Attachment 8: Benefits and Cost Analysis

Contents

Proposal Description and Summary of Benefits 2

Economic Benefits and Costs Analysis 5

Project 1: Lake Camanche Lateral Replacement Project – Phase 2 5

Summary of Monetized Benefits and Costs 5

Existing Data and Studies 6

Without Project Conditions 6

With Project Conditions 7

Description of Benefits and Methods to Estimate Benefits 7

Section D1 – Cost-Effectiveness Analysis 7

Section D2 – Non-Monetized Benefits Analysis 7

Section D3 – Monetized Benefits Analysis 10

Section D4 – Flood Damage Reduction Analysis 21

Section D5 – Project Benefits and Costs Summary 21

Project 2: Camanche Area Regional Water Supply Project – Phase 1 24

Summary of Monetized Benefits and Costs 24

Existing Data and Studies 25

Without Project Conditions 25

With Project Conditions 28

Description of Benefits and Methods to Estimate Benefits 28

Section D1 – Cost-Effectiveness Analysis 28

Section D2 – Non-Monetized Benefits Analysis 28

Section D3 – Monetized Benefits Analysis 32

Section D4 – Flood Damage Reduction Analysis 40

Section D5 – Project Benefits and Costs Summary 40

Project 3: Ponderosa Way Restoration Project – Phase 1 45

Summary of Monetized Benefits and Costs 47

Existing Data and Studies 47
Without Project Conditions 47
With Project Conditions 52
Description of Benefits and Methods to Estimate Benefits 52
Section D1 – Cost-Effectiveness Analysis 52
Section D2 – Non-Monetized Benefits Analysis 52
Section D3 – Monetized Benefits Analysis 56
Section D4 – Flood Damage Reduction Analysis 62
Section D5 – Project Benefits and Costs Summary 62
Proposal Benefits and Costs Summary 66

Proposal Description and Summary of Benefits

This Proposal includes a suite of three projects selected for implementation in the MAC Region with the overall goals of reducing water losses, improving water supply reliability, improving the quality of potable water delivered in the region, and addressing critical water issues faced by disadvantaged communities (DACs). The projects included in this Proposal are:

- Lake Camanche Lateral Replacement Project – Phase 2
- Camanche Area Regional Water Supply Project – Phase 1
- Ponderosa Way Restoration Project – Phase 1

Together, these projects will account for full lifecycle of water resources management to address the critical water supply and water quality needs of the MAC IRWM Region by achieving the following vision and theme of this Proposal:

Address critical water supply and quality needs of disadvantaged communities in the Mokelumne-Amador-Calaveras IRWM Region while maximizing water supply reliability and public benefit.

Table 8-1 summarizes the benefits that would be achieved through implementation of this Proposal.

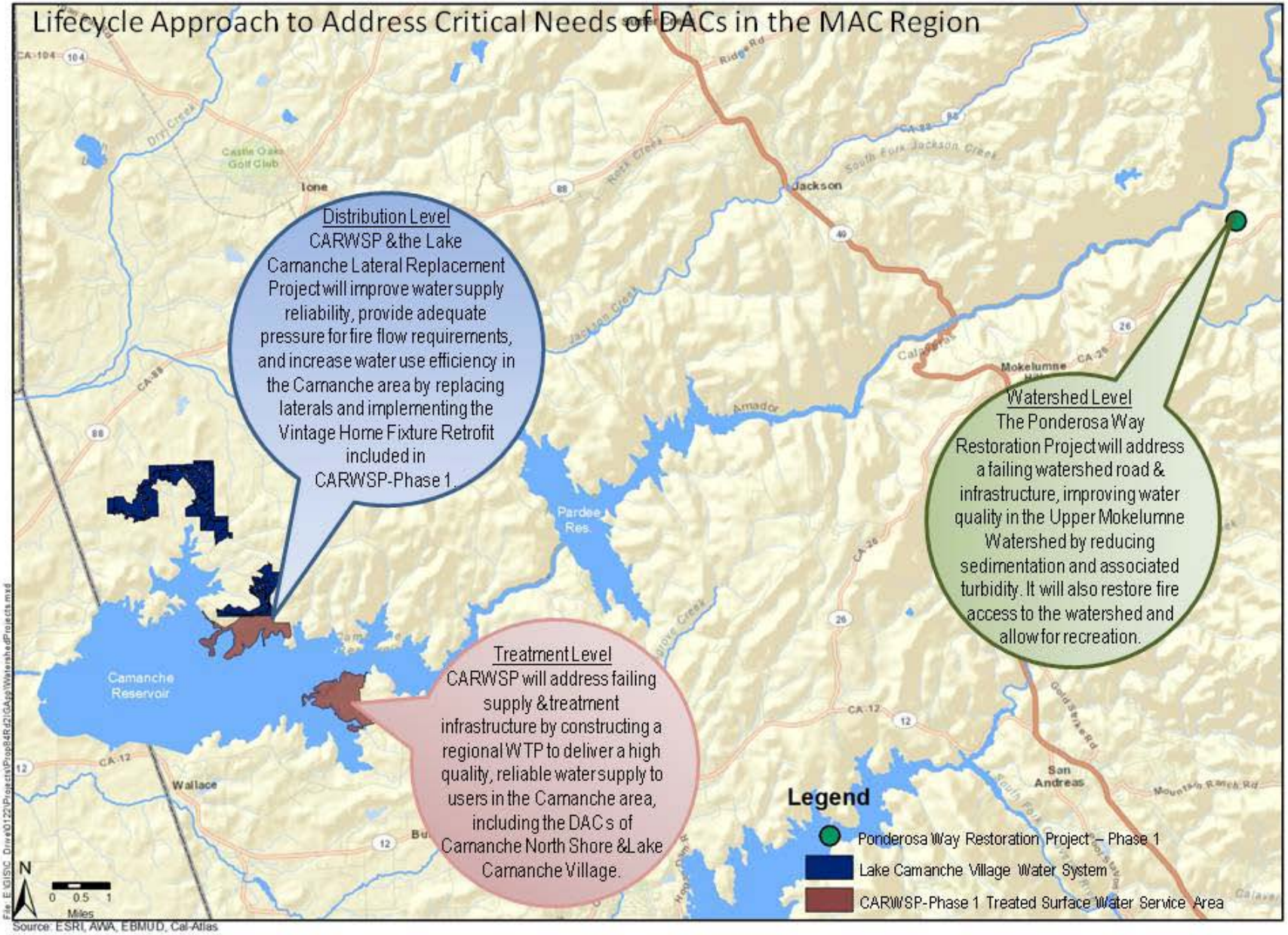

Lifecycle Approach to Address Critical Needs of DACs in the MAC Region
Distribution Level
CARWSP & the Lake Camanche Lateral Replacement Project will improve water supply reliability, provide adequate pressure for fire flow requirements, and increase water use efficiency in the Camanche area by replacing laterals and implementing the Vintage Home Fixture Retrofit included in CARWSP-Phase 1.
Watershed Level
The Ponderosa Way Restoration Project will address a failing watershed road & infrastructure, improving water quality in the Upper Mokelumne Watershed by reducing sedimentation and associated turbidity. It will also restore fire access to the watershed and allow for recreation.
Treatment Level
CARWSP will address failing supply & treatment infrastructure by constructing a regional WTP to deliver a high quality, reliable water supply to users in the Camanche area, including the DACs of Camanche North Shore & Lake Camanche Village.
Legend
Ponderosa Way Restoration Project – Phase 1
Lake Camanche Village Water System
CARWSP-Phase 1 Treated Surface Water Service Area
Camanche Reservoir
Pardee Res.
Ione
Jackson
Wallace
San Andreas
Mokelumne
Castle Oaks Golf Club
N
0 0.5 1 Miles
Source: ESRI, AWA, EBMUD, Cal-Atlas

Table 8-1: Summary of Proposed Physical Benefits

Project	Benefit Summary
Water Supply	
Lake Camanche Lateral Replacement Project – Phase 2	• 3.7 billion gallons of supply conserved
Camanche Area Regional Water Supply Project – Phase 1	• 9.1 billion gallons of high quality supply delivered • 1 billion gallons of supply conserved
Water Quality	
Lake Camanche Lateral Replacement Project – Phase 2	• 27,800 pounds chlorine avoided
Camanche Area Regional Water Supply Project – Phase 1	• 6,752 mg/L reduction in iron concentration • 279 mg/L reduction in manganese concentration
Ponderosa Way Restoration Project – Phase 1	• 9,400-ton reduction in sediment loading to the Mokelumne River
Ecosystem Improvement	
Lake Camanche Lateral Replacement Project – Phase 2	• 27,800 pounds chlorine discharge to environment avoided
Camanche Area Regional Water Supply Project – Phase 1	• 257,133 tons iron discharge to environment avoided • 10,625 tons manganese discharge to environment avoided
Ponderosa Way Restoration Project – Phase 1	• 9,400 ton reduction in sediment loading to aquatic environments
Recreation Benefits	
Ponderosa Way Restoration Project – Phase 1	• Enhanced access to: o 17 miles of trails o 8.4 river miles of whitewater boating o 2,000 acres of Mokelumne Canyon • 260,000 additional recreation visitor days per year
Energy-Related Benefits	
Lake Camanche Lateral Replacement Project – Phase 2	• Reduction in energy demand of approximately 187,745 kWh
Other Physical Benefits	
Lake Camanche Lateral Replacement Project – Phase 2	• 6,525 avoided emergency repair events

Economic Benefits and Costs Analysis

This section summarizes the extensive technical work that has been completed to monetize the proposed benefits summarized above.

Project 1: Lake Camanche Lateral Replacement Project – Phase 2

The Amador Water Agency is the main water purveyor in western Amador County with over 6,700 connections in their service area. AWA serves the cities of Amador City, Ione, Jackson, Plymouth, Sutter Creek and portions of unincorporated western Amador County, including the community of Lake Camanche Village. Lake Camanche Village, a DAC, is a major subdivision in western Amador County near the shore of Camanche Reservoir (a recreation and flood control reservoir). The Lake Camanche Village Service Area is known as Water Improvement District #7 (WID #7) by AWA and consists of three groundwater wells, storage tanks, hydro-pneumatic tanks, and booster pumps. The AWA WID #7 service area has 733 connections and provides an average of 0.27 MGD of potable water. [Note: WID#7 is sometimes also referred to as CSA#3, which is a Community Service Area established by Amador County when it approved the Lake Camanche Village subdivision. AWA established WID#7 when it took control of the Lake Camanche water system from the county. The area contained within WID#7 and CSA#3 is identical.]

The Lake Camanche Lateral Replacement Project is structured into three phases, each consisting of replacing approximately 200 laterals. AWA is currently implementing Phase 1 of the Lake Camanche Lateral Replacement Project is currently under construction which was made possible through the award of Proposition 84 implementation funds from DWR. Phase 1 includes lining the redwood tanks with geomembrane liners to reduce water loss and increases storage capacity and replacing 200 of the existing Poly-Tube service laterals with 3/4-inch copper pipe.

For Phase 2, included in this Proposal, AWA proposes the replacement of 200 additional service laterals in order to reduce the water losses in the distribution system and minimize infrastructure damage from cracked and leaky pipes.

Summary of Monetized Benefits and Costs

The projected monetized project benefits and costs are summarized in the following table.

Category	Summary	Present Value
Benefits		
Water supply benefits	Avoided groundwater pumping	$69,935
Water quality improvements	Avoided chlorine use	$5,985
Other benefits	Avoided emergency repairs	$1,002,295
Total Monetized Benefits		**$1,084,292**
Costs		
Present Value of Capital and O&M Costs		$530,278
Total Costs		**$530,278**

Existing Data and Studies

The Project is supported by a series of studies documenting the potential project benefits, including:

- 2008 Urban Drought Assistance Grant Application – In July of 2008, AWA submitted a grant application to the California Department of Water Resources (DWR) 2008 Urban Drought Assistance Grant Program for the Lake Camanche Lateral Replacement Project. Information compiled for that application was used in support of the information presented in this Proposal. (Appendix 8.1)
- Water Conservation Plan (RMC Water & Environment, 2010) – This document summarizes current water conservation programs being implemented by Amador Water Agency (AWA), and outlines a recommended program for demand management measure (DMM) implementation to levels of compliance at stated in the California Urban Water Conservation Council's Memorandum of Understanding. Section 3.2 of the Plan describes DMM 3 (system water audits, leak detection and repair), and describes a program recommended for implementation of the DMM. The Lake Camanche Tank Lateral Replacement Project will reduce significant water losses in the system and is consistent with the recommended DMM3 program as described in the Conservation Plan. (Appendix 8.2)

Without Project Conditions

The Lake Camanche Lateral Replacement Project – Phase 2 will replace 200 leaking laterals. Losses from leaking system laterals currently equal 6% to 9% of system production, or about

5.8 to 8.7 MG annually. This project would replace 200 of these laterals and reduce system losses by about 1.4 million gallons (MG) per year.

Under the No Project Condition, existing leaking laterals would remain in service. System loss from the leaking laterals that would be replaced by this project (currently about 1.4 MG per year) would be expected to increase at a rate of 5% per year.

With Project Conditions

Project implementation will conserve water supplies, improve supply reliability, and protect local habitat. Reducing system losses will also directly and immediately benefit the DAC by reducing the cost of service (achieved by cost savings associated with decreased pumping and treatment) and by increasing the sustainability of the local the groundwater supply.

Description of Benefits and Methods to Estimate Benefits

The DWR method was used to assess benefits.

Section D1 – Cost-Effectiveness Analysis

The cost-effectiveness analysis approach was not used for this project; as such, PSP Table 11 has been omitted.

Section D2 – Non-Monetized Benefits Analysis

A series of non-monetized benefits are expected to accrue from project implementation. The benefits are summarized in PSP Table 12, and are described in additional detail below.

Table 12 – Non-monetized Benefits Checklist

No.	Question	Enter "Yes", "No" or "Neg"
	Community/Social Benefits **Will the proposal**	
1	**Provide education or technology benefits?**	**Yes**
	Examples are not limited to, but may include: - Include educational features that should result in water supply, water quality, or flood damage reduction benefits? - Develop, test, or document a new technology for water supply, water quality, or flood damage reduction management? - Provide some other education or technological benefit?	
2	**Provide social recreation or access benefits?**	No
	Examples are not limited to, but may include: - Provide new or improved outdoor recreation opportunities? - Provide more access to open space? - Provide some other recreation or public access benefit?	
3	**Help avoid, reduce or resolve various public water resources conflicts?**	**Yes**
	Examples are not limited to, but may include:	

Table 12 – Non-monetized Benefits Checklist		
No.	**Question**	**Enter "Yes", "No" or "Neg"**
	- Provide more opportunities for public involvement in water management? - Help avoid or resolve an existing conflict as evidenced by recurring fines or litigation? - Help meet an existing state mandate (e.g., water quality, water conservation, flood control)?	
4	**Promote social health and safety?**	Yes
	Examples are not limited to, but may include: - Increase urban water supply reliability for fire-fighting and critical services following seismic events? - Reduce risk to life from dam failure or flooding? - Reduce exposure to water-related hazards?	
5	**Have other social benefits?**	Yes
	Examples are not limited to, but may include: - Redress or increase inequitable distribution of environmental burdens? - Have disproportionate beneficial or adverse effects on disadvantaged communities, Native Americans, or other distinct cultural groups?	
	Environmental Stewardship Benefits: **Will the proposal**	
6	**Benefit wildlife or habitat in ways that were not quantified in Attachment 7?**	No
	Examples are not limited to, but may include: - Cause an increase in the amount or quality of terrestrial, aquatic, riparian or wetland habitat? - Contribute to an existing biological opinion or recovery plan for a listed special status species? - Preserve or restore designated critical habitat of a listed species? - Enhance wildlife protection or habitat?	
7	**Improve water quality in ways that were not quantified in Attachment 7?**	No
	Examples are not limited to, but may include: - Cause an improvement in water quality in an impaired water body or sensitive habitat? - Prevent water quality degradation? - Cause some other improvement in water quality?	
8	**Reduce net emissions in ways that were not quantified in Attachment 7?**	Yes
	Examples are not limited to, but may include: - Reduce net production of greenhouse gasses? - Reduce net emissions of other harmful chemicals into the air or water?	
9	**Provide other environmental stewardship benefits, other than those claimed in Sections D1, D3, or D4?**	No
	Sustainability Benefits:	

Table 12 – Non-monetized Benefits Checklist		
No.	**Question**	**Enter "Yes", "No" or "Neg"**
	Will the proposal	
10	**Improve the overall, long-term management of California groundwater resources?**	Yes
	Examples are not limited to, but may include: - Reduce extraction of non-renewable groundwater? - Promote aquifer storage or recharge?	
11	**Reduce demand for net diversions for the regions from the Delta?**	No
12	**Provide a long-term solution in place of a short-term one?**	Yes
13	**Promote energy savings or replace fossil fuel based energy sources with renewable energy and resources?**	Yes
	Examples are not limited to, but may include: - Reduce net energy use on a permanent basis? - Increase renewable energy production? - Include new buildings or modify buildings to include certified LEED features? - Provide a net increase in recycling or reuse of materials? - Replace unsustainable land or water management practices with recognized sustainable practices?	
14	**Improve water supply reliability in ways not quantified in Attachment 7?**	Yes
	Examples are not limited to, but may include: - Provide a more flexible mix of water sources? - Reduce likelihood of catastrophic supply outages? - Reduce supply uncertainty? - Reduce supply variability?	
15	**Other (If the above listed categories do not apply, provide non-monetized benefit description)?**	No

Community/Social Benefits

1. Provide Education or Technology Benefits

Mailers will be sent to residents of the DAC educating them about the project, that the funding for the project came from DWR, the cost of the project, and the project schedule.

2. Provide Social Recreation or Access Benefits

Not applicable

3. Help Avoid, Reduce or Resolve Various Public Water Resources Conflicts

By maximizing use of local groundwater supplies, the project will offset the need for increased pumping to meet future demands, relieving strain on the groundwater basin and reducing potential conflicts with other area groundwater users.

4. Promote Social Health and Safety

The project will improve water supply availability and reduce demands, freeing up pumping capacity to meet peak demands, including for fire protection.

5. Have Other Social Benefits
The project will benefit a DAC.

Environmental Stewardship Benefits

6. Benefit Wildlife or Habitat in Ways Not Quantified in Attachment 7
Not applicable

7. Improve Water Quality in Ways Not Quantified in Attachment 7
Not applicable

8. Reduce Net Emissions in Ways Not Quantified in Attachment 7
The project will reduce energy requirements, as discussed in Attachment 7. This will result in a corresponding reduction in greenhouse gas emissions.

