving water quality and initiating collaboration with wastewater treatment facility staff to determine the technical implementation potential of using reclaimed water. The Study will include investigating:

- uses of reclaimed water for non-potable uses, mainly as irrigation water to existing WBWCD customers,
- determine the feasibility to recharge aquifers within areas of the District with the reclaimed water,
- identify permitting and regulatory issues, and
- identify public perception issues for reuse for irrigation purposes.

The proposed study is anticipated to take 18 months. If the study begins in September/October of 2017, it is expected that it will be completed in February/March 2019.

WBWCD is a junior water right holder on the Weber River and relies on low priority storage rights for most of its water supply. A shift in an earlier runoff during the year may significantly decrease the amount of water WBWCD can store in its reservoirs. Currently, approximately 80% of WBWCD's water supply comes from surface water storage reservoirs.

**Photo 2 Weber Basin Water Treatment Facility**



Weber Basin is part of the Bear River Development Project which is one of the largest water developments currently proposed in the United States. The project calls for diverting as much as 220,000 acre-feet (271.3 million cubic meters) of water from the Bear River annually, enough to serve a half-million households. Weber Basin has rights to 50,000 acre-feet. To develop the project (220,000 acre-feet) will cost more than \$1.5 billion.

Weber Basin has worked diligently on water conservation within its service area and understands that water conservation plays a significant role in meeting long-term water needs. Water conservation and improved efficiency will extend limited water supplies and defer costly new infrastructure to develop large water projects. The District is looking to increase water conservation by 35% when compared to the year 2000 levels and to develop more diversified local supplies through water reuse projects. The development of the proposed Study will allow Weber Basin to evaluate ways to reuse and reclaim water, delay the need to develop the District's portion of the Bear River Development Project, and continue to work towards their conservation goals.

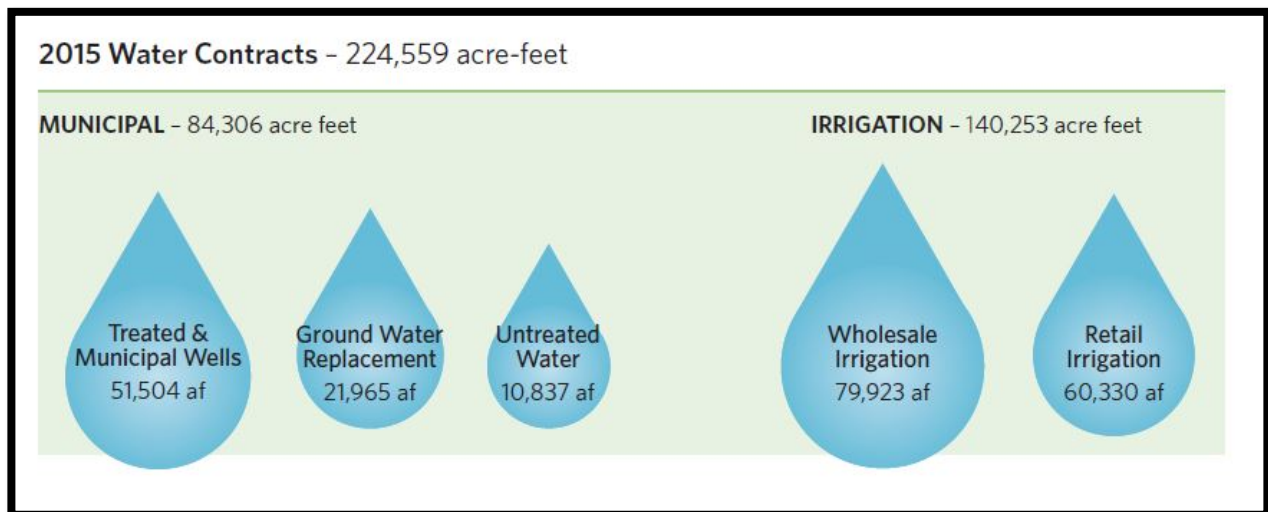
## Background Information of the District

Weber Basin Water Conservancy District has the regional water supply responsibilities for Davis, Weber, Morgan, Summit, and Box Elder counties. The District wholesales water to and develops additional supplies for cities, districts, and companies within those counties. Those agencies, in turn, distribute and retail to their respective customers. Within the District's boundaries, there are over 2,500 square miles of land. WBWCD is unique in that it provides many categories of water including drinking water, agricultural water, municipal secondary water, industrial water, and replacement water.

Weber Basin delivers approximately 225,000 acre-feet of water annually: 87,000 acre-feet for municipal and industrial uses and 138,000 acre-feet for irrigation, which includes secondary pressurized irrigation systems.

During 2015, the District's total water sales reached 224,559 acre-feet. The 2015 water year for the municipal and industrial (M&I) showed an increase of 2% in overall demand of treated drinking water from the previous year. The daily peak production was approximately 76 million gallons per day. Groundwater wells comprised about 26% of the district's total deliveries for the

Figure 1 Water Contracts and Sales



year with the remainder coming from the district's water treatment plants.

Weber Basin is continually looking for new and innovative ways to conserve and extend existing water supplies. As the population continues to increase, additional delivery requirements placed on existing infrastructure and water supplies must increase to meet future water demands.

Effective planning is essential to modify and create programs to extend limited water supplies and defer costly new infrastructure for the development of future large water projects. The District continues to develop new ideas and new education programs to work towards conservation goals and to help the District to meet future water needs.

If the reuse feasibility study cannot be completed, the District will likely continue pursuing the development of the Bear River Pipeline project that will provide water from the Bear River Watershed at a significantly higher expense and environmental impact.

Many residents of Davis and Weber counties use WBWCD water to irrigate their lawns and gardens. The District provides secondary water directly to many residents from Ogden to Woods Cross. They provide secondary water to over 17,000 connections in Davis and Weber Counties. In 2008, WBWCD began metering secondary connections, and to date, they have installed about 3,300 meters with plans to continue metering another 2,000 this coming year. The goal is to have all secondary connections on the District system metered so that users can be more accountable for the water they use.

Weber Basin wholesales drinking water to almost every city and water improvement district in Davis and Weber counties as well as several entities in Summit County. Depending on the entity, either all or a part of their drinking water supply is provided by the District.

