COLORADO
Colorado Water Conservation Board
Department of Natural Resources

Colorado Water Conservation Board

Water Plan

Water Project Summary

Name of Applicant	Shaklee Centre Metropolitan District	
Name of Water Project	Municipal Brine Treatment System	
Grant Request Amount		**$787,700.00**
Primary Category		$787,700.00
Water Storage & Supply		
Total Applicant Match		**$562,500.00**
Applicant Cash Match		$88,000.00
Applicant In-Kind Match		$474,500.00
Total Other Sources of Funding		**$0.00**
Total Project Cost		**$1,350,200.00**

Applicant & Grantee Information

Name of Grantee: Shaklee Centre Metropolitan District
Mailing Address: 7495 County Road 49 Hudson CO 80642

Organization Contact: Kerry Shaklee
Position/Title: SCMD President
Email: kerryshak@yahoo.com
Phone: 303 916 6198

Description of Grantee/Applicant

Metropolitan District formed in 2015 to provide infrastructure support for the Shaklee Centre development

Type of Eligible Entity

- ☐ Public (Government)
- ■ Public (District)
- ☐ Public (Municipality)
- ☐ Ditch Company
- ☐ Private Incorporated
- ☐ Private Individual, Partnership, or Sole Proprietor
- ☐ Non-governmental Organization
- ☐ Covered Entity
- ☐ Other

Category of Water Project

- ☐ Agricultural Projects

Developing communications materials that specifically work with and educate the agricultural community on headwater restoration, identifying the state of the science of this type of work to assist agricultural users among others.

☐ Conservation & Land Use Planning
Activities and projects that implement long-term strategies for conservation, land use, and drought planning.

☐ Engagement & Innovation Activities
Activities and projects that support water education, outreach, and innovation efforts. Please fill out the Supplemental Application on the website.

☐ Watershed Restoration & Recreation
Projects that promote watershed health, environmental health, and recreation.

■ Water Storage & Supply
Projects that facilitate the development of additional storage, artificial aquifer recharge, and dredging existing reservoirs to restore the reservoirs' full decreed capacity and Multi-beneficial projects and those projects identified in basin implementation plans to address the water supply and demand gap.

Location of Water Project

Latitude	40.110145
Longitude	-104.606946
Lat Long Flag	
Water Source	
Basins	South Platte
Counties	Weld
Districts	1-South Platte: Greeley to Balzac; 2-South Platte: Denver Gage to Greeley

Water Project Overview

Major Water Use Type	Municipal
Type of Water Project	Study
Scheduled Start Date - Design	
Scheduled Start Date - Construction	

Description

This project is intended to study the factors involved in implementing a Brine Treatment System (BTS – as described in the justification section) in conjunction with a state-of-the-a reverse osmosis (RO) system. The study will have several objectives:

1) Determine the best method for migrating an existing batch process to a continuous flow:
2) Determine the optimum control parameters for minimizing the liquid brine production from the RO unit:
3) Determine the optimal design and component sources/configuration to minimize capital-and-operational costs for an installed 20GPM water treatment system and storage:
4) Quantify the cost savings from reducing/eliminating brine disposal:
5) Identify markets for the saleable products recovered from the produced brine:
6) Assemble and demonstrate a scale (TBD) model of the combined BTS/RO treatment system:
7) Determine the impact of the treatment system on groundwater flow,

Measurable Results

New Storage Created (acre-feet)
New Annual Water Supplies Developed or Conserved (acre-feet), Consumptive or Nonconsumptive
Existing Storage Preserved or Enhanced (acre-feet)
New Storage Created (acre-feet)

Length of Stream Restored or Protected (linear feet)
Length of Pipe, Canal Built or Improved (linear feet)
Efficiency Savings (dollars/year)
Efficiency Savings (acre-feet/year)
Area of Restored or Preserved Habitat (acres)
Quantity of Water Shared through Alternative Transfer Mechanisms or water sharing agreement (acre-feet)
Number of Coloradans Impacted by Incorporating Water-Saving Actions into Land Use Planning
Number of Coloradans Impacted by Engagement Activity

Other

No additional measurable results provided

Water Project Justification

Shaklee Centre Metropolitan District (SCMD) is currently working with the Shaklee Family on infrastructure for a proposed Development in Hudson, Colorado (working title Legacy at Hudson).

The Development is submitting an augmentation plan to Water Court to develop the Box Elder Creek alluvium as the source for potable water for the development. The raw water contains a high level of total dissolved solids (300 <TDS <1800 over the extent of the property) and will require treatment to achieve potable standards set by the CDPHE.

SCMD desires to achieve a treatment system that has the following environmentally-friendly characteristics:

1) Reduces dependence on CBT and Utilizes the Box Elder Creek alluvium as the source of raw water:
2) Achieves Permeate Recovery Efficiency >98%:
3) Achieves near-zero liquid brine discharge <2%:
4) Is economically viable – minimal increase over capital and operational costs of standard RO:
5) Creates a native water source to assist Hudson in meeting the Northern Water requirement of native water/CBT water > 50%.

SCMD has contracted DDP Engineering Services (DDP) to propose a treatment system meeting these (lofty?) goals:

1) DDP proposed a state-of-the-art reverse osmosis (RO) system with recovery >80% (~20% brine):
2) DDP will augment the performance of the RO with a brine treatment system (BTS) consisting of pre- and post-processing to render the brine into saleable products:
3) BTS reduces the quantity of liquid brine to be disposed to less than 2% yielding an over-all system recovery of greater than 98%:
4) BTS significantly reduces the operational costs of the treatment system:
a. Reduce brine disposal costs and/or environmental impact by more than 90%:
b. Eliminates the cost of antiscaling compounds normally employed to enhance membrane efficiency:
c. Saleable products mostly offset added capital and operational costs of BTS implementation:
d. Reduce/eliminate need for CBT water for the Shaklee Centre Development.

DDP has self-funded BTS development for more than 4 years. In that time DDP has demonstrated the viability of the concept on the laboratory bench and in batch mode operation of the front-end processes. The performance gains of the front-end processes have been verified by a group in the Civil and Environmental Engineering department at the Colorado School of Mines.

This study grant would enable funding of DDP in the development and demonstration of a continuous flow implementation of BTS. A grant in the next cycle could facilitate the implementation of a full-scale working system which would also demonstrate the applicability of the technology to other Colorado municipalities using ground water as a potable water source.

We will be submitting a companion study grant applying BTS to agricultural challenges in regions of Colorado where the mineral content of the ground water and soil limit productivity.

Related Studies

No Related Studies provided

Taxpayer Bill of Rights

No Tax Bill of Rights provided