ATTACHMENT 6 – MONITORING, ASSESSMENT, AND PERFORMANCE MEASURES

Santa Clarita Valley Water Use Efficiency Plan Programs (CLWA – 4, SCV WUE Programs)

Project Overview

The Project implements four conservation programs of the Santa Clarita Valley Water Use Efficiency Plan (SCV WUE Plan**)**; the Santa Clarita Valley Large Landscape Audit and Incentive Program, the Santa Clarita Valley Commercial, Industrial and Institutional (CII) Audit and Customized Incentive Program, the Santa Clarita Valley Landscape Contractor Certification and Weather-based Irrigation Controller Program, and the High Efficiency Toilet Rebate Program. These programs have already had one successful year of implementation with an estimated water savings of 1,972 acre-feet (AF). Implementation of all four programs will result in a phase-in of savings in 2011 through 2013. By 2014, the programs will be fully implemented, achieving a maximum annual savings amount of 613 AF. These savings will be sustained through 2020. Over the life of the project, total water savings will amount to 6,580 AF.

Performance Measures

The main goal of the SCV WUE Programs Project is to assist the region in meeting the targeted conservation in new legislation. Senate Bill 7x-7 was signed into law in November 2009 requiring a 20 percent reduction in per capita water use by 2020 statewide (20x2020). The Project's incentives to help meet the 20x2020 reduction include rebates on weather-based irrigation controllers (WBICs), high efficiency nozzles, and high efficiency (HET) toilets. The Project's water savings of 613 AFY would meet the IRWMP objective **Reduce Water Demand**, and measurable target of 10 percent reduction in projected urban water demand through the Region through implementation of water conservation measures.

The SCV WUE Programs Project performance measures are summarized in Table 6-1 and include: improved water supply reliability; improved water quality; public education on water conservation; and improved air quality. The project will be implemented within the CLWA service area and a monitoring plan will be identified when the PAEP is developed. Hence, specific monitoring locations are not shown on the detailed project map (Figure CLWA-4).

The SCV WUE Programs Project would reduce dependence on imported water by reducing overall water demand that would otherwise be met with imported SWP water. The amount of imported water avoided as a result of the project would be quantified as the reduction in water demand per capita in comparison to previous years and would be monitored through customer meters.

By decreasing the amount of water used for irrigation and indoor use, the SCV WUE Programs Project will result in an overall decrease in runoff caused by over-irrigation and thus the loading-rate of pollutants into groundwater. To **Improve Water Quality**, an IRWMP objective, would be measured as the decrease in run-off which is proportional to the reduction in irrigation demand resulting from the project. The reduction in indoor use will decrease the total volume of effluent requiring treatment at local water reclamation plants.

This project would allow for an improvement of water quality by contributing to the reduction in the import of salts to the Basin. The improvement in water quality is the mass of salt that is not brought into the Basin and would be measured as the avoided chloride treatment that is required by local wastewater treatment plant and the reduction in outdoor water demand multiplied by the concentration of salts.

By offsetting imported water demands with reduced water usage, the Project would avoid emissions of CO_2 (a greenhouse gas) generated by transporting imported SWP water to Valley. The long-distance transport of water in conveyance systems is a major element of California's total demand for electricity. The reduction in CO_2 emissions would be measured as the avoided import of SWP to the Region versus the use of recycled water, which will be measured as part of this performance measure, and the reduction in energy requirements resulting from this project.

1. Is the Project Consistent with the Basin Plan?

Yes, the SCV WUE Programs Project is consistent with the Los Angeles Regional Water Quality Control Board Basin Plan (Basin Plan). The project helps to meet the nitrate and chloride TMDLs which are currently listed on the 303(d) lists for the Santa Clara River, and the project does not contribute to an exceedance of any other water quality objectives within the watershed. The Project will result in a reduction in runoff volume which will be proportional to the 1,972 AFY of expected savings resulting from implementation of the four conservation programs. Assuming that the percent reduction in runoff volume is 10 percent, this translates into approximately 197 AFY. The project would therefore result in a likewise reduction in runoff to the Santa Clara River containing constitutions such as coliform bacteria, nutrients, pesticides, sediment, and trash.

2. Do the Output Indicators Effectively Track Output?

Deliveries of water produced by water purveyors to customers
This output indicator will provide an estimate of how much water is being conserved through a comparison of per capita water demand from previous years, thereby providing a basis for calculating the actual water savings resulting from this project. This output indicator is deemed adequate because it shows that through the use of WBICs and other conservation measures, outdoor water demand can be reduced.

Monitoring chloride concentrations of SWP water
This output indicator monitors the concentration of chloride entering the Basin from SWP water.

Installation of WBICs, nozzles, and HET toilets to manage water usage
This output indicator will provide the quantifiable benefits of the project by demonstrating the water supply conserved as a result of the installation of the WBICs, nozzles, and HET toilets through review of customer metered data.

Attendance at water use efficiency workshops
This output indicator will provide an estimate of how many people are being educated on water-efficient outdoor water use through attendance, education and training sessions at the workshops.

3. Are the Outcome Indicators Adequate to Evaluate Change Resulting From the Work?

Quantification of the decrease in water demand compared to previous years
This outcome indicator will show the effectiveness of the project in conserving water. The project will also provide the comparison of water usage after the incentives have been installed versus the historical water usage prior to the installation of the incentives for those customers receiving them.

