

## Coachella Valley Integrated Regional Water Management Implementation Grant Proposal

### *Economic Analysis – Water Supply Costs and Benefits*

Attachment 7 consists of the following item:

✓ **Water Supply Costs and Benefits**

The body of this attachment provides an overview of the water supply costs and benefits of this proposed funding package, as well as the water supply benefits associated with each individual project.

✓ **Appendix 7-1**

Appendix 7-1 contains detailed information and background regarding the qualitative and quantitative costs and water supply benefits of each individual project contained within this Implementation Grant Proposal.

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This attachment contains estimations of the water supply-related costs and benefits of each project contained within this *Coachella Valley IRWM Implementation Grant Proposal*. Because several projects are being proposed with multiple benefits, Table 7-1 below contains a summary of the water supply costs and benefits for all projects.

Section 1 provides a summary of the regional water supply background in Coachella Valley.

Section 2 contains a narrative description of the expected costs that may be incurred to implement and operate each project, and to achieve benefits from each project. Appendix 7-1 also contains all costs associated with each project that are necessary to accomplish full implementation of each project and achievement of the stated benefits.

Section 3 contains a narrative description of the expected water supply benefits of each project. Where possible, each benefit was quantified and presented in physical or economic terms. In cases where quantitative analyses were not feasible, this attachment provides complimentary qualitative analyses. In addition, this attachment provides a description of economic factors that may affect or qualify the amount of economic benefits to be realized. This attachment also includes a discussion regarding uncertainties about the future that might affect the level of benefit received. Appendix 7-1 contains detailed information regarding the benefits anticipated to occur as a result of this proposal.



**Table 7-1: Water Supply Costs and Benefits Summary**

#	Project	Project Sponsor	Total Present Value Project Costs	Total Present Value Water Supply Benefits
1	Regional Water Conservation Program	Coachella Valley Water District	\$1,188,352	\$94,682,132
2	Short Term Arsenic Treatment Project	Pueblo Unido Community Development Corporation	\$913,459	\$743,030
3	Groundwater Quality Protection Program – Desert Hot Springs	Mission Springs Water District	\$2,764,463	N/A
4	Groundwater Quality Protection Program – Cathedral City	City of Cathedral City	\$1,760,282	N/A
<b>TOTAL</b>			<b>\$6,626,556</b>	<b>\$95,425,162</b>

## 1 Regional Water Supply Background

The Coachella Valley IRWM Region is chiefly the same boundary as the Whitewater River watershed boundary, also known as the Coachella Valley. The area is drained primarily by the Whitewater River that flows southward to the Salton Sea. The Coachella Valley is characterized by low precipitation and high summer daytime temperatures.

Water supply for the Coachella Valley is generally pumped from sub-basins of the Coachella Valley Groundwater Basin. Water is pumped from many wells around the region into each of the regional water purveyor’s distribution systems. Each of the five water purveyors of the region – Coachella Valley Water District (CVWD), Coachella Water Authority (CWA), Desert Water Agency (DWA), Indio Water Authority (IWA), and Mission Springs Water District (MSWD) – operates its own water distribution system.

Groundwater is the largest source of water supply for the region. The Coachella Valley Groundwater Basin has an estimated storage capacity of 39 million acre-feet (AF) of water. Prior to 1949, groundwater levels steadily declined due to agricultural pumping. The Coachella branch of the All American Canal (Coachella Canal) was completed in 1949 and the first deliveries of Colorado River water to the Coachella Valley began in that year. As a result, groundwater pumping was significantly reduced from 1950 to the early 1980s, and water levels rose in the eastern Coachella Valley. However, since the 1980s, increased pumping has caused water levels in the eastern Coachella Valley to decline despite Colorado River imports. CVWD estimates the decrease in freshwater storage in the Coachella Valley Groundwater Basin for 1999 to be 137,000 AF, with a cumulative overdraft of nearly 4.8 million acre-feet between 1936 and 1999.<sup>1</sup>

Due to potentially significant consequences caused by groundwater overdraft, the region has developed imported water supplies to supplement and replenish groundwater supplies. CVWD and DWA obtain imported water supplies through two primary sources 1) State Water Project (SWP) supply via exchange with Metropolitan Water District of Southern California (MWD) for delivery through the Colorado River Aqueduct and 2) Colorado River supply via the Coachella Canal.

<sup>1</sup> CVWD. 2002. Coachella Valley Water Management Plan.



## 2 Total Costs of Proposed Projects

The following sections provide information about the total project costs associated with each proposed project within this *Coachella Valley IRWM Implementation Grant Proposal*. The summary of total project costs is based on Table 11 in DWR’s Implementation Grant Proposal Solicitation Package (DWR 2010), inclusive of the project budget information contained in Attachment 4. Appendix 7-1 contains the complete Table 11 export for each proposed project.

### Project 1: Regional Water Conservation Program

The total estimated cost for the *Regional Water Conservation Program* is \$1,373,141, for a present value of \$1,188,352. Capital costs would be expended between 2010 and 2012, with the largest capital cost in construction and implementation. There are no anticipated operations and maintenance costs for this program. Detailed cost information associated with the program, including present value calculations, is presented in Appendix 7-1.

**Table 7-2: Total Project Cost**  
***Regional Water Conservation Program***

Phase	Cost
<i>Regional Water Conservation Program</i> Capital Costs	\$1,373,141
<i>Regional Water Conservation Program</i> O&M Costs	N/A
<b>Total after Discounting (\$2009)</b>	<b>\$1,188,352</b>

### Project 2: Short Term Arsenic Treatment Project

The total estimated costs for the *Short Term Arsenic Treatment Project* are \$670,164 (capital) and \$653,200 (O&M) for a net present value of \$913,459. Capital costs would be expended between 2011 and 2012, while operations and maintenance costs will be expended from 2012 to 2031. Property owners and tenants will be responsible for operation and maintenance after the proposed project is in place. Training and education will be provided by the project proponent, Pueblo Unido CDC (PUCDC), to both property owners and tenants to learn necessary operations, maintenance, and replacement needs. Operations costs represent the costs incurred to retain a certified operator and conduct water quality tests for the point-of-entry systems. Maintenance costs represent costs necessary to purchase maintenance materials including chlorine and water softener for the point-of-entry systems. Replacement costs represent the costs required to purchase replacement filters, which are assumed to cost \$35 each and require replacement on an annual basis for the point-of-use systems. Detailed cost information associated with the project, including present value calculations, is presented in Appendix 7-1.

**Table 7-3: Total Project Cost**  
***Short Term Arsenic Treatment Project***

Phase	Total Cost
<i>Short Term Arsenic Treatment Project</i> Capital Costs	\$670,164
<i>Short Term Arsenic Treatment Project</i> O&M Costs (20 yrs)	\$653,200
<b>Total After Discounting (\$2009)</b>	<b>\$913,459</b>



### ***Project 3: Groundwater Quality Protection Program - Desert Hot Springs***

The total estimated costs for the *Groundwater Quality Protection Program - Desert Hot Springs* are \$3,097,181 (capital) and \$20,430 (O&M) for a net present value of \$2,764,463. Capital costs would be expended between 2010 and 2012 and operations and maintenance costs for maintenance would be expended incrementally throughout the Project’s lifetime. Years 2010 through 2015 of the project’s lifetime would not require maintenance. Maintenance would be required starting in 2016 and thereafter every three to five years depending upon maintenance needs requirements of the particular section. These recurring maintenance costs are estimated to be \$2,270. Lines that are in good shape would require maintenance every five years, and lines with greater cleaning needs would require maintenance in approximately three-year intervals. Detailed cost information associated with the project, including present value calculations, is presented in Appendix 7-1.

**Table 7-4: Total Project Cost**  
***Groundwater Quality Protection Program - Desert Hot Springs***

<b>Phase</b>	<b>Total Cost</b>
<i>Groundwater Quality Protection Program - Desert Hot Springs</i> Capital Costs	\$3,097,181
<i>Groundwater Quality Protection Program - Desert Hot Springs</i> O&M Costs (once every 5 years)	\$20,430
<b>Total after Discounting (\$2009)</b>	<b>\$2,764,463</b>

### ***Project 4: Groundwater Quality Protection Program-Cathedral City***

The total estimated costs for the *Groundwater Quality Protection Program - Cathedral City* are \$1,851,890 (capital) and \$375,000 (O&M) for a present value of \$1,760,282. Capital costs have been/would be expended between 2008 and 2012, while operations and maintenance costs will be expended from 2011 to 2060, with the largest capital cost in construction and implementation. The operation and maintenance costs are not anticipated to change with respect to 2009 dollars, but will last throughout the duration of the Project’s lifetime. Detailed cost information associated with the Project, including present value calculations is presented in Appendix 7-1.

**Table 7-5: Total Project Cost**  
***Groundwater Quality Protection Program - Cathedral City***

<b>Phase</b>	<b>Total Cost</b>
<i>Groundwater Quality Protection Program - Cathedral City</i> Capital Costs	\$1,851,890
<i>Groundwater Quality Protection Program - Cathedral City</i> O&M Costs (50 years)	\$375,000
<b>Total after Discounting (\$2009)</b>	<b>\$1,760,282</b>



### 3 Water Supply Benefits of Proposed Projects

The following sections provide information about the water supply benefits associated with each proposed project within this *Coachella Valley IRWM Implementation Grant Proposal*. The summary of total project costs is based on Tables 12-15 in DWR’s Implementation Grant Proposal Solicitation Package (DWR 2010). Appendix 7-1 contains the complete Tables 12-15 exports for each proposed project.

The projects within this proposal are anticipated to result in significant water supply benefits to the region. Two projects specifically focus on water supply benefits (*Regional Water Conservation Program* and *Short Term Arsenic Treatment Project*). While these projects are anticipated to directly result in significant water supply benefits, the remaining projects would also have indirect or complementary benefits to the region’s water supply.

#### Project 1: Regional Water Conservation Program

The water supply benefits anticipated from implementation of the *Regional Water Conservation Program* are summarized below in Table 7-6 and the water supply cost-benefit overview is summarized in Table 7-7. This program would result in both monetized and qualitative water supply benefits. Detailed cost and benefit information associated with the program, including present value calculations, are discussed in the following sections and additional details are provided in Appendix 7-1.

**Table 7-6: Water Supply Benefits Summary**  
*Regional Water Conservation Program*

Type of Benefit	Assessment Level	Beneficiaries
<b>Water Supply Benefits</b>		
Avoided Water Supply Costs	Monetized	Local, Regional, and Statewide
Avoided Well Replacement Costs	Monetized	Local
Water Supply Reliability	Qualitative	Local, Regional, and Statewide

**Table 7-7: Water Supply Benefit-Cost Overview**  
*Regional Water Conservation Program*

	Present Value (\$2009)
Costs – Total Capital and O&M	\$1,188,352
<b>Monetizable Benefits</b>	
Avoided Water Supply Costs	\$94,235,574
Avoided Well Replacement Costs	\$446,558
<b>Total</b>	<b>\$94,682,132</b>
<b>Qualitative Benefits</b>	
Water Supply Reliability	Qualitative Indicator*
	+

\* Magnitude of effect on net benefits:

+/- (negligible or unknown); + (moderate positive); ++ (significant positive); - (moderate negative); -- (significant negative)

#### The “Without Project” Baseline

If the *Regional Water Conservation Program* were not implemented, the Coachella Valley would continue to have similar water use demands as it currently has. In result, the Coachella Valley would continue to rely on imported water (as replenished groundwater) for water supply and would continue to incur costs associated with the imported water supply. Further, as growth and development continues, urban water consumption at current rates would contribute to increasing groundwater overdraft. For more



information regarding the without project baseline used to determine water quality and other benefits, please refer to Attachment 8.