9. Provide Other Environmental Stewardship Benefits Not Claimed in Sections D1, D3, or D4
Not applicable

Sustainability Benefits

10. Improve the Overall, Long-Term Management of California Groundwater Resources
The Project will reduce leakage and optimize use of groundwater resources.

11. Reduce Demand for Net Diversions for the Region from the Delta
Not applicable

12. Provide a Long-Term Solution in Place of a Short-Term One
The project will provide a long-term reduction in water losses, reducing groundwater demands and providing for long-term capacity improvements as opposed to increasing groundwater pumping to unsustainable levels to offset water losses.

13. Promote Energy Savings or Replace Fossil Fuel Based Energy Sources with Renewable Energy
The project will reduce energy consumption by reducing the need to pump groundwater.

14. Improve Water Supply Reliability in Ways Not Quantified in Attachment 7
The project will improve supply reliability by freeing up groundwater and pumping capacity. This will result in enhanced ability to meet peak demands and reduced stress on the groundwater basin, improving supply reliability.

15. Other
Not applicable

Section D3 – Monetized Benefits Analysis

The following benefits have been monetized for this Project:

- Avoided cost of groundwater pumping
- Avoided cost of chlorine

- Avoided cost of emergency repairs

Monetized benefits, and the process for monetizing benefits, are discussed in the following paragraphs. Benefits are summarized in PSP Table15. Because this project does not avoid implementation of an alternate project, PSP Table 16 has been omitted.

Avoided Cost of Groundwater Pumping

As discussed in Attachment 7, this project will avoid the need to pump approximately 1.4 MG per year beginning on completion of the project in 2015. Without project implementation, it is assumed that losses would increase at a rate of approximately 5% per year.

Based on AWA records, it costs approximately $94.00 per acre-foot to pump groundwater (in 2012 dollars). This equates to a cost of $288.48 per MG. As shown in PSP Table 15, this project will generate $17,432 in avoided groundwater pumping costs over the 70 year project life, assuming a 6% discount rate.

Avoided Cost of Chlorine

As discussed in Attachment 7, chlorine residuals average 0.91 mg/L in the Lake Camanche area. Assuming the chlorine concentration in water losses is equal to 0.91 mg/L, this equates to 10.6 lb chlorine in year 2015. Since losses are projected to increase by 5% per year without the project, chlorine demand would similarly increase by 5% per year without the project. This amounts to approximately 6,258 lbs of chlorine discharged to the environment from the laterals that would be replaced by this Project over the 70-year project life.

AWA currently pays $1,358 for 700 gallons of 12.5 percent sodium hypochlorite by weight (refer to Appendix 8.3). Since 12.5 percent sodium hypochlorite weighs 10 lb/gallon, 700 gallons weighs 7,000 lb. Sodium hypochlorite (NaOCl) is 47.65 percent chlorine by weight (35.5 / [23 + 16 + 35.5]). As such, 7,000 lb of sodium hypochlorite solution contains 417 lbs of chlorine (7,000 * 0.125 * 0.4765). Therefore, AWA currently pays $1,358 for every 417 lbs of chlorine, or $3.25/lb.

Over the 70-year project life, avoided use of 6,258 lb of chlorine has a present value of $1,492.

Avoided Cost of Emergency Repairs

The service laterals in the Lake Camanche Village distribution system are contributing significantly to water losses in the system. The current polyethylene ("Poly-Tube") laterals were installed in the late 1970s and have become very brittle and subject to severe longitudinal cracking, catastrophically failing at an increasing rate.

Emergency repair of failing laterals is a costly undertaking. Based on AWA's service records, emergency repairs were required to address eight leaking laterals in 2010 and seven leaking laterals in 2011. Without intervention, the rate of infrastructure failure is

expected to increase at a rate of approximately 5% per year, with emergency repair requirements increasing at a similar rate.

The Phase 1 Lake Camanche Lateral Replacement Project is in the process of replacing one third of the laterals in the Lake Camanche Village Area. As such, once the Phase 1 Project is complete, it is expected that the average failure rate will be reduced by approximately one third, and emergency repairs will be reduced from an average of seven to eight emergency repairs per year to approximately five emergency repairs per year. Implementation of the Phase 2 Project would address half of the remaining laterals. Without the Project, it is expected that an average of 5 emergency repairs would be completed per year, increasing at a rate of 5% per year. With the Project, it is estimated that an average of 2.5 emergency repairs would be completed per year, also increasing at a rate of 5% per year.

The cost of emergency water system repairs has been compared to the cost of planned maintenance in a variety of venues. A 1994 article in the Journal of the American Water Works Association entitled Minimize Repairs, Maximize Service with O&M Program cited emergency repairs as typically costing approximately ten times that of planned repairs (Appendix 8.4, page 3). Similarly, a 2007 AWWA Research Foundation Report entitled Main Break Prediction, Prevention, and Control compared the cost of emergency and planned water system maintenance for five utilities and found that, on average, emergency repairs (including pavement repair and landowner claims) averaged approximately $8,223 per incident, compared to $4,606 per incident for scheduled maintenance (refer to Appendix 8.5, page 28), or a ratio of cost of emergency repairs to cost of planned repairs of 1.8. Finally, a 2011 article in the Journal of the American Water Works Association entitled Main Breaks and the Issuance of Precautionary Boil Water Orders found that emergency repairs typically cost two to three times that of planned maintenance (Appendix 8.6, page 27).

To be conservative, we have assumed that emergency repairs in the Lake Camanche Village water system cost approximately two to three times that of planned repairs, or a ratio of 2.5. To estimate the per-lateral planned repair cost, the full cost of the proposed project ($592,001) is divided by the number of laterals proposed for replacement (200), resulting in a per-lateral planned repair cost of $2,960 per lateral. This would translate to an emergency cost at a 2.5 ratio of $7,400 per emergency repair. Assuming the proposed Project avoids 2.5 emergency repairs per year and emergency repair requirements of unmaintained laterals increase at a rate of 5% per year, this translates to an avoided cost of $798,405 over the 70-year project life.

Annual Benefits Table

PSP table 15, which summarizes present value of annual benefits, is provided below.

Table 15 – Annual Benefit (All benefits should be in 2012 dollars) Project: Camanche Area Lateral Replacement Project - Phase 2									
(a)	(b)	(c)	(d)	(e)	(f)	(g)	(h)	(i)	(j)
Year	Type of Benefit	Measure of Benefit (Units)	Without Project	With Project	Change	Unit $ Value (1)	Annual $ Value	Disc. Factor (1)	Discounted Benefits
2012								1.000	
2013								0.943	
2014								0.890	
2015	Avoided groundwater pumping	MG	0	1.4	1.4	$288.48	$404	0.840	**$339**
	Avoided chlorine use	lb	0	11	11	$3.25	$35	0.840	**$29**
	Avoided emergency repairs	Incidents	5	2.5	3	$7,400	$18,500	0.840	**$15,533**
2016	Avoided groundwater pumping	MG	0	1.5	1.5	$288.48	$424	0.792	**$336**
	Avoided chlorine use	lb	0	11	11	$3.25	$36	0.792	**$29**
	Avoided emergency repairs	Incidents	5.3	2.6	3	$7,400	$19,425	0.792	**$15,386**
2017	Avoided groundwater pumping	MG	0	1.5	1.5	$288.48	$445	0.747	**$333**
	Avoided chlorine use	lb	0	12	12	$3.25	$38	0.747	**$28**
	Avoided emergency repairs	Incidents	5.5	2.8	3	$7,400	$20,396	0.747	**$15,241**
2018	Avoided groundwater pumping	MG	0	1.6	1.6	$288.48	$468	0.705	**$330**
	Avoided chlorine use	lb	0	12	12	$3.25	$40	0.705	**$28**
	Avoided emergency repairs	Incidents	5.8	2.9	3	$7,400	$21,416	0.705	**$15,097**
2019	Avoided groundwater pumping	MG	0	1.7	1.7	$288.48	$491	0.665	**$326**
	Avoided chlorine use	lb	0	13	13	$3.25	$42	0.665	**$28**
	Avoided emergency repairs	Incidents	6.1	3.0	3	$7,400	$22,487	0.665	**$14,955**
2020	Avoided groundwater pumping	MG	0	1.8	1.8	$288.48	$515	0.627	**$323**
	Avoided chlorine use	lb	0	14	14	$3.25	$44	0.627	**$28**
	Avoided emergency repairs	Incidents	6.4	3.2	3	$7,400	$23,611	0.627	**$14,814**
2021	Avoided groundwater pumping	MG	0	1.9	1.9	$288.48	$541	0.592	**$320**
	Avoided chlorine use	lb	0	14	14	$3.25	$46	0.592	**$27**
	Avoided emergency repairs	Incidents	6.7	3.4	3	$7,400	$24,792	0.592	**$14,674**

Table 15 – Annual Benefit (All benefits should be in 2012 dollars) Project: Camanche Area Lateral Replacement Project - Phase 2									
(a)	(b)	(c)	(d)	(e)	(f)	(g)	(h)	(i)	(j)
Year	Type of Benefit	Measure of Benefit (Units)	Without Project	With Project	Change	Unit $ Value (1)	Annual $ Value	Disc. Factor (1)	Discounted Benefits
2022	Avoided groundwater pumping	MG	0	2.0	2.0	$288.48	$568	0.558	**$317**
	Avoided chlorine use	lb	0	15	15	$3.25	$49	0.558	**$27**
	Avoided emergency repairs	Incidents	7.0	3.5	4	$7,400	$26,031	0.558	**$14,536**
2023	Avoided groundwater pumping	MG	0	2.1	2.1	$288.48	$597	0.527	**$314**
	Avoided chlorine use	lb	0	16	16	$3.25	$51	0.527	**$27**
	Avoided emergency repairs	Incidents	7.4	3.7	4	$7,400	$27,333	0.527	**$14,399**
2024	Avoided groundwater pumping	MG	0	2.2	2.2	$288.48	$627	0.497	**$311**
	Avoided chlorine use	lb	0	16	16	$3.25	$54	0.497	**$27**
	Avoided emergency repairs	Incidents	7.8	3.9	4	$7,400	$28,700	0.497	**$14,263**
2025	Avoided groundwater pumping	MG	0	2.3	2.3	$288.48	$658	0.469	**$308**
	Avoided chlorine use	lb	0	17	17	$3.25	$56	0.469	**$26**
	Avoided emergency repairs	Incidents	8.1	4.1	4	$7,400	$30,135	0.469	**$14,128**
2026	Avoided groundwater pumping	MG	0	2.4	2.4	$288.48	$691	0.442	**$306**
	Avoided chlorine use	lb	0	18	18	$3.25	$59	0.442	**$26**
	Avoided emergency repairs	Incidents	8.6	4.3	4	$7,400	$31,641	0.442	**$13,995**
2027	Avoided groundwater pumping	MG	0	2.5	2.5	$288.48	$725	0.417	**$303**
	Avoided chlorine use	lb	0	19	19	$3.25	$62	0.417	**$26**
	Avoided emergency repairs	Incidents	9.0	4.5	4	$7,400	$33,223	0.417	**$13,863**
2028	Avoided groundwater pumping	MG	0	2.6	2.6	$288.48	$762	0.394	**$300**
	Avoided chlorine use	lb	0	20	20	$3.25	$65	0.394	**$26**
	Avoided emergency repairs	Incidents	9.4	4.7	5	$7,400	$34,885	0.394	**$13,732**
2029	Avoided groundwater pumping	MG	0	2.8	2.8	$288.48	$800	0.371	**$297**
	Avoided chlorine use	lb	0	21	21	$3.25	$68	0.371	**$25**
	Avoided emergency repairs	Incidents	9.9	4.9	5	$7,400	$36,629	0.371	**$13,603**
2030	Avoided groundwater	MG	0	2.9	2.9	$288.48	$840	0.350	**$294**

Table 15 – Annual Benefit (All benefits should be in 2012 dollars) Project: Camanche Area Lateral Replacement Project - Phase 2									
(a)	(b)	(c)	(d)	(e)	(f)	(g)	(h)	(i)	(j)
Year	Type of Benefit	Measure of Benefit (Units)	Without Project	With Project	Change	Unit $ Value (1)	Annual $ Value	Disc. Factor (1)	Discounted Benefits
	pumping								
	Avoided chlorine use	lb	0	22	22	$3.25	$72	0.350	**$25**
	Avoided emergency repairs	Incidents	10.4	5.2	5	$7,400	$38,460	0.350	**$13,474**
2031	Avoided groundwater pumping	MG	0	3.1	3.1	$288.48	$882	0.331	**$291**
	Avoided chlorine use	lb	0	23	23	$3.25	$75	0.331	**$25**
	Avoided emergency repairs	Incidents	10.9	5.5	5	$7,400	$40,383	0.331	**$13,347**
2032	Avoided groundwater pumping	MG	0	3.2	3.2	$288.48	$926	0.312	**$289**
	Avoided chlorine use	lb	0	24	24	$3.25	$79	0.312	**$25**
	Avoided emergency repairs	Incidents	11.5	5.7	6	$7,400	$42,402	0.312	**$13,221**
2033	Avoided groundwater pumping	MG	0	3.4	3.4	$288.48	$972	0.294	**$286**
	Avoided chlorine use	lb	0	26	26	$3.25	$83	0.294	**$24**
	Avoided emergency repairs	Incidents	12.0	6.0	6	$7,400	$44,522	0.294	**$13,097**
2034	Avoided groundwater pumping	MG	0	3.5	3.5	$288.48	$1,021	0.278	**$283**
	Avoided chlorine use	lb	0	27	27	$3.25	$87	0.278	**$24**
	Avoided emergency repairs	Incidents	12.6	6.3	6	$7,400	$46,749	0.278	**$12,973**
2035	Avoided groundwater pumping	MG	0	3.7	3.7	$288.48	$1,072	0.262	**$281**
	Avoided chlorine use	lb	0	28	28	$3.25	$92	0.262	**$24**
	Avoided emergency repairs	Incidents	13.3	6.6	7	$7,400	$49,086	0.262	**$12,851**
2036	Avoided groundwater pumping	MG	0	3.9	3.9	$288.48	$1,125	0.247	**$278**
	Avoided chlorine use	lb	0	30	30	$3.25	$96	0.247	**$24**
	Avoided emergency repairs	Incidents	13.9	7.0	7	$7,400	$51,540	0.247	**$12,729**
2037	Avoided groundwater pumping	MG	0	4.1	4.1	$288.48	$1,181	0.233	**$275**
	Avoided chlorine use	lb	0	31	31	$3.25	$101	0.233	**$24**
	Avoided emergency repairs	Incidents	14.6	7.3	7	$7,400	$54,117	0.233	**$12,609**
2038	Avoided groundwater pumping	MG	0	4.3	4.3	$288.48	$1,241	0.220	**$273**

Table 15 – Annual Benefit (All benefits should be in 2012 dollars) Project: Camanche Area Lateral Replacement Project - Phase 2									
(a)	(b)	(c)	(d)	(e)	(f)	(g)	(h)	(i)	(j)
Year	Type of Benefit	Measure of Benefit (Units)	Without Project	With Project	Change	Unit $ Value (1)	Annual $ Value	Disc. Factor (1)	Discounted Benefits
	Avoided chlorine use	lb	0	33	33	$3.25	$106	0.220	**$23**
	Avoided emergency repairs	Incidents	15.4	7.7	8	$7,400	$56,823	0.220	**$12,490**
2039	Avoided groundwater pumping	MG	0	4.5	4.5	$288.48	$1,303	0.207	**$270**
	Avoided chlorine use	lb	0	34	34	$3.25	$111	0.207	**$23**
	Avoided emergency repairs	Incidents	16.1	8.1	8	$7,400	$59,664	0.207	**$12,372**
2040	Avoided groundwater pumping	MG	0	4.7	4.7	$288.48	$1,368	0.196	**$268**
	Avoided chlorine use	lb	0	36	36	$3.25	$117	0.196	**$23**
	Avoided emergency repairs	Incidents	16.9	8.5	8	$7,400	$62,648	0.196	**$12,256**
2041	Avoided groundwater pumping	MG	0	5.0	5.0	$288.48	$1,436	0.185	**$265**
	Avoided chlorine use	lb	0	38	38	$3.25	$123	0.185	**$23**
	Avoided emergency repairs	Incidents	17.8	8.9	9	$7,400	$65,780	0.185	**$12,140**
2042	Avoided groundwater pumping	MG	0	5.2	5.2	$288.48	$1,508	0.174	**$263**
	Avoided chlorine use	lb	0	40	40	$3.25	$129	0.174	**$22**
	Avoided emergency repairs	Incidents	18.7	9.3	9	$7,400	$69,069	0.174	**$12,026**
2043	Avoided groundwater pumping	MG	0	5.5	5.5	$288.48	$1,583	0.164	**$260**
	Avoided chlorine use	lb	0	42	42	$3.25	$135	0.164	**$22**
	Avoided emergency repairs	Incidents	19.6	9.8	10	$7,400	$72,522	0.164	**$11,912**
2044	Avoided groundwater pumping	MG	0	5.8	5.8	$288.48	$1,662	0.155	**$258**
	Avoided chlorine use	lb	0	44	44	$3.25	$142	0.155	**$22**
	Avoided emergency repairs	Incidents	20.6	10.3	10	$7,400	$76,149	0.155	**$11,800**
2045	Avoided groundwater pumping	MG	0	6.1	6.1	$288.48	$1,746	0.146	**$255**
	Avoided chlorine use	lb	0	46	46	$3.25	$149	0.146	**$22**
	Avoided emergency repairs	Incidents	21.6	10.8	11	$7,400	$79,956	0.146	**$11,688**
2046	Avoided groundwater pumping	MG	0	6.4	6.4	$288.48	$1,833	0.138	**$253**
	Avoided chlorine use	lb	0	48	48	$3.25	$157	0.138	**$22**