## Study Description

### **TASK 1. INTRODUCE THE PROJECT**

This task will identify the non-Federal project sponsor as the Weber Basin Water Conservancy District (WBWCD or District) and:

- 1) Describe the district regarding population served, geographic area, and institutional history.
- 2) Provide a map of the service area.
- 3) Provide a summary of completed studies related to alternative water supplies and their conclusions.
- 4) Provide a map summarizing the proposed study area and the major project components.

### **TASK 2. IDENTIFY NEEDS AND CHALLENGES**

This task serves to identify the need for the reuse project regarding the District's water supply, develop a case for implementing water reuse over other potential water supply projects and identify needs and challenges.

#### ***Task 2a. Identify the Current Water Supply Gap***

This task includes the following items:

- 1) Evaluate previous studies on drought, population growth and demand projections.
- 2) Evaluate current and historical water supplies and the water rights associated with those supplies, with a focus on drought and curtailment conditions.
- 3) Identify the need for additional water supplies.

#### ***Task 2b. Investigate Water Supply Alternatives***

This task includes the following items:

- 1) Evaluate previous studies that were done on water supply alternatives. (Also noted in Task1.3)

- 2) Evaluate current options for expanding local and regional water supplies. These will include:
  - a. water from the Bear River Pipeline Project, which is the project that would bring water from Bear River Development to the WBWCD service area,
  - b. reclaimed water from regional wastewater treatment facilities (WWTFs), and
  - c. aquifer storage and recovery, which is not a new source but a more utilized water source.
  - d. Purchase of agricultural water rights for conversion to M&I use
- 3) Compare planning-level cost estimates for the supply alternatives gathered
- 4) Identify potential water reuse alternatives, including,
  - a. water reuse for non-potable demands and potable water supply augmentation through aquifer storage and recovery.

***Task 2c. Identify Water Quality Concerns***

This task includes reviewing water quality concerns for water reuse for non-potable demands by:

- 1) Defining water quality requirements set forth by the State of Utah, which define water quality requirements for Type I (human contact is likely) and Type II (human contact is not allowed) reclaimed water.
- 2) Establishing additional water quality requirements based on end user needs. These may include limits on salinity, total chlorides, hardness, and other constituents of concern to irrigation water users.

***Task 2d. Identify Wastewater Disposal Option under Non-Title XVI Alternative***

The wastewater from the five wastewater treatment facilities, which will be studied as potential sources of reclaimed water for non-potable use, are currently discharged to the Great Salt Lake. If the non-Title XVI alternative is implemented, no changes to this discharge are needed.

**TASK 3. IDENTIFY WATER RECLAMATION AND REUSE OPPORTUNITIES**

***Task 3a. Identify Uses of Non-Potable Reclaimed Water***

The potential uses of reclaimed water are for non-potable uses mainly as agricultural irrigation water and outdoor municipal water (secondary water) to existing WBWCD customers. WBWCD's customers include both large and small water users. Previous analyses have determined that non-potable supply augmentation with reclaimed water would be the most cost effective if it occurs near the five WWTFs within the WBWCD secondary water (irrigation water) service area. These WWTFs include those operated by the Central Weber Sewer Improvement District, the North Davis Sewer District, the Central Davis Sewer District and the South Davis Sewer District. Each district operates one WWTF, except the South Davis Sewer District which operates two individual WWTFs. All of these WWTFs are located near communities that WBWCD supplies secondary water to for irrigation purposes. The WWTFs are aligned north to south near the Great Salt Lake.

Additional non-potable uses, beyond the current users, will be considered as part of Task 3b.

***Task 3b. Identify Potential Users of Non-Potable Reclaimed water***

Preliminary analysis of potential non-potable users has identified five communities with secondary water systems near the WWTFs. These potential users include the following cities: Syracuse City, West Bountiful City, Woods Cross City, West Haven City, and Farmington City. All of these communities have large secondary water (irrigation) demands that could utilize reclaimed water. Additional uses of non-potable reclaimed water will be identified, as follows:

- 1) Determine the feasibility to recharge aquifers within the WBWCD with the reclaimed water.
- 2) Determine the highest 25 non-potable water users in the District's service area to evaluate if this water could be used specifically for their demands.
- 3) Determine, based on preliminary review of distance, water quality requirements, and water supply needs (both peak and average), three to five additional potential reclaimed water customers.
- 4) Approach potential customers to determine their interest in reclaimed water as an alternative non-potable water supply.
- 5) Develop planning level cost estimates for the required infrastructure to service those customers that have indicated an interest in reclaimed water.

***Task 3c. Identify and Address Potential Hurdles Associated with Reclaimed Water Uses***

There are four categories of potential hurdles associated with the use of reclaimed water: technical water quality, water quantity (supply versus demand) and water rights; permitting and regulatory requirements; cost; and public perception. For non-potable uses they include:

- 1) Identify water quality concerns as defined in Task 2c, compare those to the current effluent quality from the five WWTFs, and determine treatment requirements to meet those water quality goals.
- 2) Identify the water users as defined in Tasks 3a and 3b and their average annual and peak day demand. Compare this to the availability of the supply.
- 3) Identify the water rights associated with the reclaimed water. File the appropriate applications for water reuse with the State Engineer. Address any downstream water users that may be concerned with a curtailment in the discharge from the WWTFs.
- 4) Identify permitting and regulatory issues, if any, encountered during the development and implementation of the previous studies in Utah. Determine if additional actions need to be taken during the planning phase. Begin to work with the State of Utah Division of Water Quality on permits and regulations.
- 5) Identify public perception issues, if any, encountered during the development and implementation of the previous studies in Utah. Determine if additional actions need to be taken during the planning phase. Address what may have been done previously and the additional information or education required to move forward.
- 6) Consider pricing incentives to encourage the use of reclaimed water. It is anticipated that reclaimed water will be a higher quality source of secondary water than the water quality of the current secondary water supplies. Therefore, consideration of possibly marketing the water as such, if sold directly to golf courses, churches and/or other high demand water users, and not mixed in with other secondary water supplies.

***Task 3d. Identify Jurisdictional Issues***



WBWCD does not own or operate the WWTFs associated with the reclaimed water project alternatives discussed in this proposal. Nor do they have full, consumptive, ownership of the water in the WWTFs' systems. Therefore, they will be required to review the jurisdictional issues that are anticipated. They will identify the water rights associated with the water as noted in Task 3c.3. They will also investigate the permits required by the State of Utah for water reuse. Modifying the current wastewater discharge strategy of the WWTFs will require instituting an agreement with each WWTF as well.