### Water Supply Benefits

This program would result in water supply benefits associated with avoided water supply costs and avoided well replacement costs. Detailed cost and benefit information associated with the program, including present value calculations, is presented in Appendix 7-1. A summary and discussion of these benefits are presented below.

#### *Avoided Water Supply Costs*

Water conservation anticipated as part of the program would reduce regional water demand, thereby reducing the Coachella Valley region's future dependence on imported water from the State Water Project (SWP). Reducing future dependence on imported water would potentially produce benefits associated with avoiding the costs of transporting, pumping, and recharging imported water into the groundwater basin.

In 1962 and 1963, respectively, DWA and CVWD entered into contracts with the State of California for 61,200 AFY of SWP water. To avoid the then-estimated \$150 million cost of constructing an aqueduct to bring SWP water directly to the Valley, CVWD and DWA entered into an exchange agreement with MWD to exchange SWP water for Colorado River water. The exchange agreement allows for delivery of SWP water to replenish groundwater in the Whitewater River Sub-basin of the Upper Coachella Valley Groundwater Basin.

By the 1980s, groundwater demand in the East Valley had again exceeded supplies, resulting in significant groundwater level decreases in some parts of the East Valley. Because groundwater recharge in the East Valley is complicated by relatively impervious clay layers in the Valley floor, CVWD began looking for sites sufficiently far away from the main clay layer to allow groundwater recharge.

CVWD, DWA, and MWD executed an Advance Delivery Agreement in 1983 (updated in 2003), which allows MWD to store up to 600,000 acre feet of water in the Whitewater River Sub-basin. MWD assigned 11,900 acre feet of its annual Table A allocation to DWA and 88,100 acre feet of its annual Table A allocation to CVWD for a total of 100,000 acre feet (Table A is an entitlement schedule set forth by the SWP on an annual basis). CVWD and DWA executed the Mission Creek Groundwater Replenishment Agreement in April 2003, which also allows for storage of advanced deliveries from MWD.

CVWD and DWA now operate four recharge areas in the Coachella Valley IRWM region:

- *Whitewater Spreading Area* recharges Colorado River water and captures stormwater, with historical peak recharge of 288,000 acre-feet in 1986,
- *Mission Creek Spreading Facility* recharges Colorado River water and has a recharge capacity of 30,000 to 40,000 AFY,
- *Thomas E. Levy Recharge Facility* recharges water obtained from the Coachella Canal and has a recharge capacity of approximately 30,000 to 40,000 AFY, and
- *Martinez Canyon Pilot Recharge Project* recharges Coachella Canal water and currently has capacity of about 2,000 AFY.

SWP supplies vary annually due to weather and runoff variations, as well as regulatory limitations on exports from the Delta. Under current conditions, the SWP can only provide about 60 percent of the Table A allocation indicated in CVWD's and DWA's contracts. In the absence of state and federal actions in



the Bay Delta to increase SWP supplies, it is anticipated that long-term SWP reliability (deliveries) could decrease to 50 percent of the Table A allocations.<sup>2</sup>

Because current water supplies imported into the Valley are from purchased entitlements via the SWP, these costs were used to estimate the avoided costs of water supply purchases that would result from the *Regional Water Conservation Program*. These costs can vary and are currently estimated to be around \$4,000 per AFY based on CVWD's draft Coachella Valley Water Management Plan (CVWMP) Update. With an estimated long-term reliability of only 50 percent, this means the actual unit cost of imported water supply is closer to \$8,000 per AFY. When exchanged for MWD's Colorado River water, additional costs for conveying the water are also incurred and are estimated to be around \$600 per AFY. The total discounted future value of avoided water supply costs are based on a unit value derived from the cost of importing, transporting, and recharging of imported water and was estimated at \$1,166/AF (in 2009 dollars).

The overall conservation program in the Coachella Valley aims to reduce 70,000 AFY of water use through various conservation activities by 2020. If implemented, the *Regional Water Conservation Program* would help the region meet its overall conservation goals. CVWD's draft CVWMP Update indicates that the return on investment for water conservation programs in the Coachella Valley is approximately \$200 per AF.<sup>3</sup> Given this cost per AF return on investment and the program's Construction/Implementation budget of \$1,325,000, it is anticipated that a maximum of approximately 6,625 AFY of water would be conserved under the program. It is anticipated that 50% of this total, or 3,433 AFY would be conserved in 2012. After implementation of the program and associated changes on consumption behavior, the total yearly amount of 6,625 AF of water savings would be expected annually between 2013 and 2032. Between 2032 and the final lifetime of the program (2060), water conservation would be anticipated to decline proportionally until water conservation resulting from this Work Plan effort ceases in 2060.

In total, after discounting, the total water supply benefits are estimated to be \$94,235,574 over the lifetime of the program as shown in Table 7-8 below.

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<sup>2</sup> CVWD. 2010. *Coachella Valley Water Management Plan Update – Draft Report*. Available at: [http://www.cvwd.org/news/publicinfo/2010\\_12\\_02\\_CVWMP\\_Update\\_Draft.pdf](http://www.cvwd.org/news/publicinfo/2010_12_02_CVWMP_Update_Draft.pdf)

<sup>3</sup> CVWD. 2010. *Coachella Valley Water Management Plan Update – Draft Report*. Available at: [http://www.cvwd.org/news/publicinfo/2010\\_12\\_02\\_CVWMP\\_Update\\_Draft.pdf](http://www.cvwd.org/news/publicinfo/2010_12_02_CVWMP_Update_Draft.pdf)



**Table 7-8: Avoided Water Supply Costs  
 Regional Water Conservation Program**

Year	Water Savings (AF)	Unit Cost (per AF)	Years	Total Cost
2012	3,313	\$1,166	1	\$3,863,502
2013-2032	6,625	\$1,166	20	\$154,540,063
2033	6,388	\$1,166	1	\$7,451,039
2034	6,152	\$1,166	1	\$7,175,074
2035	5,915	\$1,166	1	\$6,899,110
2036	5,679	\$1,166	1	\$6,623,146
2037	5,442	\$1,166	1	\$6,347,181
2038	5,205	\$1,166	1	\$6,071,217
2039	4,969	\$1,166	1	\$5,795,252
2040	4,732	\$1,166	1	\$5,519,288
2041	4,496	\$1,166	1	\$5,243,324
2042	4,259	\$1,166	1	\$4,967,359
2043	4,022	\$1,166	1	\$4,691,395
2044	3,786	\$1,166	1	\$4,415,430
2045	3,549	\$1,166	1	\$4,139,466
2046	3,313	\$1,166	1	\$3,863,502
2047	3,076	\$1,166	1	\$3,587,537
2048	2,839	\$1,166	1	\$3,311,573
2049	2,603	\$1,166	1	\$3,035,608
2050	2,366	\$1,166	1	\$2,759,644
2051	2,129	\$1,166	1	\$2,483,680
2052	1,893	\$1,166	1	\$2,207,715
2053	1,656	\$1,166	1	\$1,931,751
2054	1,420	\$1,166	1	\$1,655,786
2055	1,183	\$1,166	1	\$1,379,822
2056	946	\$1,166	1	\$1,103,858
2057	710	\$1,166	1	\$827,893
2058	473	\$1,166	1	\$551,929
2059	237	\$1,166	1	\$275,964
2060	(0)	\$1,166	1	\$0
<b>Total Avoided Water Supply Costs after Discounting</b>				<b>\$94,235,574</b>

Note: For further information regarding how these numbers were calculated, please refer to Appendix 7-1, Table 12 Annual Water Supply Benefits.

***Avoided Well Replacement Costs***

By reducing future regional water demand, the conservation program would reduce the need for future groundwater pumping in the region, and would therefore potentially reduce the need for replacing existing groundwater wells. This would result in a benefit associated with avoiding costs associated with groundwater well installation.

Well replacement involves the costs associated with land, drilling, and operating/maintaining/expanding pumping plant facilities that are already in place. Based on previous agency experience, well replacement costs average approximately \$1,000,000 per well and typical wells have a pumping capacity of 2,000



gallons per minute (gpm). During periods of maximum conservation, replacement of approximately 2.1 wells could potentially be avoided. Amortizing the total \$1,000,000 cost at 4 percent over a thirty-year period, this equates to an annual savings of approximately \$38,112 or \$5.53 per acre-foot per year.

Utilizing the same water savings described above in the Avoided Water Supply Costs analysis, the program would have various avoided well replacement costs based on the average annual water savings. In total, the avoided well replacement costs after discounting are estimated to be \$464,801 over the lifetime of the program as shown in Table 7-9 below.

**Table 7-9: Avoided Well Replacement Costs**  
*Regional Water Conservation Program*

Year	Water Savings (AF)	Well Replacement Costs (\$ per AFY)	Years	Total Cost
2012	3,313	\$5.53	1	\$18,308
2013-2032	6,625	\$5.53	20	\$732,325
2033	6,388	\$5.53	1	\$35,309
2034	6,152	\$5.53	1	\$34,001
2035	5,915	\$5.53	1	\$32,693
2036	5,679	\$5.53	1	\$31,385
2037	5,442	\$5.53	1	\$30,078
2038	5,205	\$5.53	1	\$28,770
2039	4,969	\$5.53	1	\$27,462
2040	4,732	\$5.53	1	\$26,154
2041	4,496	\$5.53	1	\$24,847
2042	4,259	\$5.53	1	\$23,539
2043	4,022	\$5.53	1	\$22,231
2044	3,786	\$5.53	1	\$20,924
2045	3,549	\$5.53	1	\$19,616
2046	3,313	\$5.53	1	\$18,308
2047	3,076	\$5.53	1	\$17,000
2048	2,839	\$5.53	1	\$15,693
2049	2,603	\$5.53	1	\$14,385
2050	2,366	\$5.53	1	\$13,077
2051	2,129	\$5.53	1	\$11,770
2052	1,893	\$5.53	1	\$10,462
2053	1,656	\$5.53	1	\$9,154
2054	1,420	\$5.53	1	\$7,846
2055	1,183	\$5.53	1	\$6,539
2056	946	\$5.53	1	\$5,231
2057	710	\$5.53	1	\$3,923
2058	473	\$5.53	1	\$2,615
2059	237	\$5.53	1	\$1,308
2060	(0)	\$5.53	1	\$0
<b>Total Avoided Well Replacement Costs after Discounting</b>				<b>\$446,558</b>

Note: For further information regarding how these numbers were calculated, please refer to Appendix 7.1, Table 14 Annual Other Water Supply Benefits.



**Water Supply Reliability**

The reliability of a water supply refers to the ability to meet water demands on a consistent basis, even in times of drought or other constraints on source water availability. The *Regional Water Conservation Program* provides for imported water supply reliability through decreasing local water demands.

Although interest in water supply reliability is increasing, only a few studies have directly attempted to quantify its value. The results from these studies do indicate that residential and industrial (i.e., urban) customers seem to value supply reliability quite highly. Studies have shown municipal water users throughout California are willing to pay a certain amount of money to avoid water shortages and reduce water scarcity.<sup>4</sup> Due to the complexity of this issue and the scarcity of monetized information, these water supply benefits were not monetized.

