



COLORADO
Colorado Water Conservation Board
Department of Natural Resources

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TO: Colorado Water Conservation Board Members

FROM: Rachel Pittinger, P.E., Project Manager
Kirk Russell, P.E., Finance Section Chief

DATE: May 20, 2020 Board Meeting

AGENDA ITEM: 11a. Water Project Loans
Arapahoe County Water and Wastewater Authority - Chambers Reservoir Liner Rehabilitation

Staff Recommendation:

Staff recommends the Board approve a loan not to exceed \$2,525,000 (\$2,500,000 for Project costs and \$25,000 for the 1% service fee) to the Arapahoe County Water and Wastewater Authority for costs related to the Chambers Reservoir Liner Rehabilitation, from the Severance Tax Perpetual Base Fund. The loan term will be 20 years at a reduced middle-income municipal interest rate of 1.90% per annum. Security for the loan shall be in compliance with CWCB Financial Policy #5.

Introduction:

The Arapahoe County Water and Wastewater Authority (ACWWA) is applying for a loan for the Chambers Reservoir Liner Rehabilitation (Project). Chambers Reservoir is a 1,400 acre-foot (AF) reservoir used by ACWWA for its raw water irrigation system. The purpose of this Project is to stop excessive leakage, maintain the ability to fill the reservoir to the storage capacity level, and continue to provide quality irrigation water to ACWWA's service area. This reservoir rehabilitation project is important to ACWWA's ability to provide raw water irrigation service to their service area. The total Project cost is estimated to be \$2,500,000. See attached Project Data Sheet for a location map and Project summary.



Borrower – Arapahoe County Water and Wastewater Authority:

ACWWA represents a cooperative effort among public entities to provide for water and wastewater service in portions of Arapahoe County, within the boundaries of the Arapahoe County Water and Wastewater Public Improvement District, and within other areas as permitted by law. ACWWA was formed in 1988 as a separate entity to develop water resources, systems and facilities, and wastewater treatment and disposal systems and facilities for the benefit of the Improvement District and the County and its residents. Pursuant to intergovernmental agreements, ACWWA also provides water and/or wastewater service to areas within the boundaries of other local governments, including Cottonwood Water and Sanitation District, East Valley Metropolitan District (formerly known as East Valley Water and Sanitation District), a portion of the City of Aurora, the Town of Foxfield, Inverness Water and Sanitation District and Elkhorn Metropolitan District No. 1.

ACWWA's 8-square mile service area serves approximately 10,000 residents and numerous commercial and industrial customers. There are currently 4,767 taps. ACWWA is governed by a seven-member Board of Directors. Each Director is appointed by the Board of County Commissioners. The Directors hold regular monthly meetings, and special meetings as needed. A majority of Directors present at the meeting constitutes a quorum for the transaction of business. The Board of Directors, through which ACWWA acts, has certain powers, duties and responsibilities, which include the power to incur indebtedness, liabilities and obligations, and to set and enforce the payment of all fees, rates, charges and assessments for the functions, services and facilities provided by ACWWA. ACWWA's main revenue sources include user service charges and tap fees.

Background:

Chambers Reservoir is located in Centennial just west of Chambers Road and South of E-470. The reservoir provides existing and is planned to provide future irrigation water to customers. It is a supplemental raw water augmentation supply for existing wells in the Cherry Creek alluvium. These wells have poor water quality, particularly iron and manganese, that causes staining. Storing water in a reservoir allows metals to oxidize and settle before being placed into the raw water irrigation system. Completion of the Project is vital to ACWWA's infrastructure and overall system and will provide the ability to improve infrastructure and continue to provide service to the customers.

This reservoir was originally constructed by both excavation below the natural ground surface and by construction of a dam across an unnamed tributary to Happy Canyon Creek. The original design of the reservoir was to be filled by pumping groundwater from the Cherry Creek alluvium through existing wells owned by ACWWA. The design of the reservoir was based upon using a partial clay liner to seal sand lenses encountered during excavation of the reservoir. This patchwork of clay lining was intended to meet the State Engineers' Reservoir Design Criteria for seepage into the reservoir. The reservoir began construction in 2010 and the pump station used to pump water out of Chambers Reservoir to meet ACWWA's raw water irrigation demands was finalized in 2012. Upon partial filling of the reservoir, ACWWA observed that the reservoir was leaking water in excess of acceptable limits and, if not repaired, would result in a reservoir that could not economically be used for storage. Upon draining of the water stored in the reservoir, a portion of the clay liner and reservoir side-slope failed. This reservoir has been inoperative for nearly ten years.

ACWWA submitted a warranty claim against the project and eventually settled with all parties including the original reservoir designer and contractor. However, ACWWA still needed a solution to the excessive leakage. ACWWA contracted with their current engineer to provide alternatives to repair of the reservoir. The dam that created Chambers Reservoir is under the jurisdiction of the State Engineer and is being repaired in cooperation with the State Engineer.