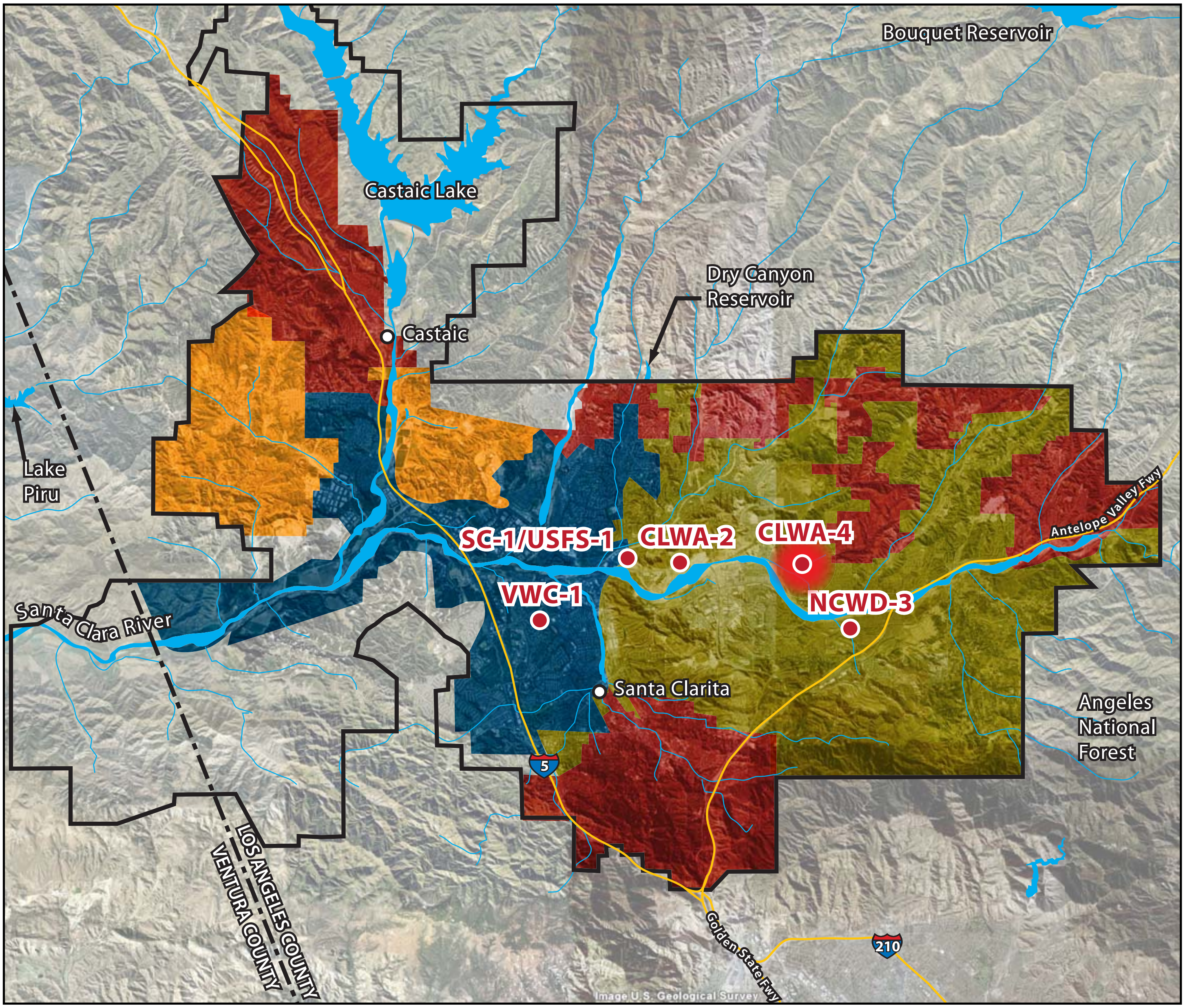
Quantification of imported water use avoided as a result of the project
This outcome indicator will show the reduction of imported water use as a result of reduced water demand and in the subsequent water savings.

Quantification of water saving from water use efficiency incentives
This outcome indicator will measure the water saving from installation of WBICs and accompanying high efficiency nozzles, large landscape audits, CII audits, and HETs by tracking water use in the years that follow.

Quantification of the number of visitors to the water use efficiency workshops
This outcome indicator will show how effective the public workshops are by the number of customers in attendance.

4. Is it Feasible to Meet the Targets within the Life of the Proposal?

The feasibility and success of each of the Best Management Practices (BMPs) to be implemented by CLWA-4 is documented in the SCV WUE Plan, provided as Reference CLWA-4.1. The programs have already had one successful year of implementation with an estimated water savings of at least 986 AF, and now seek expansion consistent with the SCV WUE Plan. These conservation projects will be (or are already) underway regardless of this specific funding opportunity since they are an important part of helping the Region to achieve a balanced water portfolio. Based on existing literature as well as documentation provided for this project, it is feasible for this project to meet the identified targets.