***Task 3e. Describe Potential Sources of Reclaimed Water***

The source of reclaimed water for this study is the treated effluent from the five WWTFs in the WBWCD service area. Based on two previous studies by the Central Weber Sewer Improvement District and the North Davis Sewer District, the effluent from the two facilities could provide reclaimed water to meet existing secondary water demands. If this water is used to offset non-potable demands it has the potential to reduce possible water supply gaps in the future and delay the need for additional water supply projects. Use of the reclaimed water could also result in additional water kept in the Weber River watershed instead of being diverted for use by WBWCD's secondary water users. The purpose of this study is to identify the highest and best use for this water.

***Task 3f. Describe Source Water Facility***

The source water facilities for the reclaimed water are the five WWTFs located within the WBWCD service area and managed by the four sewer districts. These four sewer districts are the Central Weber Sewer Improvement District, the North Davis Sewer District, the Central Davis Sewer District, and the South Davis Sewer District (which operates the North-South Davis WWTF and the South-South Davis WWTF). This task consists of the following:

- 1) Assess the total flows available from the five WWTFs, as follows:
  - a. Summarize the analysis of any previous studies or analyze documents on the water supplies available from the WWTFs based on historical effluent flows. Also, summarize future effluent flows and any current demands.
  - b. Assess the potential of diverting wastewater for groundwater recharge near wells, thus increasing the amount of recoverable water.
- 2) Evaluate the five WWTFs, as follows:
  - a. Describe the treatment process and design criteria of each of the facilities. Propose potential changes needed at the facilities to produce Type I water for reuse. The facilities will all require advanced treatment to produce reclaimed water.
  - b. Conduct site inspection and facility condition assessments.
  - c. Evaluate for energy and life cycle cost savings as advanced treatment will increase energy use. Evaluate ways to offset energy costs within the WWTFs.
  - d. Review the need for other equipment repairs and replacement that may be necessary for advanced treatment.
  - e. If necessary, develop computer hydraulic models to reassess the treatment facilities capacities to understand the feasibility of advanced treatment better.

***Task 3g. Describe Current Reuse Practices***

WBWCD currently has limited reuse practices. This study will:

- 1) Describe the current reuse projects on types of reuse and the volumes of water delivered.
- 2) Provide maps to supplement the above description.

***Task 3h. Summarize Current Water Reclamation Technology***

This study will supplement the descriptions provided in Task 3g, as follows:

- 1) Describe the current reuse project on water quality achieved and determine if any additional treatment would be beneficial.

**TASK 4. DESCRIPTION OF ALTERNATIVES**

***Task 4a. Define Objectives of the Project***

The stated purpose of this project is to determine the highest and best use of the reclaimed water produced by the five WWTFs. The following criteria will determine the evaluation of this use:

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

***Task 4b. Describe the Non-Title XVI Alternatives***

The non-Title XVI alternative is considered to be constructing a pipeline sooner than anticipated to bring the Bear River Watershed water into the BWCD system. The District has already developed a detailed project description, including a full feasibility study for that project. A cost estimate is available for this alternative and will be provided for comparison to the reclamation alternatives developed during this study.

***Task 4c. Development of Reclamation Project Alternatives with Cost Estimates***

*Note: This task will be preceded by Tasks 4e and 4f but has been placed in this location to follow the flow of the Directives and Standards Publication No. WTR 11-01.*

- 1) Develop three to five project alternatives. Elements that may vary between the alternatives will be identified as part of Task 4f.
- 2) As part of the alternatives development, particular attention will be paid to the role of existing infrastructure available at the District and the WWTFs that would support the development of individual project elements.
- 3) Develop detailed cost estimates for the selected alternatives. This will include:
  - a. detailed project (capital) cost estimates,
  - b. annual operation, maintenance, and replacement cost estimates,
  - c. life cycle cost estimates, and
  - d. the cost of water per volume delivered (dollars per acre-foot or mgd).

***Task 4d. Determine Waste Discharge Requirements***

The existing discharge permits allow discharge to the Great Salt Lake that provides potential habitat for several species. If an alternative discharge location is needed an investigation will include the following subtasks:

- 1) Perform a pipe routing analysis.
- 2) Evaluate property along any proposed routes.
- 3) Evaluate whole effluent toxicity compliance.
- 4) Evaluate the application time and feasibility to apply to the State of Utah to move the permitted discharge location.
- 5) Define the receiving water quality requirements, especially on salinity and heavy metals.
- 6) Determine what the resulting water quality will be.
- 7) Determine any additional treatment necessary to meet receiving water quality goals.
- 8) Discuss with the Utah Division of Water Quality (DWQ) requirements that will allow for the discharge of treated effluent from the WWTFs' existing outfalls.

#### ***Task 4e. Describe Potential Project Elements***

*Note: This task will precede Tasks 4d and 4e but has been placed in this location to follow the flow of the Directives and Standards Publication No. WTR 11-01.*

This task will identify project elements that, when assembled into project alternatives, will achieve water quality and water quantity goals. These project elements may consist of any of the following:

- 1) Treatment technologies employed to implement advanced wastewater treatment to achieve treatment goals for non-potable uses. These treatment technologies may include filtration, supplemental disinfection, and/or reverse osmosis (RO) for desalination.
- 2) Conveyance infrastructure for non-potable uses: different distribution pipe alignments and associated storage, pipeline and pump station elements.
- 3) For all of the above, consider measures that can increase energy efficiency, such as:
  - a. Evaluate use of renewable energy sources.
  - b. Evaluate variable frequency drives for large equipment.
  - c. Evaluate energy efficiency of treatment process alternatives (e.g., ozone and biofiltration versus reverse osmosis).

### **TASK 5. ECONOMIC ANALYSIS**

As stated in Task 4b, the objective of this project is to determine the highest and best use of the reclaimed water produced by the five WWTFs. The evaluation of this use will be determined by the criteria listed in Task 4b.

#### ***Task 5a. Describe the Potential of the Project to Meet Future Demands***

From previous studies and the analysis that will be provided the water supply needs will be identified. This will be summarized in the Feasibility Report, and the analysis will include:

- 1) Analysis of water demands, taking into account daytime and seasonal variations.
- 2) Analysis of water volume produced and the impact of storage on the ability to meet demands as well as ways to store water during the winter season (non-irrigation season).