Loan Feasibility Study:

Ms. Emily Lowell, P.E., with ACWWA, prepared the Loan Feasibility Study titled, "Loan Feasibility Study," and was received with the loan application dated April 7, 2020. Mr. John Sikora, P.E., with AECOM provided design and construction cost estimates. The feasibility study was prepared in accordance with CWCB guidelines and includes an analysis of alternatives and estimated costs. Audited financial statements were provided by Rubin Brown, LLP, Certified Public Accountants and Business Consultants.

Water Rights:

ACWWA has a large portfolio of water sources and rights available for storage in Chambers Reservoir. ACWWA plans to use its existing alluvial wells drilled into the Cherry Creek alluvium to supply water to Chambers Reservoir. Specifically, Braun Well, Smith Well No. 1, and Smith Well No. 2 water are planned for reservoir storage. ACWWA's water rights and augmentation plans (Case Nos. 86CW338(A), 90CW201, and 01CW284) allow the use of these wells and others for storage and subsequent municipal uses in Case No. 96CW1144. ACWWA's current water supplies that are used for the non-potable irrigation system that will be initially used to fill Chambers Reservoir are shown in Table 1.

TABLE 1: WATER RIGHTS

Name	Amount	Appropriation Date	Adjudication Date	Water Court Case No.
Chambers Reservoir	1,400 AF	-	December 31, 1996	96CW1114
Smith Well No. 1	1.67 cfs	July 14, 1950	June 13, 1977	84CW681(A)
Smith Well No. 2	1.44 cfs 0.22 cfs	July 14, 1950 January 27, 1966	June 13, 1977	W-4396 W-4396
Braun Well	1.33 cfs	May 7, 1964	December 1, 1972	W-1740

Project Description:

The purpose of the Project is to rehabilitate Chambers Reservoir liner to stop excessive leakage, maintain the ability to fill the reservoir to the storage capacity level, and continue to provide irrigation water to ACWWA's service area.

Alternative 1 - No Action - No Reservoir Liner Rehabilitation: If no rehabilitation occurs, the reservoir will remain unsuitable for water storage due to the amount of seepage (>500 AF/year), the risk of additional embankment failures increase and storage level restrictions may occur. This alternative would force ACWWA to use its alluvial wells to supply irrigation water, install iron removal treatment, and potentially use potable water for irrigation use. Without the Project, ACWWA's ability to provide service by rehabilitating Chambers Reservoir and other infrastructure projects may be compromised.

Alternative 2 - Repair Existing Compacted Clay Liner: This alternative involves repair of the compacted clay liner through design and seepage evaluation. ACWWA's engineer tested various locations around the reservoir to determine the reservoir's hydraulic conductivity and permeabilities. Based on these tests, the engineer concluded the permeabilities were not adequate and the entire clay liner needs replacement. The estimated cost for replacing the clay liner was approximately \$3,300,000. Due to the highly variable nature of the existing clay liner, this alternative would still leak greater than the standard design requirements therefore, this alternative was not selected.

Selected Alternative 3- Reservoir Liner Installation and Rehabilitation: This alternative includes rehabilitation of the existing reservoir to allow the installation of a synthetic liner and raising the

reservoir bottom above the local groundwater table. Removal of the existing clay liner is underway and installation of the synthetic liner is planned for Chambers Reservoir. The estimated cost for installation of the synthetic liner is approximately \$2,500,000 and is shown in Table 2. This alternative was selected.

TABLE 2: ESTIMATED PROJECT COST

Tasks	Cost
Furnish/Install/Construct geomembrane liner, geotextile, steel batten terminations, pipe penetrations, access ladders	\$2,175,000
Furnish/Install ballast tubes	\$250,000
Project Management/Engineering	\$75,000
TOTAL	\$2,500,000

Permitting: Permitting and approvals for this Project have been extensive and have required local and State involvement over a period of ten years. This coordination includes a county Location and Extent permit, Sampling and Analysis Plan, water quality monitoring, Division of Water Resources Dam Safety oversight and approval, Grading Erosion and Sediment Control Plan and permit, noise-quality, air-quality, and access permits. ACWWA does not anticipate obtaining additional permits for this Project from those already mentioned.

Schedule: ACWWA anticipates completing the Project in 2020. Design drawings are finalized and construction bidding is underway. ACWWA anticipates filling Chambers Reservoir late 2020.

Financial Analysis:

Table 3 provides a summary of the Project’s financial aspects. ACWWA qualifies for a middle-income interest rate of 2.15% for a 30-year loan. This rate is reduced to 1.90% for a 20-year term (Ownership: 100% Middle-Income Municipal).

TABLE 3: FINANCIAL SUMMARY

Project Cost	\$2,500,000
CWCB Loan Amount	\$2,500,000
CWCB Loan Amount (Including 1% Service Fee)	\$2,525,000
CWCB Annual Loan Payment	\$152,935
CWCB Annual Loan Obligation (1 st Ten Years)	\$168,228
Number of Taps	4,767
Monthly Loan Obligation per Tap	\$2.94

Creditworthiness: ACWWA has \$101,920,000 in existing debt. ACWWA added to its operating and capital reserves the past three years and plans to use these funds for future capital projects. ACWWA will continue to focus on capital improvement and infrastructure needs, maintenance needs, improving water quality to meet growth needs and maintain affordable rates for customers.

