

## **1.11 Locally Not Cost Effective Water Conservation Programs and Measures**

### **BCWD**

The BCWD Water Main Replacement and Meter Installation Project is a water conservation project that is not locally cost effective. The project is expected to result in conserving an annual average of 27 acre-feet of water through the replacement of existing leaking water mains and the implementation of a metered customer services. Over the life of the project, the total water savings is estimated to be 1,374 acre-feet. The associated monetary benefit of this water savings is essentially the associated BCWD water rate. The present value of the monetary local benefits (detailed in **Attachment 3**), are less than the present value of the local costs to implement the project.

### **Monetized Benefits**

The monetized benefits include reduced groundwater production due to lower water demands. These benefits are quantified in **Attachment 3** and are monetized using the DWR Method. The guidelines and assumption used in the analysis include the following:

1. Without-Project and With Project. Without the project none of the costs will be incurred and no benefits will be realized. With the project all the costs will be incurred and all benefits are expected to be realized.
2. Period of Analysis: The period of analysis is 50 years for the water mains and 20 years for the water meters. The water meters are expected to last 20 years based on the experience of other water meter programs.
3. Sunk Costs: The project does not include sunk costs.
4. Opportunity Costs: The project does not include opportunity costs.
5. Discount Rate: A 6% discount rate was used in the analysis.
6. Dollar Value Base Year: All values are based on 2014 dollars.

### **Reduced Groundwater Production Costs**

The installation of water mains and water meters are expected to reduce water demands by 16% since customers will purchase water on a volumetric basis (411 acre-feet per year). This will reduce the cost to pump, operate and maintain groundwater wells. Groundwater pumping is expected to reduce by 27 AF/yr over the 50 year life of the project. BWCD estimates the cost to produce an acre foot of water to be \$134/AF. This is the value of local potable water and was used in the economic analysis. Groundwater pumping and delivery is the least expensive and most likely alternative water supply, and is therefore considered appropriate for the economic analysis. See **Table ES-3 – Annual Benefit** and Supporting Documentation (**Attachment 1.11-A**) for a summary of the fiscal benefits associated with these items.

**Project Costs**

Construction and Engineering Costs

The total estimated costs for the project are \$3,746,080 as presented in detail in Attachment 5 – Budget. These costs must be expended before the project can operate.

Administration Costs

The project administrative costs will include office staff time to implement the volumetric rates structure. It is estimated administration will take approximately 4 hours per month (48 hours per year) of office staff time. The burdened hourly rate for this staff is \$40. The administrative costs will average approximately \$1,920 per year (\$40\*48). Also included in the Administration costs line item is the annual meter reading software fee of \$1,000.

Operation Costs

The project operational duties will be primarily performed by the system manager and should take approximately 6 hours per month; 4 hours per month to coordinate meter reading, and 2 hours per month to upload the data and correct any anomalies. The burdened hourly rate associated with this staff is approximately \$40. Based on these assumptions, the operation cost will be \$2,880 per year (\$40\*6\*12).

Maintenance Costs

The water mains and water meters will require minimal routine maintenance. It is anticipated approximately 20 meters per year will require maintenance.

The meter maintenance will be performed by field staff that has a burdened hourly rate of \$25. The maintenance should take no more than 2 hour per meter – 40 hours per year, which equates to a cost of \$1,000 per year.

Replacement Costs

The project does not include replacement costs. The meters are assumed to have a useful life of 20 years; at the end of the meter’s useful life it is assumed that there will be no water savings from the meters. The mains are assumed to have a useful life of 50 years, which contribute to the project’s water savings through the analysis period.

Monitoring Costs

No additional monitoring costs are associated with this project; meter readings and associated administrative costs are included in administration costs above.

The lifecycle project costs are provided in DWR Economic **ES-5 – Annual Costs (Attachment 1.11-B)**.

**Benefit Cost Analysis**

A financial analysis was performed over a 50-year period using a six percent discount rate. The costs (initial, administration, operation, and maintenance) and benefits (water conservation) were calculated over a 50-year period. The project benefit cost ratio is provided below:

$$\frac{\text{Project Benefits}}{\text{Project Costs}} = \frac{\$95,015}{\$3,639,755} = 0.03$$

**Appendix 1.11-A**

**Reduced Groundwater Production Cost Supporting Documentation**

## Buttonwillow County Water District Water Usage

**Pump Test Report Data indicates the following water pumping**

KWH per Acre-Foot                    534

Elect Cost per A-F                    \$133

### January 2013 thru December 2013

Month	Charge	KWH	Gallons	Acre-Feet Pumped
January-13	\$1,752.05	11,450	5,541,264	17.01
February-13	\$2,314.08	11,829	5,970,500	18.32
March-13	\$2,920.81	11,681	7,928,880	24.33
April-13	\$3,234.08	11,847	13,396,400	41.11
May-13	\$6,780.01	17,954	16,043,668	49.24
June-13	\$7,036.76	24,827	17,890,700	54.91
July-13	\$7,402.58	30,732	19,369,300	59.45
August-13	\$6,857.95	29,843	16,876,400	51.80
September-13	\$6,348.00	25,392	11,559,400	35.48
October-13	\$4,514.76	18,708	6,834,451	20.98
November-13	\$2,956.75	13,768	6,260,840	19.22
December-13	\$2,447.79	11,246	6,241,392	19.16
<b>Totals</b>	<b>\$54,566</b>	<b>219,278</b>	<b>133,913,195</b>	<b>411</b>
Average Gallons per Day Usage				366,885
Average Gallons per Capita per Day Usage				473.40