**Distribution of Project Benefits and Identification of Beneficiaries**

The *Regional Water Conservation Program* would result in regional water conservation efforts, which would reduce future water demand within the Coachella Valley region and potentially reduce the future demand for imported water supplies. Due to the expense incurred to purchase imported water supplies, this program would lower future water costs to local agencies, and these cost savings would potentially be passed through to local water users in the future. In addition, by decreasing future imported water demand, this program would have a regional benefit by increasing the future water supplies available to all MWD customers. Finally, reducing imported water demands could potentially reduce future water exports, which would mitigate declining ecosystem conditions in the Bay-Delta to the benefit of all California residents. A summary of project beneficiaries is shown below in Table 7-10.

**Table 7-10: Water Supply Beneficiaries Summary**  
*Regional Water Conservation Program*

Local	Regional	Statewide
Local water purveyors and water ratepayers	MWD customers	Bay-Delta ecosystem

**Project Benefits Timeline Description**

This program would provide water supply benefits beginning in 2012 and continuing through the program lifetime (2060).

**Potential Adverse Effects from the Project**

Any potential short-term impacts associated with program construction/implementation will be mitigated through the CEQA compliance process. However, no such impacts are expected. No long-term adverse effects are expected as a result of the proposed program.

**Uncertainty of Benefits**

Uncertainties relating to the water supply benefits of the program associated with avoided imported water costs and water supply reliability are summarized below in Table 7-11.

<sup>4</sup>Jenkins, Lund, and Howitt (2001) use programming methods to measure the per capita value of urban water scarcity by Detailed Analysis Unit (DAU) throughout California at projected population levels in the year 2020. Scarcity values are measured as lost consumer surplus resulting from changes in quantity of water available for a given willingness-to-pay schedule and depend heavily on the estimated price elasticity of demand for urban water supplies.



**Table 7-11: Omissions, Biases, and Uncertainties and their Effect on the Project**  
*Regional Water Conservation Program*

Benefit or Cost Category	Likely Impact on Net Benefits*	Comment
<b>Avoided Water Supply Costs</b>		
Water Rate Forecast (MWD)	+/-	Margin of error implicit in forecasting.
Climate	+	The projections also are driven by “normal year” expectations, whereas dry year conditions will add additional cost pressures (and may move some of the imported water to higher cost Tier 2 levels).
Regulatory / Legal	+	Regulatory/ legal issues combine to make it more likely than not that the future availability of MWD-provided imported waters will be increasingly constrained, and that costs will escalate at rates higher than experienced in the recent past.
Increased Water Demands	+	Other SWP users may increase their demand and may result in higher rates (holding supply constant).
<b>Avoided Well Replacement Costs</b>		
Avoided Well Replacement	-	The probability of new wells being constructed and/or replaced without the project is unknown.
<b>Water Supply Reliability</b>		
Water Supply Reliability	+	The monetized value of added reliability is not included in the benefit-cost comparison. If we had added the present value benefit of improved water supply reliability in the overall benefit-cost analysis, it would increase net benefits.

\* Magnitude of effect on net benefits:

+/- (negligible or unknown); + (moderate positive); ++ (significant positive); - (moderate negative); -- (significant negative)

### ***Project 2: Short Term Arsenic Treatment Project***

The water supply benefits that are anticipated to result from implementation of the *Short Term Arsenic Treatment Project* are summarized below in Table 7-12 and the water supply cost-benefit overview is summarized in Table 7-13. This project would result in monetized water supply benefits and would also result in quantitative and qualitative water quality and other benefits (refer to Attachment 8). Detailed cost and benefit information associated with the project, including present value calculations, is provided in Appendix 7-1.

**Table 7-12: Water Supply Benefits Summary**  
*Short Term Arsenic Treatment Project*

Type of Benefit	Assessment Level	Beneficiaries
<b>Water Supply Benefits</b>		
Avoided Bottled Water Purchases	Monetized	Local



**Table 7-13: Water Supply Benefit-Cost Overview**  
*Short Term Arsenic Treatment Project*

	<b>Present Value (\$2009)</b>
<b>Costs – Total Capital and O&amp;M</b>	<b>\$913,459</b>
<b>Monetizable Benefits</b>	
Avoided Bottled Water Purchases	<b>\$743,030</b>
<b>Qualitative Benefits</b>	<b><u>Qualitative Indicator*</u></b>
N/A	N/A

**The “Without Project” Baseline**

If this project were not implemented, there would be continued and potential further negative impacts associated with arsenic contamination in the drinking water supplies of various disadvantaged communities (DACs) within Eastern Coachella Valley. In addition, without this project, benefits associated with avoided water costs, reduced arsenic levels, human health benefits, and avoided fuel purchases would not be realized.

**Water Supply Benefits**

The *Short Term Arsenic Treatment Project* would provide water supply benefits associated with avoided water costs. A summary and discussion of these benefits are presented below.

***Avoided Bottled Water Purchases***

This project would include installation of point-of-entry and point-of use reverse osmosis systems in various pockets of disadvantaged communities within Eastern Coachella Valley. This project is a replication and extension of an existing pilot project that occurred at the St. Anthony of the Desert Mobile Home Park.

Arsenic contamination in isolated pockets of drinking water supplies in the Eastern Coachella Valley may cause local residents to avoid drinking tap water and instead purchase alternative water supplies such as bottled water. Through water quality testing and analysis, the St. Anthony of the Desert pilot project was demonstrated to be effective in removing arsenic from drinking water supplies.

The *Short Term Arsenic Treatment Project* proposes installing five point-of-entry reverse osmosis water treatment systems and 280 point-of-use reverse osmosis water treatment systems. Based on information from the pilot project, it is assumed that these reverse osmosis systems would be effective in addressing arsenic-related water quality concerns. Therefore, this project would potentially provide benefits associated with avoided water costs by eliminating or reducing the amount of bottled water purchased by local residents within the project area each year.

It is assumed that the average use of bottled water is 1.2 gallons per household per day, and there are 95 households that would be impacted by the project. It is assumed that the project would avoid the need for water purchases in all 95 homes and would, therefore, reduce bottled water purchases by 114 gallons per day, or 41,610 gallons per year. For this analysis, the average price for bottled water is assumed to be \$1.50 to \$2.00 per gallon.

After discounting, the project would result in \$743,030 of total avoided water supply costs over the lifetime of the project (from 2012 to 2031).



**Table 7-14: Avoided Bottled Water Purchases**  
*Short Term Arsenic Treatment Project*

	Total Annual Avoided Water Supply Purchases (gallons)	Average Cost of Bottled Water (per gallon)	Total Annual Avoided Costs (gallons per year)	Years	Total Avoided Costs
Avoided Water Supply Costs	114	\$1.75	41,610	20	\$1,456,350
<b>Total Avoided Bottled Water Purchases after Discounting</b>					<b>\$743,030</b>

**Distribution of Project Benefits and Identification of Beneficiaries**

Table 7-15 summarizes the anticipated beneficiaries of water supply benefits that would be provided by the Project. The water supply benefits would be anticipated on a local level to local residents using groundwater that would be treated by the project.

**Table 7-15: Project Beneficiaries Summary**  
*Short Term Arsenic Treatment Project*

Local	Regional	Statewide
Local residents	<i>Not Applicable</i>	<i>Not Applicable</i>

**Project Benefits Timeline Description**

This project would provide water supply benefits beginning in 2012 and continuing through 2031.

**Potential Adverse Effects from the Project**

Any potential short-term impacts associated with project construction will be mitigated through the environmental review and permitting process. No long-term adverse effects are expected as a result of the proposed project.

**Uncertainty of Benefits**

There are no uncertainties regarding the water supply benefits associated with avoided costs of bottled water purchases.

**Table 7-16: Omissions, Biases, and Uncertainties and their Effect on the Project**  
*Short Term Arsenic Treatment Project*

Benefit or Cost Category	Likely Impact on Net Benefits*	Comment
Avoided Bottled Water Purchases	+/-	The actual usage of installed systems and the subsequent reduction in bottled water purchases are estimated.

\* Magnitude of effect on net benefits

+/- (negligible or unknown); + (moderate positive); ++ (significant positive); - (moderate negative); -- (significant negative)



### ***Project 3: Groundwater Quality Protection Program-Desert Hot Springs***

The water supply benefits that are anticipated to result from implementation of the *Groundwater Quality Protection Program – Desert Hot Springs* are summarized below in Table 7-17 and the water supply cost-benefit overview is summarized in Table 7-18. This project would not result in any direct monetized water supply benefits, but it would also result in some qualitative benefits. The project would also result in both monetized and physically quantitative water quality and other benefits (refer to Attachment 8). Detailed cost and benefit information associated with the project, including present value calculations, is provided in Appendix 7-1.

**Table 7-17: Water Supply Benefits Summary**  
***Groundwater Quality Protection Program - Desert Hot Springs***

Type of Benefit	Assessment Level	Beneficiaries
<b>Water Supply Benefits</b>		
Contributions to Recycled Water Supplies	Qualitative	Local, Regional, and Statewide

**Table 7-18: Water Supply Benefit-Cost Overview**  
***Groundwater Quality Protection Program - Desert Hot Springs***

	Present Value (\$2009)
Costs – Total Capital and O&M	<b>\$2,764,463</b>
<b>Monetizable Benefits</b>	<i>Not Applicable</i>
<b>Qualitative Benefits</b>	<b>Qualitative Indicator*</b>
Contributions to Recycled Water Supplies	+

\* Magnitude of effect on net benefits:

+/- (negligible or unknown); + (moderate positive); ++ (significant positive); - (moderate negative); -- (significant negative)

#### **The “Without Project” Baseline**

If this project were not implemented, there would be continued and potential further negative impacts associated with failing and/or densely located septic systems within the project area. For more information regarding the without project baseline as it relates to water quality and other expected benefits, refer to Attachment 8.

#### **Water Supply Benefits**

This project would not result in direct water supply benefits. However, increased sewage discharges would contribute more wastewater flows, which could result in future potential recycled water supplies if the Mission Spring Water District were to implement a recycled water program. The District has looked into implementing a recycled water program. However, implementation of such a project is at least three years out. There is no current timeline for such a project, so this benefit is not currently quantifiable.

#### ***Contributions to Recycled Water Supplies***

Completion of the entire *Groundwater Quality Protection Program – Desert Hot Springs* would result in an estimated 6,000 AFY of potential recycled water for future reuse by Coachella Valley agencies. However, additional treatment and construction of a recycled water conveyance system would be needed to implement such a system.



**Distribution of Project Benefits and Identification of Beneficiaries**

Table 7-19 summarizes the potential future beneficiaries of water supply benefits that would be provided by the project if a recycled water program were subsequently initiated. These potential future water supplies would directly benefit the local water agency, Mission Springs Water District. In addition, by decreasing future potable water demand, this program would have a regional benefit by increasing the future water supplies available to other regional customers. Finally, reducing imported water demands could potentially reduce future water exports, which would mitigate declining ecosystem conditions in the Bay-Delta to the benefit of all California residents.

**Table 7-19: Project Beneficiaries Summary**  
*Groundwater Quality Protection Program - Desert Hot Springs*

Local	Regional	Statewide
Local residents	Coachella Valley	Bay-Delta ecosystem

**Project Benefits Timeline Description**

As stated above, there is not current timeline for the implementation of a recycled water project that would utilize the increase wastewater flows from this project.

**Potential Adverse Effects from the Project**

Any potential short-term impacts associated with program construction/implementation will be mitigated through the CEQA compliance process. No long-term adverse effects are expected as a result of the proposed program.

