

# **Feasibility of Arkansas River Southside Diversion Dam Modifications and River Improvement Project**

Sponsored by  
Board of Water Works of Pueblo, CO

For the  
Colorado Water Conservation Board

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Colorado Water Conservation Board

# **Feasibility Study for Board of Water Works of Pueblo, CO. Arkansas River Southside Diversion Dam Modifications and River Improvement Project**

## **Introduction (Need for the Project)**

The Board of Water Works of Pueblo, CO (Pueblo Water) manages the municipal water supply needs for the City of Pueblo using several water management facilities situated along the Arkansas River. The Southside Diversion Raw Water Intake, which serves as a tertiary water source for the city, is part of Pueblo Water's redundancy in conveying water to its treatment plant. The associated Southside Diversion Dam (SDD) is a run-of-river dam, and its steep, abrupt geometry of the overflow weir makes it highly effective at dissipating flow energy over a relatively short distance. Its geometry, however, results in the formation of a highly retentive hydraulic roller below the weir, especially at higher river flows. The hydraulic conditions that can occur along the base of the overflow weir pose a serious, and potentially deadly, hazard to unsuspecting river users. This project would eliminate the weir and establish the SDD reach as a river passage.

## **Project Sponsor**

The Board of Water Works of Pueblo, CO, is the sponsor of this project. The City of Pueblo, Pueblo County Government, and the Pueblo Conservancy District also have pledged support for this project.

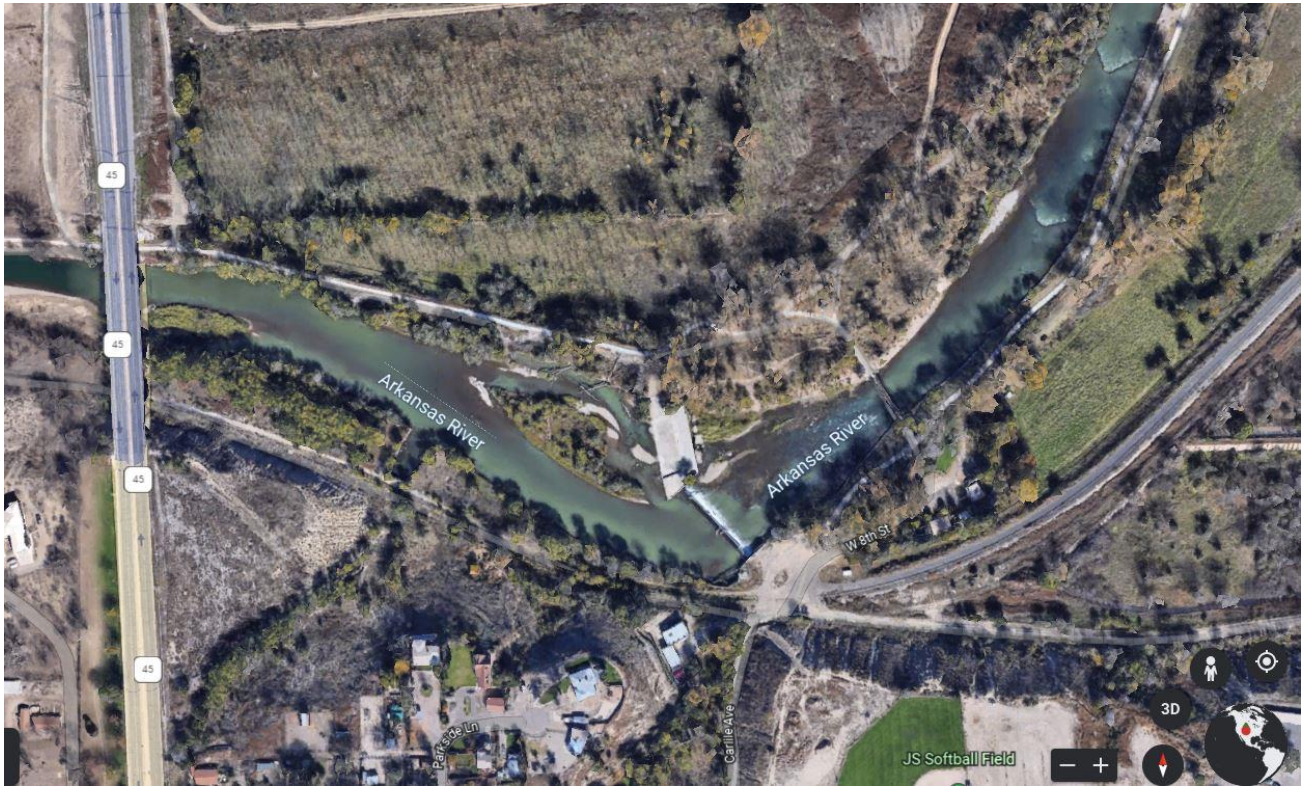
## **Project Service Area and Facilities**

The SDD was built sometime in the 1920's after experiencing the Flood of Record in 1921, probably within five years of the event. The earliest available imagery for the project reach shows the SDD in place on the river in September 1937, thus indicating that the facility is at least 85 years old – but is probably aged closer to 95 years. The Southside Diversion RWI is recessed along the right (south) bank within a retaining wall structure and centered approximately 50 feet upstream of the dam crest (Figure 2). The SDD is a monolithic concrete structure.