LEGEND:

- CLWA Service Area
- L.A. County Waterworks District #36
- Newhall County Water District
- Santa Clarita Water Division
- Valencia Water Company
- Project Location
- Service Area Wide
- Interstate Line
- County Line

N

Sources:
1. Castaic Lake Water Agency Service Area
2. Google Earth - Image U.S. Geological Survey

CLWA-4
SCV Water Use Efficiency Plan Programs

TABLE 6-1
SCV WUE PROGRAMS PROJECT PERFORMANCE MEASURES

Project Goals	Desired Outcomes	Output Indicators	Outcome Indicators	Measurement Tools and Methods	Targets
Improve water supply reliability through reduced water demand	Decreased outdoor water use and overall water demand in the Region	Deliveries of water produced by water purveyors to customers	Quantification of the decrease in water demand compared to previous years	Volume delivered to water customers per customer flow meters; comparison of actual water usage vs. historical usage	Reduction of water demand and water dependence by 613 AFY to 2020, and approximately 6,580 AF of water over the project lifetime
	Interest in utilization of 1,507 WBICs and accompanying nozzles and 502 HET toilets	Installation of 1,507 WBICs and accompanying nozzles and 502 HET toilets to manage water usage	Quantification of 1,507 of WBICs and accompanying nozzles and 502 HET toilets distributed	Record of 1,507 of WBICs and accompanying nozzles and 502 HET toilets and distributed	Distribution of 1507 WBICs and accompanying nozzles, and 502 HET toilets
Improve Water Quality	Reduced irrigation run-off into the Groundwater Basin	Deliveries of water by water purveyors to customers	Quantification of existing imported water use avoided as a result of the project	Volume delivered to water customers per customer flow meters; comparison of actual water usage vs. historical usage	Reduction of water demand and water dependence by approximately 613 AFY (starting in 2014) or 6,580 AF of water over the project lifetime

Project Goals	Desired Outcomes	Output Indicators	Outcome Indicators	Measurement Tools and Methods	Targets
	Reduced import of chlorides into the groundwater Basin	Monitoring chlorides concentrations in SWP water		Part of standard monitoring data collected by CLWA	Reduction in ~24 metric tons of salt per year and 638 metric tons of salt over the 27 year project lifetime
Educate public on water conservation	Decreased outdoor water use and overall water demand in the Region	Installation of WBICs, nozzles, and and HETs to manage water usage	Quantification of increase in WBICs, nozzles, and HETs purchased	Record of number of WBICs, nozzles, and HETs purchased	Distribute 1,507 WBICs and accompanying nozzles, and 502 HETs
	Increased number of residents and businesses who understand what types of plants to use to reduce water consumption	Attendance at the water use efficiency workshops	Quantification of attendance water use efficiency workshops	Record of number of customers at the water use efficiency workshops	Attendance of 420 people at water use efficiency workshops
Reduced GHG emissions	Reduced emissions of CO_2	Deliveries of water produced by water purveyors to customers	Quantification of existing imported water use avoided as a result of the project	Volume delivered to water customers per customer flow meters; comparison of actual water usage vs. historical usage	Reduction in the emission of 115 metric tons of CO_2 per year or 3,106 metric tons of CO_2 over project lifetime

Santa Clara River – Sewer Truck Line Relocation (Phase I) (NCWD – 3, Sewer Trunk Line Removal)

Project Overview

Within the riverbed, Newhall County Water District (NCWD) maintains a portion of a sewer trunk line in the Canyon Country area of Santa Clarita. NCWD has owned and operated this trunk line since the late 1960's and has previously combated sewer trunk line breakage by preventative maintenance and proactive responses. Nevertheless, the threat of an accidental release has become increasingly evident and relocation of the trunk line out of the riverbed is now a priority. A line break would be detrimental to the ecosystems in and around the river and also could affect domestic groundwater wells within the region.

The Sewer Trunk Line Removal Project is proposed in phases, with Phase 1 being the engineering and planning associated with relocating the sewer trunk line out of the Santa Clara riverbed. Phase 2 would concentrate on the actual removal or the gravity feed portion of the sewer trunk line. Within Phase 2, construction activities would relocate the sewer flow fed by gravity, prior to the proposed sewer lift station, into the public right-of-way. In Phase 3, the construction of a sewer lift station, forced sewer main, and the remaining gravity feed portion of the sewer trunk line to complete the relocation project. Funding is being requested for Phase 1 only, which includes: river bank protection, land title requests, surveying, and the engineering report.

Performance Measures

The main goals of the Sewer Trunk Line Removal Project are to eliminate the possibility of a sewer discharge into the Santa Clara River and to minimize or eliminate disturbance of native vegetation caused by the frequent and ongoing maintenance on the exposed sewer trunk line. The Project will eventually result in the removal of the sewer line into the public right-of-way during a future phase (Phases 2 and 3) of the project.

The Sewer Trunk Line Removal Project performance measures are summarized in Table 6-2 and include: completion of the planning and design of the project; and the minimization or elimination of disturbances of native vegetation caused by the ongoing maintenance to the sewer trunk line.

When the project is ready for construction a PAEP will be prepared for the assessment and evaluation of project performance and to identify measures that can be used to monitor progress towards achieving project goals. Performance and monitoring measures will be identified for long-term monitoring and reporting of project efficacy, which likely will be done in accordance with the SWRCB Waste Discharge Requirements (WDRs). Hence, specific monitoring locations are not shown on the detailed project map (Figure NCWD-3).

However, for Phase 1, performance measures for the Project will focus on completing the planning, design, and engineering tasks necessary to safely relocate the trunk line in order to proceed at a future time to Phases 2 and 3 and complete the project. Funding is requested for river bank protection, design, land title requests, surveying, and the engineering report.

1. Is the Project Consistent with the Basin Plan?

Yes, the project is consistent with the Basin Plan. The project does not contribute to the nitrate or chloride TMDLs which are currently listed on the 303(d) lists for the Santa Clara River, nor does the project contribute to exceedances of any water quality objectives within the watershed.