**Uncertainty of Benefits**

Uncertainties relating to the water supply benefits of the program are summarized below in Table 7-20.

**Table 7-20: Omissions, Biases, and Uncertainties and their Effect on the Project**  
*Groundwater Quality Protection Program - Desert Hot Springs*

Benefit or Cost Category	Likely Impact on Net Benefits*	Comment
<b>Contributions to Recycled Water Supplies</b>		
Timing of Recycled Water Project	+/-	As no recycled water project is currently planned, the benefits to water supply for this project are uncertain at this time.

\* Magnitude of effect on net benefits:

+/- (negligible or unknown); + (moderate positive); ++ (significant positive); - (moderate negative); -- (significant negative)

**Project 4: Groundwater Quality Protection Program - Cathedral City**

The water supply benefits that are anticipated to result from implementation of the *Groundwater Quality Protection Program – Cathedral* are summarized below in Table 7-21 and the water supply cost-benefit overview is summarized in Table 7-22. This project would not result in any direct monetized water supply benefits, but it would also result in some qualitative benefits. The project would also result in both monetized and physically quantitative water quality and other benefits (refer to Attachment 8). Detailed cost and benefit information associated with the project, including present value calculations, is provided in Appendix 7-1.



**Table 7-21: Water Supply Benefits Summary**  
*Groundwater Quality Protection Program – Cathedral City*

Type of Benefit	Assessment Level	Beneficiaries
<b>Water Supply Benefits</b>		
Contributions to Recycled Water Supplies	Physically Quantified	Local, Regional, and Statewide

**Table 7-22: Water Supply Benefit-Cost Overview**  
*Groundwater Quality Protection Program – Cathedral City*

	Present Value (\$2009)
Costs – Total Capital and O&M	<b>\$1,760,282</b>
<b>Monetizable Benefits</b>	<i>Not Applicable</i>
<b>Qualitative Benefits</b>	<b>Qualitative Indicator*</b>
Protecting beneficial uses	+

\* Magnitude of effect on net benefits:

+/- (negligible or unknown); + (moderate positive); ++ (significant positive); - (moderate negative); -- (significant negative)

### The “Without Project” Baseline

If this project were not implemented, there would be continued and potential further negative impacts associated with failing and/or densely located septic systems within the project area. For more information regarding the without project baseline as it relates to water quality and other expected benefits, refer to Attachment 8. In addition, the Desert Water Agency would have to continue to pay for operations and maintenance of a wastewater pumping station that would no longer be necessary if this Project were implemented.

### Water Supply Benefits

This project would not result in direct water supply benefits. However, increased sewage discharges would contribute more wastewater flows, which would result additional future recycled water supplies to the Coachella Valley Water District’s (CVWD) wastewater treatment plant. Such flows could be used for irrigation in lieu of potable groundwater supplies. Thus, the project would help to conserve potable groundwater supplies and reducing future imported groundwater replenishment needs.

### *Contributions to Recycled Water Supplies*

Completion of the entire *Groundwater Quality Protection Program – Cathedral City* would result in an estimated annual flow of 7,000,000 gallons of wastewater will be generated because of this project and could be utilized by CVWD to irrigate additional golf course in the region with recycled water in lieu of potable water sources. The effort or cost required for CVWD to utilize these additional flows is unknown, and therefore, this benefit has not been monetized.

### Distribution of Project Benefits and Identification of Beneficiaries

Table 7-23 summarizes the potential future beneficiaries of water supply benefits that would be provided by the Project if the additional recycled water supplies were utilized by the CVWD. These potential future water supplies would directly benefit the local water agency, CVWD. In addition, by decreasing future potable water demand, this program would have a regional benefit by increasing the future water supplies available to other regional customers. Finally, reducing imported water demands could potentially reduce future water exports, which would mitigate declining ecosystem conditions in the Bay-Delta to the benefit of all California residents.



**Table 7-23: Project Beneficiaries Summary**  
*Groundwater Quality Protection Program – Cathedral City*

Local	Regional	Statewide
Local residents	Coachella Valley	Bay-Delta ecosystem

**Project Benefits Timeline Description**

This project could provide recycled water supply benefits by 2012 or as soon as the septic to sewer conversions are initiated. However, it is not known if or when the CVWD would be able to utilize such additional recycled water supplies.

**Potential Adverse Effects from the Project**

Any potential short-term impacts associated with program construction/implementation will be mitigated through the CEQA compliance process. No long-term adverse effects are expected as a result of the proposed program.

**Uncertainty of Benefits**

Uncertainties relating to the water supply benefits of the program are summarized below in Table 7-24.

**Table 7-24: Omissions, Biases, and Uncertainties and their Effect on the Project**  
*Groundwater Quality Protection Program – Cathedral City*

Benefit or Cost Category	Likely Impact on Net Benefits*	Comment
<b>Contributions to Recycled Water Supplies</b>		
Ability to utilize additional recycled water supplies	+/-	CVWD would likely be able to utilize some of the additional recycle supplies during peak use periods. However, potential infrastructure improvements may be required to fully utilize the entire wastewater flows that will be generated from this project. Any such necessary effort to implement this additional recycled water usage is not known.

\* Magnitude of effect on net benefits:

+/- (negligible or unknown); + (moderate positive); ++ (significant positive); - (moderate negative); -- (significant negative)



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## **Appendix 7-1: Economic Analysis Tables**

✓ **Project 1: Regional Water Conservation Program**

Table 11 – Annual Cost of Project.....	Attached
Table 12 – Annual Water Supply Benefits .....	Attached
Table 13 – Annual Costs of Avoided Projects.....	Not Applicable
Table 14 – Annual <u>Other</u> Water Supply Benefits .....	Attached
Table 15 – Total Water Supply Benefits .....	Attached

✓ **Project 2: Short Term Arsenic Treatment Project**

Table 11 – Annual Cost of Project.....	Attached
Table 12 – Annual Water Supply Benefits .....	Attached
Table 13 – Annual Costs of Avoided Projects.....	Not Applicable
Table 14 – Annual Other Water Supply Benefits .....	Not Applicable
Table 15 – Total Water Supply Benefits .....	Attached

✓ **Project 3: Groundwater Quality Protection Program –Desert Hot Springs**

Table 11 – Annual Cost of Project.....	Attached
Table 12 – Annual Water Supply Benefits .....	Not Applicable
Table 13 – Annual Costs of Avoided Projects.....	Not Applicable
Table 14 – Annual Other Water Supply Benefits .....	Not Applicable
Table 15 – Total Water Supply Benefits .....	Not Applicable

✓ **Project 4: Groundwater Quality Protection Program –Cathedral City**

Table 11 – Annual Cost of Project.....	Attached
Table 12 – Annual Water Supply Benefits .....	Not Applicable
Table 13 – Annual Costs of Avoided Projects.....	Not Applicable
Table 14 – Annual Other Water Supply Benefits .....	Not Applicable
Table 15 – Total Water Supply Benefits .....	Not Applicable

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Table 11 - Annual Cost of Project (All costs should be in 2009 dollars)									
Project 1: Regional Water Conservation Program									
Year	Initial Costs	Operations and Maintenance Costs					Discounting Calculations		
	(a) Grand Total Cost from Table 7 (row (i), column (d))	(b) Admin	(c) Operation	(d) Maintenance	(e) Replacement	(f) Other	(g) Total Costs (a)+...+(f)	(h) Discount Factor	(i) Discounted Costs (g) x (h)
2009	\$0	\$0	\$0	\$0	\$0	\$0	\$0	1.00	\$0
2010	\$7,500	\$0	\$0	\$0	\$0	\$0	\$7,500	0.94	\$7,073
2011	\$682,821	\$0	\$0	\$0	\$0	\$0	\$682,821	0.89	\$607,710
2012	\$682,821	\$0	\$0	\$0	\$0	\$0	\$682,821	0.84	\$573,569
2013	\$0	\$0	\$0	\$0	\$0	\$0	\$0	0.79	\$0
2014	\$0	\$0	\$0	\$0	\$0	\$0	\$0	0.75	\$0
2015	\$0	\$0	\$0	\$0	\$0	\$0	\$0	0.71	\$0
2016	\$0	\$0	\$0	\$0	\$0	\$0	\$0	0.67	\$0
2017	\$0	\$0	\$0	\$0	\$0	\$0	\$0	0.63	\$0
2018	\$0	\$0	\$0	\$0	\$0	\$0	\$0	0.59	\$0
2019	\$0	\$0	\$0	\$0	\$0	\$0	\$0	0.56	\$0
2020	\$0	\$0	\$0	\$0	\$0	\$0	\$0	0.53	\$0
2021	\$0	\$0	\$0	\$0	\$0	\$0	\$0	0.50	\$0
2022	\$0	\$0	\$0	\$0	\$0	\$0	\$0	0.47	\$0
2023	\$0	\$0	\$0	\$0	\$0	\$0	\$0	0.44	\$0
2024	\$0	\$0	\$0	\$0	\$0	\$0	\$0	0.42	\$0
2025	\$0	\$0	\$0	\$0	\$0	\$0	\$0	0.39	\$0
2026	\$0	\$0	\$0	\$0	\$0	\$0	\$0	0.37	\$0
2027	\$0	\$0	\$0	\$0	\$0	\$0	\$0	0.35	\$0
2028	\$0	\$0	\$0	\$0	\$0	\$0	\$0	0.33	\$0
2029	\$0	\$0	\$0	\$0	\$0	\$0	\$0	0.31	\$0
2030	\$0	\$0	\$0	\$0	\$0	\$0	\$0	0.29	\$0
2031	\$0	\$0	\$0	\$0	\$0	\$0	\$0	0.28	\$0
2032	\$0	\$0	\$0	\$0	\$0	\$0	\$0	0.26	\$0
2033	\$0	\$0	\$0	\$0	\$0	\$0	\$0	0.25	\$0
2034	\$0	\$0	\$0	\$0	\$0	\$0	\$0	0.23	\$0
2035	\$0	\$0	\$0	\$0	\$0	\$0	\$0	0.22	\$0
2036	\$0	\$0	\$0	\$0	\$0	\$0	\$0	0.21	\$0
2037	\$0	\$0	\$0	\$0	\$0	\$0	\$0	0.20	\$0
2038	\$0	\$0	\$0	\$0	\$0	\$0	\$0	0.19	\$0
2039	\$0	\$0	\$0	\$0	\$0	\$0	\$0	0.17	\$0
2040	\$0	\$0	\$0	\$0	\$0	\$0	\$0	0.16	\$0
2041	\$0	\$0	\$0	\$0	\$0	\$0	\$0	0.16	\$0
2042	\$0	\$0	\$0	\$0	\$0	\$0	\$0	0.15	\$0
2043	\$0	\$0	\$0	\$0	\$0	\$0	\$0	0.14	\$0
2044	\$0	\$0	\$0	\$0	\$0	\$0	\$0	0.13	\$0
2045	\$0	\$0	\$0	\$0	\$0	\$0	\$0	0.12	\$0
2046	\$0	\$0	\$0	\$0	\$0	\$0	\$0	0.12	\$0
2047	\$0	\$0	\$0	\$0	\$0	\$0	\$0	0.11	\$0
2048	\$0	\$0	\$0	\$0	\$0	\$0	\$0	0.10	\$0
2049	\$0	\$0	\$0	\$0	\$0	\$0	\$0	0.10	\$0
2050	\$0	\$0	\$0	\$0	\$0	\$0	\$0	0.09	\$0
2051	\$0	\$0	\$0	\$0	\$0	\$0	\$0	0.09	\$0
2052	\$0	\$0	\$0	\$0	\$0	\$0	\$0	0.08	\$0
2053	\$0	\$0	\$0	\$0	\$0	\$0	\$0	0.08	\$0
2054	\$0	\$0	\$0	\$0	\$0	\$0	\$0	0.07	\$0
2055	\$0	\$0	\$0	\$0	\$0	\$0	\$0	0.07	\$0
2056	\$0	\$0	\$0	\$0	\$0	\$0	\$0	0.07	\$0
2057	\$0	\$0	\$0	\$0	\$0	\$0	\$0	0.06	\$0
2058	\$0	\$0	\$0	\$0	\$0	\$0	\$0	0.06	\$0
2059	\$0	\$0	\$0	\$0	\$0	\$0	\$0	0.05	\$0
2060	\$0	\$0	\$0	\$0	\$0	\$0	\$0	0.05	\$0
Project Life	Total Present Value of Discounted Costs (Sum of Column (i)) Transfer to Table 20, Column (c), Exhibit F: Proposal Costs and Benefit Summaries								<b>\$1,188,352</b>

Comments: Administration and operation costs from 2009-10 facility budget scaled by factor of 0.35 to represent new portion of facility (excluding electricity and water which are addressed in WQ & other benefits sheet) plus additional annual maintenance cost of \$5,000 to maintain retrofit areas. Life of project estimated to be 50 years.