		Annual Water Savings	
Estimated savings from meters	15%	20,086,979	Gallons
	15%	61.64	Acre-feet
Estimated savings from new mains	3.0%	4,017,396	Gallons
	3.0%	12.33	Acre-feet
Estimated Cumulative Water Savings	18%	24,104,375	Gallons
	18%	73.97	Acre-feet

**Appendix 1.11-B**  
**Annual Monitoring Costs**

**Table ES-5 – Annual Costs of Project**

(All costs should be in 2014 Dollars)

**Project: Buttonwillow County Water District Water Main Replacement and Meter Installation Project**

Year	Initial Costs Grand Total Cost from Table 7 (row (i), column (d))	Adjusted Grant Total Cost <sup>(1)</sup>	Annual Costs <sup>(2)</sup>					Discounting Calculations		
			Admin	Operation	Maintenance	Replacement	Other	Total Costs (a) +...+ (g)	Discount Factor <sup>(3)</sup>	Discounted Project Costs (h) x (i)
	(a)	(b)	(c)	(d)	(e)	(f)	(g)	(h)	(i)	(j)
2014		\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	1	\$0.00
2015	\$3,122,273.00	\$0.00	\$2,920.00	\$2,880.00	\$1,000.00	\$3,533.20	\$0.00	\$10,333.20	0.943	\$9,744.21
2016		\$0.00	\$2,920.00	\$2,880.00	\$1,000.00	\$3,533.20	\$0.00	\$10,333.20	0.89	\$9,196.55
2017		\$0.00	\$2,920.00	\$2,880.00	\$1,000.00	\$3,533.20	\$0.00	\$10,333.20	0.84	\$8,679.89
2018		\$0.00	\$2,920.00	\$2,880.00	\$1,000.00	\$3,533.20	\$0.00	\$10,333.20	0.792	\$8,183.89
2019		\$0.00	\$2,920.00	\$2,880.00	\$1,000.00	\$3,533.20	\$0.00	\$10,333.20	0.747	\$7,718.90
2020		\$0.00	\$2,920.00	\$2,880.00	\$1,000.00	\$3,533.20	\$0.00	\$10,333.20	0.705	\$7,284.91
2021		\$0.00	\$2,920.00	\$2,880.00	\$1,000.00	\$3,533.20	\$0.00	\$10,333.20	0.665	\$6,871.58
2022		\$0.00	\$2,920.00	\$2,880.00	\$1,000.00	\$3,533.20	\$0.00	\$10,333.20	0.627	\$6,478.92
2023		\$0.00	\$2,920.00	\$2,880.00	\$1,000.00	\$3,533.20	\$0.00	\$10,333.20	0.592	\$6,117.25
2024		\$0.00	\$2,920.00	\$2,880.00	\$1,000.00	\$3,533.20	\$0.00	\$10,333.20	0.558	\$5,765.93
2025		\$0.00	\$2,920.00	\$2,880.00	\$1,000.00	\$3,533.20	\$0.00	\$10,333.20	0.527	\$5,445.60
2026		\$0.00	\$2,920.00	\$2,880.00	\$1,000.00	\$3,533.20	\$0.00	\$10,333.20	0.497	\$5,135.60
2027		\$0.00	\$2,920.00	\$2,880.00	\$1,000.00	\$3,533.20	\$0.00	\$10,333.20	0.469	\$4,846.27
2028		\$0.00	\$2,920.00	\$2,880.00	\$1,000.00	\$3,533.20	\$0.00	\$10,333.20	0.442	\$4,567.27
2029		\$0.00	\$2,920.00	\$2,880.00	\$1,000.00	\$3,533.20	\$0.00	\$10,333.20	0.417	\$4,308.94
2030		\$0.00	\$2,920.00	\$2,880.00	\$1,000.00	\$3,533.20	\$0.00	\$10,333.20	0.394	\$4,071.28
2031		\$0.00	\$2,920.00	\$2,880.00	\$1,000.00	\$3,533.20	\$0.00	\$10,333.20	0.371	\$3,833.62
2032		\$0.00	\$2,920.00	\$2,880.00	\$1,000.00	\$3,533.20	\$0.00	\$10,333.20	0.35	\$3,616.62
2033		\$0.00	\$2,920.00	\$2,880.00	\$1,000.00	\$3,533.20	\$0.00	\$10,333.20	0.331	\$3,420.29
2034		\$0.00	\$2,920.00	\$2,880.00	\$1,000.00	\$3,533.20	\$0.00	\$10,333.20	0.312	\$3,223.96
2035		\$0.00	\$2,920.00	\$2,880.00	\$1,000.00	\$0.00	\$0.00	\$6,800.00	0.294	\$1,999.20