2. Do the Output Indicators Effectively Track Output?

Preparation of all necessary engineering studies, reports, and plans and make submittals to regulatory agencies

This output indicator will provide the documentation necessary to show that the permits for the Project have been prepared and approved by the regulatory agencies.

Native vegetation re-established in the area

This output indicator will show that the methods being implementation are resulting in the native vegetation successfully reestablishing within the project area.

3. Are the Outcome Indicators Adequate to Evaluate Change Resulting From the Work?

All regulatory permits are issued and 60-90 percent design documents produced

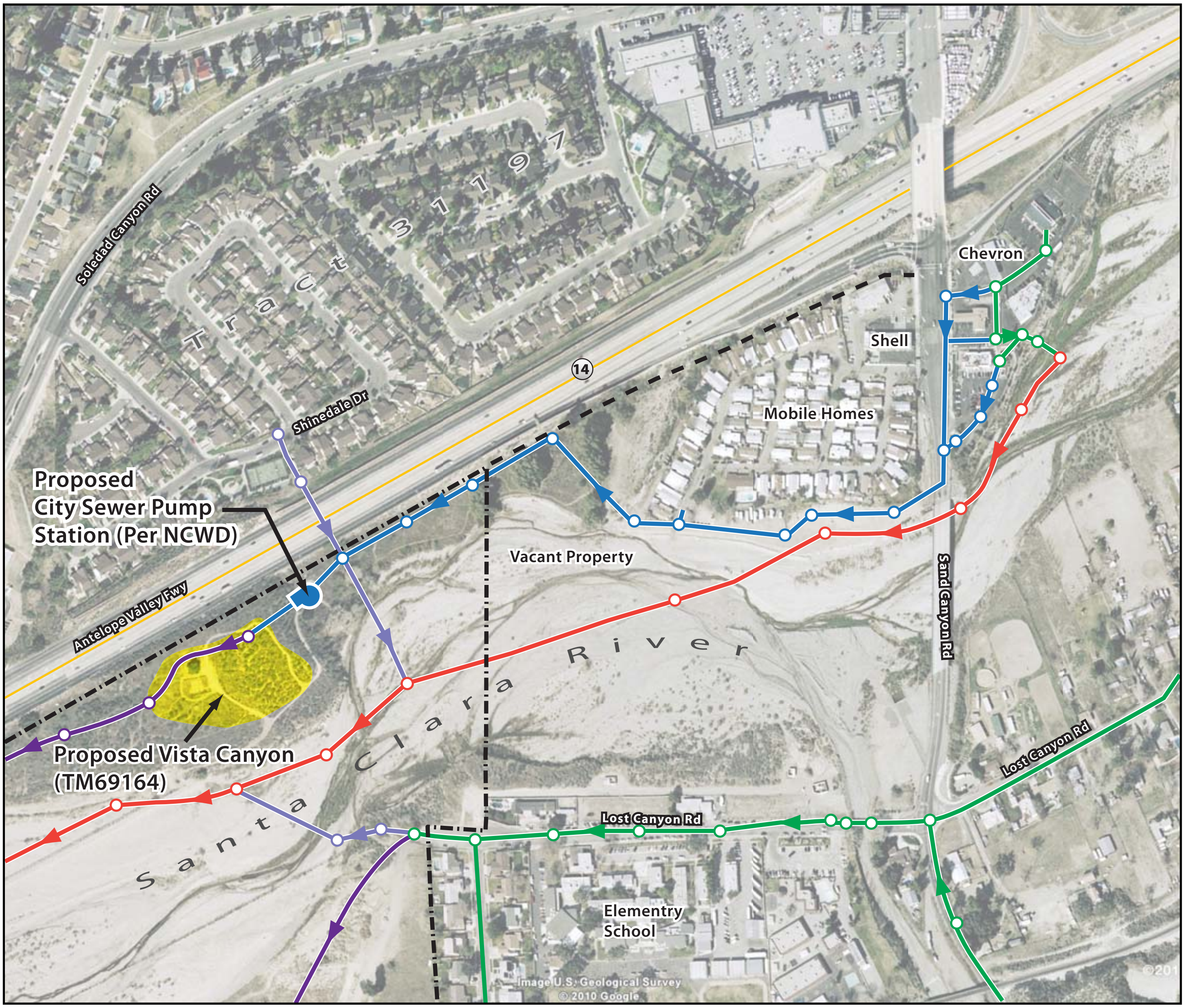
This outcome indicator shows that the project is progressing and completing the tasks necessary to complete Phase 1 and move on to the construction of the project in future Phases 2 and 3.

Percent increase in native vegetation coverage

This outcome indicator provides the delta as compared to the baseline by which to measure progress of the project. Tracking this data point over time will indicate whether the native vegetation is successfully being reestablished.

4. Is it Feasible to Meet the Targets within the Life of the Proposal?

Yes, NCWD is committed to completing the planning and design of the Project within the timeframe of the Proposal and within the budget proposed. The project is structured in a phased approach so that each phase can be implemented in an efficient and practical manner, well suited to the District's financial capabilities and needs of the Project.