Table 15 – Annual Benefit (All benefits should be in 2012 dollars) Project: Camanche Area Lateral Replacement Project - Phase 2									
(a)	(b)	(c)	(d)	(e)	(f)	(g)	(h)	(i)	(j)
Year	Type of Benefit	Measure of Benefit (Units)	Without Project	With Project	Change	Unit $ Value (1)	Annual $ Value	Disc. Factor (1)	Discounted Benefits
	Avoided emergency repairs	Incidents	22.7	11.3	11	$7,400	$83,954	0.138	**$11,578**
2047	Avoided groundwater pumping	MG	0	6.7	6.7	$288.48	$1,924	0.130	**$250**
	Avoided chlorine use	lb	0	51	51	$3.25	$165	0.130	**$21**
	Avoided emergency repairs	Incidents	23.8	11.9	12	$7,400	$88,151	0.130	**$11,469**
2048	Avoided groundwater pumping	MG	0	7.0	7.0	$288.48	$2,021	0.123	**$248**
	Avoided chlorine use	lb	0	53	53	$3.25	$173	0.123	**$21**
	Avoided emergency repairs	Incidents	25.0	12.5	13	$7,400	$92,559	0.123	**$11,361**
2049	Avoided groundwater pumping	MG	0	7.4	7.4	$288.48	$2,122	0.116	**$246**
	Avoided chlorine use	lb	0	56	56	$3.25	$182	0.116	**$21**
	Avoided emergency repairs	Incidents	26.3	13.1	13	$7,400	$97,187	0.116	**$11,254**
2050	Avoided groundwater pumping	MG	0	7.7	7.7	$288.48	$2,228	0.109	**$243**
	Avoided chlorine use	lb	0	59	59	$3.25	$191	0.109	**$21**
	Avoided emergency repairs	Incidents	27.6	13.8	14	$7,400	$102,046	0.109	**$11,147**
2051	Avoided groundwater pumping	MG	0	8.1	8.1	$288.48	$2,339	0.103	**$241**
	Avoided chlorine use	lb	0	62	62	$3.25	$200	0.103	**$21**
	Avoided emergency repairs	Incidents	29.0	14.5	14	$7,400	$107,149	0.103	**$11,042**
2052	Avoided groundwater pumping	MG	0	8.5	8.5	$288.48	$2,456	0.097	**$239**
	Avoided chlorine use	lb	0	65	65	$3.25	$210	0.097	**$20**
	Avoided emergency repairs	Incidents	30.4	15.2	15	$7,400	$112,506	0.097	**$10,938**
2053	Avoided groundwater pumping	MG	0	8.9	8.9	$288.48	$2,579	0.092	**$237**
	Avoided chlorine use	lb	0	68	68	$3.25	$221	0.092	**$20**
	Avoided emergency repairs	Incidents	31.9	16.0	16	$7,400	$118,131	0.092	**$10,835**
2054	Avoided groundwater pumping	MG	0	9.4	9.4	$288.48	$2,708	0.087	**$234**
	Avoided chlorine use	lb	0	71	71	$3.25	$232	0.087	**$20**
	Avoided emergency	Inciden	33.5	16.8	17	$7,400	$124,038	0.087	**$10,733**

Table 15 – Annual Benefit (All benefits should be in 2012 dollars) Project: Camanche Area Lateral Replacement Project - Phase 2									
(a)	(b)	(c)	(d)	(e)	(f)	(g)	(h)	(i)	(j)
Year	Type of Benefit	Measure of Benefit (Units)	Without Project	With Project	Change	Unit $ Value (1)	Annual $ Value	Disc. Factor (1)	Discounted Benefits
	repairs	ts							
2055	Avoided groundwater pumping	MG	0	9.9	9.9	$288.48	$2,843	0.082	**$232**
	Avoided chlorine use	lb	0	75	75	$3.25	$243	0.082	**$20**
	Avoided emergency repairs	Incidents	35.2	17.6	18	$7,400	$130,240	0.082	**$10,631**
2056	Avoided groundwater pumping	MG	0	10.3	10.3	$288.48	$2,985	0.077	**$230**
	Avoided chlorine use	lb	0	79	79	$3.25	$255	0.077	**$20**
	Avoided emergency repairs	Incidents	37.0	18.5	18	$7,400	$136,752	0.077	**$10,531**
2057	Avoided groundwater pumping	MG	0	10.9	10.9	$288.48	$3,135	0.073	**$228**
	Avoided chlorine use	lb	0	83	83	$3.25	$268	0.073	**$19**
	Avoided emergency repairs	Incidents	38.8	19.4	19	$7,400	$143,589	0.073	**$10,432**
2058	Avoided groundwater pumping	MG	0	11.4	11.4	$288.48	$3,291	0.069	**$226**
	Avoided chlorine use	lb	0	87	87	$3.25	$282	0.069	**$19**
	Avoided emergency repairs	Incidents	40.7	20.4	20	$7,400	$150,769	0.069	**$10,333**
2059	Avoided groundwater pumping	MG	0	12.0	12.0	$288.48	$3,456	0.065	**$223**
	Avoided chlorine use	lb	0	91	91	$3.25	$296	0.065	**$19**
	Avoided emergency repairs	Incidents	42.8	21.4	21	$7,400	$158,307	0.065	**$10,236**
2060	Avoided groundwater pumping	MG	0	12.6	12.6	$288.48	$3,629	0.061	**$221**
	Avoided chlorine use	lb	0	96	96	$3.25	$311	0.061	**$19**
	Avoided emergency repairs	Incidents	44.9	22.5	22	$7,400	$166,223	0.061	**$10,139**
2061	Avoided groundwater pumping	MG	0	13.2	13.2	$288.48	$3,810	0.058	**$219**
	Avoided chlorine use	lb	0	100	100	$3.25	$326	0.058	**$19**
	Avoided emergency repairs	Incidents	47.2	23.6	24	$7,400	$174,534	0.058	**$10,044**
2062	Avoided groundwater pumping	MG	0	13.9	13.9	$288.48	$4,001	0.054	**$217**
	Avoided chlorine use	lb	0	105	105	$3.25	$342	0.054	**$19**
	Avoided emergency repairs	Incidents	49.5	24.8	25	$7,400	$183,260	0.054	**$9,949**

Table 15 – Annual Benefit (All benefits should be in 2012 dollars) Project: Camanche Area Lateral Replacement Project - Phase 2									
(a)	(b)	(c)	(d)	(e)	(f)	(g)	(h)	(i)	(j)
Year	Type of Benefit	Measure of Benefit (Units)	Without Project	With Project	Change	Unit $ Value (1)	Annual $ Value	Disc. Factor (1)	Discounted Benefits
2063	Avoided groundwater pumping	MG	0	14.6	14.6	$288.48	$4,201	0.051	**$215**
	Avoided chlorine use	lb	0	111	111	$3.25	$359	0.051	**$18**
	Avoided emergency repairs	Incidents	52.0	26.0	26	$7,400	$192,423	0.051	**$9,855**
2064	Avoided groundwater pumping	MG	0	15.3	15.3	$288.48	$4,411	0.048	**$213**
	Avoided chlorine use	lb	0	116	116	$3.25	$377	0.048	**$18**
	Avoided emergency repairs	Incidents	54.6	27.3	27	$7,400	$202,045	0.048	**$9,762**
2065	Avoided groundwater pumping	MG	0	16.1	16.1	$288.48	$4,631	0.046	**$211**
	Avoided chlorine use	lb	0	122	122	$3.25	$396	0.046	**$18**
	Avoided emergency repairs	Incidents	57.3	28.7	29	$7,400	$212,147	0.046	**$9,670**
2066	Avoided groundwater pumping	MG	0	16.9	16.9	$288.48	$4,863	0.043	**$209**
	Avoided chlorine use	lb	0	128	128	$3.25	$416	0.043	**$18**
	Avoided emergency repairs	Incidents	60.2	30.1	30	$7,400	$222,754	0.043	**$9,579**
2067	Avoided groundwater pumping	MG	0	17.7	17.7	$288.48	$5,106	0.041	**$207**
	Avoided chlorine use	lb	0	134	134	$3.25	$437	0.041	**$18**
	Avoided emergency repairs	Incidents	63.2	31.6	32	$7,400	$233,892	0.041	**$9,488**
2068	Avoided groundwater pumping	MG	0	18.6	18.6	$288.48	$5,361	0.038	**$205**
	Avoided chlorine use	lb	0	141	141	$3.25	$459	0.038	**$18**
	Avoided emergency repairs	Incidents	66.4	33.2	33	$7,400	$245,587	0.038	**$9,399**
2069	Avoided groundwater pumping	MG	0	19.5	19.5	$288.48	$5,629	0.036	**$203**
	Avoided chlorine use	lb	0	148	148	$3.25	$482	0.036	**$17**
	Avoided emergency repairs	Incidents	69.7	34.8	35	$7,400	$257,866	0.036	**$9,310**
2070	Avoided groundwater pumping	MG	0	20.5	20.5	$288.48	$5,911	0.034	**$201**
	Avoided chlorine use	lb	0	156	156	$3.25	$506	0.034	**$17**
	Avoided emergency repairs	Incidents	73.2	36.6	37	$7,400	$270,759	0.034	**$9,222**
2071	Avoided groundwater pumping	MG	0	21.5	21.5	$288.48	$6,206	0.032	**$199**

Table 15 – Annual Benefit (All benefits should be in 2012 dollars) Project: Camanche Area Lateral Replacement Project - Phase 2									
(a)	(b)	(c)	(d)	(e)	(f)	(g)	(h)	(i)	(j)
Year	Type of Benefit	Measure of Benefit (Units)	Without Project	With Project	Change	Unit $ Value (1)	Annual $ Value	Disc. Factor (1)	Discounted Benefits
	Avoided chlorine use	lb	0	163	163	$3.25	$531	0.032	**$17**
	Avoided emergency repairs	Incidents	76.8	38.4	38	$7,400	$284,297	0.032	**$9,135**
2072	Avoided groundwater pumping	MG	0	22.6	22.6	$288.48	$6,517	0.030	**$198**
	Avoided chlorine use	lb	0	172	172	$3.25	$558	0.030	**$17**
	Avoided emergency repairs	Incidents	80.7	40.3	40	$7,400	$298,512	0.030	**$9,049**
2073	Avoided groundwater pumping	MG	0	23.7	23.7	$288.48	$6,843	0.029	**$196**
	Avoided chlorine use	lb	0	180	180	$3.25	$586	0.029	**$17**
	Avoided emergency repairs	Incidents	84.7	42.4	42	$7,400	$313,438	0.029	**$8,964**
2074	Avoided groundwater pumping	MG	0	24.9	24.9	$288.48	$7,185	0.027	**$194**
	Avoided chlorine use	lb	0	189	189	$3.25	$615	0.027	**$17**
	Avoided emergency repairs	Incidents	88.9	44.5	44	$7,400	$329,109	0.027	**$8,879**
2075	Avoided groundwater pumping	MG	0	26.2	26.2	$288.48	$7,544	0.025	**$192**
	Avoided chlorine use	lb	0	199	199	$3.25	$646	0.025	**$16**
	Avoided emergency repairs	Incidents	93.4	46.7	47	$7,400	$345,565	0.025	**$8,795**
2076	Avoided groundwater pumping	MG	0	27.5	27.5	$288.48	$7,921	0.024	**$190**
	Avoided chlorine use	lb	0	209	209	$3.25	$678	0.024	**$16**
	Avoided emergency repairs	Incidents	98.1	49.0	49	$7,400	$362,843	0.024	**$8,713**
2077	Avoided groundwater pumping	MG	0	28.8	28.8	$288.48	$8,317	0.023	**$188**
	Avoided chlorine use	lb	0	219	219	$3.25	$712	0.023	**$16**
	Avoided emergency repairs	Incidents	103.0	51.5	51	$7,400	$380,985	0.023	**$8,630**
2078	Avoided groundwater pumping	MG	0	30.3	30.3	$288.48	$8,733	0.021	**$187**
	Avoided chlorine use	lb	0	230	230	$3.25	$747	0.021	**$16**
	Avoided emergency repairs	Incidents	108.1	54.1	54	$7,400	$400,035	0.021	**$8,549**
2079	Avoided groundwater pumping	MG	0	31.8	31.8	$288.48	$9,170	0.020	**$185**
	Avoided chlorine use	lb	0	241	241	$3.25	$785	0.020	**$16**

Table 15 – Annual Benefit (All benefits should be in 2012 dollars) Project: Camanche Area Lateral Replacement Project - Phase 2									
(a)	(b)	(c)	(d)	(e)	(f)	(g)	(h)	(i)	(j)
Year	Type of Benefit	Measure of Benefit (Units)	Without Project	With Project	Change	Unit $ Value (1)	Annual $ Value	Disc. Factor (1)	Discounted Benefits
	Avoided emergency repairs	Incidents	113.5	56.8	57	$7,400	$420,036	0.020	**$8,468**
2080	Avoided groundwater pumping	MG	0	33.4	33.4	$288.48	$9,628	0.019	**$183**
	Avoided chlorine use	lb	0	254	254	$3.25	$824	0.019	**$16**
	Avoided emergency repairs	Incidents	119.2	59.6	60	$7,400	$441,038	0.019	**$8,388**
2081	Avoided groundwater pumping	MG	0	35.0	35.0	$288.48	$10,110	0.018	**$181**
	Avoided chlorine use	lb	0	266	266	$3.25	$865	0.018	**$16**
	Avoided emergency repairs	Incidents	125.2	62.6	63	$7,400	$463,090	0.018	**$8,309**
2082	Avoided groundwater pumping	MG	0	36.8	36.8	$288.48	$10,615	0.017	**$180**
	Avoided chlorine use	lb	0	279	279	$3.25	$908	0.017	**$15**
	Avoided emergency repairs	Incidents	131.4	65.7	66	$7,400	$486,245	0.017	**$8,231**
2083	Avoided groundwater pumping	MG	0	38.6	38.6	$288.48	$11,146	0.016	**$178**
	Avoided chlorine use	lb	0	293	293	$3.25	$954	0.016	**$15**
	Avoided emergency repairs	Incidents	138.0	69.0	69	$7,400	$510,557	0.016	**$8,153**
2084	Avoided groundwater pumping	MG	0	40.6	40.6	$288.48	$11,703	0.015	**$176**
	Avoided chlorine use	lb	0	308	308	$3.25	$1,001	0.015	**$15**
	Avoided emergency repairs	Incidents	144.9	72.4	72	$7,400	$536,085	0.015	**$8,076**
Total Present Value of Discounted Benefits Based on Unit Value (Sum of the values in Column (j) for all Benefits shown in table)									**$817,408**
Comments:									

(1) Complete these columns if dollar value is being claimed for the benefit.

Section D4 – Flood Damage Reduction Analysis

Flood damage reduction has not been monetized for this Project. As such, PSP Tables 17 and 18 have been omitted.

Section D5 – Project Benefits and Costs Summary

Project costs were developed in accordance with PSP requirements:

- Consistency: The economic analysis is consistent with the grant requirements, uses the total project costs as provided in Attachment 4.
- Period of Analysis. The initial costs presented in Table 19 are consistent with the projected construction schedule for the project, as shown in Attachment 5, and reflect start of construction activities in 2013 and completion in 2015. The operational life of the Project is assumed to be 70 years.
- Economic Cost. The economic cost of the total Project as presented in Attachment 4 considers all reasonably foreseeable costs including opportunity costs.
- Sunk Costs. No sunk costs have been eliminated from the initial costs.
- Opportunity Costs. All opportunity costs are accounted for including previous construction costs incurred since October 2008.
- Discount Rate. In accordance with PSP requirements, a 6% discount rate was applied.
- Dollar Value. In accordance with PSP requirements, all costs are presented in 2012 dollars.

As shown in PSP Table 19 below, the present value of project costs, discounted at 6%, is estimated to be $530,278. This estimate includes all capital costs as well as costs associated with construction, administration, operation and maintenance of the project, and includes all costs required for the project to achieve its stated benefits. Costs funded by local, State, federal agencies and non-profits are included. The initial costs presented in this table are equivalent to those presented in Attachment 4, with the exceptions identified above.

Capital costs are estimated to be $592,001, and will phased based as follows.

- $63,656 expended in 2013
- $528,345 expended in 2014

No operations and maintenance costs are expected for this Project.

Table 19 – Annual Costs of Project

(All costs are in 2012 Dollars)

Project: Camanche Area Lateral Replacement Project - Phase 2

	Initial Costs Grand Total Cost from Table 7 (row (i), column (d))	Adjusted Grant Total Cost(1)	Annual Costs (2)						Discounting Calculations	
			Admin	Operation	Maintenance	Replacement	Other	Total Costs (a) +…+ (g)	Discount Factor	Discounted Project Costs (h) x (i)
Year	(a)	(b)	(c)	(d)	(e)	(f)	(g)	(h)	(i)	(j)
2012									1.000	
2013	$63,656							$63,656	0.943	**$60,053**
2014	$528,345							$528,345	0.890	**$470,225**
….										
2114								$0	0.048	**$0**

Table 19 – Annual Costs of Project (All costs are in 2012 Dollars) Project: Camanche Area Lateral Replacement Project - Phase 2										
	Initial Costs Grand Total Cost from Table 7 (row (i), column (d))	Adjusted Grant Total Cost(1)	Annual Costs (2)						Discounting Calculations	
			Admin	Operation	Maintenance	Replacement	Other	Total Costs (a) +…+ (g)	Discount Factor	Discounted Project Costs (h) x (i)
Year	(a)	(b)	(c)	(d)	(e)	(f)	(g)	(h)	(i)	(j)
Total Present Value of Discounted Costs (Sum of column (j)) Transfer to Table 20, column (c), Proposal Benefits and Costs Summaries										**$530,278**
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

Project Benefits

PSP Table 20, below, summarizes benefits and costs for the proposed project.

Table 20 – Project Benefits and Costs Summary Proposal: Mokelumne-Amador-Calaveras Region – Proposition 84 Round 2 Grant Proposal Agency: Upper Mokelumne River Watershed Authority							
Project	Project Proponent	Total Present Value Project Costs (1)	Total Present Value Project Benefits			Cost-Effectiveness Analysis, Cost Savings	Non-monetized benefits
			Monetized (2)	Flood Damage Reduction (3)	Total		
(a)	(b)	(c)	(d)	(e)	(f) = (d) + (e)	(g)	(h)
Camanche Area Lateral Replacement Project - Phase 2	AWA	$530,278	$817,408	N/A	$817,408	N/A	Reduced energy usage, improved supply reliability, reduced environmental discharges

(1) From Table 19, or RWMG method
(2) From Table 15 or RWMG method
(3) From Table 18 or RWMG method

Project 2: Camanche Area Regional Water Supply Project – Phase 1

The Camanche Regional Water Supply Project – Phase 1, once fully implemented, will address the water needs of three separate water system purveyors: Amador Water Agency, Calaveras County Water District, and East Bay Municipal Utility District (specifically, the communities adjacent to EBMUD's Camanche Reservoir). The fully-implemented Phase 1 Project will consist of a 0.5 MGD membrane filtration water treatment plant (WTP) at the Camanche South Shore (allllllso referred to as CASS) area, a new raw water pipeline to provide raw water from the Mokelumne Aqueducts to the new treatment plant, and a new cross-Camanche Reservoir treated water pipeline from the CASS WTP to the Camanche North Shore (also referred to as CANS) area to provide treated water to the North Shore and via an intertie to Lake Camanche Village. The 0.5 MGD plant will be designed such that it can be expanded to treat up to 2.0 MGD without significant building/facility alteration (although updated environmental review may be needed). This additional capacity will be used to supply neighboring areas of Amador and Calaveras Counties, including the Lake Camanche Village area in Amador County (a disadvantaged community) in Phase 2, and the community of Wallace in Calaveras County in Phase 3.

