

# Attachment 10: Costs and Benefits Summary

## Contents

Costs and Benefits Summary .....	1
Lake Camanche Tank Rehabilitation & Lateral Replacement Project .....	2
Amador Water System Leak Detection & Repair Program .....	3
West Point Water Main & Tank Replacement Project .....	4
Camanche Regional Water Treatment Plant Phase 1 Project .....	5

## COSTS AND BENEFITS SUMMARY

This Proposition 84 Implementation Grant Proposal for the Mokelumne/Amador/Calaveras (MAC) Integrated Regional Water Management (IRWM) Planning Region contains four projects: the Lake Camanche Tank Rehabilitation & Lateral Replacement Project, the Amador Water System (AWS) Leak Detection & Repair Program, the West Point Water Main & Tank Replacement Project, and the Camanche Regional Water Treatment Plant Phase 1 Project. Of these four projects, all but one (the Camanche Regional Water Treatment Plant Phase 1 Project) have quantifiable benefits. The total present value of projects with quantifiable benefits in this Proposal is \$2,272,896 and together, these projects provide cumulative quantitative benefits of \$2,243,304. This is equivalent to a program-level benefit-cost ratio of 1.0.

It is important to note that the quantitative analyses presented herein and in Attachment 7 of this grant application do not reflect all the benefits provided by this Proposal. Once the two phased projects included herein are fully implemented, additional benefits will be realized by the Region. Benefits from the overall AWS Leak Detection & Repair Program and the Camanche Regional Water Treatment Plant Project are not quantifiable at this time due to insufficient information regarding the breadth of water savings to be obtained from program implementation (in the case of the AWS Leak Detection & Repair Program), the volume of water to be delivered to neighboring communities (in the case of the Camanche Regional Water Treatment Plant), and the timing of project benefits due to uncertainty in project construction scheduling (in the case of both projects).

The quantitative and qualitative benefits of each of the projects contained in this grant application are summarized below and in Table 20, Proposal Project Costs and Benefits Summary.

## Lake Camanche Tank Rehabilitation & Lateral Replacement Project

The Lake Camanche Tank Rehabilitation & Lateral Replacement Project has both quantitative and qualitative benefits. Primary quantifiable water supply and water quality benefits of this project are as follows:

- **Elimination of storage tank losses.** The value of this annual benefit is equal to the annual loss multiplied by the variable production cost of water. The variable production cost of water is approximately \$2,070/MG. The benefit calculation assumes that under the No Project Condition, the tanks would be replaced in 12.5 years (the midpoint of the remaining useful life range of 10 to 15 years) and that storage tanks losses would increase at a rate of 5% per year.
- **Restoration of distribution system storage capacity.** The value of this benefit is equal to the replacement cost of the lost storage capacity. The project would increase system storage by approximately 96,000 gallons. The replacement cost is \$5/gallon, or about \$480,000 in upfront capital cost. The annualized value of this storage capacity, assuming a 40-year useful life and a 6% discount rate, is \$31,900/year for 25 years.
- **Reduction of system losses from leaking laterals.** The value of this annual benefit is equal to the annual loss from leaking laterals multiplied by the variable production cost of water. Avoided annual water loss from replacing one third of system laterals is estimated at 2.4 MG. Laterals are assumed to have a 30-year useful life. Losses are valued at \$2,070/MG.
- **Reduction of coliform contamination risk and lower annual expenditure on chlorine treatment.** The value of this annual benefit is equal to the annual quantity of chlorination required for water lost plus the reduction in chlorination required for water delivered multiplied by the unit cost of chlorination. Lining the tanks will reduce expenditures on chlorine treatment by about \$2,000 per year over a 25 year period.