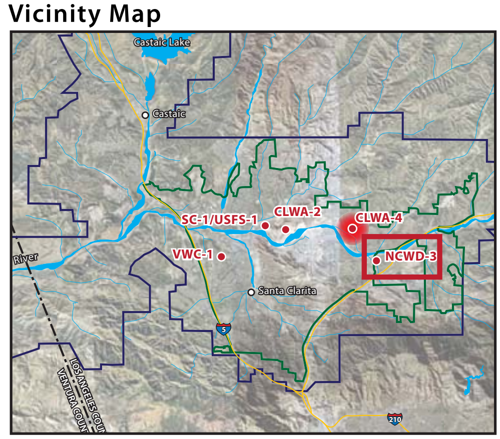


LEGEND:

- Proposed City Sewer (per NCWD)
- Proposed City Sewer (per VC)
- Existing City Sewer
- Existing NCWD Sewer
- Existing County Sewer
- Vista Canyon Boundary
- Existing Caltrans Fence
- Interstate Line

N

Vicinity Map



Sources:
1. Alliance - Sand Canyon Sewer Relocation Exhibit, 11/06/09
2. Google Earth - Image U.S. Geological Survey

NCWD-3

Santa Clara River Sewer Trunk Line Relocation (Phase 1) Project

TABLE 6-2
SEWER TRUNK LINE REMOVAL PROJECT PERFORMANCE MEASURES

Project Goals	Desired Outcomes	Output Indicators	Outcome Indicators	Measurement Tools and Methods	Targets
To complete the planning and design of the project	Issuance of permits required to move forward onto Phase 2 and Phase 3 of the project	Preparation of all necessary engineering studies, reports, and plans and make submittals to regulatory agencies	All regulatory permits are issued and 60-90 percent design documents produced	Submittal and feedback from regulatory agencies and permits issued	Design and specifications are at 100percent and permits are included within the design documents
Minimize or eliminate disturbance of native vegetation caused by ongoing maintenance	Native vegetation of the affected area	Native vegetation re-established in the area	Percent increase in native vegetation coverage	Riverbank protection monitoring plan will ensure native vegetation is reestablished	Native vegetation monitoring program complete

Santa Clarita Valley Southern End Recycled Water Project (VWC - 1, SCV Recycled Water)

Project Overview

Valencia Water Company (VWC) wants to expand the existing recycled water transmission and distribution system within the Santa Clarita Valley in order to supply recycled water to additional customers within its service area. VWC currently relies on imported State Water Project (SWP) water (imported via CLWA) to meet roughly one-half of its potable water demands. The balance of the VWC's potable demand is met through local groundwater sources. The use of recycled water made available via the Project will offset the use of 910 AFY of imported water because imported water is the marginal water source (i.e., it is the most expensive source of supply available to VWC).

Performance Measures

The primary goal of the SCV Southern End Recycled Water Project is to extend recycled water to additional customers to the southerly portion of the Santa Clarita Valley to already identified users.

The SCV Southern End Recycled Water Project performance measures are summarized in Table 6-3 and include: improved water supply reliability and maximization of the beneficial use of recycled water; and improved water quality.

The SCV Southern End Recycled Water Project would improve water supply reliability by expanding the local recycled water supply, to the southerly portion of the Santa Clarita Valley that would be used in lieu of imported supply. By offsetting current potable water use with recycled water, the project reduces reliance on existing demand for imported water. Reduced need for SWP imported water leads to three benefits: 1) avoided costs of imported water, 2) avoided costs of imported supplies, and 3) reduced stress on the Bay Delta. The amount of avoided imported water demand as a result of the project would be quantified as the amount of recycled water delivered to customers. This new source of water would be a drought proof supply, thereby increasing local water supply reliability. Both the actual amount of imported water and amount of recycled water delivered to customers would be monitored to track the progress of the project. The reduction in dependence of imported water is assumed to be the delivery of recycled water to customers. The Project's use of 910 AFY of recycled water would meet the IRWMP objective **Increase Water Supply**, and help to meet the measurable target of increased use of recycled water by 17,400 AFY by 2030 in the 2005 UWMP.

The SCV Southern End Recycled Water Project would improve water quality within the Basin by contributing to a reduction in the import of chloride to the Basin, and would meet the IRWMP objective **Improve Water Quality**. By serving customers recycled water in lieu of imported water, this project avoids the introduction of additional salts to the Basin. As a new supply produced from local water, recycled water contains salts, nutrients and other constituents that were already present in the basin. Water which is imported from outside of the Basin, also contains salts, nutrients and other constituents. When imported water is used in the Basin, those salts nutrients and other constituents remain in the Basin increasing the mass of salts in the Basin. By avoiding additional water imports, using recycled water effectively avoids importing additional salts. The improvement in water quality would be measured as the avoided water imported to the Region (equal to the delivery of recycled water to customers) multiplied by the chloride concentration to provide an estimate of mass of salt that will NOT be imported in the Basin. Monitoring will take place at the WRP and at the end of distribution; see Figure VWC-1 for identification of these locations.

By offsetting imported water demands with locally produced water, the project will also avoid emissions of CO2 (a greenhouse gas) generated by the production of energy required to transport imported water to the VWC service area. The long-distance transport of water in conveyance systems is a major element of California's total demand for electricity. The reduction in CO2 emissions would be measured as the avoided imported water to the Region versus the use of recycled water, which will be measured as part of this performance measure, and the reduction in energy requirements resulting from this project.