***Task 5b. Compare Costs between Title XVI Project Alternative***

This task will:

- 1) Compare the cost of project alternatives developed in Task 4d. The basis for this comparison will be:
  - a. The cost of water on a per acre-foot or mgd basis.
  - b. Project capital cost and the availability of funding to meet the needed expenditures.
- 2) All comparisons will be made on the basis of the same interest rates and period of analysis.

***Task 5c. Compare Cost of Non-Title XVI Project Alternative to Proposed Title XVI Alternatives***

Planning level cost estimates for the non-Title XVI alternative has been developed (Bear River Pipeline project) previously. This task will:

- 1) Compare the cost of project alternatives developed in Task 4d against the non-Title XVI alternative. The basis for this comparison will be:
  - a. The cost of water on a per acre-foot and mgd basis.
  - b. Project capital cost and the availability of funding to meet the needed expenditures.
  - c. Environmental impacts.

***Task 5d. Compare Other Benefits between Non-Title XVI Project Alternative and Proposed Title XVI Alternatives***

Based on the stated objectives of the project first identified in Task 4b and reiterated at the beginning of this section, the noneconomic value of water supply alternatives that will be considered includes water supply reliability and relative project risk. These evaluation criteria will be incorporated as follows:

- 1) District staff will identify the relative importance of financial and non-financial criteria.
- 2) Based on this definition, the alternatives will be evaluated using a multi-criterion analysis approach.

**TASK 6. SELECTION OF THE TITLE XVI PROJECT**

Selection of the Title XVI project will be determined based on the objectives and evaluation criteria of the project, as identified in Task 4b. The following steps will be taken to select the Title XVI Project:

- 1) Evaluate alternatives based on the criteria identified in Task 4b and quantified in Task 5.
- 2) Determine the relative importance (weighting) of financial and non-financial criteria.
- 3) Develop multiple project that are ranked by need and importance
- 4) Based on the results of 1 and 2, compare the alternatives using a multi-criteria analysis approach.

**TASK 7. CONSIDER THE POTENTIAL EFFECTS ON THE ENVIRONMENT**

In order to minimize the District's impacts with respect to the environmental impacts and energy requirements, the following items will be evaluated:

- 1) Assess the implications to habitats and species within the alternative project areas.
  - a. Evaluate the potential benefits of modifying the effluent discharge at the WWTFs at the current discharge locations.

- b. Evaluate the potential benefits of keeping more water in the watershed due to the use of reclaimed water.
- 2) Evaluate the energy requirements of the proposed treatment facilities.
- 3) Evaluate energy saving measures, including:
  - a. Evaluate energy conservation measures in conjunction with the condition assessment of the five WWTFs proposed under Task 3f.
  - b. Evaluate potential energy savings measures in the design and upgrade of treatment facilities, such as energy recovery devices and variable frequency drives on large equipment.
- 4) Assess the availability of renewable energy, including,
  - a. Evaluate purchasing energy produced renewably from local utilities.
  - b. Evaluate construction of a local renewable energy project, such as wind turbines or solar to offset the power consumption of advanced treatment facilities investigating using existing District renewable energy.

### **TASK 8. LEGAL AND INSTITUTIONAL REQUIREMENTS**

The proposed project is associated with legal and institutional requirements, which will be addressed in the following tasks:

#### ***Task 8a. Analyze Water Rights***

The District does not own all of the water rights for the water that come into these five facilities. Therefore, an examination of the number and the use of those rights needs to be determined as well as investigating the water rights. This task will also include investigating the potential collaboration with municipalities that have water rights for water that flows to the WWTFs that could be used for water reuse in their service areas, and that would benefit from the reuse project.

#### ***Task 8b. Analyze Institutional and Legal Requirements***

The District will evaluate the legal demands of a reclamation project and their relation to water quality, permitting, and water rights.

#### ***Task 8c. Analyze Multi-Jurisdictional and Interagency Aspects***

Collaboration with the municipalities, sewer districts that own the WWTFs, the State of Utah, and others will be carried out.

#### ***Task 8d. Analyze Permitting Requirements***

Required permitting will be addressed and investigated with the Utah DWQ and State Engineer's office.

#### ***Task 8e. Discuss Any Unresolved Issues Pertaining to Implementing the Proposed Project***

Throughout the course of the study as issues arise for the proposed projects the issues will be identified and addressed as part of this task.

### **TASK 9. DEMONSTRATE FINANCIAL CAPABILITY OF SPONSOR**

The District is financially capable of implementing these types of projects. The District regularly completes large water infrastructure projects that are financed in a variety of ways including

bonds, low-interest loans from Utah Division of Water Resources and other state agencies and internally through capital improvement funds. WBWCD has an AAA bond rating according to Fitch Ratings. Examples of recent projects successfully constructed for the District include the A.V. Watkins Dam Raise project at Willard Bay Reservoir, which was a \$10 Million project, and the East Layton Pipeline Project, which was a \$6 Million project.

The Feasibility Study will determine the project costs required to complete the reuse projects. A proposed schedule for completion of the projects evaluated will be addressed within the Study and in the selection of the projects. Future funding opportunity announcements and other available grants will be pursued to obtain a Federal match to the District's existing local funding availability. As part of this task, the District will:

- 1) Demonstrate the District's capability and willingness to implement projects based on feasibility and on the information provided above.
- 2) Provide a funding plan for the projects, including capital (construction) cost, operation, maintenance, and replacement cost.
- 3) List all the Federal and Non-Federal sources of funding and any restrictions on them.

#### **REGARDING RESEARCH NEEDS REPORT DEVELOPMENT**

It is not expected that the Feasibility Study or Title XVI projects evaluated will require additional research. The project is expected to use proven technologies and conventional system components for its evaluation and study.

#### **REPORT DEVELOPMENT**

- 1) Finalize individual sections of the report
- 2) Prepare report figures
- 3) Compile Draft Report
- 4) Prepare Final Report based on comments from draft
- 5) Bureau Reporting

## Timeline

The proposed study is anticipated to take 18 months. If the study begins in September/October of 2017, it is expected that it will be completed in February/March 2019.