**Coachella Valley Integrated Regional Water Management  
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**Table 12 - Annual Water Supply Benefits (2009 dollars)  
Project 1: Regional Water Conservation Program**

(a) Year	(b) Type of Benefit: Avoided cost of imported water					(b) Type of Benefit:					(b) Type of Benefit:					Discounting Calculations for Economic Benefits		
	(c) Measure of Benefit [Unit]: Acre Feet per year					(c) Measure of Benefit [Unit]:					(c) Measure of Benefit [Unit]:							
	(d) Without Project	(e) With Project	(f) Change Resulting from Project [e - d]	(g) Unit \$ Value	(h) Annual \$ Value [f x g]	(d) Without Project	(e) With Project	(f) Change Resulting from Project [e - d]	(g) Unit \$ Value	(h) Annual \$ Value [f x g]	(d) Without Project	(e) With Project	(f) Change Resulting from Project [e - d]	(g) Unit \$ Value	(h) Annual \$ Value [f x g]	(h) Total Annual Benefits (\$)	(i) Discount Value	(j) Discounted Benefits [h x i]
2009			0	\$1,166	\$0			0	\$0			0	\$0	\$0	\$0	1.000	\$0	
2010			0	\$1,166	\$0			0	\$0			0	\$0	\$0	\$0	0.943	\$0	
2011			0	\$1,166	\$0			0	\$0			0	\$0	\$0	\$0	0.890	\$0	
2012	-3,313	0	3,313	\$1,166	\$3,863,502			0	\$0			0	\$0	\$3,863,502	\$3,863,502	0.840	\$3,245,341	
2013	-6,625	0	6,625	\$1,166	\$7,727,003			0	\$0			0	\$0	\$7,727,003	\$7,727,003	0.792	\$6,119,786	
2014	-6,625	0	6,625	\$1,166	\$7,727,003			0	\$0			0	\$0	\$7,727,003	\$7,727,003	0.747	\$5,772,071	
2015	-6,625	0	6,625	\$1,166	\$7,727,003			0	\$0			0	\$0	\$7,727,003	\$7,727,003	0.705	\$5,447,537	
2016	-6,625	0	6,625	\$1,166	\$7,727,003			0	\$0			0	\$0	\$7,727,003	\$7,727,003	0.665	\$5,138,457	
2017	-6,625	0	6,625	\$1,166	\$7,727,003			0	\$0			0	\$0	\$7,727,003	\$7,727,003	0.627	\$4,844,831	
2018	-6,625	0	6,625	\$1,166	\$7,727,003			0	\$0			0	\$0	\$7,727,003	\$7,727,003	0.592	\$4,574,386	
2019	-6,625	0	6,625	\$1,166	\$7,727,003			0	\$0			0	\$0	\$7,727,003	\$7,727,003	0.558	\$4,311,668	
2020	-6,625	0	6,625	\$1,166	\$7,727,003			0	\$0			0	\$0	\$7,727,003	\$7,727,003	0.527	\$4,072,131	
2021	-6,625	0	6,625	\$1,166	\$7,727,003			0	\$0			0	\$0	\$7,727,003	\$7,727,003	0.497	\$3,840,321	
2022	-6,625	0	6,625	\$1,166	\$7,727,003			0	\$0			0	\$0	\$7,727,003	\$7,727,003	0.469	\$3,623,964	
2023	-6,625	0	6,625	\$1,166	\$7,727,003			0	\$0			0	\$0	\$7,727,003	\$7,727,003	0.442	\$3,415,335	
2024	-6,625	0	6,625	\$1,166	\$7,727,003			0	\$0			0	\$0	\$7,727,003	\$7,727,003	0.417	\$3,222,160	
2025	-6,625	0	6,625	\$1,166	\$7,727,003			0	\$0			0	\$0	\$7,727,003	\$7,727,003	0.390	\$3,013,531	
2026	-6,625	0	6,625	\$1,166	\$7,727,003			0	\$0			0	\$0	\$7,727,003	\$7,727,003	0.371	\$2,866,718	
2027	-6,625	0	6,625	\$1,166	\$7,727,003			0	\$0			0	\$0	\$7,727,003	\$7,727,003	0.350	\$2,704,451	
2028	-6,625	0	6,625	\$1,166	\$7,727,003			0	\$0			0	\$0	\$7,727,003	\$7,727,003	0.331	\$2,557,638	
2029	-6,625	0	6,625	\$1,166	\$7,727,003			0	\$0			0	\$0	\$7,727,003	\$7,727,003	0.312	\$2,410,825	
2030	-6,625	0	6,625	\$1,166	\$7,727,003			0	\$0			0	\$0	\$7,727,003	\$7,727,003	0.294	\$2,271,739	
2031	-6,625	0	6,625	\$1,166	\$7,727,003			0	\$0			0	\$0	\$7,727,003	\$7,727,003	0.278	\$2,148,107	
2032	-6,625	0	6,625	\$1,166	\$7,727,003			0	\$0			0	\$0	\$7,727,003	\$7,727,003	0.262	\$2,024,475	
2033	-6,388	0	6,388	\$1,166	\$7,451,039			0	\$0			0	\$0	\$7,451,039	\$7,451,039	0.247	\$1,840,407	
2034	-6,152	0	6,152	\$1,166	\$7,175,074			0	\$0			0	\$0	\$7,175,074	\$7,175,074	0.233	\$1,671,792	
2035	-5,915	0	5,915	\$1,166	\$6,899,110			0	\$0			0	\$0	\$6,899,110	\$6,899,110	0.220	\$1,517,804	
2036	-5,679	0	5,679	\$1,166	\$6,623,146			0	\$0			0	\$0	\$6,623,146	\$6,623,146	0.207	\$1,370,991	
2037	-5,442	0	5,442	\$1,166	\$6,347,181			0	\$0			0	\$0	\$6,347,181	\$6,347,181	0.196	\$1,244,048	
2038	-5,205	0	5,205	\$1,166	\$6,071,217			0	\$0			0	\$0	\$6,071,217	\$6,071,217	0.185	\$1,123,175	
2039	-4,969	0	4,969	\$1,166	\$5,795,252			0	\$0			0	\$0	\$5,795,252	\$5,795,252	0.174	\$1,008,374	
2040	-4,732	0	4,732	\$1,166	\$5,519,288			0	\$0			0	\$0	\$5,519,288	\$5,519,288	0.164	\$905,163	
2041	-4,496	0	4,496	\$1,166	\$5,243,324			0	\$0			0	\$0	\$5,243,324	\$5,243,324	0.155	\$812,715	
2042	-4,259	0	4,259	\$1,166	\$4,967,359			0	\$0			0	\$0	\$4,967,359	\$4,967,359	0.146	\$725,234	
2043	-4,022	0	4,022	\$1,166	\$4,691,395			0	\$0			0	\$0	\$4,691,395	\$4,691,395	0.138	\$647,412	
2044	-3,786	0	3,786	\$1,166	\$4,415,430			0	\$0			0	\$0	\$4,415,430	\$4,415,430	0.130	\$574,006	
2045	-3,549	0	3,549	\$1,166	\$4,139,466			0	\$0			0	\$0	\$4,139,466	\$4,139,466	0.123	\$509,154	
2046	-3,313	0	3,313	\$1,166	\$3,863,502			0	\$0			0	\$0	\$3,863,502	\$3,863,502	0.116	\$448,166	
2047	-3,076	0	3,076	\$1,166	\$3,587,537			0	\$0			0	\$0	\$3,587,537	\$3,587,537	0.109	\$391,042	
2048	-2,839	0	2,839	\$1,166	\$3,311,573			0	\$0			0	\$0	\$3,311,573	\$3,311,573	0.103	\$341,092	
2049	-2,603	0	2,603	\$1,166	\$3,035,608			0	\$0			0	\$0	\$3,035,608	\$3,035,608	0.097	\$294,454	
2050	-2,366	0	2,366	\$1,166	\$2,759,644			0	\$0			0	\$0	\$2,759,644	\$2,759,644	0.092	\$253,887	
2051	-2,129	0	2,129	\$1,166	\$2,483,680			0	\$0			0	\$0	\$2,483,680	\$2,483,680	0.087	\$216,080	
2052	-1,893	0	1,893	\$1,166	\$2,207,715			0	\$0			0	\$0	\$2,207,715	\$2,207,715	0.082	\$181,033	
2053	-1,656	0	1,656	\$1,166	\$1,931,751			0	\$0			0	\$0	\$1,931,751	\$1,931,751	0.077	\$148,745	
2054	-1,420	0	1,420	\$1,166	\$1,655,786			0	\$0			0	\$0	\$1,655,786	\$1,655,786	0.073	\$120,872	
2055	-1,183	0	1,183	\$1,166	\$1,379,822			0	\$0			0	\$0	\$1,379,822	\$1,379,822	0.069	\$95,208	
2056	-946	0	946	\$1,166	\$1,103,858			0	\$0			0	\$0	\$1,103,858	\$1,103,858	0.065	\$71,751	
2057	-710	0	710	\$1,166	\$827,893			0	\$0			0	\$0	\$827,893	\$827,893	0.061	\$50,501	
2058	-473	0	473	\$1,166	\$551,929			0	\$0			0	\$0	\$551,929	\$551,929	0.058	\$32,012	
2059	-237	0	237	\$1,166	\$275,964			0	\$0			0	\$0	\$275,964	\$275,964	0.054	\$14,982	
2060	0	0	0	\$1,166	\$0			0	\$0			0	\$0	\$0	\$0	0.051	\$0	
<b>Total Present Value of Discounted Benefits over Project Life (Monetized Benefits):</b>															\$94,235,574			
Project Allocation:															100.0%			
<b>Total Present Value of Discounted Benefits (Monetized Benefits):</b>															\$94,235,574			

Comments: The overall conservation program in the Coachella Valley aims to reduce 70,000 AFY of water use through various conservation activities by 2020. If implemented, the Regional Water Conservation Program would help the region meet its overall conservation goals. CVWD's draft CVMWP Update indicates that the return on investment for water conservation programs in the Coachella Valley is approximately \$200 per AF. Given this cost per AF return on investment and the program's Construction/Implementation budget of \$1,325,000, it is anticipated that a maximum of approximately 6,625 AFY of water would be conserved under the program. It is anticipated that 50% of this total, or 3,433 AFY would be conserved in 2012. After implementation of the program and associated changes on consumption behavior, the total yearly amount of 6,625 AF of water savings would be expected annually between 2013 and 2032. Between 2032 and the final lifetime of the program (2060), water conservation would be anticipated to decline proportionally until water conservation resulting from this Work Plan effort ceases in 2060.