In the area adjacent to Camanche North Shore, AWA serves the residential development of Lake Camanche Village. This development consists of approximately 2,000 parcels and was designed to be served by five water supply wells. Presently, only three wells are in service because of water quality and quantity problems. Evidence exists that the remaining wells may also be subject to similar quality and quantity problems in the years ahead. Lake Camanche Village is a DAC as identified in the 2006 MAC IRWM Plan and in a recent income survey conducted by AWA for the area (see Attachment 12). CARWSP – Phase 1 will convey treated supplies to the CANS service area and provide water service to the adjacent DAC Lake Camanche Village via intertie, which will provide supplemental supplies in the event of water shortages or system failures.

Summary of Monetized Benefits and Costs

The projected monetized project benefits and costs are summarized in the following table.

Category	Summary	Present Value
Benefits		
Water supply benefits	Avoided trucking potable supplies	$24,577,056
Water demand reduction	Avoided groundwater pumping	$80,981
Total Monetized Benefits		**$24,658,037**
Costs		

Present Value of Capital and O&M Costs		$6,688,046
Total Costs		**$6,688,046**

Existing Data and Studies

The Project is supported by a series of studies documenting the potential project benefits, including:

- *Camanche Area Regional Water Supply Plan Feasibility Study and Conceptual Design* (RMC Water and Environment, 2013) – The Camanche Area Regional Water Supply Project (CARWSP) planning process was enabled by a Proposition 84IRWM planning grant received by the MAC IRWM Region. An evaluation of the feasibility of CARWSP was completed and documented in the CARWSP Feasibility Study and Conceptual Design, which identified the areas to be served by the project, determined project phasing, and detailed other parameters for project implementation such as financing, operations and maintenance requirements, and technical information. (Appendix 8.7)
- *Camanche South and North Shore Water Treatment Plants Evaluation* was completed, comparing alternative treatment plant technologies and pipeline alignments and costs. (Appendix 8.8)
- *Camanche Water Treatment Plant Replacement Project Mitigated Negative Declaration, State Clearinghouse Number 2001072084 (July 2001 Draft; September 2001 Final)* – This MND conducted the environmental impact evaluation of the proposed Camanche Regional Water Treatment Plant project as required under the California Environmental Quality Act (CEQA). Evaluated under this document were the 0.5 MGD filtration plant, the raw water pipeline connecting the Mokelumne Aqueducts to the new Camanche Regional Water Treatment Plant, and a cross-Camanche distribution pipeline. In general, the document determined that all potential environmental impacts could be mitigated, and provided recommended mitigation measures to be implemented at the time of project construction. (Appendix 8.9)
- *Camanche Regional Water System Draft Feasibility Study* (KASL, July 1999) – Performed initial evaluation of alternatives for surface water treatment to serve EBMUD's Camanche North and South Shores, AWA's Lake Camanche Village, and CCWD's Wallace and Burson service areas. This study laid the foundation for other studies and project development. (Appendix 8.10)
- Nichols, Dana. *All is Not Well Near Burson: For Residents Near Burson, Getting Water is No Mere Turn of the Tap* (RecordNet, October 20, 2005) – Article summarizing groundwater quality and quantity problems in the project area that have forced residents of the community of Burson to truck in potable supplies. (Appendix 8.11)

Without Project Conditions

Without the Project, highly unreliable groundwater supplies would require an alternative source to be identified. In 2012, as part of the MAC IRWM Plan Update, CARWSP was

identified as a project that could potentially engage multiple water suppliers in the MAC region in developing a regional solution to address critical water supply and water quality needs of select disadvantaged communities in the region. The potential project partners, EBMUD, AWA, and CCWD, undertook the Camanche Area Regional Water Supply Plan (CARWSP) Feasibility Study and Conceptual Design (supported with Proposition 84 funding). A key task of the study (Task 3 - Water Supply Alternatives Analysis) identified and evaluated potential water supplies for their suitability in meeting Camanche area demands. The alternatives evaluated and summary of conclusions reached were as follows (refer to pages 9 – 15 of Appendix 8.7):

- Groundwater - Groundwater quantity and quality in the area varies considerably among well sites due to the region's geology and the small and unpredictable yields of the groundwater subbasins in this area of the Sierra foothills. Over the years, groundwater has proven to be an unreliable and often unsuitable water supply source for the Camanche area. In addition to the highly variable quantities of available groundwater, Camanche area groundwater quality has also been a chronic issue (elevated levels of nitrates, iron, manganese, and boron, hydrogen sulfide, heterotrophic plate counts, and total coliform). These impaired groundwater quantity and quality conditions have rendered groundwater alone to be an unsuitable water supply for the Camanche area.
- Surface Water - EBMUD owns and operates Pardee and Camanche Reservoirs on the Mokelumne River. Camanche Reservoir is currently the water supply source for the existing Camanche South Shore WTP. This 417,120 acre-foot reservoir is located approximately 10 miles downstream from Pardee Reservoir which has a maximum storage capacity of 197,950 acre-feet (AF). Water is conveyed through three Mokelumne Aqueducts and flows by gravity approximately 83 miles to EBMUD's service area in the San Francisco Bay area.

  During the environmental review process for the Camanche WTP Replacement Project, EBMUD determined that the most cost-effective way to serve surface water to the Camanche area would be to convey raw water from the Mokelumne Aqueducts. The Mokelumne Aqueducts were also identified as the preferred Camanche area water supply source in the 2003 Camanche South and North Shore Water Treatment Plant Evaluation. It has been determined that up to 2.8 mgd of additional water supply could be safely available from Pardee Reservoir via the Mokelumne Aqueduct.

- Stormwater - Due to the significant cost associated with implementing widespread rainwater harvesting, the unreliability of stormwater supplies, the limited demands that could be met with harvested rainwater (outdoor demands only), and the need to provide complete redundancy for those supplies in the event rainwater supplies are not available, stormwater is not considered to be a viable supply to meet Camanche area demands.

- Conservation - Based on the analysis completed in the Camanche Area Regional Water Supply Plan Feasibility Study and Conceptual Design, water conservation may be a viable alternative to offset a portion of demands currently being met with groundwater supplies in the service area.
- Conjunctive Use - The groundwater resources in the Camanche area are problematic and would not allow for the extensive application of conjunctive use since, as previously described, the quantity and quality of groundwater has led to the development of the CARWSP study. Limited conjunctive use opportunities may be achieved through coordinated management of surface water supplies and existing groundwater supply facilities. For example, AWA could meet a portion of user demands in the DAC community of Lake Camanche Village using a combination of water conservation and treated surface water, while still relying on groundwater to meet peak demands.

The conclusion reached by the Water Supply Alternatives Analysis was that conjunctive management of groundwater and treated surface water diverted from the Mokelumne Aqueduct, combined with a targeted water conservation program, is the best and most suitable approach to addressing Camanche area water supply and quality problems (refer to page 15 of Appendix 8.7). Water conservation would help offset new potable water supplies required, and similarly, relying on groundwater to meet peak demands and provide emergency and/or backup supply would minimize the size of a surface WTP. Conjunctive management of existing groundwater and surface water supplies provides a reliable, high quality water supply; improves flexibility; and reduces stress on the over-drafted groundwater basins. The study recommended that the project be implemented in a series of three phases (refer to Appendix 8.7, page 28).

Due to Groundwater Supply and Quality Issues, Residents of Nearby Burson Must Truck in Water, as Pictured Here (from RecordNet article All is Not Well in Burson, Dana M. Nichols, Oct 20, 2005: http://www.recordnet.com/apps/pbcs.dll/article?AID=/20051020/NEWS01/510200340&SearchID=73223946845221)

If the CARWSP project is not implemented, residents will need to truck in potable water supplies, as is currently done in the nearby Burson area (refer to Appendix 8.11). Assuming that one tenth of the 0.5 mgd which would be met by CARWSP – Phase 1 is intended to meet potable demands and the remaining 90% of the 0.5 mgd demand could continue to be met by unreliable groundwater supplies for nonpotable uses, approximately 0.05 mgd of potable supplies would be required to be trucked to the area. This equates to 1.5 MG/month, or 18.25 MG/year. Over the assumed 50-year life of the project, this would result in 913 MG of potable supplies being trucked into the area.

Further, this Project represents Phase 1 of a three-phased Project. Phases 2 and 3 would expand the treatment plant to serve the communities of Lake Camanche Village (a DAC) and Wallace, respectively. Without this Project, Phases 2 and 3 could not proceed, and high quality, reliable surface supplies could not be provided to Lake Camanche Village or Wallace.

Finally, without the Project, an estimated 558 of units with dated, high-water-using showerheads and toilets would remain in place in the CANS, CASS, and Lake Camanche Village areas (Table 6, page 14 of the Camanche Area Regional Water Supply Plan Feasibility Study and Conceptual Design, Appendix 8.7). As such, an estimated 54,825 gallons per day (20 MG/year) would be wasted through use of non-conserving fixtures. Over the 50-year life of the Project, this amounts to 1 billion gallons (BG) conserved.

With Project Conditions

With the Project, 0.5 MGD of high quality Mokelumne River supplies will be treated and conveyed to the CASSS and CANS areas. In lieu of the project, EBMUD would likely need to truck in supplies to meet potable demands, as is currently done in the nearby Burson area, which faces similar groundwater supply and quality challenges. In addition, showerhead and toilet rebate programs in the CASS, CANS, and Lake Camanche Village areas would reduce water demands by approximately 1 billion gallons over the 50-year project life.

The project would also enable AWA to secure emergency supplies from EBMUD in the event of a catastrophic supply interruption of well failures. Phases 2 and 3 would expand the treatment plant to serve the communities of Lake Camanche Village (a DAC) and Wallace, respectively.

Description of Benefits and Methods to Estimate Benefits

The DWR method was used to assess benefits.

Section D1 – Cost-Effectiveness Analysis

The cost-effectiveness analysis approach was not used for this project; as such, PSP Table 11 has been omitted.

Section D2 – Non-Monetized Benefits Analysis

A series of non-monetized benefits are expected to accrue from project implementation. The benefits are summarized in PSP Table 12, and are described in additional detail below.

Table 12 – Non-monetized Benefits Checklist

No.	Question	Enter "Yes", "No" or "Neg"
	Community/Social Benefits **Will the proposal**	
1	**Provide education or technology benefits?**	**Yes**
	Examples are not limited to, but may include:	

Table 12 – Non-monetized Benefits Checklist		
No.	**Question**	**Enter "Yes", "No" or "Neg"**
	- Include educational features that should result in water supply, water quality, or flood damage reduction benefits? - Develop, test, or document a new technology for water supply, water quality, or flood damage reduction management? - Provide some other education or technological benefit?	
2	**Provide social recreation or access benefits?**	No
	Examples are not limited to, but may include: - Provide new or improved outdoor recreation opportunities? - Provide more access to open space? - Provide some other recreation or public access benefit?	
3	**Help avoid, reduce or resolve various public water resources conflicts?**	**Yes**
	Examples are not limited to, but may include: - Provide more opportunities for public involvement in water management? - Help avoid or resolve an existing conflict as evidenced by recurring fines or litigation? - Help meet an existing state mandate (e.g., water quality, water conservation, flood control)?	
4	**Promote social health and safety?**	Yes
	Examples are not limited to, but may include: - Increase urban water supply reliability for fire-fighting and critical services following seismic events? - Reduce risk to life from dam failure or flooding? - Reduce exposure to water-related hazards?	
5	**Have other social benefits?**	Yes
	Examples are not limited to, but may include: - Redress or increase inequitable distribution of environmental burdens? - Have disproportionate beneficial or adverse effects on disadvantaged communities, Native Americans, or other distinct cultural groups?	
	Environmental Stewardship Benefits: **Will the proposal**	
6	**Benefit wildlife or habitat in ways that were not quantified in Attachment 7?**	Yes
	Examples are not limited to, but may include: - Cause an increase in the amount or quality of terrestrial, aquatic, riparian or wetland habitat? - Contribute to an existing biological opinion or recovery plan for a listed special status species? - Preserve or restore designated critical habitat of a listed species? - Enhance wildlife protection or habitat?	
7	**Improve water quality in ways that were not quantified in Attachment 7?**	Yes

Table 12 – Non-monetized Benefits Checklist		
No.	**Question**	**Enter "Yes", "No" or "Neg"**
	Examples are not limited to, but may include: - Cause an improvement in water quality in an impaired water body or sensitive habitat? - Prevent water quality degradation? - Cause some other improvement in water quality?	
8	**Reduce net emissions in ways that were not quantified in Attachment 7?**	No
	Examples are not limited to, but may include: - Reduce net production of greenhouse gasses? - Reduce net emissions of other harmful chemicals into the air or water?	
9	**Provide other environmental stewardship benefits, other than those claimed in Sections D1, D3, or D4?**	No
	Sustainability Benefits: **Will the proposal**	
10	**Improve the overall, long-term management of California groundwater resources?**	Yes
	Examples are not limited to, but may include: - Reduce extraction of non-renewable groundwater? - Promote aquifer storage or recharge?	
11	**Reduce demand for net diversions for the regions from the Delta?**	No
12	**Provide a long-term solution in place of a short-term one?**	Yes
13	**Promote energy savings or replace fossil fuel based energy sources with renewable energy and resources?**	No
	Examples are not limited to, but may include: - Reduce net energy use on a permanent basis? - Increase renewable energy production? - Include new buildings or modify buildings to include certified LEED features? - Provide a net increase in recycling or reuse of materials? - Replace unsustainable land or water management practices with recognized sustainable practices?	
14	**Improve water supply reliability in ways not quantified in Attachment 7?**	Yes
	Examples are not limited to, but may include: - Provide a more flexible mix of water sources? - Reduce likelihood of catastrophic supply outages? - Reduce supply uncertainty? - Reduce supply variability?	
15	**Other (If the above listed categories do not apply, provide non-monetized benefit description)?**	No

Community/Social Benefits

1. Provide Education or Technology Benefits

Mailers will be sent to residents of the CANS and Lake Camanche Village DACs educating them about the change in the water supply, that funding for the project came from DWR, the cost of the project, and the project schedule. In addition, information on the showerhead and toilet rebate programs will be provided.

2. Provide Social Recreation or Access Benefits

Not applicable

3. Help Avoid, Reduce or Resolve Various Public Water Resources Conflicts

By offsetting the use of local groundwater supplies, the project will relieve strain on the groundwater basin and reduce potential conflicts with other area groundwater users. In addition, by implementing a regional project, it will enhance collaboration and communication among water suppliers, aiding in reducing conflict in the long term.

4. Promote Social Health and Safety

The project will improve water supply availability and delivered water quality, as well as reducing demands. Improved water quality will reduce potential public health risks associated with impaired groundwater quality. Improved reliability will improve the ability to meet peak demands peak demands, including for fire protection.

5. Have Other Social Benefits

The project will benefit two DACs: CANS and Lake Camanche Village.

Environmental Stewardship Benefits

6. Benefit Wildlife or Habitat in Ways Not Quantified in Attachment 7

The project will benefit wildlife habitat by reducing treatment-related discharges from wellhead treatment units designed to remove iron, manganese, and other water quality parameters of concern in local groundwater.

7. Improve Water Quality in Ways Not Quantified in Attachment 7

Not applicable

8. Reduce Net Emissions in Ways Not Quantified in Attachment 7

Not applicable

9. Provide Other Environmental Stewardship Benefits Not Claimed in Sections D1, D3, or D4

The project will ultimately enable Phases 2 and 3 to move forward. Phase 2 will allow AWA to secure an additional 1.0 mgd of supply from the regional plant. This will require moving the diversion point in AWA's water right downstream, effectively leaving additional supply in the river longer and providing environmental and habitat benefits.

Sustainability Benefits

10. Improve the Overall, Long-Term Management of California Groundwater Resources

The Project will reduce demands on the groundwater system and allow the basin to recover.

11. Reduce Demand for Net Diversions for the Region from the Delta

Not applicable

12. Provide a Long-Term Solution in Place of a Short-Term One
The project will provide a long-term reduction in water losses, reducing demands for unreliable groundwater supplies and providing for long-term reliability improvements.

13. Promote Energy Savings or Replace Fossil Fuel Based Energy Sources with Renewable Energy
Not applicable

14. Improve Water Supply Reliability in Ways Not Quantified in Attachment 7
The project will improve supply reliability by replacing unreliable groundwater supplies with highly reliable Mokelumne River supplies.

15. Other
Not applicable

Section D3 – Monetized Benefits Analysis

The following benefits have been monetized for this Project:

- Avoided cost of trucking in potable supplies
- Value of reduced water demands

Monetized benefits, and the process for monetizing benefits, are discussed in the following paragraphs. Benefits are summarized in PSP Table15. Because this project does not avoid implementation of an alternate project, PSP Table 16 has been omitted.

Avoided Cost of Trucking in Potable Supplies

As discussed in Attachment 7, this project will replace 0.5 MGD of highly unreliable groundwater supplies with reliable, high quality surface water supplies, preventing a need to truck in potable supplies for CASS and CANS (a disadvantaged community).

Without the Project, EBMUD would need to truck in potable supplies to meet demands, as is currently done in the nearby Burson area, which faces similar groundwater challenges. The only certified potable water hauling company in the general area is El Dorado Water out of the Placerville area (El Dorado County). El Dorado Water charges $75.00 an hour for a 1,600 gallon truck. Assuming ten percent of the 0.5 mgd is used for potable water, 0.05 mgd would be required to be trucked in to the area. Providing 0.05 mgd, or 50,000 gallons per day (gpd) would require 32 truckloads per day or 11,680 truckloads per year. Accounting for two hours travel time to the Camanche Area per truckload, this equates to 64 hours, or $4,800 per day.