<b>Estimated Project Schedule</b> October 2017 – March 2019											
<b>Milestone/Task</b>	Oct – Nov 2017	Nov – Dec 2017	Jan – Feb 2018	Mar – April 2018	May – June 2018	July – Aug 2018	Sept – Oct 2018	Nov – Dec 2018	Jan – Feb 2019	Mar – April 2019	
Contract Development & Introduce the Project											
Identify Needs and Challenges											
Identify Water Reclamation and Reuse Opportunities											
Description of Alternatives											
Economic Analysis											
Selection of the Title XVI Project											
Consider the Potential Effects on the Environment											
Legal and Institutional Requirements											
Prepare Draft Report for Review											
Final Report Approval											

## Evaluation Criteria

### **Evaluation Criterion 1—Statement of Problems and Needs**

- Points will be awarded based on the presence of watershed-based water resource management problems and needs for which water reclamation and reuse may provide a solution.*

There are currently over 600,000 people residing within the Weber River watershed, and this population is expected to grow to over 1 million by 2060. Water is currently not imported from other watersheds, so this entire population is dependent upon the Weber River and its tributaries for all surface water that is used to supply the needs of agricultural and M&I. Development of water reuse projects is a vital part of WBWCD’s strategy to meet the water demands required by this expanding population.

- Describe in detail the water resource management problems and needs in the area and explain how water reclamation and reuse may address those problems and needs. 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 the feasibility study will include climate change information in the supply and demand projections used.*

In addition to the challenge of providing water for a rapidly expanding population, the District is engaged in an effort to better understand how climate change will affect the

existing water supply. WBWCD is currently leading a Reclamation-funded Drought Contingency Planning (DCP) effort in the Weber River Basin that involves over a dozen stakeholders that will help the District better understand the vulnerabilities of existing water resources in the Weber River Basin to drought, climate change, and climate variability. Existing technical papers, such as “Planning for an Uncertain Future: Climate Change Sensitivity Assessment towards Adaptation Planning for Public Water Supply” written by Tim Bardsley, et al., describes how future climate-driven hydrologic changes could impact water supplies in the Northern Utah area. Their findings indicate that 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.

As previously stated, WBWCD is a junior water right holder on the Weber River and relies on low priority storage rights for most of its water supply. A change in an earlier runoff can significantly decrease the amount of water WBWCD can store in its reservoirs. With approximately 80% of WBWCD’s water supply coming from surface water storage reservoirs, the effects of the existing drought conditions, climate change, and growth is driving the District to evaluate water supply options.

The DCP will allow the District to evaluate water opportunities. Water reuse has been identified by the District as a relatively drought resilient water supply and is therefore of interest to help meet water demands during future droughts.

## Evaluation Criterion 2—Water Reclamation and Reuse Opportunities

1. *Describe how the feasibility study will investigate potential uses for reclaimed water (e.g., environmental restoration, fish, and wildlife, groundwater recharge, municipal, domestic, industrial, agricultural, power generation, and recreation).*

WBWCD will focus on reuse water for potential uses as non-potable water mainly for irrigation water to existing WBWCD customers. WBWCD’s customers will include both large and small secondary water users. Previous analyses have determined that non-potable supply augmentation with reclaimed water would be the most cost effective if it occurs near the five WWTFs within the WBWCD secondary water (irrigation water) service area. These WWTFs include those operated by the Central Weber Sewer Improvement District, the North Davis Sewer District, the Central Davis Sewer District and the South Davis Sewer District. Each district operates one WWTF, except the South Davis Sewer District which runs two facilities. All of these WWTFs are located near communities that WBWCD supplies secondary water to for irrigation purposes. The WWTFs are aligned north to south near the Great Salt Lake. [See Figure 2 for the WBWCD Service District Map and Attachment A for a larger WBWCD Service District Map](#)

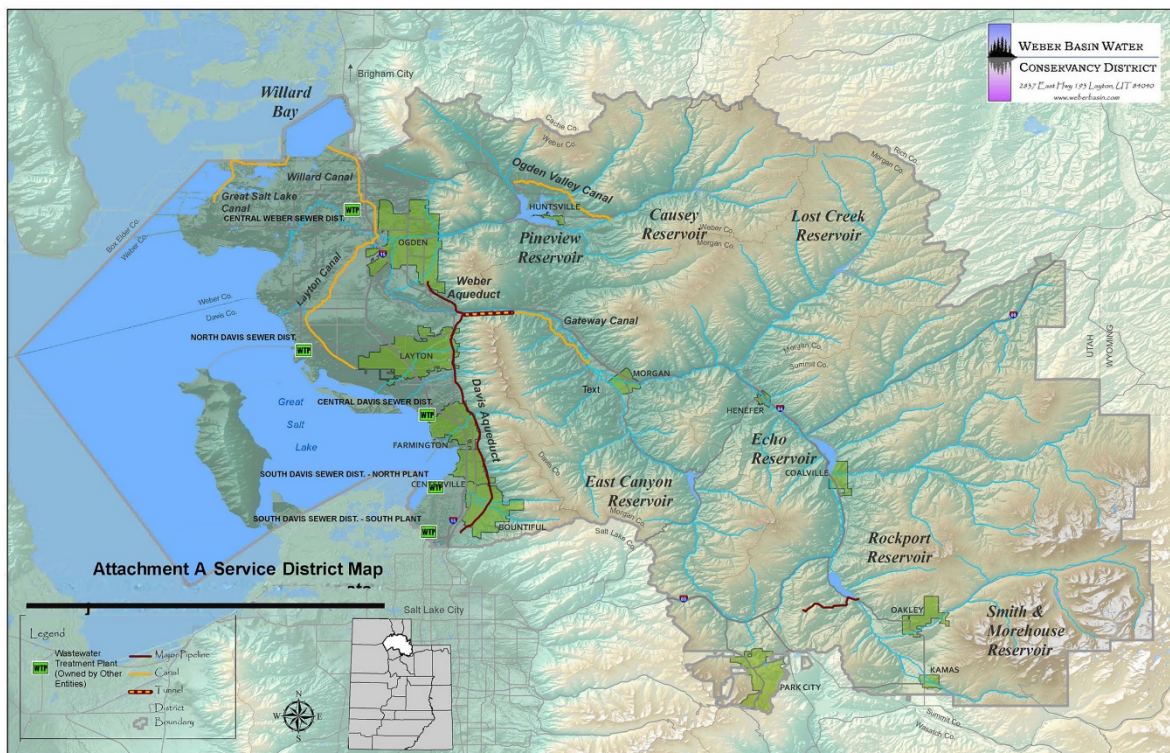
2. *Describe the potential water market available to use any recycled water that might be produced upon completion of a water reuse project, as well as potential methods to stimulate recycled water demand and/or methods to eliminate obstacles for use of reclaimed water.*



The market for reclaimed water in the Wasatch Front region is becoming more and more important as the population skyrockets and droughts continue year after year. Many think the answer is to build more reservoirs and billion-dollar pipelines to bring water to the Wasatch Front. Understanding other options – less expensive options to supplement secondary water uses, so that other water sources can be used for culinary use – is the key to this project.