**Coachella Valley Integrated Regional Water Management  
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**Table 14 - Annual Other Water Supply Benefits (2009 dollars)  
Project 1: Regional Water Conservation Program**

(a) Year	(b) Type of Benefit: Avoided Water Infrastructure Costs (C) Description of Benefit: Well Replacement	(b) Type of Benefit: (C) Description of Benefit:	(b) Type of Benefit: (C) Description of Benefit:	Discounting Calculations for Economic Benefits		
	(d) Annual Benefit (\$)	(d) Annual Benefit (\$)	(d) Annual Benefit (\$)	(d) Total Annual Benefits (\$)	(i) Discount Value	(j) Discounted Benefits [h x i]
2009	\$0			\$0	1.000	\$0
2010	\$0			\$0	0.943	\$0
2011	\$0			\$0	0.890	\$0
2012	\$18,308			\$18,308	0.840	\$15,379
2013	\$36,616			\$36,616	0.792	\$29,000
2014	\$36,616			\$36,616	0.747	\$27,352
2015	\$36,616			\$36,616	0.705	\$25,814
2016	\$36,616			\$36,616	0.665	\$24,350
2017	\$36,616			\$36,616	0.627	\$22,958
2018	\$36,616			\$36,616	0.592	\$21,677
2019	\$36,616			\$36,616	0.558	\$20,432
2020	\$36,616			\$36,616	0.527	\$19,297
2021	\$36,616			\$36,616	0.497	\$18,198
2022	\$36,616			\$36,616	0.469	\$17,173
2023	\$36,616			\$36,616	0.442	\$16,184
2024	\$36,616			\$36,616	0.417	\$15,269
2025	\$36,616			\$36,616	0.390	\$14,280
2026	\$36,616			\$36,616	0.371	\$13,585
2027	\$36,616			\$36,616	0.350	\$12,816
2028	\$36,616			\$36,616	0.331	\$12,120
2029	\$36,616			\$36,616	0.312	\$11,424
2030	\$36,616			\$36,616	0.294	\$10,765
2031	\$36,616			\$36,616	0.278	\$10,179
2032	\$36,616			\$36,616	0.262	\$9,593
2033	\$35,309			\$35,309	0.247	\$8,721
2034	\$34,001			\$34,001	0.233	\$7,922
2035	\$32,693			\$32,693	0.220	\$7,192
2036	\$31,385			\$31,385	0.207	\$6,497
2037	\$30,078			\$30,078	0.196	\$5,895
2038	\$28,770			\$28,770	0.185	\$5,322
2039	\$27,462			\$27,462	0.174	\$4,778
2040	\$26,154			\$26,154	0.164	\$4,289
2041	\$24,847			\$24,847	0.155	\$3,851
2042	\$23,539			\$23,539	0.146	\$3,437
2043	\$22,231			\$22,231	0.138	\$3,068
2044	\$20,924			\$20,924	0.130	\$2,720
2045	\$19,616			\$19,616	0.123	\$2,413
2046	\$18,308			\$18,308	0.116	\$2,124
2047	\$17,000			\$17,000	0.109	\$1,853
2048	\$15,693			\$15,693	0.103	\$1,616
2049	\$14,385			\$14,385	0.097	\$1,395
2050	\$13,077			\$13,077	0.092	\$1,203
2051	\$11,770			\$11,770	0.087	\$1,024
2052	\$10,462			\$10,462	0.082	\$858
2053	\$9,154			\$9,154	0.077	\$705
2054	\$7,846			\$7,846	0.073	\$573
2055	\$6,539			\$6,539	0.069	\$451
2056	\$5,231			\$5,231	0.065	\$340
2057	\$3,923			\$3,923	0.061	\$239
2058	\$2,615			\$2,615	0.058	\$152
2059	\$1,308			\$1,308	0.054	\$71
2060	\$0			\$0	0.051	\$0

Total Present Value of Discounted Benefits over Project Life (Monetized Benefits): \$446,558

Project Allocation: 100.0%

Total Present Value of Discounted Benefits (Monetized Benefits): \$446,558

Comments: Well replacement involves the costs associated with land, drilling, and operating/maintaining/expanding pumping plant facilities that are already in place. Based on previous agency experience, well replacement costs average approximately \$1,000,000 per well and typical wells have a pumping capacity of 2,000 gallons per minute (gpm). During periods of maximum conservation, replacement of approximately 2.1 wells could potentially be avoided. Amortizing the total \$1,000,000 cost at 4 percent over a thirty-year period, this equates to an annual savings of approximately \$38,112 or \$5.53 per acre foot per year.

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**Table 15 - Total Water Supply Benefits (2009 dollars)  
Project 1: Regional Water Conservation Program**

(a) Total Discounted Water Supply Benefits	(b) Total Discounted Avoided Project Costs	(c) Other Discounted Water Supply Benefits	(d) Total Value of Discounted Benefits [a + c] or [b + c]
\$94,235,574	\$0	\$446,558	<b>\$94,682,132</b>

**Comments:**

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Table 11 - Annual Cost of Project (All costs should be in 2009 dollars)										
Project 2: Short Term Arsenic Treatment Project										
Year	Initial Costs	Operations and Maintenance Costs					Discounting Calculations			
	(a)	(b)	(c)	(d)	(e)	(f)	(g)	(h)	(i)	
	Grand Total Cost from Table 7 (row (i), column (d))	Admin	Operation	Maintenance	Replacement	Other	Total Costs (a)+...+(f)	Discount Factor	Discounted Costs (g) x (h)	
2009	\$0	\$0	\$0	\$0	\$0	\$0	\$0	1.00	\$0	
2010	\$0	\$0	\$0	\$0	\$0	\$0	\$0	0.94	\$0	
2011	\$345,162	\$0	\$0	\$0	\$0	\$0	\$345,162	0.89	\$307,194	
2012	\$325,002	\$0	\$17,360	\$2,500	\$12,800	\$0	\$357,662	0.84	\$300,436	
2013	\$0	\$0	\$17,360	\$2,500	\$12,800	\$0	\$32,660	0.79	\$25,867	
2014	\$0	\$0	\$17,360	\$2,500	\$12,800	\$0	\$32,660	0.75	\$24,397	
2015	\$0	\$0	\$17,360	\$2,500	\$12,800	\$0	\$32,660	0.71	\$23,025	
2016	\$0	\$0	\$17,360	\$2,500	\$12,800	\$0	\$32,660	0.67	\$21,719	
2017	\$0	\$0	\$17,360	\$2,500	\$12,800	\$0	\$32,660	0.63	\$20,478	
2018	\$0	\$0	\$17,360	\$2,500	\$12,800	\$0	\$32,660	0.59	\$19,335	
2019	\$0	\$0	\$17,360	\$2,500	\$12,800	\$0	\$32,660	0.56	\$18,224	
2020	\$0	\$0	\$17,360	\$2,500	\$12,800	\$0	\$32,660	0.53	\$17,212	
2021	\$0	\$0	\$17,360	\$2,500	\$12,800	\$0	\$32,660	0.50	\$16,232	
2022	\$0	\$0	\$17,360	\$2,500	\$12,800	\$0	\$32,660	0.47	\$15,318	
2023	\$0	\$0	\$17,360	\$2,500	\$12,800	\$0	\$32,660	0.44	\$14,436	
2024	\$0	\$0	\$17,360	\$2,500	\$12,800	\$0	\$32,660	0.42	\$13,619	
2025	\$0	\$0	\$17,360	\$2,500	\$12,800	\$0	\$32,660	0.39	\$12,737	
2026	\$0	\$0	\$17,360	\$2,500	\$12,800	\$0	\$32,660	0.37	\$12,117	
2027	\$0	\$0	\$17,360	\$2,500	\$12,800	\$0	\$32,660	0.35	\$11,431	
2028	\$0	\$0	\$17,360	\$2,500	\$12,800	\$0	\$32,660	0.33	\$10,810	
2029	\$0	\$0	\$17,360	\$2,500	\$12,800	\$0	\$32,660	0.31	\$10,190	
2030	\$0	\$0	\$17,360	\$2,500	\$12,800	\$0	\$32,660	0.29	\$9,602	
2031	\$0	\$0	\$17,360	\$2,500	\$12,800	\$0	\$32,660	0.28	\$9,079	
2032	\$0	\$0	\$0	\$0	\$0	\$0	\$0	0.26	\$0	
2033	\$0	\$0	\$0	\$0	\$0	\$0	\$0	0.25	\$0	
2034	\$0	\$0	\$0	\$0	\$0	\$0	\$0	0.23	\$0	
2035	\$0	\$0	\$0	\$0	\$0	\$0	\$0	0.22	\$0	
2036	\$0	\$0	\$0	\$0	\$0	\$0	\$0	0.21	\$0	
2037	\$0	\$0	\$0	\$0	\$0	\$0	\$0	0.20	\$0	
2038	\$0	\$0	\$0	\$0	\$0	\$0	\$0	0.19	\$0	
2039	\$0	\$0	\$0	\$0	\$0	\$0	\$0	0.17	\$0	
2040	\$0	\$0	\$0	\$0	\$0	\$0	\$0	0.16	\$0	
2041	\$0	\$0	\$0	\$0	\$0	\$0	\$0	0.16	\$0	
2042	\$0	\$0	\$0	\$0	\$0	\$0	\$0	0.15	\$0	
2043	\$0	\$0	\$0	\$0	\$0	\$0	\$0	0.14	\$0	
2044	\$0	\$0	\$0	\$0	\$0	\$0	\$0	0.13	\$0	
2045	\$0	\$0	\$0	\$0	\$0	\$0	\$0	0.12	\$0	
2046	\$0	\$0	\$0	\$0	\$0	\$0	\$0	0.12	\$0	
2047	\$0	\$0	\$0	\$0	\$0	\$0	\$0	0.11	\$0	
2048	\$0	\$0	\$0	\$0	\$0	\$0	\$0	0.10	\$0	
2049	\$0	\$0	\$0	\$0	\$0	\$0	\$0	0.10	\$0	
2050	\$0	\$0	\$0	\$0	\$0	\$0	\$0	0.09	\$0	
2051	\$0	\$0	\$0	\$0	\$0	\$0	\$0	0.09	\$0	
2052	\$0	\$0	\$0	\$0	\$0	\$0	\$0	0.08	\$0	
2053	\$0	\$0	\$0	\$0	\$0	\$0	\$0	0.08	\$0	
2054	\$0	\$0	\$0	\$0	\$0	\$0	\$0	0.07	\$0	
2055	\$0	\$0	\$0	\$0	\$0	\$0	\$0	0.07	\$0	
2056	\$0	\$0	\$0	\$0	\$0	\$0	\$0	0.07	\$0	
2057	\$0	\$0	\$0	\$0	\$0	\$0	\$0	0.06	\$0	
2058	\$0	\$0	\$0	\$0	\$0	\$0	\$0	0.06	\$0	
2059	\$0	\$0	\$0	\$0	\$0	\$0	\$0	0.05	\$0	
2060	\$0	\$0	\$0	\$0	\$0	\$0	\$0	0.05	\$0	
Project Life	Total Present Value of Discounted Costs (Sum of Column (i))									
	Transfer to Table 20, Column (c), Exhibit F: Proposal Costs and Benefit Summaries									<b>\$913,459</b>

Comments: Property owners and tenants will be responsible for operation and maintenance after the proposed point-of-entry and point-of-use Reverse Osmosis water system is in placed. Training and education will be provided by Pueblo Unido CDC to both property owners and tenants to operate, maintain and replacement. Operation cost in the amount \$17,360 include the cost of retaining a certified operator, water lab test costs(point-of-entry). Maintenance cost of \$2,500 include chlorine, and water softener(point-of-entry). Replacement cost of \$12,800 include the replacement of filters (\$35 each, once a year) for the point-of-use Reverse Osmosis water treatment system. O&M costs would last over the system lifetime (or 20 years).