Assuming a 6 percent discount rate, 32 truckloads per day, and $75/truckload (2012 dollars), the avoided cost to truck in water for potable demands is approximately $ $24,577,056 over the 50-year project life.

Reduced Water Demands

As discussed in Attachment 7, the Vintage Home Fixture Retrofit project will reduce demands in the area by approximately 54,825 gallons per day (20 MG/year), or 1 billion gallons (BG) over the 50-year project life. Assuming the cost to pump groundwater is approximately $94.00 per acre-foot ($288.48 per MG) in 2012 dollars, this equates to a present value of $80,981over the 50-year project life.

Annual Benefits Table

PSP table 15, which summarizes present value of annual benefits, is provided below.

Table 15 – Annual Benefit (All benefits should be in 2012 dollars) Project: Camanche Area Regional Water Supply Project Phase 1									
(a)	(b)	(c)	(d)	(e)	(f)	(g)	(h)	(i)	(j)
Year	Type of Benefit	Measure of Benefit (Units)	Without Project	With Project	Change Resulting from Project (e) – (d)	Unit $ Value (1)	Annual $ Value (1) (f) x (g)	Discount Factor (1)	Discounted Benefits (1) (h) x (i)
2012								1.000	
2013								0.943	
2014								0.890	
2015	Avoided water trucking	truckloads /year	11680	0	11680	$150	$1,752,000	0.840	**$1,471,013**
	Reduced groundwater demand	MG / year	0	20	20.0	$288.48	$5,773	0.840	**$4,847**
2016	Avoided water trucking	truckloads /year	11680	0	11680	$150	$1,752,000	0.792	**$1,387,748**
	Reduced groundwater demand	MG / year	0	20	20.0	$288.48	$5,773	0.792	**$4,573**
2017	Avoided water trucking	truckloads /year	11680	0	11680	$150	$1,752,000	0.747	**$1,309,196**
	Reduced groundwater demand	MG / year	0	20	20.0	$288.48	$5,773	0.747	**$4,314**
2018	Avoided water trucking	truckloads /year	11680	0	11680	$150	$1,752,000	0.705	**$1,235,091**
	Reduced groundwater demand	MG / year	0	20	20.0	$288.48	$5,773	0.705	**$4,070**
2019	Avoided water trucking	truckloads /year	11680	0	11680	$150	$1,752,000	0.665	**$1,165,180**

Table 15 – Annual Benefit (All benefits should be in 2012 dollars) Project: Camanche Area Regional Water Supply Project Phase 1									
(a)	(b)	(c)	(d)	(e)	(f)	(g)	(h)	(i)	(j)
Year	Type of Benefit	Measure of Benefit (Units)	Without Project	With Project	Change Resulting from Project (e) – (d)	Unit $ Value (1)	Annual $ Value (1) (f) x (g)	Discount Factor (1)	Discounted Benefits (1) (h) x (i)
	Reduced groundwater demand	MG / year	0	20	20.0	$288.48	$5,773	0.665	**$3,839**
2020	Avoided water trucking	truckloads /year	11680	0	11680	$150	$1,752,000	0.627	**$1,099,226**
	Reduced groundwater demand	MG / year	0	20	20.0	$288.48	$5,773	0.627	**$3,622**
2021	Avoided water trucking	truckloads /year	11680	0	11680	$150	$1,752,000	0.592	**$1,037,006**
	Reduced groundwater demand	MG / year	0	20	20.0	$288.48	$5,773	0.592	**$3,417**
2022	Avoided water trucking	truckloads /year	11680	0	11680	$150	$1,752,000	0.558	**$978,308**
	Reduced groundwater demand	MG / year	0	20	20.0	$288.48	$5,773	0.558	**$3,224**
2023	Avoided water trucking	truckloads /year	11680	0	11680	$150	$1,752,000	0.527	**$922,932**
	Reduced groundwater demand	MG / year	0	20	20.0	$288.48	$5,773	0.527	**$3,041**
2024	Avoided water trucking	truckloads /year	11680	0	11680	$150	$1,752,000	0.497	**$870,690**
	Reduced groundwater demand	MG / year	0	20	20.0	$288.48	$5,773	0.497	**$2,869**
2025	Avoided water trucking	truckloads /year	11680	0	11680	$150	$1,752,000	0.469	**$821,406**
	Reduced groundwater demand	MG / year	0	20	20.0	$288.48	$5,773	0.469	**$2,707**
2026	Avoided water trucking	truckloads /year	11680	0	11680	$150	$1,752,000	0.442	**$774,911**
	Reduced	MG / year	0	20	20.0	$288.48	$5,773	0.442	**$2,553**

Table 15 – Annual Benefit (All benefits should be in 2012 dollars) Project: Camanche Area Regional Water Supply Project Phase 1									
(a)	(b)	(c)	(d)	(e)	(f)	(g)	(h)	(i)	(j)
Year	Type of Benefit	Measure of Benefit (Units)	Without Project	With Project	Change Resulting from Project (e) – (d)	Unit $ Value (1)	Annual $ Value (1) (f) x (g)	Discount Factor (1)	Discounted Benefits (1) (h) x (i)
	groundwater demand								
2027	Avoided water trucking	truckloads /year	11680	0	11680	$150	$1,752,000	0.417	**$731,048**
	Reduced groundwater demand	MG / year	0	20	20.0	$288.48	$5,773	0.417	**$2,409**
2028	Avoided water trucking	truckloads /year	11680	0	11680	$150	$1,752,000	0.394	**$689,668**
	Reduced groundwater demand	MG / year	0	20	20.0	$288.48	$5,773	0.394	**$2,272**
2029	Avoided water trucking	truckloads /year	11680	0	11680	$150	$1,752,000	0.371	**$650,630**
	Reduced groundwater demand	MG / year	0	20	20.0	$288.48	$5,773	0.371	**$2,144**
2030	Avoided water trucking	truckloads /year	11680	0	11680	$150	$1,752,000	0.350	**$613,802**
	Reduced groundwater demand	MG / year	0	20	20.0	$288.48	$5,773	0.350	**$2,022**
2031	Avoided water trucking	truckloads /year	11680	0	11680	$150	$1,752,000	0.331	**$579,059**
	Reduced groundwater demand	MG / year	0	20	20.0	$288.48	$5,773	0.331	**$1,908**
2032	Avoided water trucking	truckloads /year	11680	0	11680	$150	$1,752,000	0.312	**$546,282**
	Reduced groundwater demand	MG / year	0	20	20.0	$288.48	$5,773	0.312	**$1,800**
2033	Avoided water trucking	truckloads /year	11680	0	11680	$150	$1,752,000	0.294	**$515,360**
	Reduced groundwater	MG / year	0	20	20.0	$288.48	$5,773	0.294	**$1,698**

Table 15 – Annual Benefit (All benefits should be in 2012 dollars) Project: Camanche Area Regional Water Supply Project Phase 1									
(a)	(b)	(c)	(d)	(e)	(f)	(g)	(h)	(i)	(j)
Year	Type of Benefit	Measure of Benefit (Units)	Without Project	With Project	Change Resulting from Project (e) – (d)	Unit $ Value (1)	Annual $ Value (1) (f) x (g)	Discount Factor (1)	Discounted Benefits (1) (h) x (i)
	demand								
2034	Avoided water trucking	truckloads /year	11680	0	11680	$150	$1,752,000	0.278	**$486,189**
	Reduced groundwater demand	MG / year	0	20	20.0	$288.48	$5,773	0.278	**$1,602**
2035	Avoided water trucking	truckloads /year	11680	0	11680	$150	$1,752,000	0.262	**$458,669**
	Reduced groundwater demand	MG / year	0	20	20.0	$288.48	$5,773	0.262	**$1,511**
2036	Avoided water trucking	truckloads /year	11680	0	11680	$150	$1,752,000	0.247	**$432,706**
	Reduced groundwater demand	MG / year	0	20	20.0	$288.48	$5,773	0.247	**$1,426**
2037	Avoided water trucking	truckloads /year	11680	0	11680	$150	$1,752,000	0.233	**$408,214**
	Reduced groundwater demand	MG / year	0	20	20.0	$288.48	$5,773	0.233	**$1,345**
2038	Avoided water trucking	truckloads /year	11680	0	11680	$150	$1,752,000	0.220	**$385,107**
	Reduced groundwater demand	MG / year	0	20	20.0	$288.48	$5,773	0.220	**$1,269**
2039	Avoided water trucking	truckloads /year	11680	0	11680	$150	$1,752,000	0.207	**$363,309**
	Reduced groundwater demand	MG / year	0	20	20.0	$288.48	$5,773	0.207	**$1,197**
2040	Avoided water trucking	truckloads /year	11680	0	11680	$150	$1,752,000	0.196	**$342,744**
	Reduced groundwater demand	MG / year	0	20	20.0	$288.48	$5,773	0.196	**$1,129**

Table 15 – Annual Benefit (All benefits should be in 2012 dollars) Project: Camanche Area Regional Water Supply Project Phase 1									
(a)	(b)	(c)	(d)	(e)	(f)	(g)	(h)	(i)	(j)
Year	Type of Benefit	Measure of Benefit (Units)	Without Project	With Project	Change Resulting from Project (e) – (d)	Unit $ Value (1)	Annual $ Value (1) (f) x (g)	Discount Factor (1)	Discounted Benefits (1) (h) x (i)
2041	Avoided water trucking	truckloads /year	11680	0	11680	$150	$1,752,000	0.185	**$323,343**
	Reduced groundwater demand	MG / year	0	20	20.0	$288.48	$5,773	0.185	**$1,065**
2042	Avoided water trucking	truckloads /year	11680	0	11680	$150	$1,752,000	0.174	**$305,041**
	Reduced groundwater demand	MG / year	0	20	20.0	$288.48	$5,773	0.174	**$1,005**
2043	Avoided water trucking	truckloads /year	11680	0	11680	$150	$1,752,000	0.164	**$287,774**
	Reduced groundwater demand	MG / year	0	20	20.0	$288.48	$5,773	0.164	**$948**
2044	Avoided water trucking	truckloads /year	11680	0	11680	$150	$1,752,000	0.155	**$271,485**
	Reduced groundwater demand	MG / year	0	20	20.0	$288.48	$5,773	0.155	**$895**
2045	Avoided water trucking	truckloads /year	11680	0	11680	$150	$1,752,000	0.146	**$256,118**
	Reduced groundwater demand	MG / year	0	20	20.0	$288.48	$5,773	0.146	**$844**
2046	Avoided water trucking	truckloads /year	11680	0	11680	$150	$1,752,000	0.138	**$241,621**
	Reduced groundwater demand	MG / year	0	20	20.0	$288.48	$5,773	0.138	**$796**
2047	Avoided water trucking	truckloads /year	11680	0	11680	$150	$1,752,000	0.130	**$227,944**
	Reduced groundwater demand	MG / year	0	20	20.0	$288.48	$5,773	0.130	**$751**
2048	Avoided	truckloads	11680	0	11680	$150	$1,752,000	0.123	**$215,042**

Table 15 – Annual Benefit (All benefits should be in 2012 dollars) Project: Camanche Area Regional Water Supply Project Phase 1									
(a)	(b)	(c)	(d)	(e)	(f)	(g)	(h)	(i)	(j)
Year	Type of Benefit	Measure of Benefit (Units)	Without Project	With Project	Change Resulting from Project (e) – (d)	Unit $ Value (1)	Annual $ Value (1) (f) x (g)	Discount Factor (1)	Discounted Benefits (1) (h) x (i)
	water trucking	/year							
	Reduced groundwater demand	MG / year	0	20	20.0	$288.48	$5,773	0.123	**$709**
2049	Avoided water trucking	truckloads /year	11680	0	11680	$150	$1,752,000	0.116	**$202,870**
	Reduced groundwater demand	MG / year	0	20	20.0	$288.48	$5,773	0.116	**$668**
2050	Avoided water trucking	truckloads /year	11680	0	11680	$150	$1,752,000	0.109	**$191,386**
	Reduced groundwater demand	MG / year	0	20	20.0	$288.48	$5,773	0.109	**$631**
2051	Avoided water trucking	truckloads /year	11680	0	11680	$150	$1,752,000	0.103	**$180,553**
	Reduced groundwater demand	MG / year	0	20	20.0	$288.48	$5,773	0.103	**$595**
2052	Avoided water trucking	truckloads /year	11680	0	11680	$150	$1,752,000	0.097	**$170,333**
	Reduced groundwater demand	MG / year	0	20	20.0	$288.48	$5,773	0.097	**$561**
2053	Avoided water trucking	truckloads /year	11680	0	11680	$150	$1,752,000	0.092	**$160,692**
	Reduced groundwater demand	MG / year	0	20	20.0	$288.48	$5,773	0.092	**$529**
2054	Avoided water trucking	truckloads /year	11680	0	11680	$150	$1,752,000	0.087	**$151,596**
	Reduced groundwater demand	MG / year	0	20	20.0	$288.48	$5,773	0.087	**$500**
2055	Avoided water	truckloads /year	11680	0	11680	$150	$1,752,000	0.082	**$143,015**

Table 15 – Annual Benefit (All benefits should be in 2012 dollars) Project: Camanche Area Regional Water Supply Project Phase 1									
(a)	(b)	(c)	(d)	(e)	(f)	(g)	(h)	(i)	(j)
Year	Type of Benefit	Measure of Benefit (Units)	Without Project	With Project	Change Resulting from Project (e) – (d)	Unit $ Value (1)	Annual $ Value (1) (f) x (g)	Discount Factor (1)	Discounted Benefits (1) (h) x (i)
	trucking								
	Reduced groundwater demand	MG / year	0	20	20.0	$288.48	$5,773	0.082	**$471**
2056	Avoided water trucking	truckloads /year	11680	0	11680	$150	$1,752,000	0.077	**$134,920**
	Reduced groundwater demand	MG / year	0	20	20.0	$288.48	$5,773	0.077	**$445**
2057	Avoided water trucking	truckloads /year	11680	0	11680	$150	$1,752,000	0.073	**$127,283**
	Reduced groundwater demand	MG / year	0	20	20.0	$288.48	$5,773	0.073	**$419**
2058	Avoided water trucking	truckloads /year	11680	0	11680	$150	$1,752,000	0.069	**$120,078**
	Reduced groundwater demand	MG / year	0	20	20.0	$288.48	$5,773	0.069	**$396**
2059	Avoided water trucking	truckloads /year	11680	0	11680	$150	$1,752,000	0.065	**$113,281**
	Reduced groundwater demand	MG / year	0	20	20.0	$288.48	$5,773	0.065	**$373**
2060	Avoided water trucking	truckloads /year	11680	0	11680	$150	$1,752,000	0.061	**$106,869**
	Reduced groundwater demand	MG / year	0	20	20.0	$288.48	$5,773	0.061	**$352**
2061	Avoided water trucking	truckloads /year	11680	0	11680	$150	$1,752,000	0.058	**$100,820**
	Reduced groundwater demand	MG / year	0	20	20.0	$288.48	$5,773	0.058	**$332**
2062	Avoided water trucking	truckloads /year	11680	0	11680	$150	$1,752,000	0.054	**$95,113**

Table 15 – Annual Benefit (All benefits should be in 2012 dollars) Project: Camanche Area Regional Water Supply Project Phase 1									
(a)	(b)	(c)	(d)	(e)	(f)	(g)	(h)	(i)	(j)
Year	Type of Benefit	Measure of Benefit (Units)	Without Project	With Project	Change Resulting from Project (e) – (d)	Unit $ Value (1)	Annual $ Value (1) (f) x (g)	Discount Factor (1)	Discounted Benefits (1) (h) x (i)
	Reduced groundwater demand	MG / year	0	20	20.0	$288.48	$5,773	0.054	**$313**
2063	Avoided water trucking	truckloads /year	11680	0	11680	$150	$1,752,000	0.051	**$89,729**
	Reduced groundwater demand	MG / year	0	20	20.0	$288.48	$5,773	0.051	**$296**
2064	Avoided water trucking	truckloads /year	11680	0	11680	$150	$1,752,000	0.048	**$84,650**
	Reduced groundwater demand	MG / year	0	20	20.0	$288.48	$5,773	0.048	**$279**
Total Present Value of Discounted Benefits Based on Unit Value (Sum of the values in Column (j) for all Benefits shown in table)									**$24,658,037**
Comments:									

(1) Complete these columns if dollar value is being claimed for the benefit.

Section D4 – Flood Damage Reduction Analysis

Flood damage reduction has not been monetized for this Project. As such, PSP Tables 17 and 18 have been omitted.

Section D5 – Project Benefits and Costs Summary

Project costs were developed in accordance with PSP requirements:

- Consistency: The economic analysis is consistent with the grant requirements, uses the total project costs as provided in Attachment 4.
- Period of Analysis. The initial costs presented in Table 19 are consistent with the projected construction schedule for the project, as shown in Attachment 5, and reflect start of construction activities in 2013 and completion in 2015. The operational life of the Project is assumed to be 50 years.
- Economic Cost. The economic cost of the total Project as presented in Attachment 4 considers all reasonably foreseeable costs including opportunity costs.
- Sunk Costs. No sunk costs have been eliminated from the initial costs.
- Opportunity Costs. All opportunity costs are accounted for including previous construction costs incurred since October 2008.

- Discount Rate. In accordance with PSP requirements, a 6% discount rate was applied.
- Dollar Value. In accordance with PSP requirements, all costs are presented in 2012 dollars.

As shown in PSP Table 19 below, the present value of project costs, discounted at 6%, is estimated to be $6,688,046. This estimate includes all capital costs as well as costs associated with construction, administration, operation and maintenance of the project, and includes all costs required for the project to achieve its stated benefits. Costs funded by local, State, federal agencies and non-profits are included. The initial costs presented in this table are equivalent to those presented in Attachment 4, with the exceptions identified above.

Capital costs are estimated to be $3,038,774, and will phased based as follows.