1. Is the Project Consistent with the Basin Plan?

Yes, the project is consistent with the Basin Plan. The project does not contribute to the nitrate or chloride TMDLs which are currently listed on the 303(d) lists for the Santa Clara River, nor does the project contribute to an exceedance of any water quality objectives within the watershed. Beneficial reuse of the recycled water will ensure that long-term water quality improvements are realized in the Region. More specifically, by serving customers recycled water in lieu of imported water, this project avoids the introduction of additional salts (i.e., total dissolved solids) to the basin. As a new supply produced from local water, recycled water contains salts, nutrients and other constituents that were already present in the basin. SWP water, which is imported from outside of the basin, also contains salts, nutrients and other constituents. When imported water is used in the basin, those salts nutrients and other constituents are imported to and remain in the basin. By avoiding SWP water imports, using recycled water effectively avoids importing additional salts.

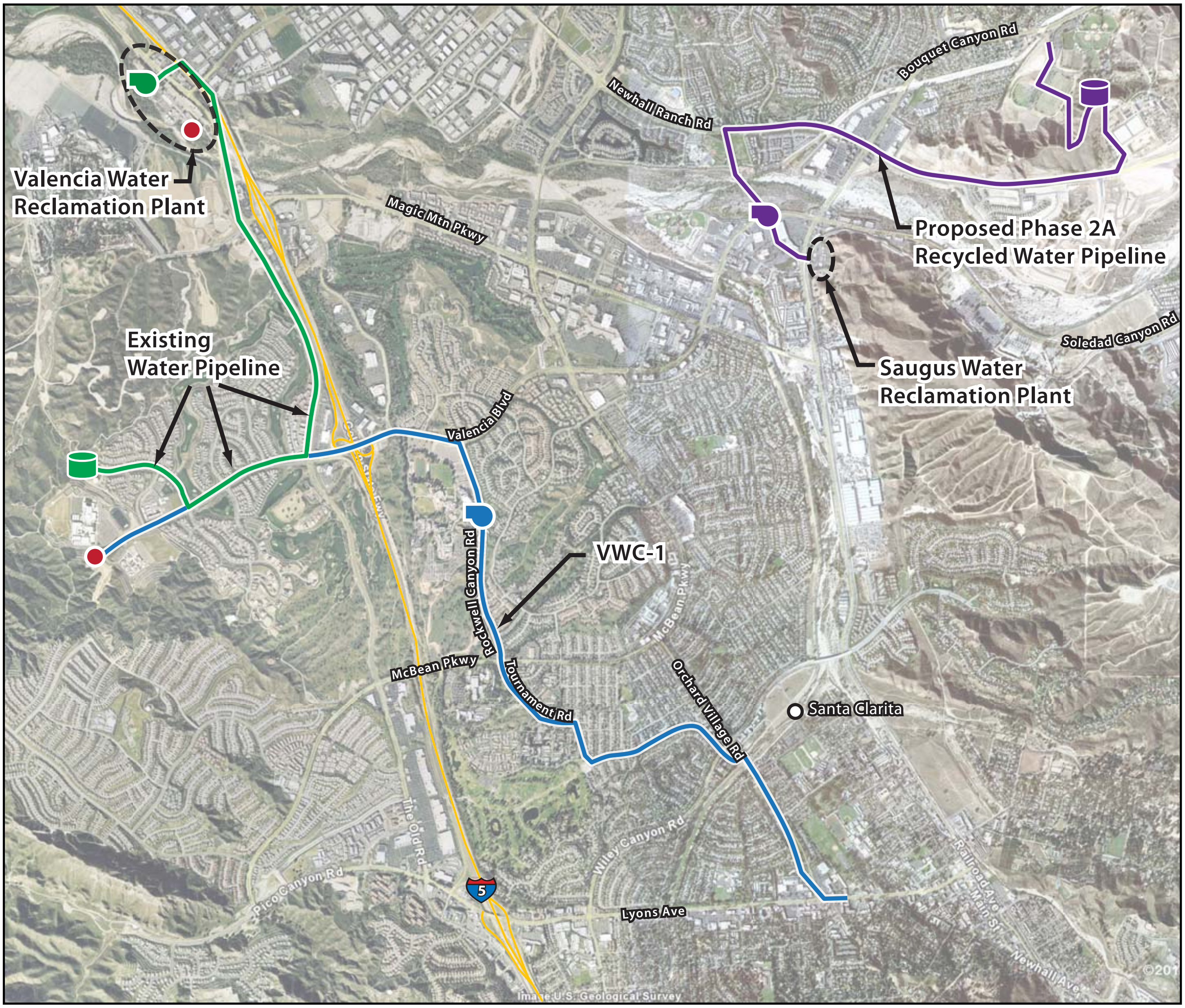
2. Do the Output Indicators Effectively Track Output?

Availability of recycled water for residential and M&I uses
This output indicator will be used to track the progress of the project and provide an accurate account of the recycled water being produced throughout the Region.

Monitoring of effluent for water quality constituents identified in Waste Discharge Requirements (WDSs) and Title 22 of the California Code of Regulations
This output indicator will be used to track the total quantity of effluent to ensure regulatory requirements are met. WDRs dictate water quality requirements for the effluent that is discharged from the plant. Title 22 requirements are standards for water quality that dictate the type of reuse.

3. Are the Outcome Indicators Adequate to Evaluate Change Resulting From the Work?

Quantification of the recycled water produced as a result of the project
This outcome indicator will provide the actual amount of recycled water produced in the Region.