The District has made strides to educate its secondary customers and to meter thousands of secondary water connections to help users understand their water consumption and make efforts to conserve. The potential water market for WBWCD is for use within their secondary water system. In the past, water reuse has been limited along the Wasatch Front because of three things: 1) public perception, 2) water rights laws, and 3) the cost to treat and deliver the water. The requested Feasibility Project will allow Weber Basin to develop an outreach effort to assure the public that the water is safe for use on their lawns and gardens. It will also allow for an in-depth evaluation of the water rights and what will be required to be able to reuse that water. Cost estimates will be developed to better understand the cost of additional infrastructure needed at the WWTFs and for the delivery system to get the reclaimed water into Weber Basin’s secondary system. The District feels that there is sufficient demand for reclaimed water that all of the water available could be used within their system.

Figure 2 WBWCD Service District Map with WWTFs



3. *Describe the sources of water that will be investigated for potential reclamation, including impaired surface and ground waters.*

The plan is to examine water from the four sewer districts located within WBWCD's service area. These four sewer districts operate five wastewater treatment facilities. The five WWTFs are all facing increased scrutiny from the Utah Division of Water Quality regarding their effluent nutrient concentrations. Producing reclaimed water could be a beneficial method of utilizing not only the water but the nutrients as well. While nutrient loads to surface waters often create issues with algae blooms and other related concerns, nutrients in irrigation water help plants and trees grow.

### Evaluation Criterion 3—Description of Potential Alternatives

1. *Describe the objectives that all alternatives will be designed to meet. What other water supply alternatives will be investigated as part of the feasibility study?*

The stated objective of this project is to determine the highest and best use of the reclaimed water produced by the five WWTFs. An evaluation of this will be determined 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.

2. *Provide a general description of the proposed project that will be the subject of a feasibility study.*

The proposed project will likely require adding advanced water treatment infrastructure to the five WWTFs and the delivery system needed to carry the reclaimed water into WBWCD secondary systems. The District has identified five communities with secondary water systems near the WWTFs. These potential users include the following cities: Syracuse City, West Bountiful City, Woods Cross City, West Haven City, and Farmington City. All of these communities have large secondary water (irrigation) demands that could utilize reclaimed water.

3. *Describe alternative measures or technologies for water reclamation, distribution, and reuse that will be investigated as part of the feasibility study.*

The study will also look at alternative uses such as:

- Determine the feasibility to recharge aquifers within the WBWCD with the reclaimed water.
- Determine the highest 25 non-potable water users in the District's service area to evaluate if this water could be used specifically for their demands.

- Determine, based on preliminary review of distance, water quality requirements, and water supply needs (both peak and average), three to five additional potential reclaimed water customers.
- Approach potential customers to determine their interest in reclaimed water as an alternative non-potable water supply.
- Develop planning level cost estimates for the required infrastructure to service those customers that have indicated an interest in reclaimed water.

#### Evaluation Criterion 4—Stretching Water Supplies

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

To meet projected water demands, WBWCD is engaged with the Division of Water Resources, Cache County, Jordan Valley Water Conservancy District, Bear River Water Conservancy District and others in the 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 to the Weber River and Jordan River basins. Due to the high cost and other impacts of the Bear River Project, the District wishes to postpone that project as long as possible. In order to delay the project, the District is looking to increase water conservation by 35% when compared to the year 2000 levels and to develop local supplies through water reuse projects. Water reuse has been identified as a critical water supply component to be developed before the Bear River Project is initiated. Estimates for the timing of the Bear River Project in the District’s latest published Supply and Demand Study (2010) estimate the Bear River Project will be needed as soon as 2035.

2. *Describe the potential for the project to reduce or eliminate the use of existing diversions from natural watercourses or withdrawals from aquifers.*

Water reuse projects provide a reliable additional water supply, which will allow the District to keep more water in storage in upstream reservoirs. In years when reservoirs are at or near capacity, reuse water will allow additional water to stay in the Weber River and eventually go to the Great Salt Lake.

3. *Describe, if applicable, the potential for the project to reduce the demand on existing Federal water supply facilities.*

The majority of the District’s supply comes from the Weber Basin Project which is a federal project developed by the US Bureau of Reclamation. The Weber River Project and Ogden River Project also provide irrigation water in the area and may benefit from water reuse projects in the area. Water reuse projects in the area would help to reduce demand on the Weber Basin, Weber River and Ogden River Projects by creating an additional water supply.

## Evaluation Criterion 5—Environment and Water Quality

1. *Describe the potential for the project to improve the quality of surface or groundwater, including description of any specific issues that will be investigated or information that will be developed as part of the feasibility study.*

The project could potentially improve the quality of surface water by decreasing the nutrient load that would otherwise have been discharged by the wastewater treatment facilities (WWTFs) to the receiving water body. The project would divert a portion of the effluent from the WWTFs to be filtered and disinfected for use as irrigation water. It is also possible that the sewer districts will decide to upgrade their WWTFs concurrently to WBWCD's efforts, which would improve the quality of the rest of the water being discharged to surface waters.

2. *Describe the potential for the project to improve flow conditions in a natural stream channel, including a description of any specific issues that will be investigated or information that will be developed as part of the feasibility study.*

One of the benefits of this project is to potentially allow, in the short-term, surface water that would be diverted from the Weber River watershed for irrigation could be maintained within the watershed as the reclaimed water would be used for irrigation instead.