- $94,476 expended in 2012
- $981,433 expended in 2013
- $981,433 expended in 2014
- $981,433 expended in 2015

Operations and maintenance O&M costs for this Project are expected to be approximately $300,000 per year. As discussed on pages 11 and 12 of the *Camanche Area Regional Water Supply Plan Feasibility Study and Conceptual Design*, O&M costs were derived from experience on similar projects and standard engineering planning methods and cost curves. These costs should be calibrated using existing EBMUD data, including data on power costs, labor rates, etc. Operating costs are defined as labor, material, equipment, and outside services necessary for routine operating functions. Outside services include electric power and chemicals. Maintenance expenses include all costs associated with the routine servicing and repair of facilities required on an annual basis. The following unit costs were used:

- Water treatment plant: $0.54/gallon of treatment capacity
- Pipelines: $0.60/ linear foot of pipeline
- Pump station O&M: $10,000 plus 5% of capital construction cost
- Pump station electricity: $0.12/KW-hr
- Storage Facilities- Distribution System Tanks: $75,000 per tank
- Miscellaneous components (altitude valves, etc): 5% of their capital construction cost

Over the 50-year project life, this amounts to a present value cost of $6,688,046.

Table 19 – Annual Costs of Project

(All costs are in 2012 Dollars)

Project: Camanche Area Regional Water Supply Project - Phase 1

	Initial Costs Grand Total Cost from	Adjusted Grant Total Cost[1]	Annual Costs [2]						Discounting Calculations	
			Admin	Operation	Maint.	Replace-ment	Other	Total Costs (a) +…+ (g)	Disc. Factor	Discounted Project Costs
Year	(a)	(b)	(c)	(d)	(e)	(f)	(g)	(h)	(i)	(j)
2012	$94,476							$94,476	1.000	**$94,476**
2013	$981,433							$981,433	0.943	**$925,880**
2014	$981,433							$981,433	0.890	**$873,472**
2015	$981,433							$981,433	0.840	**$824,030**
2016				$300,000				$300,000	0.792	**$237,628**
2017				$300,000				$300,000	0.747	**$224,177**
2018				$300,000				$300,000	0.705	**$211,488**
2019				$300,000				$300,000	0.665	**$199,517**
2020				$300,000				$300,000	0.627	**$188,224**
2021				$300,000				$300,000	0.592	**$177,570**
2022				$300,000				$300,000	0.558	**$167,518**
2023				$300,000				$300,000	0.527	**$158,036**
2024				$300,000				$300,000	0.497	**$149,091**
2025				$300,000				$300,000	0.469	**$140,652**
2026				$300,000				$300,000	0.442	**$132,690**
2027				$300,000				$300,000	0.417	**$125,180**
2028				$300,000				$300,000	0.394	**$118,094**
2029				$300,000				$300,000	0.371	**$111,409**
2030				$300,000				$300,000	0.350	**$105,103**
2031				$300,000				$300,000	0.331	**$99,154**
2032				$300,000				$300,000	0.312	**$93,541**
2033				$300,000				$300,000	0.294	**$88,247**
2034				$300,000				$300,000	0.278	**$83,252**
2035				$300,000				$300,000	0.262	**$78,539**
2036				$300,000				$300,000	0.247	**$74,094**
2037				$300,000				$300,000	0.233	**$69,900**
2038				$300,000				$300,000	0.220	**$65,943**
2039				$300,000				$300,000	0.207	**$62,210**
2040				$300,000				$300,000	0.196	**$58,689**
2041				$300,000				$300,000	0.185	**$55,367**
2042				$300,000				$300,000	0.174	**$52,233**
2043				$300,000				$300,000	0.164	**$49,276**
2044				$300,000				$300,000	0.155	**$46,487**
2045				$300,000				$300,000	0.146	**$43,856**
2046				$300,000				$300,000	0.138	**$41,373**
2047				$300,000				$300,000	0.130	**$39,032**
2048				$300,000				$300,000	0.123	**$36,822**

Table 19 – Annual Costs of Project (All costs are in 2012 Dollars) Project: Camanche Area Regional Water Supply Project - Phase 1										
	Initial Costs Grand Total Cost from	Adjusted Grant Total Cost[1]	Annual Costs [2]						Discounting Calculations	
			Admin	Operation	Maint.	Replace-ment	Other	Total Costs (a) +...+ (g)	Disc. Factor	Discounted Project Costs
Year	(a)	(b)	(c)	(d)	(e)	(f)	(g)	(h)	(i)	(j)
2049				$300,000				$300,000	0.116	**$34,738**
2050				$300,000				$300,000	0.109	**$32,772**
2051				$300,000				$300,000	0.103	**$30,917**
2052				$300,000				$300,000	0.097	**$29,167**
2053				$300,000				$300,000	0.092	**$27,516**
2054				$300,000				$300,000	0.087	**$25,958**
2055				$300,000				$300,000	0.082	**$24,489**
2056				$300,000				$300,000	0.077	**$23,103**
2057				$300,000				$300,000	0.073	**$21,795**
2058				$300,000				$300,000	0.069	**$20,561**
2059				$300,000				$300,000	0.065	**$19,397**
2060				$300,000				$300,000	0.061	**$18,300**
2061				$300,000				$300,000	0.058	**$17,264**
2062				$300,000				$300,000	0.054	**$16,287**
2063				$300,000				$300,000	0.051	**$15,365**
2064				$300,000				$300,000	0.048	**$14,495**
2065				$300,000				$300,000	0.046	**$13,674**
Total Present Value of Discounted Costs (Sum of column (j)) Transfer to Table 20, column (c), Proposal Benefits and Costs Summaries										**$6,688,046**
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

Project Benefits

PSP Table 20, below, summarizes benefits and costs for the proposed project.

Table 20 – Project Benefits and Costs Summary Proposal: Mokelumne-Amador-Calaveras Region – Proposition 84 Round 2 Grant Proposal Agency: Upper Mokelumne River Watershed Authority							
Project	Project Proponent	Total Present Value Project Costs (1)	Total Present Value Project Benefits			Cost-Effectiveness Analysis, Cost Savings	Non-monetized benefits
			Monetized (2)	Flood Damage Reduction (3)	Total		
(a)	(b)	(c)	(d)	(e)	(f) = (d) + (e)	(g)	(h)
Camanche Area Regional Water Supply Project - Phase 1	EBMUD	$6,688,046	$24,658,037	N/A	$24,658,037	N/A	Improved supply reliability, reduced environmental discharges, improved groundwater management

(1) From Table 19, or RWMG method

(2) From Table 15 or RWMG method

(3) From Table 18 or RWMG method

Project 3: Ponderosa Way Restoration Project – Phase 1

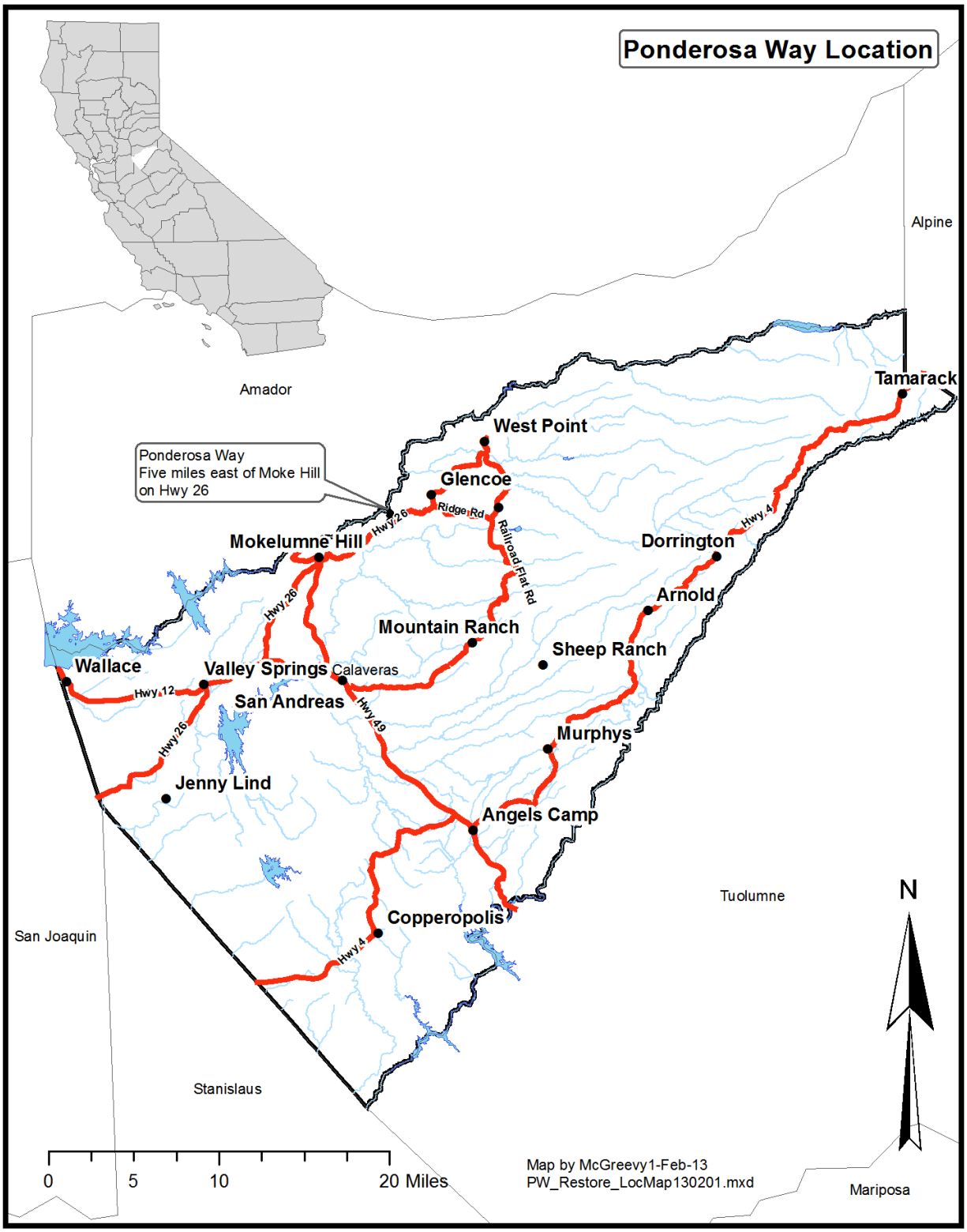
The Ponderosa Way Restoration Project focuses on the restoration of a segment of Ponderosa Way from Highway 26 to the Main Stem Mokelumne River, a distance of 2 miles with an elevation change from 1,900 feet to 800 feet. Ponderosa Way was built in 1934 by Franklin Roosevelt's Civilian Conservation Corps (CCC) to provide transportation for firefighters and provide a 200 foot wide fuel break. The public also used the road to access the Mokelumne Canyon and the River for recreation. The road is now 79 years old and its drainage system has degraded causing deep rutting and three slides with gullying on the outside edge. Alabama Gulch, Dutchmans Gulch and the Mokelumne River have severe siltation. The erosion process is further accelerated by 4-wheel drive vehicular traffic during the wet season. With each storm, the drainage system further degrades, the ruts deepen and the gullies grow. During a deluge in January 2011, a blocked culvert forced Alabama Creek over its banks and washed the lower 700 foot segment of the road into the River. Without road restoration, maintenance and traffic control, winter erosion will continue unabated. The purpose of this project is to restore Ponderosa Way to minimize erosion, provide watershed access to the fire service, and allow for river access to the public for recreation.

The Ponderosa Way Restoration Project is divided into three phases. Phase 1, the Restoration of Ponderosa Way, for which funding is being requested, includes road restoration to minimize road erosion and river siltation, restore watershed access to CAL FIRE and BLM for fire prevention and suppression, and to the general public for recreation. The return of public access to the river will trigger Phase 2, the development of river recreation on the Main Stem Mokelumne River to include commercial whitewater boating.

Phase 2, the Development of the Ponderosa Way Boat Launch, will open the Ponderosa Whitewater Run, 2.8 miles of class II/III rapids down to the Electra Powerhouse and connecting with the popular 5.8 mile Electra Whitewater Run. As part of FERC Agreement P-137, PG&E will install, operate, and maintain information signage, parking signage, a staff gage, unpaved parking for six vehicles, and a portable toilet during the boating season (See *Mokelumne River Project, FERC Project No. 137, Mokelumne Relicensing Settlement Agreement, Appendix A, Section 15. Whitewater Boating Access Facility Recommendation, Ponderosa Way run Put-in Facilities,* included as Appendix 8.13).

Phase 3, the Long-term Maintenance of Ponderosa Way and the Boat Launch, will be a collaborative effort between PG&E, BLM, and Calaveras County Public Works. PG&E will operate and maintain the facilities at the Boat Launch and will also provide $25,000 annually to BLM for two River Rangers during the whitewater season (See Contribution for River Rangers and Recreation Technician in FERC Project No. 137, Mokelumne Relicensing Settlement Agreement).

Figure 4: Ponderosa Way Restoration Project Location



Phase 1, which will optimize road drainage and minimize long-term maintenance on Ponderosa Way, as well as restore public access to the Mokelumne River, is ready for implementation. Planning, design, environmental documentation, and permitting are already complete.

Summary of Monetized Benefits and Costs

The projected monetized project benefits and costs are summarized in the following table.

Category	Summary	Present Value
Benefits		
Water quality	Reduced sediment management costs	$70,072
Recreation	Increased visitor days	$277,193
Total Monetized Benefits		**$347,265**
Costs		
Present Value of Capital and O&M Costs		$194,231
Total Costs		**$194,231**

Existing Data and Studies

The Project is supported by a series of studies documenting the potential project benefits, including:

- Ponderosa Way Restoration Project letter from Jan Bray, Calaveras Area Forester, Tuolumne-Calaveras Unit at the California Department of Forestry and Fire Protection to Calaveras County Public Works, dated October 22, 2012 – the letter summarizes an on-site assessment conducted by Jan Bray, a Professional Engineer and Certified Professional in Soil and Erosion Control, of Ponderosa Way. The letter provides recommendations of improvements including restoration measures and the installation of a gate (Appendix 8.12)
- Mokelumne River Project FERC Project No. 37, Mokelumne Relicensing Settlement Agreement (2000) – Appendix A, Section 15, describes the second and third phases of the Ponderosa Way Restoration Project. (Appendix 8.13)

Without Project Conditions

Without road restoration, maintenance, and traffic control, winter road erosion and river siltation will continue unabated. Ponderosa Way will continue to erode, and sedimentation to

the river is expected to occur at historical rates or greater. It is estimated that, in the past 10 years, an average of 188 tons of sediment has eroded and discharged to the river each year.

In addition, the current condition of Ponderosa Way prevents its use as an access way for recreational river access and for management of fire fuels. Traditionally, Ponderosa Way was used by residents of nearby disadvantaged communities as a means of no-cost to access the river and a variety of popular swimming holes along the Way. Since it has fallen into disrepair, it can no longer be used for easy river access, and the once popular family swimming holes have become a hot spot for illegal activity, due in part to their inaccessibility. Without the Project, this trend is expected to continue into the future, and one of the few no-cost recreational alternatives available to the region will be lost.

Phase 1 of the project is a necessary first step that must be implemented prior to implementation of Phases 2 and 3. In Phase 2, PG&E will install, operate, and maintain information signage, parking signage, a staff gage, unpaved parking for six vehicles, and a portable toilet during the boating season. This will not be implemented unless and until Ponderosa Way is restored. Phase 3, the Long-term Maintenance of Ponderosa Way and the Boat Launch, will be a collaborative effort between PG&E, BLM, and Calaveras County Public Works. PG&E will operate and maintain the facilities at the Boat Launch and will also provide $25,000 annually to BLM for two River Rangers during the whitewater season. Without implementation of Phase 1, the new recreational facilities to be installed by PG&E and the ongoing maintenance support will not be realized, and community volunteers will continue their struggle to prevent Ponderosa Way from sliding into the River.

Lastly, without the Project, Ponderosa Way will continue to provide little to no value as a fire break or access road for fire and fuels management, leaving the Region vulnerable to wild fire impacts on public safety and property, as well as water quality.

The following images demonstrate the problems that are expected to persist and worsen without the project as well as the required restoration activities.

Ponderosa Way Below Quarry

WP 8

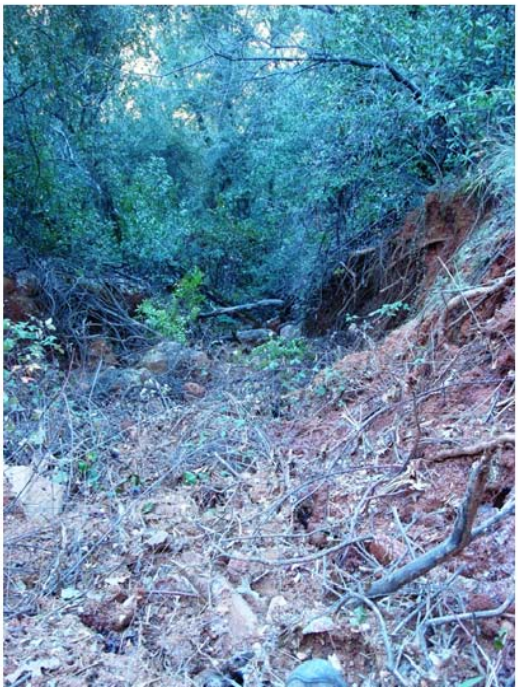
- Culvert exposed & broken
- Remediation
  - Replace inside 20' of culvert
  - Fill ruts, compact and grade

Ponderosa Way at 'Big' Slide

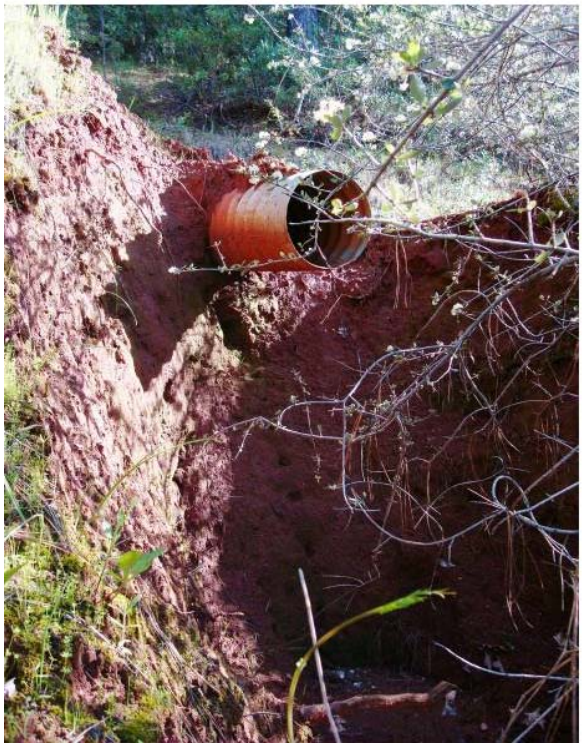
WP 19a

- Outboard slide
- Restoration:
  - Remove culvert
  - Fill slide, compact
  - Rip ruts, fill, grade
  - Install new culvert 20' downhill

Ponderosa Way–Inside "Big Slide" 120' below road
L: Looking up; R: Looking down



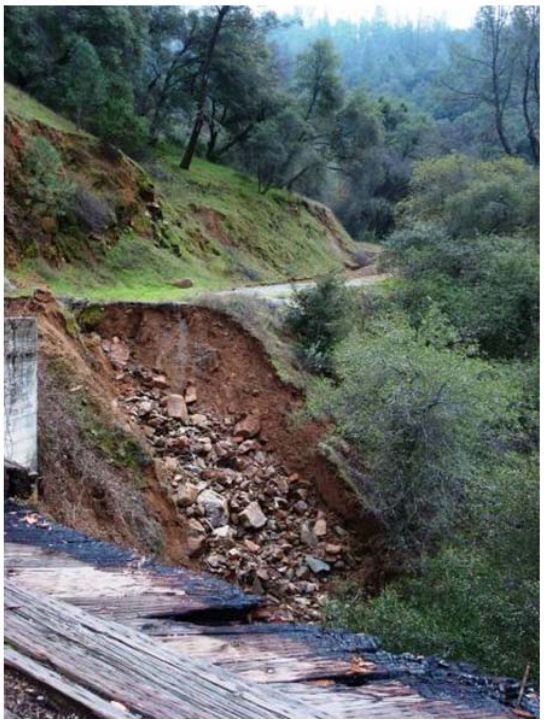
Ponderosa Way- 'Little' Slide



WP 21

- Catchment blocked
- Culvert exposed
- Outside slide
- Restoration:
  - Open catchment
  - Fill slide, compact
  - Rip ruts, fill, grade

Ponderosa Way
Erosion & Slide at River (January 2011)



Discharge at river
Slide and gully eroded ~246 tons of dirt

Ponderosa Way: November Rills after October Grading & Rain

With Project Conditions

With the project, Ponderosa Way will be restored and erosion control implemented. Sediment loading to the Mokelumne River will be significantly reduced, and the restored Ponderosa Way will provide CAL FIRE and the Bureau of Land Management (BLM) access to the canyon for fuel management and suppression, preventing significant water quality and habitat impacts caused by wildfires such as those observed from the 2004 Power Fire.