2036		\$0.00	\$2,920.00	\$2,880.00	\$1,000.00	\$0.00	\$0.00	\$6,800.00	0.278	\$1,890.40
2037		\$0.00	\$2,920.00	\$2,880.00	\$1,000.00	\$0.00	\$0.00	\$6,800.00	0.262	\$1,781.60
2038		\$0.00	\$2,920.00	\$2,880.00	\$1,000.00	\$0.00	\$0.00	\$6,800.00	0.247	\$1,679.60
2039		\$0.00	\$2,920.00	\$2,880.00	\$1,000.00	\$0.00	\$0.00	\$6,800.00	0.233	\$1,584.40
2040		\$0.00	\$2,920.00	\$2,880.00	\$1,000.00	\$0.00	\$0.00	\$6,800.00	0.22	\$1,496.00
2041		\$0.00	\$2,920.00	\$2,880.00	\$1,000.00	\$0.00	\$0.00	\$6,800.00	0.207	\$1,407.60
2042		\$0.00	\$2,920.00	\$2,880.00	\$1,000.00	\$0.00	\$0.00	\$6,800.00	0.196	\$1,332.80
2043		\$0.00	\$2,920.00	\$2,880.00	\$1,000.00	\$0.00	\$0.00	\$6,800.00	0.185	\$1,258.00
2044		\$0.00	\$2,920.00	\$2,880.00	\$1,000.00	\$0.00	\$0.00	\$6,800.00	0.174	\$1,183.20
2045		\$0.00	\$2,920.00	\$2,880.00	\$1,000.00	\$0.00	\$0.00	\$6,800.00	0.164	\$1,115.20
2046		\$0.00	\$2,920.00	\$2,880.00	\$1,000.00	\$0.00	\$0.00	\$6,800.00	0.155	\$1,054.00
2047		\$0.00	\$2,920.00	\$2,880.00	\$1,000.00	\$0.00	\$0.00	\$6,800.00	0.146	\$992.80
2048		\$0.00	\$2,920.00	\$2,880.00	\$1,000.00	\$0.00	\$0.00	\$6,800.00	0.138	\$938.40
2049		\$0.00	\$2,920.00	\$2,880.00	\$1,000.00	\$0.00	\$0.00	\$6,800.00	0.13	\$884.00
2050		\$0.00	\$2,920.00	\$2,880.00	\$1,000.00	\$0.00	\$0.00	\$6,800.00	0.123	\$836.40
2051		\$0.00	\$2,920.00	\$2,880.00	\$1,000.00	\$0.00	\$0.00	\$6,800.00	0.116	\$788.80
2052		\$0.00	\$2,920.00	\$2,880.00	\$1,000.00	\$0.00	\$0.00	\$6,800.00	0.109	\$741.20
2053		\$0.00	\$2,920.00	\$2,880.00	\$1,000.00	\$0.00	\$0.00	\$6,800.00	0.103	\$700.40
2054		\$0.00	\$2,920.00	\$2,880.00	\$1,000.00	\$0.00	\$0.00	\$6,800.00	0.097	\$659.60
2055		\$0.00	\$2,920.00	\$2,880.00	\$1,000.00	\$0.00	\$0.00	\$6,800.00	0.092	\$625.60
2056		\$0.00	\$2,920.00	\$2,880.00	\$1,000.00	\$0.00	\$0.00	\$6,800.00	0.087	\$591.60
2057		\$0.00	\$2,920.00	\$2,880.00	\$1,000.00	\$0.00	\$0.00	\$6,800.00	0.082	\$557.60
2058		\$0.00	\$2,920.00	\$2,880.00	\$1,000.00	\$0.00	\$0.00	\$6,800.00	0.077	\$523.60
2059		\$0.00	\$2,920.00	\$2,880.00	\$1,000.00	\$0.00	\$0.00	\$6,800.00	0.073	\$496.40
2060		\$0.00	\$2,920.00	\$2,880.00	\$1,000.00	\$0.00	\$0.00	\$6,800.00	0.069	\$469.20
2061		\$0.00	\$2,920.00	\$2,880.00	\$1,000.00	\$0.00	\$0.00	\$6,800.00	0.065	\$442.00
2062		\$0.00	\$2,920.00	\$2,880.00	\$1,000.00	\$0.00	\$0.00	\$6,800.00	0.061	\$414.80
2063		\$0.00	\$2,920.00	\$2,880.00	\$1,000.00	\$0.00	\$0.00	\$6,800.00	0.058	\$394.40
2064		\$0.00	\$2,920.00	\$2,880.00	\$1,000.00	\$0.00	\$0.00	\$6,800.00	0.055	\$374.00

**Total Present Value of Discounted Costs (Sum of column (j))** **\$147,724.27**

**Transfer to Table ES-6, column (c), Proposal Benefits and Costs Summaries**

Comments:

- (1) If any, based on opportunity costs, sunk costs and associated costs
- (2) The incremental change in O&M costs attributable to the project
- (3) Discount Factors are contained in Table ES-1