Qualitative benefits of the Lake Camanche Tank Rehabilitation & Lateral Replacement Project include increased water storage capacity as a result of the tank linings; improved water quality as a result of reduced contamination from redwood substrate and associated increases in chlorination; and increased water supply reliability during periods of peak demand, drought and/or emergency (i.e. wild fires) as a result of the lateral replacements. Additionally, local, regional and statewide communities will benefit from reduced losses, which will help meet statewide targets for potable water use reductions and associated reductions in demands on the local groundwater basin. Finally, the project will also help to stabilize water rates for Lake Camanche Village by reducing system operations and maintenance costs which will, in turn, allow AWA to continue to operate the system without the need for significant rate increases imposed on this DAC.

## Amador Water System Leak Detection & Repair Program

The Amador Water System Leak Detection & Repair Program has both quantitative and qualitative benefits. Primary quantifiable water supply benefits of this project are as follows:

- **Reduction of system losses.** System losses currently approach 7% of water production. The leak testing and repair program is expected to reduce system losses by up to 3% of production, an annual water savings of 59 MG per year. The value of this annual benefit is equal to the annual avoided water loss multiplied by the variable production cost of water. The variable production cost of water is approximately \$2,070/MG. Annual benefits of reduced system losses are calculated over the 40-year useful life of the project and are assumed to phase in over a 20-year period.
- **Reduction of water main repairs.** Replacement of aging mains is expected to reduce main repairs by an average of 1 per year over the 40-year useful life of the project. This benefit is valued at \$10,000 per year, or \$10,000 per avoided main repair, which is the average repair cost of recent main repairs for this system.

Many benefits from the AWS Leak Detection & Repair Program will not be realized immediately, but rather will be accrued after subsequent project phases, repairing or replacing project infrastructure to reduce water loss, have been completed. While it is known that there is significant water loss from the AWS, the location and severity of specific leaks are not yet known and therefore the magnitude and cost of repairs and/or replacements has not yet been determined. These factors will have a considerable impact on the timing of repairs/replacements and the relative water savings to be achieved with each repair or replacement project. Therefore, long-term, the AWS Leak Detection & Repair Program will also have the benefits of increasing water supply reliability, reducing operations and maintenance costs, improving water use efficiency, and ultimately reducing diversions from the Mokelumne River. With respects to water quality and other non-water supply-related benefits, implementation of the AWS Leak Detection & Repair Program will reduce AWS water losses and will therefore concurrently reduce costs associated with the treatment and distribution of that water. To that end, implementation of the AWS Leak Detection & Repair Program will allow AWA to delay development of new water projects and reduce O&M costs of the existing system, which will, in turn, allow them to limit future water rate increases for system customers.

## West Point Water Main & Tank Replacement Project

The West Point Water Main & Tank Replacement Project has both quantitative and qualitative benefits. Primary quantifiable water supply benefits of this project are as follows:

- **Reduction of system losses.** System losses currently exceed 25% of water production. The new storage tank and main replacements are expected to reduce system losses to 20% of production, an annual water savings of 2.9 MG per year. The value of this annual benefit is equal to the annual avoided water loss multiplied by the variable production cost of water. The variable production cost of water is approximately \$1,700/MG. Annual benefits of reduced system losses are calculated over the 40-year useful life of the project.
- **Restoration distribution system storage capacity.** CCWD's 2005 Master Plan calculated a deficit for the Bummerville treated water storage of 263,000 gallons; therefore, the recommendation is to replace the existing redwood tank with a new tank. However, a single tank of sufficient size to supply the entire treated water storage required would promote water quality deterioration and increased DBP formation during normal operation. Therefore, a smaller tank and an upgraded fire flow pump are recommended to satisfy the four-hour fire flow demand. The storage tank would be situated at the existing location of the redwood tank and would be a minimum of 50,000 gallons, an increase of 20,000 gallons. The tank would also provide the required emergency and operational storage per District standards. The value of this benefit is equal to the replacement cost of the foregone storage capacity. The project would increase system storage by approximately 20,000 gallons relative to the Without Project condition. The replacement cost is \$5/gallon, or about \$100,000 in upfront capital cost. The annualized value of this storage capacity, assuming a 40-year useful life and a 6% discount rate, is \$6,646/year for 40 years.
- **Reduced main repairs.** Replacement of the aging mains is expected to reduce main repairs by an average of 6 per year over the 50-year useful life of the project. This benefit is valued at \$60,000 per year, or \$10,000 per avoided main repair, which is the average repair cost of recent main repairs for this system.