The Phase 1 project will facilitate access to 17 miles of trails, 8.5 miles of whitewater boating, and 2,000 acres of open space recreation. In addition, it will facilitate Phase 2, in which PG&E will install, operate, and maintain information signage, parking signage, a staff gage, unpaved parking for six vehicles, and a portable toilet during the boating season, enhancing recreation and public access.

Description of Benefits and Methods to Estimate Benefits

The DWR method was used to assess benefits.

Section D1 – Cost-Effectiveness Analysis

The cost-effectiveness analysis approach was not used for this project; as such, PSP Table 11 has been omitted.

Section D2 – Non-Monetized Benefits Analysis

A series of non-monetized benefits are expected to accrue from project implementation. The benefits are summarized in PSP Table 12, and are described in additional detail below.

Table 12 – Non-monetized Benefits Checklist

No.	Question	Enter "Yes", "No" or "Neg"
	Community/Social Benefits **Will the proposal**	
1	**Provide education or technology benefits?**	**No**
	Examples are not limited to, but may include: - Include educational features that should result in water supply, water quality, or flood damage reduction benefits? - Develop, test, or document a new technology for water supply, water quality, or flood damage reduction management? - Provide some other education or technological benefit?	
2	**Provide social recreation or access benefits?**	Yes
	Examples are not limited to, but may include: - Provide new or improved outdoor recreation opportunities? - Provide more access to open space? - Provide some other recreation or public access benefit?	
3	**Help avoid, reduce or resolve various public water resources conflicts?**	**No**
	Examples are not limited to, but may include:	

Table 12 – Non-monetized Benefits Checklist		
No.	**Question**	**Enter "Yes", "No" or "Neg"**
	- Provide more opportunities for public involvement in water management? - Help avoid or resolve an existing conflict as evidenced by recurring fines or litigation? - Help meet an existing state mandate (e.g., water quality, water conservation, flood control)?	
4	**Promote social health and safety?**	Yes
	Examples are not limited to, but may include: - Increase urban water supply reliability for fire-fighting and critical services following seismic events? - Reduce risk to life from dam failure or flooding? - Reduce exposure to water-related hazards?	
5	**Have other social benefits?**	Yes
	Examples are not limited to, but may include: - Redress or increase inequitable distribution of environmental burdens? - Have disproportionate beneficial or adverse effects on disadvantaged communities, Native Americans, or other distinct cultural groups?	
	Environmental Stewardship Benefits: **Will the proposal**	
6	**Benefit wildlife or habitat in ways that were not quantified in Attachment 7?**	Yes
	Examples are not limited to, but may include: - Cause an increase in the amount or quality of terrestrial, aquatic, riparian or wetland habitat? - Contribute to an existing biological opinion or recovery plan for a listed special status species? - Preserve or restore designated critical habitat of a listed species? - Enhance wildlife protection or habitat?	
7	**Improve water quality in ways that were not quantified in Attachment 7?**	Yes
	Examples are not limited to, but may include: - Cause an improvement in water quality in an impaired water body or sensitive habitat? - Prevent water quality degradation? - Cause some other improvement in water quality?	
8	**Reduce net emissions in ways that were not quantified in Attachment 7?**	Yes
	Examples are not limited to, but may include: - Reduce net production of greenhouse gasses? - Reduce net emissions of other harmful chemicals into the air or water?	
9	**Provide other environmental stewardship benefits, other than those claimed in Sections D1, D3, or D4?**	No
	Sustainability Benefits:	

Table 12 – Non-monetized Benefits Checklist		
No.	**Question**	**Enter "Yes", "No" or "Neg"**
	Will the proposal	
10	**Improve the overall, long-term management of California groundwater resources?**	No
	Examples are not limited to, but may include: - Reduce extraction of non-renewable groundwater? - Promote aquifer storage or recharge?	
11	**Reduce demand for net diversions for the regions from the Delta?**	No
12	**Provide a long-term solution in place of a short-term one?**	Yes
13	**Promote energy savings or replace fossil fuel based energy sources with renewable energy and resources?**	No
	Examples are not limited to, but may include: - Reduce net energy use on a permanent basis? - Increase renewable energy production? - Include new buildings or modify buildings to include certified LEED features? - Provide a net increase in recycling or reuse of materials? - Replace unsustainable land or water management practices with recognized sustainable practices?	
14	**Improve water supply reliability in ways not quantified in Attachment 7?**	Yes
	Examples are not limited to, but may include: - Provide a more flexible mix of water sources? - Reduce likelihood of catastrophic supply outages? - Reduce supply uncertainty? - Reduce supply variability?	
15	**Other (If the above listed categories do not apply, provide non-monetized benefit description)?**	No

Community/Social Benefits

1. Provide Education or Technology Benefits

No applicable

2. Provide Social Recreation or Access Benefits

The project provides significant recreation and access benefits. In addition to the quantified trails, whitewater boating, and open space made accessible by the project, it will also facilitate access to a host of informal picnic areas, swimming holes, and fishing spots along the river.

3. Help Avoid, Reduce or Resolve Various Public Water Resources Conflicts

Not applicable

4. Promote Social Health and Safety

The project will restore access along Ponderosa Way. Currently, the road poses a safety risk. Further, it has become a popular place for criminal activity due to its poor access. Restoring the road will correct this condition.

5. Have Other Social Benefits

A tribe of the Northern Sierra Miwok lives just south of West Point. According to the 2010 Census, they number 215, about 5% of the community population. The restoration of Ponderosa Way will provide access to the Mokelumne Canyon from Rich Gulch where one of the County's last Miwok villages, Apautawilu, thrived until the early 1900's when it was abandoned.

Environmental Stewardship Benefits

6. Benefit Wildlife or Habitat in Ways Not Quantified in Attachment 7
The project will protect both aquatic and riparian habitat from the impacts of sediment loading and erosion while trail development will provide wildlife corridors along the steep canyon walls.

7. Improve Water Quality in Ways Not Quantified in Attachment 7
In addition to sediment reduction, the project will reduce loading of heavy metals, nutrients, bacteria, and a variety of other water quality contaminants from running off into the river.

8. Reduce Net Emissions in Ways Not Quantified in Attachment 7
The project will reduce sediment management and hauling, reducing associated greenhouse gas emissions.

9. Provide Other Environmental Stewardship Benefits Not Claimed in Sections D1, D3, or D4
Not applicable

Sustainability Benefits

10. Improve the Overall, Long-Term Management of California Groundwater Resources
Not applicable

11. Reduce Demand for Net Diversions for the Region from the Delta
Not applicable

12. Provide a Long-Term Solution in Place of a Short-Term One
The project will provide a long-term fix to the Ponderosa Way erosion problem, in contrast to the current approach, which involves periodic emergency maintenance.

13. Promote Energy Savings or Replace Fossil Fuel Based Energy Sources with Renewable Energy
The project will reduce sediment hauling requirements, promoting energy conservation.

14. Improve Water Supply Reliability in Ways Not Quantified in Attachment 7
The project will improve supply reliability by reducing sediment loading to the river, improving treatability. In addition, the restored Ponderosa Way will provide canyon access to prevent supply interruptions resulting from wildfire water quality impacts.

15. Other
Not applicable

Section D3 – Monetized Benefits Analysis

The following benefits have been monetized for this Project:

- Avoided cost of sediment cleanup
- Increased recreation visitor days

Monetized benefits, and the process for monetizing benefits, are discussed in the following paragraphs. Benefits are summarized in PSP Table15. Because this project does not avoid implementation of an alternate project, PSP Table 16 has been omitted.

Avoided Cost of Sediment Cleanup

As discussed in Attachment 7, approximately 188 tons of sediment per year erodes and is discharged into the river. Calaveras County Public Works estimates that approximately $51,612 has been spent in the past ten years to address sedimentation and erosion issues (refer to Attachment 4, calculation of in-kind services match), or approximately $27.45 per ton per year, on average.

As shown in PSP Table 15, by avoiding 188 tons of sediment erosion per year, this project will avoid a present value of $72,393 in sedimentation cleanup costs over the 50-year project life, assuming a 6 percent discount factor.

Increased Visitor Days

As discussed in Attachment 7, the project will provide access to a variety of recreational assets, including:

- 8.5 miles of whitewater boating on the Mokelumne river down to Middle Bar (river miles measured bythe Calaveras County Parks and Recreation Commission using ArcMap).
- More than 17 miles of trails in a developing trail system in the Mokelumne Canyon, including the Mokelumne Coast to Crest Trail, Butterfield Trail and the Mokelumne Canal Trail. Trails were plotted by the Calaveras County Parks and Recreation Commission and measured in ArcMap.
- 850 acres of wild BLM and PG&E land in the Mokelumne Canyon. Over 2,000 acres will be accessible when the when the Mokelumne Coast to Crest Trail is developed over the next five years. This acreage was measured the Calaveras County Parks and Recreation Commission using ArcMap.

The Upper Mokelumne River watershed is home to approximately 10,000 residents (Upper Mokelumne River Watershed Assessment and Management Plan, page 4-4). Assuming only one percent of watershed residents take advantage of enhanced recreation access on a weekly basis during spring and summer months, this translates to an additional 2,600 recreation visitor days per year (10,000 * 1 / 100 * 52 / 2).

The range of Unit Day Values for general recreation in 2013 is $3.80 to $11.39 (Army Corps of Engineers, Economic Guidance Memorandum, 13-03, Unit Day Values for Recreation for

Fiscal Year 2013). As shown in Table 15, conservatively applying the median unit day recreation value ($7.60), the present value of 2,600 additional recreation days per year over the 50 year project life at a 6 percent discount factor, is $277,193.

Annual Benefits Table

PSP table 15, which summarizes present value of annual benefits, is provided below.

Table 15 – Annual Benefit (All benefits should be in 2012 dollars) Project: Ponderosa Way Restoration Project - Phase 1									
(a)	(b)	(c)	(d)	(e)	(f)	(g)	(h)	(i)	(j)
Year	Type of Benefit	Measure of Benefit (Units)	Without Project	With Project	Change Resulting from Project (e) – (d)	Unit $ Value (1)	Annual $ Value (1) (f) x (g)	Discount Factor (1)	Discounted Benefits (1) (h) x (i)
2012								1.000	
2013								0.943	
2014								0.890	
2015	Avoided sediment cleanup	tons / yr	0	188.0	188.0	$27.45	$5,161	0.840	**$4,333**
	Increased visitor days	days / yr	0	2600	2600	$7.60	$19,760	0.840	**$16,591**
2016	Avoided sediment cleanup	tons / yr	0	188.0	188.0	$27.45	$5,161	0.792	**$4,088**
	Increased visitor days	days / yr	0	2600	2600	$7.60	$19,760	0.792	**$15,652**
2017	Avoided sediment cleanup	tons / yr	0	188.0	188.0	$27.45	$5,161	0.747	**$3,856**
	Increased visitor days	days / yr	0	2600	2600	$7.60	$19,760	0.747	**$14,766**
2018	Avoided sediment cleanup	tons / yr	0	188.0	188.0	$27.45	$5,161	0.705	**$3,638**
	Increased visitor days	days / yr	0	2600	2600	$7.60	$19,760	0.705	**$13,930**
2019	Avoided sediment cleanup	tons / yr	0	188.0	188.0	$27.45	$5,161	0.665	**$3,432**
	Increased visitor days	days / yr	0	2600	2600	$7.60	$19,760	0.665	**$13,142**
2020	Avoided sediment cleanup	tons / yr	0	188.0	188.0	$27.45	$5,161	0.627	**$3,238**
	Increased visitor days	days / yr	0	2600	2600	$7.60	$19,760	0.627	**$12,398**
2021	Avoided sediment cleanup	tons / yr	0	188.0	188.0	$27.45	$5,161	0.592	**$3,055**
	Increased visitor days	days / yr	0	2600	2600	$7.60	$19,760	0.592	**$11,696**
2022	Avoided sediment cleanup	tons / yr	0	188.0	188.0	$27.45	$5,161	0.558	**$2,882**

Table 15 – Annual Benefit (All benefits should be in 2012 dollars) Project: Ponderosa Way Restoration Project - Phase 1									
(a)	(b)	(c)	(d)	(e)	(f)	(g)	(h)	(i)	(j)
Year	Type of Benefit	Measure of Benefit (Units)	Without Project	With Project	Change Resulting from Project (e) – (d)	Unit $ Value (1)	Annual $ Value (1) (f) x (g)	Discount Factor (1)	Discounted Benefits (1) (h) x (i)
	Increased visitor days	days / yr	0	2600	2600	$7.60	$19,760	0.558	**$11,034**
2023	Avoided sediment cleanup	tons / yr	0	188.0	188.0	$27.45	$5,161	0.527	**$2,719**
	Increased visitor days	days / yr	0	2600	2600	$7.60	$19,760	0.527	**$10,409**
2024	Avoided sediment cleanup	tons / yr	0	188.0	188.0	$27.45	$5,161	0.497	**$2,565**
	Increased visitor days	days / yr	0	2600	2600	$7.60	$19,760	0.497	**$9,820**
2025	Avoided sediment cleanup	tons / yr	0	188.0	188.0	$27.45	$5,161	0.469	**$2,419**
	Increased visitor days	days / yr	0	2600	2600	$7.60	$19,760	0.469	**$9,264**
2026	Avoided sediment cleanup	tons / yr	0	188.0	188.0	$27.45	$5,161	0.442	**$2,283**
	Increased visitor days	days / yr	0	2600	2600	$7.60	$19,760	0.442	**$8,740**
2027	Avoided sediment cleanup	tons / yr	0	188.0	188.0	$27.45	$5,161	0.417	**$2,153**
	Increased visitor days	days / yr	0	2600	2600	$7.60	$19,760	0.417	**$8,245**
2028	Avoided sediment cleanup	tons / yr	0	188.0	188.0	$27.45	$5,161	0.394	**$2,031**
	Increased visitor days	days / yr	0	2600	2600	$7.60	$19,760	0.394	**$7,778**
2029	Avoided sediment cleanup	tons / yr	0	188.0	188.0	$27.45	$5,161	0.371	**$1,916**
	Increased visitor days	days / yr	0	2600	2600	$7.60	$19,760	0.371	**$7,338**
2030	Avoided sediment cleanup	tons / yr	0	188.0	188.0	$27.45	$5,161	0.350	**$1,808**
	Increased visitor days	days / yr	0	2600	2600	$7.60	$19,760	0.350	**$6,923**
2031	Avoided sediment cleanup	tons / yr	0	188.0	188.0	$27.45	$5,161	0.331	**$1,706**
	Increased visitor days	days / yr	0	2600	2600	$7.60	$19,760	0.331	**$6,531**
2032	Avoided sediment cleanup	tons / yr	0	188.0	188.0	$27.45	$5,161	0.312	**$1,609**
	Increased visitor days	days / yr	0	2600	2600	$7.60	$19,760	0.312	**$6,161**
2033	Avoided sediment cleanup	tons / yr	0	188.0	188.0	$27.45	$5,161	0.294	**$1,518**