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**Table 12 - Annual Water Supply Benefits (2009 dollars)  
Project: Short Term Arsenic Treatment Project**

(a) Year	(b) Type of Benefit: Avoided cost of bottled water					(b) Type of Benefit:					(b) Type of Benefit:					Discounting Calculations for Economic Benefits		
	(c) Measure of Benefit [Unit]: Gallons per year					(c) Measure of Benefit [Unit]:					(c) Measure of Benefit [Unit]:					(h) Total Annual Benefits (\$)	(i) Discount Value	(j) Discounted Benefits [h x i]
	(d) Without Project	(e) With Project	(f) Change Resulting from Project [e - d]	(g) Unit \$ Value	(h) Annual \$ Value [f x g]	(d) Without Project	(e) With Project	(f) Change Resulting from Project [e - d]	(g) Unit \$ Value	(h) Annual \$ Value [f x g]	(d) Without Project	(e) With Project	(f) Change Resulting from Project [e - d]	(g) Unit \$ Value	(h) Annual \$ Value [f x g]			
2009			0		\$0			0		\$0			0		\$0	\$0	1.000	\$0
2010			0		\$0			0		\$0			0		\$0	\$0	0.943	\$0
2011			0		\$0			0		\$0			0		\$0	\$0	0.890	\$0
2012	-41,610	0	41,610	\$1.75	\$72,818			0		\$0			0		\$0	\$72,818	0.840	\$61,167
2013	-41,610	0	41,610	\$1.75	\$72,818			0		\$0			0		\$0	\$72,818	0.792	\$57,671
2014	-41,610	0	41,610	\$1.75	\$72,818			0		\$0			0		\$0	\$72,818	0.747	\$54,395
2015	-41,610	0	41,610	\$1.75	\$72,818			0		\$0			0		\$0	\$72,818	0.705	\$51,336
2016	-41,610	0	41,610	\$1.75	\$72,818			0		\$0			0		\$0	\$72,818	0.665	\$48,424
2017	-41,610	0	41,610	\$1.75	\$72,818			0		\$0			0		\$0	\$72,818	0.627	\$45,657
2018	-41,610	0	41,610	\$1.75	\$72,818			0		\$0			0		\$0	\$72,818	0.592	\$43,108
2019	-41,610	0	41,610	\$1.75	\$72,818			0		\$0			0		\$0	\$72,818	0.558	\$40,632
2020	-41,610	0	41,610	\$1.75	\$72,818			0		\$0			0		\$0	\$72,818	0.527	\$38,375
2021	-41,610	0	41,610	\$1.75	\$72,818			0		\$0			0		\$0	\$72,818	0.497	\$36,190
2022	-41,610	0	41,610	\$1.75	\$72,818			0		\$0			0		\$0	\$72,818	0.469	\$34,151
2023	-41,610	0	41,610	\$1.75	\$72,818			0		\$0			0		\$0	\$72,818	0.442	\$32,185
2024	-41,610	0	41,610	\$1.75	\$72,818			0		\$0			0		\$0	\$72,818	0.417	\$30,365
2025	-41,610	0	41,610	\$1.75	\$72,818			0		\$0			0		\$0	\$72,818	0.390	\$28,399
2026	-41,610	0	41,610	\$1.75	\$72,818			0		\$0			0		\$0	\$72,818	0.371	\$27,015
2027	-41,610	0	41,610	\$1.75	\$72,818			0		\$0			0		\$0	\$72,818	0.350	\$25,486
2028	-41,610	0	41,610	\$1.75	\$72,818			0		\$0			0		\$0	\$72,818	0.331	\$24,103
2029	-41,610	0	41,610	\$1.75	\$72,818			0		\$0			0		\$0	\$72,818	0.312	\$22,719
2030	-41,610	0	41,610	\$1.75	\$72,818			0		\$0			0		\$0	\$72,818	0.294	\$21,408
2031	-41,610	0	41,610	\$1.75	\$72,818			0		\$0			0		\$0	\$72,818	0.278	\$20,243
2032					\$0			0		\$0			0		\$0	\$0	0.262	\$0
2033					\$0			0		\$0			0		\$0	\$0	0.247	\$0
2034					\$0			0		\$0			0		\$0	\$0	0.233	\$0
2035					\$0			0		\$0			0		\$0	\$0	0.220	\$0
2036					\$0			0		\$0			0		\$0	\$0	0.207	\$0
2037					\$0			0		\$0			0		\$0	\$0	0.196	\$0
2038					\$0			0		\$0			0		\$0	\$0	0.185	\$0
2039					\$0			0		\$0			0		\$0	\$0	0.174	\$0
2040					\$0			0		\$0			0		\$0	\$0	0.164	\$0
2041					\$0			0		\$0			0		\$0	\$0	0.155	\$0
2042					\$0			0		\$0			0		\$0	\$0	0.146	\$0
2043					\$0			0		\$0			0		\$0	\$0	0.138	\$0
2044					\$0			0		\$0			0		\$0	\$0	0.130	\$0
2045					\$0			0		\$0			0		\$0	\$0	0.123	\$0
2046					\$0			0		\$0			0		\$0	\$0	0.116	\$0
2047					\$0			0		\$0			0		\$0	\$0	0.109	\$0
2048					\$0			0		\$0			0		\$0	\$0	0.103	\$0
2049					\$0			0		\$0			0		\$0	\$0	0.097	\$0
2050					\$0			0		\$0			0		\$0	\$0	0.092	\$0
2051					\$0			0		\$0			0		\$0	\$0	0.087	\$0
2052					\$0			0		\$0			0		\$0	\$0	0.082	\$0
2053					\$0			0		\$0			0		\$0	\$0	0.077	\$0
2054					\$0			0		\$0			0		\$0	\$0	0.073	\$0
2055					\$0			0		\$0			0		\$0	\$0	0.069	\$0
2056					\$0			0		\$0			0		\$0	\$0	0.065	\$0
2057					\$0			0		\$0			0		\$0	\$0	0.061	\$0
2058					\$0			0		\$0			0		\$0	\$0	0.058	\$0
2059					\$0			0		\$0			0		\$0	\$0	0.054	\$0
2060					\$0			0		\$0			0		\$0	\$0	0.051	\$0
<b>Total Present Value of Discounted Benefits over Project Life (Monetized Benefits):</b>																		\$743,030
<b>Project Allocation:</b>																		100.0%
<b>Total Present Value of Discounted Benefits (Monetized Benefits):</b>																		\$743,030
<p><b>Narrative description on benefits:</b> <i>The Proposed introduction of Point-of-Entry and Point of Use System is a replication of an existing pilot project at St. Anthony of the Desert that has demonstrated good performance in removing Arsenic from underground water offering reliable drinking water. This alternative substantially reduces cost of buying bottled water. It is assumed that average use of drinking water is 1.2 gallons per household per day, there are 95 households, and average price is \$1.0-\$2.00 per gallon. Gas prices are an additional cost that is not quantified. Current gas prices are \$3,00 per gallon and a typical round trip to get water averages 3 miles.</i></p>																		
<b>Comments:</b>																		

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<b>Table 15 - Total Water Supply Benefits (2009 dollars)</b> <b>Project 2: Short Term Arsenic Treatment Project</b>			
(a) Total Discounted Water Supply Benefits	(b) Total Discounted Avoided Project Costs	(c) Other Discounted Water Supply Benefits	(d) Total Value of Discounted Benefits [a + c] or [b + c]
\$743,030	\$0	\$0	<b>\$743,030</b>
<b>Comments:</b> <div style="height: 150px; border: 1px solid black;"></div>			

