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Final Design Report  
Executive Summary

# BIG SANDY WATER SUPPLY PROJECT LEVEL II

Wyoming Water Development  
Commission

**NELSON  
ENGINEERING**

P.O. Box 1599 Jackson, Wyoming

October 1993

## EXECUTIVE SUMMARY

### 1. INTRODUCTION

The Big Sandy River Unit has been identified as a major contributor of salt to the Green River, which is a tributary of the Colorado River. As part of the Colorado River Basin Salinity Control Program, numerous farms in the Eden Irrigation & Drainage District are converting to sprinkler irrigation. Consequently, better regulation of delivered water, with less sedimentation, has become more desirable.

The current District records indicate approximately 105 operators irrigating 17,010 acres. The water delivery system is essentially as designed and constructed through contract with the Bureau of Reclamation and completed in 1959. There are currently about 50 sprinkler irrigation systems serving an estimated 5200 acres.

The salinity reduction program on the Big Sandy River Unit is estimated to result in the eventual reduction of 52,900 tons of salt annually entering the Big Sandy River. The implementation of this plan requires the voluntary conversion of irrigation methods to Low Pressure Sprinkler Irrigation Systems. As farms convert to sprinkler irrigation, the excessive sedimentation in the canals has the potential to become a significant problem as it wears on the pumps and other components.

This study and Level II report was authorized in June 1992 by WWDC and the Eden Valley I&D District. The study

objective was to identify and evaluate potential sand/silt control facilities and regulating reservoirs on the canal systems.

2. **DESIGN CRITERIA AND DESIGN CONSIDERATIONS**

Criteria has been established so that the capacity, quality or functional capability of each segment of canal is integral to each design.

The general design considerations include:

- normal civil engineering rules used in reservoir design
- criteria and findings relative to silt/sediment control (Lidstone & Anderson, Inc.)
- earthwork and foundation investigations
- cultural constraints (Frontier Archaeology)
- geotechnical considerations (Inberg-Miller Engineers)
- environmental constraints (Mountain West Environmental Services and Headwater Ecology)

3. **PRELIMINARY DESIGN**

Using the design criteria, five(5) reservoir sites were chosen. To design the reservoirs for specific sites, the following factors were considered:

- Reservoir Type: Preliminary design of two reservoir types were created for each location. The most appropriate for each site has not been determined.
- Reservoir Capacity: Surge, Operating Demand and Emergency Reserve were the three general factors effecting the size of each reservoir. In total, they provided a volume that each reservoir was designed to accommodate.

- Water Surface Elevations: Canal water surface level above and below each site dictate the usability of each location.
- Inlet/Outlet: Design based on the capacity of the facilities (pipes, gates et al) to move water to and from the reservoir.
- Silt Traps: Prevents the flow of sediment in the canals. This was proven to be especially critical in the Eden Canal.

The aforementioned criteria provided a uniform basis of comparison and evaluation of each site.

4. **COST ESTIMATES AND ECONOMIC ANALYSIS**

The best opinion of probable cost has been generated based upon the information available. These costs have been tabulated and appear on the following page.

5. **EVALUATION**

Silt was found not to be a serious problem on either the Westside or the Farson Lateral. The sedimentation of the Eden Canal was found to be a more significant problem. A minimum of two silt traps have been proposed on the Eden Canal where the most significant buildup has occurred.

Reservoirs provide a somewhat more efficient management of water. There are many variables to be considered in the evaluation of reservoir sites. A logical basis of comparison has been established so that the characteristics of the reservoirs can be equated.

ITEM	SITE #1 Farson Lateral	SITE #4 Eden Canal	SITE #5 Eden Canal	SITE #7 Westside Lateral	SITE #9 Farson Lateral	*Relocate Cnty Rd. (1900 L.F.)  SITE #10 Westside Lateral	SITE #11 Westside Lateral	SILT TRAP STA 650 + 00 Eden Canal	SILT TRAP STA 750 + 00 Eden Canal	SILT TRAP STA 1020 + 00 Eden Canal
A. Land and Access Costs	N/A Burec set aside	N/A Burec set aside	N/A Burec set aside	\$6,000.00	\$8,000.00	\$3,150.00	\$5,000.00	N/A	N/A	N/A
B. Construction Costs										
1. Mobilization	\$17,935.00	\$55,053.00	\$67,985.00	\$36,885.00	\$22,512.00	\$28,200.00	\$15,276.00	\$1,353.00	\$1,327.00	\$1,297.00
2. Site Preparation	1,950.00	4,875.00	5,640.00	4,305.00	2,400.00	2,550.00 57,000.00	1,500.00	75.00	75.00	75.00
3. Exc. a) Reservoir b) Stockpile	48,750.00 17,600.00	311,250.00 74,250.00	298,125.00 105,835.00	N/A (Borrow Pit) 90,667.00	63,375.00 38,133.00	122,500.00 27,132.00	51,250.00 22,309.00	1,967.00	1,967.00	1,857.00
4. Canal Exc.	7,500.00	N/A (on line)	N/A (on line)	25,400.00	3,666.00	N/A (on line)	815.00	7,200.00	7,200.00	6,768.00
5. Clay a) Liner b) Haul	19,556.00 1,956.00	82,500.00 24,750.00	117,594.00 42,334.00	100,741.00 20,148.00	42,370.00 8,474.00	30,147.00 9,647.00	24,787.00 4,957.00	1,740.00 487.00	1,740.00 348.00	1,650.00 264.00
6. Rip Rap	1,860.00	660.00	6,660.00	66,660.00	2,100.00	2,700.00	4,020.00	1,965.00	1,842.00	2,254.00
7. Concrete Work	38,000.00	32,500.00	44,500.00	29,000.00	28,750.00	20,000.00	20,000.00			
8. Gates	19,000.00	N/A	36,250.00	20,200.00	7,900.00	N/A	7,900.00			
9. RCP	16,710.00	12,325.00	12,900.00	8,100.00	19,100.00	4,850.00	12,725.00			
10. Gate Valves	3,500.00	5,500.00	5,500.00	N/A	5,500.00	3,500.00				
11. Trash Racks	1,800.00	570.00	3,300.00	2,400.00	2,310.00	1,500.00	1,530.00			
12. Misc Metal/Tmbr	770.00	750.00	790.00	1,130.00	770.00	N/A	770.00			
13. Grading/Seed	400.00	600.00	425.00	100.00	275.00	475.00	200.00	100.00	100.00	100.00
Construct. Cost Total	\$197,287.00	\$605,583.00	\$747,838.00	\$405,736.00	\$247,635.00	\$310,201.00	\$168,039.00	\$14,887.00	\$14,599.00	\$14,265.00

The District, WWDC and other reviewing agencies will need to consider their own methods to fully equate each of the alternatives.

6. QUESTIONNAIRE

The public input that has been received on this project was overwhelmingly negative in nature. Those that participated in the questionnaire process, and at the public hearings, did recognize some merit in the project philosophy. However, they (the irrigators) did not feel that salinity or sedimentation of the Big Sandy System was a problem of such magnitude as to justify the costs (especially to them) for 'improvements'. The respondents generally did not view either of these problems as significant. Nor did they feel that the delivery time of irrigation water to their farms was as problematic as previously thought.

Consequently, it is the concensus of the participating persons, agencies and departments that further development of the Big Sandy Water Supply Project, Level II, be terminated.