In the long-term, this project would likely allow a delay to the implementation of the Bear River Pipeline Project (BRPR). The Bear River Pipeline Project would move water from the Bear River watershed to be used for both potable and non-potable demands. The cost of the BRPP is high, and the potential environmental impacts are significant.

3. *Describe the potential for the project to provide water or habitat for federally listed threatened or endangered species, including description of any specific issues that will be investigated or information that will be developed as part of the feasibility study.*

As noted in Task 7 and in response to the previous question, the production of reclaimed water for use as irrigation water will allow water to potentially remain in the Weber River watershed, in the short-term, and in the Bear River Watershed, in the long-term.

## Evaluation Criterion 6—Legal and Institutional Requirements

The District does not own all of the water rights for the water that come into these five WWTFs. Therefore, an examination of the number and the use of those rights needs to be determined as well as investigating the water rights laws when it comes to groundwater recharge and withdrawal. This District will also investigate the potential collaboration with municipalities that have water rights for water that flows to the WWTFs that could be used for water reuse and the legal ramifications. The following will be completed as part of the project:

- Analyze Institutional and Legal requirements – the District will evaluate the legal demands of a reclamation project and their relation to water quality, permitting, and water rights.

- Analyze Multi-Jurisdictional and Interagency Aspects – collaboration with the municipalities, sewer districts that own the WWTFs, the State of Utah, and others will be carried out.
- Analyze Permitting Requirements - required permitting will be addressed and investigated with the Utah DWQ and the State Engineer’s office.
- Discuss Any Unresolved Issues Pertaining to Implementing the Proposed Project – throughout the course of the study as issues arise for the proposed projects the issues will be identified and discussed as part of this task.

### Evaluation Criterion 7—Renewable Energy and Energy Efficiency

The Study will consider energy requirements by evaluating the power needs of the proposed treatment facilities and ways to include energy savings measures. An evaluation of energy saving measures in conjunction with the condition assessment of the five WWTFs is proposed under Task 3f. An evaluation of potential energy saving measures in the design and upgrade of treatment facilities, such as energy recovery devices and variable frequency drives on large equipment. The energy efficiency of treatment process alternatives (e.g., ozone and biofiltration versus reverse osmosis) will also be evaluated. An evaluation will be conducted of the availability of renewable energy including purchasing power produced from a renewable source from local utilities.

### Evaluation Criterion 8—Watershed Perspective

The primary purpose of the proposed project is to provide the District with a new source of water supply. As such, the reclaimed water itself is not intended to provide environmental benefits. However, the reduction in withdrawals from the Weber River and Bear River offers benefits to both watersheds.

This alternative also postpones the implementation of a pipeline from the Bear River previously planned by the District, which allows it to continue pursuing other regional water supply projects.

# LETTERS OF PROJECT SUPPORT

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North Davis Sewer District – Kevin R Cowan P.E., District Manager

Central Weber Sewer Improvement District – Lance L Wood, P.E., General Manager

To view these letters please see [Attachment B Letters of Support](#)



NORTH DAVIS SEWER DISTRICT

Attachment B -

DEC 15 2016

December 08, 2016

Tage I. Flint, General Manager/CEO  
Weber Basin Water Conservancy District  
2837 East Hwy 193  
Layton, UT 84040

	ORIG	COPY	ACTION	DUE
TAGE				
MARK				
SCOTT				
JOHN				
SHERRIE				
BRITTNEY				
OFF.FILE	✓			

RETURN ANY ORIGINALS TO OFFICE

Dear Mr. Flint,

The North Davis Sewer District (NDS) would like to express its support of the grant application being submitted to the Bureau of Reclamation's Title XVI Water Reclamation and Reuse Program for a feasibility study.

NDS provides wastewater collection and treatment services for a population of approximately 215,000 residing in seven cities and unincorporated areas of Davis and Weber counties. Our system consists of approximately 100 miles of pipe in sizes ranging from 8 inches to 84 inches in diameter and a 34 million gallon per day treatment plant.

A feasibility study of the water reclamation and reuse opportunities within the area will be helpful in identifying potential reuse projects. Reuse projects may be a viable source of water to meet the needs of a rapidly growing population and will increase the drought resiliency of the regional water supply.

NDS is pleased to support this feasibility study and to participate with Weber Basin Water Conservancy District in exploring water reuse opportunities in our area.

Sincerely,

Kevin R. Cowan, P.E.  
District Manager  
[kcowan@ndsd.org](mailto:kcowan@ndsd.org)



## Central Weber Sewer Improvement District

Attachment B -

January 4, 2017

Tage I. Flint, General Manager/CEO  
Weber Basin Water Conservancy District  
2837 East Hwy 193  
Layton, UT 84040

Dear Mr. Flint,

Central Weber Sewer Improvement District [Central Weber] would like to express its support of the grant application being submitted to the Bureau of Reclamation's Title XVI Water Reclamation and Reuse Program for a feasibility study.

Central Weber is a regional wastewater treatment facility for the cities of Ogden, North Ogden, South Ogden, Riverdale, Washington Terrace, Harrisville, Pleasant View, Farr West, West Haven, Hooper, Marriott Slaterville, South Weber City (Davis County) and portions of Roy, Uintah, Plain City, and other unincorporated areas in Weber County.

On an annual basis Central Weber treats an average of approximately 35 million gallons of wastewater a day. The treated effluent is discharged into the Warren Canal and then into the Weber River. The treated effluent meets the EPA NPDES Permit Limits as established by EPA and the Utah Division of Water Quality.

A feasibility study of the water reclamation and reuse opportunities within the area will be helpful in identifying potential reuse projects. Reuse projects may be a viable source of water to meet the needs of a rapidly growing population and will increase the drought resiliency of the regional water supply.

In December 2008 Central Weber completed a joint Water Reclamation & Reuse Project Feasibility Report with Pine View Water Systems. The findings of the report identified water rights that could be further treated and developed for a reuse program. Central Weber, in conjunction with Weber Basin Water Conservancy District, would fully support an effort to further study the feasibility and development of a reuse program.

Central Weber Sewer Improvement District is pleased to be involved in this feasibility study and to participate with Weber Basin Water Conservancy District in exploring water reuse opportunities in our area.