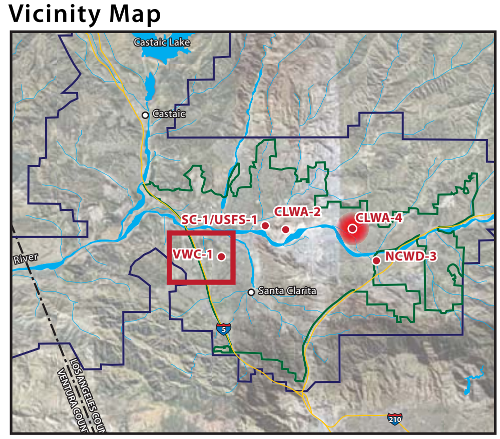


Legend:

- Water Pump Station
- Water Pipeline
- Water Storage Tank
- Interstate Line
- Monitoring Location

N

Vicinity Map



Sources:
1. Draft Recycled Water Phase 2C Planning & Preliminary Design Layout
2. Google Earth - Image U.S. Geological Survey

VWC-1
SCV Southern End Recycled Water Project

<u>Quantification of the local water resources (i.e. recycled water) used in lieu of imported water as a result of the project</u>

This outcome indicator will provide the actual amount of recycled water used in the Region, replacing imported water and/or groundwater supplies.

<u>Improved effluent quality</u>

The outcome indicator will evaluate the improvement in water quality resulting from the projects and will be used to determine the improvement in effluent quality resulting from the projects.

4. Is it Feasible to Meet the Targets within the Life of the Proposal?

There is considerable information to support the feasibility of a recycled water market within the Santa Clarita Valley, and where recycled water can specifically replace potable water. Both the Recycled Water Master Plan (2002), and the Dexter Wilson Technical Memorandum (References VWC-1.1 and VWC-1.3) concluded that the Project was feasible for implementation on a per-acre cost basis and on the identified recycled water demands. Thus it is feasible that these targets will be met within the life of the Proposal.

TABLE 6-3
SCV Southern End Recycled Water Project Performance Measures

Project Goals	Desired Outcomes	Output Indicators	Outcome Indicators	Measurement Tools and Methods	Targets
Improve water supply reliability by creating new supply & maximize beneficial use of recycled water supply	Increased use of underutilized recycled water	Availability of recycled water for residential and M&I uses	Quantification of the recycled water produced a result of the project	Recycled water effluent flow meters at Valencia WRP	Production capacity of approximately 910 AFY of new recycled water
			Quantification of the local water resources (i.e. recycled water) used in lieu of imported water as a result of the project	Volume delivered to recycled water customers per customer flow meters	Expected delivery of 455* AFY by 2014 and 8,190 AFY by 2020

Project Goals	Desired Outcomes	Output Indicators	Outcome Indicators	Measurement Tools and Methods	Targets
Improve water quality	Produce effluent that meets WDR and Title 22 requirements for restrictions	Monitoring of effluent for water quality constituents identified in WDRs and Title 22	Improved effluent quality	Part of standard monitoring data collected by SCVSD	Meet or exceed WDR for effluent 100 percent of the time
Reduced GHG emissions	Reduced emissions of CO2	Availability of recycled water for residential and M&I uses	Quantification of the recycled water produced a result of the project	Quantification of the recycled water produced a result of the project	Reduction in the emission of 222 metric tons of CO_2 per year or 10,791 metric tons of CO_2 over the 50-year project lifetime

* The Project will become operational in mid-2014, so will deliver 455 AF in that year.

Electrolysis and Volatilization for Bromide Removal and Disinfectant Byproduct Reduction Demonstration Plant (CLWA – 2, Bromide Removal)

Project Overview

Bromide is a non-volatile anion found in all natural waters. Although bromide is generally considered non-toxic at concentrations found in most drinking water sources, it reacts with a variety of commonly used disinfectants, most notably ozone and chlorine, to create by-products that are of serious public health concern. CLWA has developed a technology that can remove bromide from SWP water. However, this technology needs to be scaled up to determine if it is effective at treatment volumes that make it cost effective. The Bromide Removal Project would improve drinking water quality and allow for disinfectant treatment flexibility.

Performance Measures

The Bromide Removal Project performance measures are summarized in Table 6-4 and include: improved water quality; and making feasible the bromide electrolysis and volatilization technology.

The proposed project is a pilot plant which will treat 300,000 gallons per day (gpd). If the demonstration plant is successful, the Agency can scale up the size of the plant to ultimately treat all of the imported water in the Castaic Lake Water Agency Service area (260,000 customers).

The Agency has been using chloramines to treat drinking water since 2005. If the demonstration plant were sufficiently effective, the plant could return to using free chlorine for disinfection. This would save money (reduced ammonia), improve the chemical water quality (decrease nitrification), improve microbial protection, and improve water quality in regards to discharges to water reclamation plants and direct discharges to the Santa Clara River. This project contributes to the IRWMP objective to **Improve Water Quality**. Refer to Figure CLWA-2 for the detailed project and monitoring locations.

1. Is the Project Consistent with the Basin Plan?

Yes, the project is consistent with the Basin Plan. The project does not contribute to the nitrate or chloride TMDLs which are currently listed on the 303(d) lists for the Santa Clara River, nor does the project contribute to an exceedance of any water quality objectives within the watershed. CLWA-2 will improve the water quality of SWP water and help meet WDRs by reducing bromide loading in the Basin through improved water treatment processes at the RVWTP. The key water quality benefit generated by the Project is compliance with water quality regulations.