## **Hydrology and Water Rights**

The hydrology of the Arkansas River at the project site is relatively straightforward, especially since flow became regulated in late 1975 following construction of the Pueblo Dam and Reservoir by the United States Bureau of Reclamation (USBR). The facility serves a dual purpose of (i) mitigating flood risk at Pueblo and downstream communities by storing surface water runoff and attenuating inflow and (ii) ensuring continuous streamflow in Pueblo during low flow periods. The Pueblo Dam and Reservoir is one of several extensive flood mitigation structures found along the Arkansas River at Pueblo. A detailed listing of Pueblo Water's water rights can be found in appendix A.

## Detailed Location Map





## Photos of Existing Diversion



## Project Description and Alternatives

The purpose of this project is to modify the existing Southside Diversion Dam on the Arkansas River in Pueblo, CO. The modifications will make the reach safer, allow the river to be fully navigable through Pueblo, create a fish passage, improve river health, and provide recreational opportunities. Alternatives included:

1. The no-action alternative.
2. Proceed with SDD modifications as specified.

**Alternative No. 1** is considered unacceptable as doing nothing will result in the dangerous dam structure remaining in the river.

**Alternative No. 2** was selected.

**Table 1. Pueblo Water – SDD Diversion Project - Cost Estimate**

Item	Quantity	Unit	Unit Price \$	Amount \$
Engineering Costs	1	Job	\$715,003	\$715,003
Estimated Construction Costs			\$11,000,000	\$11,000,000
<b>Total</b>				<b>\$11,715,003</b>

## Implementation Schedule

SG1 has completed the first three phases of this four-phase project. Once final construction designs are completed, along with securing financing and required permitting, construction can begin.

## Permitting

Pueblo Water currently is in the permitting process.

## Institutional Considerations

Entities that are, or may be, involved in the design, construction, and financing of the project include:

Board of Water Works of Pueblo, CO (Pueblo Water)  
The City of Pueblo  
Pueblo County  
Pueblo Conservancy District

Pueblo Water is the lead for the financing, design, and construction of the project and will be the entity entering into contracts and agreements with the various entities for the services provided by each.

## Financial Analysis

Several entities will be involved in financing the estimated total project cost of \$11,715,003. The actual or estimated amounts by entity are given in Table 2.

**Table 2. Sources of Funding**

<b>Entity</b>	<b>Reserves</b>	<b>Loan</b>	<b>Percent Participation</b>
CWCB	\$0	\$9,750,000	83%
Pueblo Water	\$990,003	\$0	8%
City of Pueblo	\$325,000	\$0	3%
Pueblo County	\$325,000	\$0	3%
PCD	\$325,000	\$0	3%
<b>Totals</b>	<b>\$1,965,003</b>	<b>\$9,750,000</b>	<b>\$11,715,003</b>

Pueblo Water will cover any costs that exceed the estimated project cost.

Pueblo Water is requesting a 20-year loan from the CWCB. The standard low-income municipal lending rate would be 2.30%, resulting in annual payments of \$608,649.96.

Since all other funding for the project is cash, Pueblo Water would have no other debt service related to this project. Operation and maintenance costs will be allocated between Pueblo Water's and or the City of Pueblo's existing budget(s).

**Credit worthiness:** Pueblo Water currently has outstanding revenue bonds the principal of which is equal to \$18,613,333. These revenue bonds will be retired in 2029. Table 4 shows the Financial Ratios for Pueblo Water and indicates a strong ability to repay the loan.

**Table 4. Financial Ratios**

<b><i>Financial Ratio</i></b>	<b><i>Dec. 31, 2021</i></b>	<b><i>Dec. 31, 2022 (est)</i></b>
Operating Ratio (revenue/expense)	140% (strong)	154% (strong)
Debit Service Coverage Ratio (revenues-expenses)/debt service	313% (strong)	454% (strong)
# Of Days of Working Capital	318 days (strong)	304 days (strong)
Operating Reserves as a % of Operating Revenue	53% (strong)	54% (strong)

**Alternative financing considerations:** Pueblo Water consider either cash funding the project or issuing revenue bonds. Given the fact that the cost of the project is relatively low it did not warrant the issuance costs associated with issuing revenue bonds. CWCB's low-interest loan program and the low cost of issuance ultimately proved a better fit for the project.

**Collateral:** As security for the CWCB loan Pueblo Water will pledge its net revenues.

### **Social and Physical Impacts**

The project will have significant social and physical impacts. Along with creating a safer passage on the Arkansas River through Pueblo, the modified dam will create a fish passage, help improve river health, and provide numerous recreational opportunities. The new diversion structure will be in the same location as the current structure.