Table 15 – Annual Benefit (All benefits should be in 2012 dollars) Project: Ponderosa Way Restoration Project - Phase 1									
(a)	(b)	(c)	(d)	(e)	(f)	(g)	(h)	(i)	(j)
Year	Type of Benefit	Measure of Benefit (Units)	Without Project	With Project	Change Resulting from Project (e) – (d)	Unit $ Value (1)	Annual $ Value (1) (f) x (g)	Discount Factor (1)	Discounted Benefits (1) (h) x (i)
	Increased visitor days	days / yr	0	2600	2600	$7.60	$19,760	0.294	**$5,813**
2034	Avoided sediment cleanup	tons / yr	0	188.0	188.0	$27.45	$5,161	0.278	**$1,432**
	Increased visitor days	days / yr	0	2600	2600	$7.60	$19,760	0.278	**$5,484**
2035	Avoided sediment cleanup	tons / yr	0	188.0	188.0	$27.45	$5,161	0.262	**$1,351**
	Increased visitor days	days / yr	0	2600	2600	$7.60	$19,760	0.262	**$5,173**
2036	Avoided sediment cleanup	tons / yr	0	188.0	188.0	$27.45	$5,161	0.247	**$1,275**
	Increased visitor days	days / yr	0	2600	2600	$7.60	$19,760	0.247	**$4,880**
2037	Avoided sediment cleanup	tons / yr	0	188.0	188.0	$27.45	$5,161	0.233	**$1,202**
	Increased visitor days	days / yr	0	2600	2600	$7.60	$19,760	0.233	**$4,604**
2038	Avoided sediment cleanup	tons / yr	0	188.0	188.0	$27.45	$5,161	0.220	**$1,134**
	Increased visitor days	days / yr	0	2600	2600	$7.60	$19,760	0.220	**$4,343**
2039	Avoided sediment cleanup	tons / yr	0	188.0	188.0	$27.45	$5,161	0.207	**$1,070**
	Increased visitor days	days / yr	0	2600	2600	$7.60	$19,760	0.207	**$4,098**
2040	Avoided sediment cleanup	tons / yr	0	188.0	188.0	$27.45	$5,161	0.196	**$1,010**
	Increased visitor days	days / yr	0	2600	2600	$7.60	$19,760	0.196	**$3,866**
2041	Avoided sediment cleanup	tons / yr	0	188.0	188.0	$27.45	$5,161	0.185	**$952**
	Increased visitor days	days / yr	0	2600	2600	$7.60	$19,760	0.185	**$3,647**
2042	Avoided sediment cleanup	tons / yr	0	188.0	188.0	$27.45	$5,161	0.174	**$899**
	Increased visitor days	days / yr	0	2600	2600	$7.60	$19,760	0.174	**$3,440**
2043	Avoided sediment cleanup	tons / yr	0	188.0	188.0	$27.45	$5,161	0.164	**$848**
	Increased visitor days	days / yr	0	2600	2600	$7.60	$19,760	0.164	**$3,246**
2044	Avoided sediment cleanup	tons / yr	0	188.0	188.0	$27.45	$5,161	0.155	**$800**

Table 15 – Annual Benefit (All benefits should be in 2012 dollars) Project: Ponderosa Way Restoration Project - Phase 1									
(a)	(b)	(c)	(d)	(e)	(f)	(g)	(h)	(i)	(j)
Year	Type of Benefit	Measure of Benefit (Units)	Without Project	With Project	Change Resulting from Project (e) – (d)	Unit $ Value (1)	Annual $ Value (1) (f) x (g)	Discount Factor (1)	Discounted Benefits (1) (h) x (i)
	Increased visitor days	days / yr	0	2600	2600	$7.60	$19,760	0.155	**$3,062**
2045	Avoided sediment cleanup	tons / yr	0	188.0	188.0	$27.45	$5,161	0.146	**$754**
	Increased visitor days	days / yr	0	2600	2600	$7.60	$19,760	0.146	**$2,889**
2046	Avoided sediment cleanup	tons / yr	0	188.0	188.0	$27.45	$5,161	0.138	**$712**
	Increased visitor days	days / yr	0	2600	2600	$7.60	$19,760	0.138	**$2,725**
2047	Avoided sediment cleanup	tons / yr	0	188.0	188.0	$27.45	$5,161	0.130	**$671**
	Increased visitor days	days / yr	0	2600	2600	$7.60	$19,760	0.130	**$2,571**
2048	Avoided sediment cleanup	tons / yr	0	188.0	188.0	$27.45	$5,161	0.123	**$633**
	Increased visitor days	days / yr	0	2600	2600	$7.60	$19,760	0.123	**$2,425**
2049	Avoided sediment cleanup	tons / yr	0	188.0	188.0	$27.45	$5,161	0.116	**$598**
	Increased visitor days	days / yr	0	2600	2600	$7.60	$19,760	0.116	**$2,288**
2050	Avoided sediment cleanup	tons / yr	0	188.0	188.0	$27.45	$5,161	0.109	**$564**
	Increased visitor days	days / yr	0	2600	2600	$7.60	$19,760	0.109	**$2,159**
2051	Avoided sediment cleanup	tons / yr	0	188.0	188.0	$27.45	$5,161	0.103	**$532**
	Increased visitor days	days / yr	0	2600	2600	$7.60	$19,760	0.103	**$2,036**
2052	Avoided sediment cleanup	tons / yr	0	188.0	188.0	$27.45	$5,161	0.097	**$502**
	Increased visitor days	days / yr	0	2600	2600	$7.60	$19,760	0.097	**$1,921**
2053	Avoided sediment cleanup	tons / yr	0	188.0	188.0	$27.45	$5,161	0.092	**$473**
	Increased visitor days	days / yr	0	2600	2600	$7.60	$19,760	0.092	**$1,812**
2054	Avoided sediment cleanup	tons / yr	0	188.0	188.0	$27.45	$5,161	0.087	**$447**
	Increased visitor days	days / yr	0	2600	2600	$7.60	$19,760	0.087	**$1,710**
2055	Avoided sediment cleanup	tons / yr	0	188.0	188.0	$27.45	$5,161	0.082	**$421**

Table 15 – Annual Benefit (All benefits should be in 2012 dollars) Project: Ponderosa Way Restoration Project - Phase 1									
(a)	(b)	(c)	(d)	(e)	(f)	(g)	(h)	(i)	(j)
Year	Type of Benefit	Measure of Benefit (Units)	Without Project	With Project	Change Resulting from Project (e) – (d)	Unit $ Value (1)	Annual $ Value (1) (f) x (g)	Discount Factor (1)	Discounted Benefits (1) (h) x (i)
	Increased visitor days	days / yr	0	2600	2600	$7.60	$19,760	0.082	**$1,613**
2056	Avoided sediment cleanup	tons / yr	0	188.0	188.0	$27.45	$5,161	0.077	**$397**
	Increased visitor days	days / yr	0	2600	2600	$7.60	$19,760	0.077	**$1,522**
2057	Avoided sediment cleanup	tons / yr	0	188.0	188.0	$27.45	$5,161	0.073	**$375**
	Increased visitor days	days / yr	0	2600	2600	$7.60	$19,760	0.073	**$1,436**
2058	Avoided sediment cleanup	tons / yr	0	188.0	188.0	$27.45	$5,161	0.069	**$354**
	Increased visitor days	days / yr	0	2600	2600	$7.60	$19,760	0.069	**$1,354**
2059	Avoided sediment cleanup	tons / yr	0	188.0	188.0	$27.45	$5,161	0.065	**$334**
	Increased visitor days	days / yr	0	2600	2600	$7.60	$19,760	0.065	**$1,278**
2060	Avoided sediment cleanup	tons / yr	0	188.0	188.0	$27.45	$5,161	0.061	**$315**
	Increased visitor days	days / yr	0	2600	2600	$7.60	$19,760	0.061	**$1,205**
2061	Avoided sediment cleanup	tons / yr	0	188.0	188.0	$27.45	$5,161	0.058	**$297**
	Increased visitor days	days / yr	0	2600	2600	$7.60	$19,760	0.058	**$1,137**
2062	Avoided sediment cleanup	tons / yr	0	188.0	188.0	$27.45	$5,161	0.054	**$280**
	Increased visitor days	days / yr	0	2600	2600	$7.60	$19,760	0.054	**$1,073**
2063	Avoided sediment cleanup	tons / yr	0	188.0	188.0	$27.45	$5,161	0.051	**$264**
	Increased visitor days	days / yr	0	2600	2600	$7.60	$19,760	0.051	**$1,012**
2064	Avoided sediment cleanup	tons / yr	0	188.0	188.0	$27.45	$5,161	0.048	**$249**
	Increased visitor days	days / yr	0	2600	2600	$7.60	$19,760	0.048	**$955**
Total Present Value of Discounted Benefits Based on Unit Value (Sum of the values in Column (j) for all Benefits shown in table)									**$349,586**
Comments:									

(1) Complete these columns if dollar value is being claimed for the benefit.

Section D4 – Flood Damage Reduction Analysis

Flood damage reduction has not been monetized for this Project. As such, PSP Tables 17 and 18 have been omitted.

Section D5 – Project Benefits and Costs Summary

Project costs were developed in accordance with PSP requirements:

- Consistency: The economic analysis is consistent with the grant requirements, uses the total project costs as provided in Attachment 4.
- Period of Analysis. The initial costs presented in Table 19 are consistent with the projected construction schedule for the project, as shown in Attachment 5, and reflect start of construction activities in 2013 and completion in 2014. The operational life of the Project is assumed to be 50 years.
- Economic Cost. The economic cost of the total Project as presented in Attachment 4 considers all reasonably foreseeable costs including opportunity costs.
- Sunk Costs. No sunk costs have been eliminated from the initial costs.
- Opportunity Costs. All opportunity costs are accounted for including previous construction costs incurred since October 2008.
- Discount Rate. In accordance with PSP requirements, a 6% discount rate was applied.
- Dollar Value. In accordance with PSP requirements, all costs are presented in 2012 dollars.

As shown in PSP Table 19 below, the present value of project costs, discounted at 6%, is estimated to be $ $194,231. This estimate includes all capital costs as well as costs associated with construction, administration, operation and maintenance of the project, and includes all costs required for the project to achieve its stated benefits. Costs funded by local, State, federal agencies and non-profits are included. The initial costs presented in this table are equivalent to those presented in Attachment 4, with the exceptions identified above.

Capital costs are estimated to be $185,872, and will phased based as follows.

- $14,039 expended in 2013
- $171,833 expended in 2014

Operations and maintenance costs for this Project are expected to be $2,000 per year for general road maintenance.

Table 19 – Annual Costs of Project (All costs are in 2012 Dollars) Project: Ponderosa Way Restoration Project - Phase 1										
	Initial Costs Grand Total Cost from Table	Adjusted Grant Total Cost(1)	Annual Costs (2)						Discounting Calculations	
			Admin	Operation	Maint.	Replace-ment	Other	Total Costs	Disc. Factor	Discounted Costs
Year	(a)	(b)	(c)	(d)	(e)	(f)	(g)	(h)	(i)	(j)
2012									1.000	
2013	$14,039							$14,039	0.943	**$13,244**
2014	$171,833							$171,833	0.890	**$152,931**
2015					$2,000		$0	$2,000	0.840	**$1,679**
2016					$2,000		$0	$2,000	0.792	**$1,584**
2017					$2,000		$0	$2,000	0.747	**$1,495**
2018					$2,000		$0	$2,000	0.705	**$1,410**
2019					$2,000		$0	$2,000	0.665	**$1,330**
2020					$2,000		$0	$2,000	0.627	**$1,255**
2021					$2,000		$0	$2,000	0.592	**$1,184**
2022					$2,000		$0	$2,000	0.558	**$1,117**
2023					$2,000		$0	$2,000	0.527	**$1,054**
2024					$2,000		$0	$2,000	0.497	**$994**
2025					$2,000		$0	$2,000	0.469	**$938**
2026					$2,000		$0	$2,000	0.442	**$885**
2027					$2,000		$0	$2,000	0.417	**$835**
2028					$2,000		$0	$2,000	0.394	**$787**
2029					$2,000		$0	$2,000	0.371	**$743**
2030					$2,000		$0	$2,000	0.350	**$701**
2031					$2,000		$0	$2,000	0.331	**$661**
2032					$2,000		$0	$2,000	0.312	**$624**
2033					$2,000		$0	$2,000	0.294	**$588**
2034					$2,000		$0	$2,000	0.278	**$555**
2035					$2,000		$0	$2,000	0.262	**$524**
2036					$2,000		$0	$2,000	0.247	**$494**
2037					$2,000		$0	$2,000	0.233	**$466**
2038					$2,000		$0	$2,000	0.220	**$440**
2039					$2,000		$0	$2,000	0.207	**$415**
2040					$2,000		$0	$2,000	0.196	**$391**
2041					$2,000		$0	$2,000	0.185	**$369**
2042					$2,000		$0	$2,000	0.174	**$348**
2043					$2,000		$0	$2,000	0.164	**$329**
2044					$2,000		$0	$2,000	0.155	**$310**
2045					$2,000		$0	$2,000	0.146	**$292**

Table 19 – Annual Costs of Project (All costs are in 2012 Dollars) Project: Ponderosa Way Restoration Project - Phase 1										
	Initial Costs Grand Total Cost from Table	Adjusted Grant Total Cost(1)	Annual Costs (2)						Discounting Calculations	
			Admin	Operation	Maint.	Replace-ment	Other	Total Costs	Disc. Factor	Discounted Costs
Year	(a)	(b)	(c)	(d)	(e)	(f)	(g)	(h)	(i)	(j)
2046					$2,000		$0	$2,000	0.138	**$276**
2047					$2,000		$0	$2,000	0.130	**$260**
2048					$2,000		$0	$2,000	0.123	**$245**
2049					$2,000		$0	$2,000	0.116	**$232**
2050					$2,000		$0	$2,000	0.109	**$218**
2051					$2,000		$0	$2,000	0.103	**$206**
2052					$2,000		$0	$2,000	0.097	**$194**
2053					$2,000		$0	$2,000	0.092	**$183**
2054					$2,000		$0	$2,000	0.087	**$173**
2055					$2,000		$0	$2,000	0.082	**$163**
2056					$2,000		$0	$2,000	0.077	**$154**
2057					$2,000		$0	$2,000	0.073	**$145**
2058					$2,000		$0	$2,000	0.069	**$137**
2059					$2,000		$0	$2,000	0.065	**$129**
2060					$2,000		$0	$2,000	0.061	**$122**
2061					$2,000		$0	$2,000	0.058	**$115**
2062					$2,000		$0	$2,000	0.054	**$109**
2063					$2,000		$0	$2,000	0.051	**$102**
2064					$2,000		$0	$2,000	0.048	**$97**
Total Present Value of Discounted Costs (Sum of column (j)) Transfer to Table 20, column (c), Proposal Benefits and Costs Summaries										**$194,231**
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

Project Benefits

PSP Table 20, below, summarizes benefits and costs for the proposed project.

Table 20 – Project Benefits and Costs Summary Proposal: Mokelumne-Amador-Calaveras Region – Proposition 84 Round 2 Grant Proposal Agency: Upper Mokelumne River Watershed Authority							
Project	Project Proponent	Total Present Value Project Costs (1)	Total Present Value Project Benefits			Cost-Effectiveness Analysis, Cost Savings	Non-monetized benefits
			Monetized (2)	Flood Damage Reduction (3)	Total		
(a)	(b)	(c)	(d)	(e)	(f) = (d) + (e)	(g)	(h)
Ponderosa Way Restoration Project - Phase 1	Calaveras County	$194,231	$349,586	N/A	$349,586	N/A	Improved aquatic and riparian habitat, energy reduction, water quality improvement

(1) From Table 19, or RWMG method

(2) From Table 15 or RWMG method

(3) From Table 18 or RWMG method

Proposal Benefits and Costs Summary

As shown in PSP table 20, the total present value cost of this proposal is $7,412,555. Present value benefits of the proposed projects equal $25,822,710.

Table 20 – Proposal Benefits and Costs Summary

Proposal: Mokelumne-Amador-Calaveras Region – Proposition 84 Round 2 Grant Proposal

Agency: Upper Mokelumne River Watershed Authority

Project	Project Proponent	Total Present Value Project Costs (1)	Total Present Value Project Benefits			From Section D1 – Cost-Effectiveness Analysis, Cost Savings	From Section D2 – Briefly describe the main Non-monetized benefits
			From Section D3 – Monetized (2)	From Section D4 – Flood Damage Reduction (3)	Total		
(a)	(b)	(c)	(d)	(e)	(f) = (d) + (e)	(g)	(h)
Camanche Area Lateral Replacement Project - Phase 2	AWA	$530,278	$817,408	N/A	$817,408	N/A	Reduced energy usage, improved supply reliability, reduced environmental discharges
Camanche Area Regional Water Supply Project - Phase 1	EBMUD	$6,688,046	$24,658,037	N/A	$24,658,037	N/A	Improved supply reliability, reduced environmental discharges, improved groundwater management
Ponderosa Way Restoration Project - Phase 1	Calaveras County	$194,231	$349,586	N/A	$349,586	N/A	Improved aquatic and riparian habitat, energy reduction, water quality improvement
TOTAL		$7,412,555	$25,825,031	$0	$25,825,031	$0	

(1) From Table 19, or RWMG method

(2) From Table 15 or RWMG method

(3) From Table 18 or RWMG method

Appendices

The following Appendices have been provided on the CD included at the end of this proposal.

Appendix	Filename
Appendix 8-1 – 2008 Urban Drought Assistance Grant Application	Att8_IG2_BenCost_2of2
Appendix 8-2 - Water Conservation Plan (RMC Water & Environment, 2010)	Att8_IG2_BenCost_2of2
Appendix 8-3 – Amador Water Agency Purchase Order 02438: 700 gal 12.5% Hypochlorite	Att8_IG2_BenCost_2of2
Appendix 8-4 – Minimize Repairs, maximize Service with O&M Program, Journal of the American Water Works Association, January 1994.	Att8_IG2_BenCost_2of2
Appendix 8-5 – Main Break Prediction, Prevention, and Control, AWWA RF 2007.	Att8_IG2_BenCost_2of2
Appendix 8-6 – Fasten Your Seat Belts: Main Breaks and the Issuance of Precautionary Boil-water Notices, March 2011.	Att8_IG2_BenCost_2of2
Appendix 8-7 – Camanche Area Regional Water Supply Plan Feasibility Study and Conceptual Design (RMC Water and Environment, 2013)	Att8_IG2_BenCost_2of2
Appendix 8-8 – Camanche South and North Shore Water Treatment Plants Evaluation	Att8_IG2_BenCost_2of2
Appendix 8-9 – Camanche Water Treatment Plant Replacement Project Mitigated Negative Declaration, State Clearinghouse Number 2001072084 (July 2001 Draft; September 2001 Final)	Att8_IG2_BenCost_2of2
Appendix 8-10 – Camanche Regional Water System Draft Feasibility Study (KASL, July 1999)	Att8_IG2_BenCost_2of2
Appendix 8-11 - Nichols, Dana. All is Not Well Near Burson: For Residents Near Burson, Getting Water is No Mere Turn of the Tap (RecordNet, October 20, 2005)	Att8_IG2_BenCost_2of2
Appendix 8-12 - Ponderosa Way Restoration Project letter from Jan Bray, Calaveras Area Forester, Tuolumne-Calaveras Unit at the California Department of Forestry and Fire Protection to Calaveras County Public Works, dated October 22, 2012	Att8_IG2_BenCost_2of2
Appendix 8-13 - Mokelumne River Project, FERC Project No. 137, Mokelumne Relicensing Settlement Agreement, Appendix A	Att8_IG2_BenCost_2of2