TABLE 4: EXISTING DEBT

Lender	Original Balance	Current Balance	Annual Payment	Maturity Date	Collateral
Colorado State Bank and Trust Bond Series 2012	\$5,525,000	\$3,385,000	\$1,178,000	2022	Pledged Revenues
Revenue Refunding Bonds Series 2016	\$16,475,000	\$14,510,000	\$1,001,900	2033	Pledged Revenues
Revenue Refunding Bonds Series 2017	\$12,720,000	\$12,540,000	\$585,850	2033	Pledged Revenues
Revenue Refunding Bonds Series 2019	\$71,485,000	\$71,485,000	\$4,737,000	2039	Pledged Revenues
Total		\$101,920,000	\$7,502,750		

TABLE 5: FINANCIAL RATIOS

Financial Ratio	Past Years	Future w/ Project
Operating Ratio (revenues/expenses) weak: <100% - average: 100% - 120% - strong: >120%	107% (average) \$20.9M/\$19.6M	106% (average) \$20.9M/\$19.8M
Debt Service Coverage Ratio (revenues-expenses)/debt service weak: <100% - average: 100% - 120% - strong: >120%	117% (average) (\$20.9M-\$12.1M) \$7.5M	114% (average) (\$20.9M-\$12.1M) \$7.7M
Cash Reserves to Current Expenses ¹ weak: <50% - average: 50% - 100% - strong: >100%	36% (weak) \$7M/\$19.6M	35% (weak) \$7M/\$19.8M
Debt per Tap (4,767 taps) weak: >\$5,000 - average: \$2,500 - \$5,000 - strong: <\$2,500	\$21,380 (weak) \$101.9M/4767taps	\$21,910 (weak) \$104.4M/4767taps
Average Monthly Water Bill ² weak: >\$60 - average: \$30 - \$60 - strong: <\$30	\$367 (weak)	\$367 (weak)

¹ ACWWA currently has \$7 Million cash reserves not allocated to the 2020 CIP Budget to cover other expenses.

² Average monthly water bills for ACWWA service area include commercial and residential customers.

Collateral: Security for this loan will be a pledge of revenues backed by a rate covenant. This security is in compliance with the CWCB Financial Policy #5 (Collateral).

cc: Steve Witter, General Manager, Arapahoe County Water and Wastewater Authority
 Emily Lowell, Engineering Manager, Arapahoe County Water and Wastewater Authority
 Jennifer Mele, Colorado Attorney General's Office

Attachments: Water Project Loan Program - Project Data Sheet

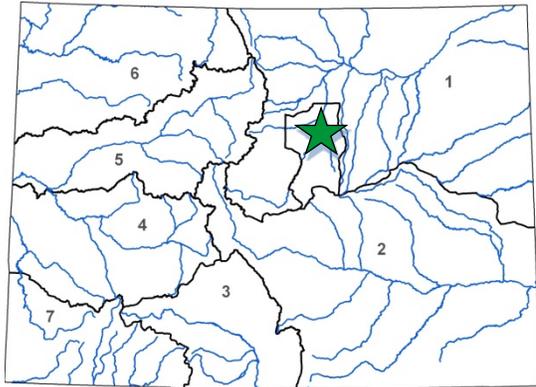


Chambers Reservoir Liner Rehabilitation

Arapahoe County Water and Wastewater Authority

May 2020 Board Meeting

L O A N D E T A I L S	
Project Cost:	\$2,500,000
CWCB Loan (with Service Fee):	\$2,525,000
Loan Term and Interest Rate:	20 Years @ 1.90%
Funding Source: Severance Tax Perpetual Base Fund	
B O R R O W E R T Y P E	
Agriculture	Municipal
0%	0% Low - 100% Mid - 0% High
Commercial	0%
P R O J E C T D E T A I L S	
Project Type:	Reservoir Rehabilitation
Preserved Storage:	1,400 AF



L O C A T I O N	
County:	Arapahoe
Water Source:	Cherry Creek
Drainage Basin:	South Platte
Division:	1
District:	8

The Arapahoe County Water and Wastewater Authority (ACWWA) was formed in 1988 to supply potable and non-potable water service and wastewater service to approximately 10,000 residents and numerous commercial and industrial customers in southern Arapahoe County and a small portion of northern Douglas counties.

Chambers Reservoir was constructed in 2010 for ACWWA, who owns and operates the reservoir for the purpose of storing alluvial aquifer well water for non-potable irrigation use within its service area. The original reservoir design included excavation below the natural ground surface, installation of a compacted clay liner, and construction of a dam across an unnamed tributary of Happy Canyon Creek. Due to design and construction defects, the reservoir was found to leak up to a calculated 27 AF per week when the reservoir was approximately ¾ full. The reservoir was subsequently drained in 2017 and a 500-foot long portion of the clay liner and reservoir side slope failed. The failure is thought to have occurred due to high groundwater from the leaking reservoir and insufficient clay liner thickness and material properties.

The proposed project includes raising the bottom of the reservoir, installing an underdrain system to capture and remove any groundwater that may damage the reservoir, and install a synthetic liner. Construction is expected to begin in summer 2020.