Sincerely,  
CENTRAL WEBER SEWER IMPROVEMENT DISTRICT

Lance L Wood, P.E.  
General Manager



## REQUIRED PERMITS OR APPROVALS

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Required permitting will be addressed and investigated with the Utah DWQ and the State Engineer's office. It is anticipated there will be two primary permits that will be required for the project to move forward – a discharge permit and a non-potable reuse authorization. The District has authorized the project and has passed an official resolution approving this application. No additional permits or approvals are anticipated for this project at this time.

# OFFICIAL RESOLUTION

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WBWCD will submit an Official Resolution within 30 days of the application deadline.

# STUDY BUDGET

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## Funding Plan and Letters of Commitment

- How you will make your contribution to the cost-share requirement, such as monetary and/or in-kind contributions and source funds contributed by the applicant (e.g., reserve account, tax revenue, and/or assessments).*  
 The District will fund all non-Federal contributions entirely with Weber Basin Water Conservancy District operating revenue and in-kind services from the District’s staff time.
- Describe any project expenditures that have been incurred or may be incurred before the anticipated award date that you may seek to include as project costs.*  
 WBWCD will not have any pre-application costs included in the budget.
- Provide the identity and amount of funding to be provided by funding partners, as well as the required letters of commitment.*  
 N/A
- Describe any funding requested or received from other Federal partners. Note: other sources of Federal funding may not be counted towards the cost-share unless otherwise allowed by statute.*  
 N/A
- Describe any pending funding requests that have not yet been approved, and explain how the project will be affected if such funding is denied.*  
 No other requests for financing have been made. WBWCD already has the funds for their cost-sharing portion for this project.

FUNDING SOURCES	FUNDING AMOUNT
<b>Non-Federal Entities</b>	
WBWCD In-Kind Services	\$15,915
WBWCD Cash	\$134,915
<b>Non-Federal Subtotal</b>	<b>\$150,830</b>
<b>Other Federal Entities</b>	
	\$0.00
<b>Other Federal Subtotal</b>	<b>\$0.00</b>
<b>Requested Reclamation Funding</b>	<b>\$150.00</b>
<b>Total Project Funding</b>	<b>\$300,830</b>





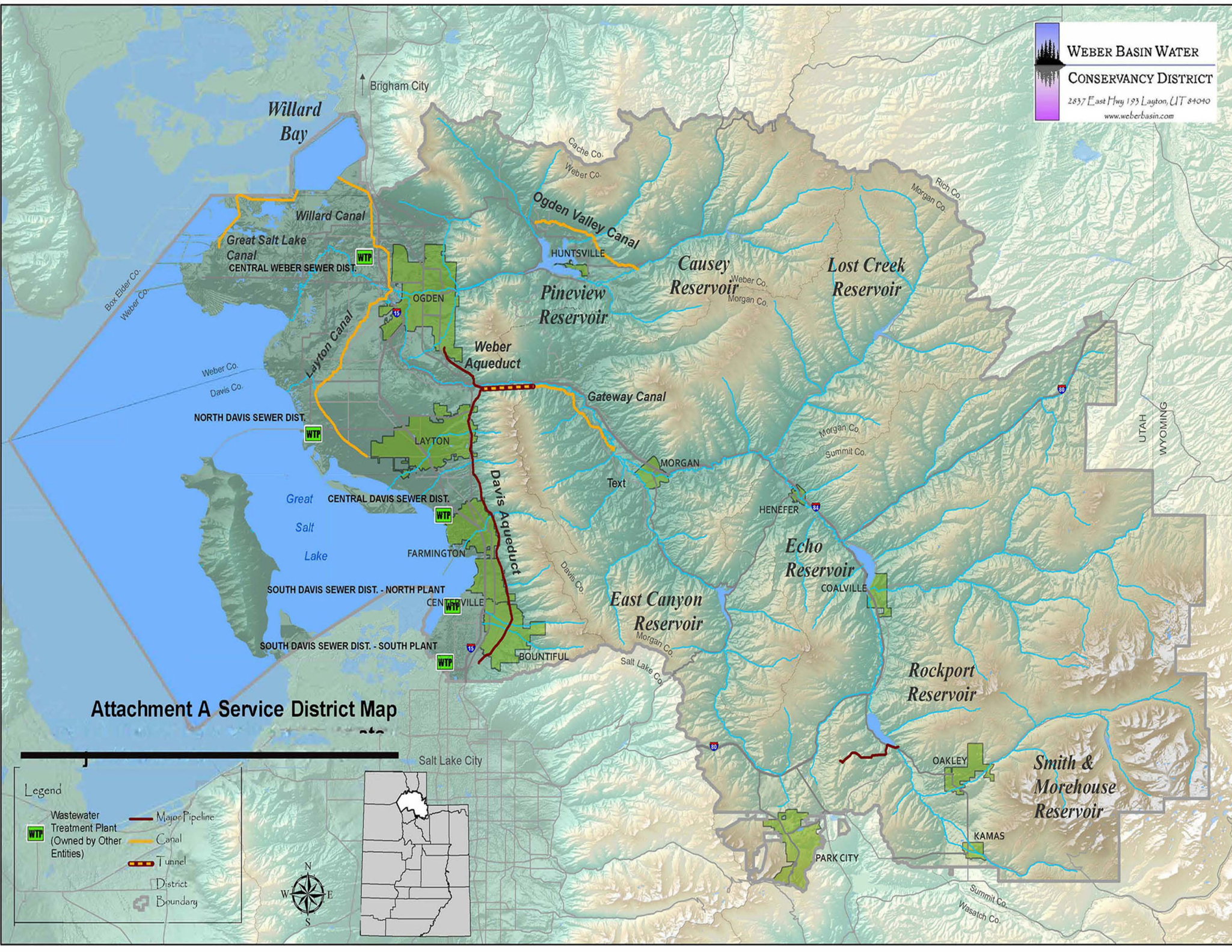
a discussion of any unresolved issues pertaining to implementing the proposed project. These will be 80 hours of expenses in the amount of \$18,480.

*Indirect Costs*

No indirect costs will be part of the project.

*Total Costs*

<u>WBWCD Portion</u>	<u>Fed Portion</u>	<u>Total</u>
<b>\$134,915 Cash \$15,915 In-kind = \$150,830</b>	<b>\$150,000</b>	<b>\$300,830</b>



**Attachment A Service District Map**

**Legend**

- Wastewater Treatment Plant (Owned by Other Entities)
- Major Pipeline
- Canal
- Tunnel
- District Boundary
- County Boundary