Qualitative benefits of the West Point Water Main & Tank Replacement Project include increased water storage capacity as a result of the tank replacement, improved water quality as a result of contamination elimination stemming from redwood substrate; reduced diversions from the Calaveras River; and increased water supply reliability during periods of peak demand, drought and/or emergency (i.e. wild fires) as a result of the water main and tank replacements. Water loss reductions resulting from this project implementation will help both CCWD and the State meet their 20x2020 urban water use efficiency goals by increasing water use efficiency, and reducing production rates. This water loss reduction will translate into reduced potable water treatment, which results in power cost savings and power production benefits such as the reduction of greenhouse gas emission. And finally,

the disadvantaged community of West Point will benefit in that project implementation will allow CCWD to delay development of new water projects (as a result of the loss reductions) and reduce operations & maintenance costs of the existing system, which will, in turn, allow them to limit future water rate increases for system customers.

### **Camanche Regional Water Treatment Plant Phase 1 Project**

Water supply and water quality benefits of the Camanche Regional Water Treatment Plant Project cannot be quantified at this time due to insufficient information as to the timing of project component construction. The Phase 1 project, for which funding is being sought, consists of the Mokelumne Aqueduct to CSS Water Treatment Plant pipeline. While this pipeline does not provide quantifiable benefits in and of itself, it is a pivotal component of the overall project; and one that can be operated independently providing qualitative water quality benefits to the local community. The Phase 1 project, as described herein, will improve potable water quality by providing an alternative high-quality raw water source from Pardee Reservoir. Additionally, the useful life of the existing water treatment plant will be extended by the higher-quality raw water in that the bacterial loading to the existing plant will be reduced and there will be fewer Surface Water Treatment Rules violations. The fully completed project will provide high-quality potable water to several Camanche Reservoir communities that are currently depended on an over-drafted groundwater supply. Project implementation will allow these communities to conjunctively manage their groundwater supplies with a higher-quality, reliable surface water source, thereby ensuring the sustainability the groundwater basin and the economic viability of these small communities. Additionally, the development and operation of a regional water treatment plant will provide economies of scales relative to water treatment, and will help keep water rates to a level affordable by the communities.

**Table 20 - Proposal Project Costs and Benefits Summary**  
**Proposal: Mokelumne/Amador/Calaveras (MAC) IRWM Region Proposition 84 Implementation Grant Application**  
**Agency: Upper Mokelumne River Watershed Authority**

Project	Agency	Total Present Value Project Costs (1)	Total Present Value Project Benefits				B/C Ratio
			Water Supply (2)	Flood Damage Reduction (3)	Other (4)	Total	
(a)	(b)	(c)	(d)	(e)	(f)	(g) (d) + (e) + (f)	(h) (g) / (c)
Lake Camanche Tank Rehabilitation & Lateral Replacement Project	Amador Water Agency	\$484,687	\$342,152	\$0	\$21,466	\$363,618	<b>0.8</b>
Amador Water System Leak Detection & Repair Program	Amador Water Agency	\$593,914	\$997,540	\$0	\$0	\$997,540	<b>1.7</b>
West Point Water Main & Tank Replacement Project	Calaveras County Water District	\$1,194,295	\$903,612	\$0	\$0	\$903,612	<b>0.8</b>
Camanche Regional Water Treatment Plant Phase 1 Project <sup>1</sup>	East Bay Municipal Utility District	\$0	\$0	\$0	\$0	\$0	<b>0.0</b>
<b>TOTAL</b>		<b>\$2,272,896</b>	<b>\$2,243,304</b>	<b>\$0</b>	<b>\$21,466</b>	<b>\$2,264,770</b>	<b>1.0</b>

Notes:

1. This project only has qualitative benefits