### **Conclusions**

1. Pueblo Water was created under article 15 of the City Charter as a stand-alone enterprise fund, not subject to TABOR with the ability to enter a contract with the CWCB for the purpose of obtaining a Construction Fund loan.
2. The project will eliminate the overly retentive hydraulic and reduce existing safety hazards associated with the SDD.
3. The project will connect the reaches upstream and downstream of the SDD to allow navigation.
4. The project will improve the river system ecology.
5. The project will allow for emergency diversion from the Southside Diversion RWI, on rare occasion, to supply water to the Northside Reservoirs at the Whitlock Treatment Plant.
6. The project will allow Pueblo Water to continue supplying water to the Riverside Dairy Ditch.
7. The total estimated cost of the project is \$11.7 million, and this will be financed, in part, by reserves. Pueblo Water is applying for a \$9.75 million loan from the CWCB Construction Fund for the amount not covered by reserves.
8. The project is technically and financially feasible.

## Appendix A

### Water Rights Summary

<b>Direct Flow</b>			
Appropriation			
Date	Amount (CFS)	Name	Case #
4/1/1861	7.00	Warrant, Barnes, and Baxter Ditch	W-145
4/1/1864	8.00	Booth Ditch	W-145
6/20/1870	2.50	Richie Ditch	CA20076 & 20077
11/30/1870	1.03	Hamp-Bell	12CW102
1/31/1871	1.20	Brooks Ditch	CA20076 & 20077
3/31/1871	1.60	Hobson Ditch	W-76
4/1/1872	1.16	West Pueblo Ditch	90CW55
6/20/1872	4.60	Fields Ditch	CA20076 & 20077
4/1/1874	0.96	West Pueblo Ditch	90CW55
4/1/1874	45.00	Ditch of the Trustees of the Pueblo Water Works, Ditch of Public Water Works District 2	CA19693
10/1/1878	0.58	West Pueblo Ditch	90CW55
12/31/1878	0.29	Hamp-Bell Ditch	12CW102
12/31/1881	2.00	Booth Ditch	W-145
12/31/1883	0.39	West Pueblo Ditch	90CW55
4/30/1886	2.46	Hobson Ditch	W-76
12/31/1888	1.00	Hamp-Bell	12CW102
12/31/1861	5.56	Bessemer Ditch (Excelsior Ditch)	17CW3050
5/31/1864	1.04	Bessemer Ditch (Canon City & Oil Creek Ditch)	17CW3051
6/30/1866	0.83	Bessemer Ditch (Rogers Ditch)	17CW3052
1/8/1867	0.70	Bessemer Ditch (Arkansas Ditch)	17CW3053
5/31/1867	1.43	Bessemer Ditch (Canon City & Oil Creek Ditch)	17CW3054
11/30/1870	0.41	Bessemer Ditch (Hamp-Bell Ditch)	17CW3055
12/31/1870	0.95	Bessemer Ditch (Barnum Ditch)	17CW3056
9/18/1873	0.56	Bessemer Ditch (Cape Horn Ranch Ditch)	17CW3057
12/31/1876	0.70	Bessemer Ditch (Cape Horn Ranch Ditch)	17CW3058
12/31/1876	0.14	Bessemer Ditch (Cape Horn Ranch Ditch)	17CW3059
12/31/1878	0.11	Bessemer Ditch (Hamp-Bell Ditch)	17CW3060
5/4/1881	3.89	Bessemer Ditch (Collier Ditch)	17CW3061
6/20/1881	0.56	Bessemer Ditch (I.N. Sater Ditch)	17CW3062
3/31/1882	2.22	Bessemer Ditch (Cawfield No. 2 Ditch)	17CW3063
5/1/1887	89.53	Bessemer Ditch	17CW3064
<b>Transmountain</b>			
6/1/1906	18.50	Ewing Ditch	Eagle County, Civil Action No. 507
6/27/1921	85.00*	Busk-Ivanhoe (Ivanhoe Reservoir and Tunnel)	Garfield County, Case No. 2621
9/28/1924	85.00*	Busk-Ivanhoe (Lyle Ditch)	Garfield County, Case No. 2621
10/5/1924	85.00*	Busk-Ivanhoe (Pan Ditch)	Garfield County, Case No. 2621
8/30/1927	85.00*	Busk-Ivanhoe (Hidden Ditch)	Garfield County, Case No. 2621
6/8/1929	85.00	Wurtz Ditch	Eagle County, Civil Action No. 963
8/23/1930	9000 AF	Twin Lakes IPTDS	Garfield County, Case No. 3082
9/22/1952	2500 AF	Homestake	Eagle County, Civil Action 1193
10/26/1953	24.00	Wurtz Extension	80CW505
7/29/1957	4500 AF	Fry-Ark	W-829-76
	* Total for all Busk-Ivanhoe		

## **Appendix B**

### **Summary Proforma Statement 2022 - 2032**

## **Appendix C**

### **2021 Annual Comprehensive Financial Report**



## **Appendix D**

### **2023 Budget**

## **Appendix E**

### **Basis of Design Report**

## **Appendix F**

### **CWCB Loan Application CWCB Memorandum of Loan Approval**