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Table 11 - Annual Cost of Project (All costs should be in 2009 dollars)									
Project: Groundwater Quality Protection Program - Desert Hot Springs									
Year	Initial Costs	Operations and Maintenance Costs					Discounting Calculations		
	(a)	(b)	(c)	(d)	(e)	(f)	(g)	(h)	(i)
	Grand Total Cost from Table 7 (row (i), column (d))	Admin	Operation	Maintenance	Replacement	Other	Total Costs (a)+...+(f)	Discount Factor	Discounted Costs (g) x (h)
2008	\$0	\$0	\$0	\$0	\$0	\$0	\$0	1.01	\$0
2009	\$0	\$0	\$0	\$0	\$0	\$0	\$0	1.00	\$0
2010	\$1,023,847	\$0	\$0	\$0	\$0	\$0	\$1,023,847	0.94	\$965,487
2011	\$1,036,667	\$0	\$0	\$0	\$0	\$0	\$1,036,667	0.89	\$922,634
2012	\$1,036,667	\$0	\$0	\$0	\$0	\$0	\$1,036,667	0.84	\$870,800
2013	\$0	\$0	\$0	\$0	\$0	\$0	\$0	0.79	\$0
2014	\$0	\$0	\$0	\$0	\$0	\$0	\$0	0.75	\$0
2015	\$0	\$0	\$0	\$0	\$0	\$0	\$0	0.71	\$0
2016	\$0	\$0	\$0	\$2,270	\$0	\$0	\$2,270	0.67	\$1,510
2017	\$0	\$0	\$0	\$0	\$0	\$0	\$0	0.63	\$0
2018	\$0	\$0	\$0	\$0	\$0	\$0	\$0	0.59	\$0
2019	\$0	\$0	\$0	\$0	\$0	\$0	\$0	0.56	\$0
2020	\$0	\$0	\$0	\$0	\$0	\$0	\$0	0.53	\$0
2021	\$0	\$0	\$0	\$2,270	\$0	\$0	\$2,270	0.50	\$1,128
2022	\$0	\$0	\$0	\$0	\$0	\$0	\$0	0.47	\$0
2023	\$0	\$0	\$0	\$0	\$0	\$0	\$0	0.44	\$0
2024	\$0	\$0	\$0	\$0	\$0	\$0	\$0	0.42	\$0
2025	\$0	\$0	\$0	\$0	\$0	\$0	\$0	0.39	\$0
2026	\$0	\$0	\$0	\$2,270	\$0	\$0	\$2,270	0.37	\$842
2027	\$0	\$0	\$0	\$0	\$0	\$0	\$0	0.35	\$0
2028	\$0	\$0	\$0	\$0	\$0	\$0	\$0	0.33	\$0
2029	\$0	\$0	\$0	\$0	\$0	\$0	\$0	0.31	\$0
2030	\$0	\$0	\$0	\$0	\$0	\$0	\$0	0.29	\$0
2031	\$0	\$0	\$0	\$2,270	\$0	\$0	\$2,270	0.28	\$631
2032	\$0	\$0	\$0	\$0	\$0	\$0	\$0	0.26	\$0
2033	\$0	\$0	\$0	\$0	\$0	\$0	\$0	0.25	\$0
2034	\$0	\$0	\$0	\$0	\$0	\$0	\$0	0.23	\$0
2035	\$0	\$0	\$0	\$0	\$0	\$0	\$0	0.22	\$0
2036	\$0	\$0	\$0	\$2,270	\$0	\$0	\$2,270	0.21	\$470
2037	\$0	\$0	\$0	\$0	\$0	\$0	\$0	0.20	\$0
2038	\$0	\$0	\$0	\$0	\$0	\$0	\$0	0.19	\$0
2039	\$0	\$0	\$0	\$0	\$0	\$0	\$0	0.17	\$0
2040	\$0	\$0	\$0	\$0	\$0	\$0	\$0	0.16	\$0
2041	\$0	\$0	\$0	\$2,270	\$0	\$0	\$2,270	0.16	\$352
2042	\$0	\$0	\$0	\$0	\$0	\$0	\$0	0.15	\$0
2043	\$0	\$0	\$0	\$0	\$0	\$0	\$0	0.14	\$0
2044	\$0	\$0	\$0	\$0	\$0	\$0	\$0	0.13	\$0
2045	\$0	\$0	\$0	\$0	\$0	\$0	\$0	0.12	\$0
2046	\$0	\$0	\$0	\$2,270	\$0	\$0	\$2,270	0.12	\$263
2047	\$0	\$0	\$0	\$0	\$0	\$0	\$0	0.11	\$0
2048	\$0	\$0	\$0	\$0	\$0	\$0	\$0	0.10	\$0
2049	\$0	\$0	\$0	\$0	\$0	\$0	\$0	0.10	\$0
2050	\$0	\$0	\$0	\$0	\$0	\$0	\$0	0.09	\$0
2051	\$0	\$0	\$0	\$2,270	\$0	\$0	\$2,270	0.09	\$197
2052	\$0	\$0	\$0	\$0	\$0	\$0	\$0	0.08	\$0
2053	\$0	\$0	\$0	\$0	\$0	\$0	\$0	0.08	\$0
2054	\$0	\$0	\$0	\$0	\$0	\$0	\$0	0.07	\$0
2055	\$0	\$0	\$0	\$0	\$0	\$0	\$0	0.07	\$0
2056	\$0	\$0	\$0	\$2,270	\$0	\$0	\$2,270	0.07	\$148
2057	\$0	\$0	\$0	\$0	\$0	\$0	\$0	0.06	\$0
2058	\$0	\$0	\$0	\$0	\$0	\$0	\$0	0.06	\$0
2059	\$0	\$0	\$0	\$0	\$0	\$0	\$0	0.05	\$0
2060	\$0	\$0	\$0	\$0	\$0	\$0	\$0	0.05	\$0
Project Life	Total Present Value of Discounted Costs (Sum of Column (i))								
	Transfer to Table 20, Column (c), Exhibit F: Proposal Costs and Benefit Summaries								<b>\$2,764,463</b>

Comments: Years 1-5 no maintenance is performed on new sewer lines (not needed base on historical evidence). Starting in year 6 and thereafter every 3 to 5 years depending upon maintenance needs requirements of the particular section with lines in good shape being done every 5 years and those with greater need for cleaning more after, adjust between 1 and 3 year intervals. This project is expected to be cleaned and inspected every 5 years, with the first effort being completed in 2016 and every 5 years thereafter through the useful life of this asset, which is estimated at 100 years before replacement. 7500' of sewer main @ 3000' cleaned on average per day or 2.5 days effort (20 hours) of 2 men x \$79.50/hour x 20 hours = \$1,590.00 plus vehicle costs (1) jet truck @ \$205.41/day x 2.5 days = \$513.53, and (1) collection maintenance truck @ \$65.96/day x 2.5 days = \$164.90 for a grand total of \$2,268.43 every 5 years (future cost unadjusted for inflation). Note: labor and equipment costs are per November 2010 MSWD rates. Labor cost includes all direct labor hours plus benefits and G & A. Administration costs allocated to this effort are minimal when compared to the overall collection system administration effort, and are not included as such.

**Coachella Valley Integrated Regional Water Management  
Implementation Grant Proposal  
Appendix 7-1**

Table 11 - Annual Cost of Project (All costs should be in 2009 dollars)									
Project 4: Groundwater Quality Protection Program - Cathedral City									
Year	Initial Costs	Operations and Maintenance Costs					Discounting Calculations		
	(a) Grand Total Cost from Table 7 (row (i), column (d))	(b) Admin	(c) Operation	(d) Maintenance	(e) Replacement	(f) Other	(g) Total Costs (a)+...+(f)	(h) Discount Factor	(i) Discounted Costs (g) x (h)
2008	\$114,658	\$0	\$0	\$0	\$0	\$0	\$114,658	1.01	\$115,805
2009	\$114,658	\$0	\$0	\$0	\$0	\$0	\$114,658	1.00	\$114,658
2010	\$135,175	\$0	\$0	\$0	\$0	\$0	\$135,175	0.94	\$127,470
2011	\$828,405	\$800	\$1,800	\$2,500	\$2,400	\$0	\$835,905	0.89	\$743,956
2012	\$658,994	\$800	\$1,800	\$2,500	\$2,400	\$0	\$666,494	0.84	\$559,855
2013	\$0	\$800	\$1,800	\$2,500	\$2,400	\$0	\$7,500	0.79	\$5,940
2014	\$0	\$800	\$1,800	\$2,500	\$2,400	\$0	\$7,500	0.75	\$5,603
2015	\$0	\$800	\$1,800	\$2,500	\$2,400	\$0	\$7,500	0.71	\$5,288
2016	\$0	\$800	\$1,800	\$2,500	\$2,400	\$0	\$7,500	0.67	\$4,988
2017	\$0	\$800	\$1,800	\$2,500	\$2,400	\$0	\$7,500	0.63	\$4,703
2018	\$0	\$800	\$1,800	\$2,500	\$2,400	\$0	\$7,500	0.59	\$4,440
2019	\$0	\$800	\$1,800	\$2,500	\$2,400	\$0	\$7,500	0.56	\$4,185
2020	\$0	\$800	\$1,800	\$2,500	\$2,400	\$0	\$7,500	0.53	\$3,953
2021	\$0	\$800	\$1,800	\$2,500	\$2,400	\$0	\$7,500	0.50	\$3,728
2022	\$0	\$800	\$1,800	\$2,500	\$2,400	\$0	\$7,500	0.47	\$3,518
2023	\$0	\$800	\$1,800	\$2,500	\$2,400	\$0	\$7,500	0.44	\$3,315
2024	\$0	\$800	\$1,800	\$2,500	\$2,400	\$0	\$7,500	0.42	\$3,128
2025	\$0	\$800	\$1,800	\$2,500	\$2,400	\$0	\$7,500	0.39	\$2,925
2026	\$0	\$800	\$1,800	\$2,500	\$2,400	\$0	\$7,500	0.37	\$2,783
2027	\$0	\$800	\$1,800	\$2,500	\$2,400	\$0	\$7,500	0.35	\$2,625
2028	\$0	\$800	\$1,800	\$2,500	\$2,400	\$0	\$7,500	0.33	\$2,483
2029	\$0	\$800	\$1,800	\$2,500	\$2,400	\$0	\$7,500	0.31	\$2,340
2030	\$0	\$800	\$1,800	\$2,500	\$2,400	\$0	\$7,500	0.29	\$2,205
2031	\$0	\$800	\$1,800	\$2,500	\$2,400	\$0	\$7,500	0.28	\$2,085
2032	\$0	\$800	\$1,800	\$2,500	\$2,400	\$0	\$7,500	0.26	\$1,965
2033	\$0	\$800	\$1,800	\$2,500	\$2,400	\$0	\$7,500	0.25	\$1,853
2034	\$0	\$800	\$1,800	\$2,500	\$2,400	\$0	\$7,500	0.23	\$1,748
2035	\$0	\$800	\$1,800	\$2,500	\$2,400	\$0	\$7,500	0.22	\$1,650
2036	\$0	\$800	\$1,800	\$2,500	\$2,400	\$0	\$7,500	0.21	\$1,553
2037	\$0	\$800	\$1,800	\$2,500	\$2,400	\$0	\$7,500	0.20	\$1,470
2038	\$0	\$800	\$1,800	\$2,500	\$2,400	\$0	\$7,500	0.19	\$1,388
2039	\$0	\$800	\$1,800	\$2,500	\$2,400	\$0	\$7,500	0.17	\$1,305
2040	\$0	\$800	\$1,800	\$2,500	\$2,400	\$0	\$7,500	0.16	\$1,230
2041	\$0	\$800	\$1,800	\$2,500	\$2,400	\$0	\$7,500	0.16	\$1,163
2042	\$0	\$800	\$1,800	\$2,500	\$2,400	\$0	\$7,500	0.15	\$1,095
2043	\$0	\$800	\$1,800	\$2,500	\$2,400	\$0	\$7,500	0.14	\$1,035
2044	\$0	\$800	\$1,800	\$2,500	\$2,400	\$0	\$7,500	0.13	\$975
2045	\$0	\$800	\$1,800	\$2,500	\$2,400	\$0	\$7,500	0.12	\$923
2046	\$0	\$800	\$1,800	\$2,500	\$2,400	\$0	\$7,500	0.12	\$870
2047	\$0	\$800	\$1,800	\$2,500	\$2,400	\$0	\$7,500	0.11	\$818
2048	\$0	\$800	\$1,800	\$2,500	\$2,400	\$0	\$7,500	0.10	\$773
2049	\$0	\$800	\$1,800	\$2,500	\$2,400	\$0	\$7,500	0.10	\$728
2050	\$0	\$800	\$1,800	\$2,500	\$2,400	\$0	\$7,500	0.09	\$690
2051	\$0	\$800	\$1,800	\$2,500	\$2,400	\$0	\$7,500	0.09	\$653
2052	\$0	\$800	\$1,800	\$2,500	\$2,400	\$0	\$7,500	0.08	\$615
2053	\$0	\$800	\$1,800	\$2,500	\$2,400	\$0	\$7,500	0.08	\$578
2054	\$0	\$800	\$1,800	\$2,500	\$2,400	\$0	\$7,500	0.07	\$548
2055	\$0	\$800	\$1,800	\$2,500	\$2,400	\$0	\$7,500	0.07	\$518
2056	\$0	\$800	\$1,800	\$2,500	\$2,400	\$0	\$7,500	0.07	\$488
2057	\$0	\$800	\$1,800	\$2,500	\$2,400	\$0	\$7,500	0.06	\$458
2058	\$0	\$800	\$1,800	\$2,500	\$2,400	\$0	\$7,500	0.06	\$435
2059	\$0	\$800	\$1,800	\$2,500	\$2,400	\$0	\$7,500	0.05	\$407
2060	\$0	\$800	\$1,800	\$2,500	\$2,400	\$0	\$7,500	0.05	\$384
Project Life	Total Present Value of Discounted Costs (Sum of Column (i)) Transfer to Table 20, Column (c ), Exhibit F: Proposal Costs and Benefit Summaries								<b>\$1,760,282</b>

Comments: Capital costs will be expended from 2008 through 2012. O&M costs will not change in respect to 2009 dollars over the life of the project.