2. Do the Output Indicators Effectively Track Output?

Monitoring bromide and concentrations in SWP water
This output indicator monitors the concentration of bromide entering the Basin from SWP water.

Preparation of all necessary engineering studies, reports, and plans and make submittals to regulatory agencies
This output indicator will used to verify the initial engineering work and permit issuance.

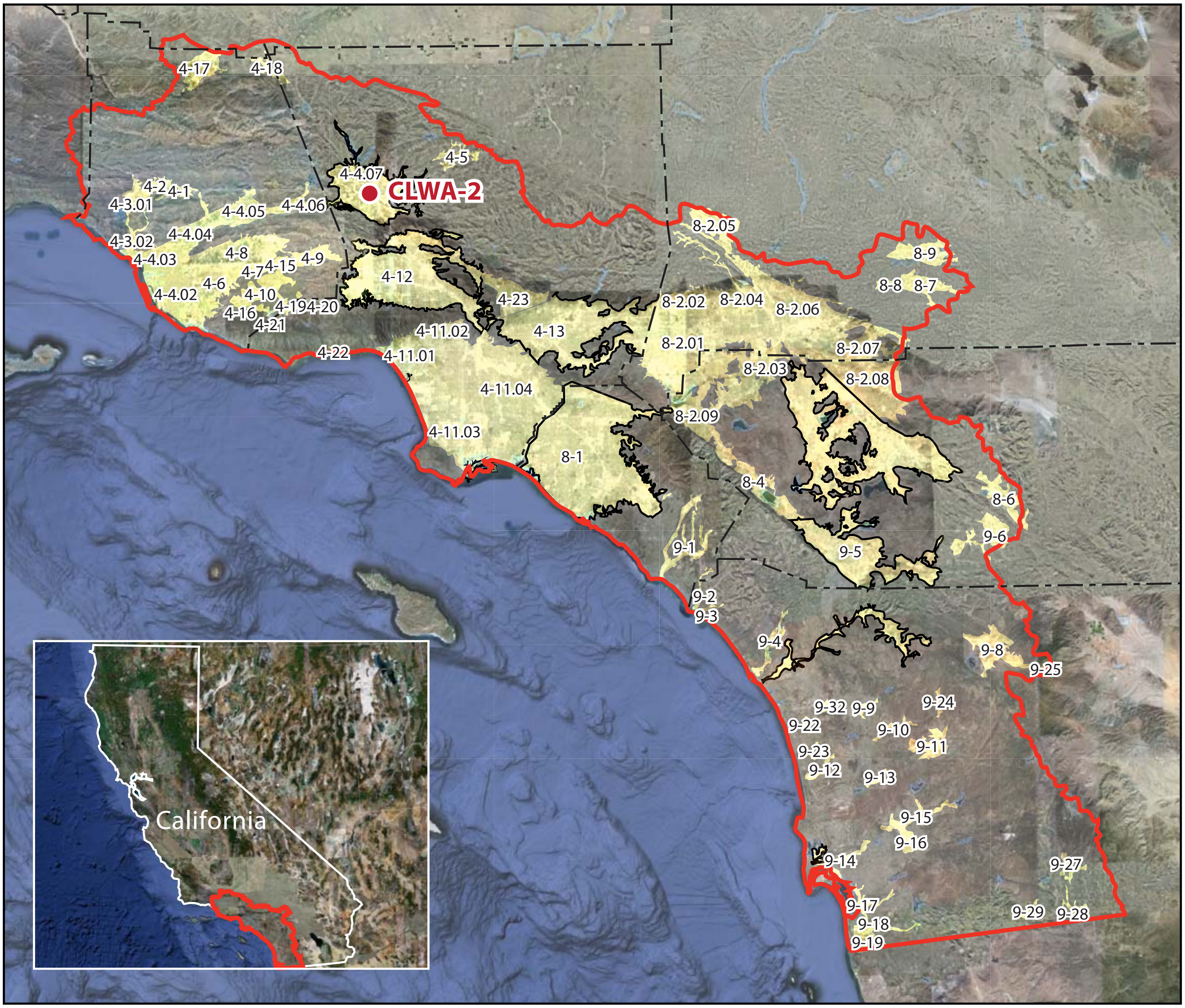
3. Are the Outcome Indicators Adequate to Evaluate Change Resulting From the Work?

Quantification of reduced bromide and DBPs as a result of the project
This outcome indicator will evaluate the improvement in water quality resulting from the project and will be used to determine the quantity in tons of bromide per year removed as a result of the project.

Necessary approvals are obtained from regulatory agencies to allow construction and operation of the treatment plant
This outcome indicator is adequate because prior to construction of the Demonstration Plant all permits will need to be obtained from the appropriate regulatory agencies, in particular, the California Department of Public Health.

4. Is it Feasible to Meet the Targets within the Life of the Proposal?

There are a number of technical peer reviewed reports that support the technical adequacy of the CLWA-2 project. The two references that were chosen (see the Work Plan in section 3) because they demonstrate the capability of the water treatment technology being proposed, the use of the technology on waters used by CLWA, and the sufficiency of a pilot project. Reference CLWA-2.2 goes even further to confirm that the treatment technology when used on SWP water under various conditions, demonstrated a removal of up to 35 percent of bromide and up to 60 percent less disinfection by-products (DBPs) measured. Reference CLWA-2.2 summarizes the results of a first-phase bench, pilot, and feasibility study investigating the practicality of using electrolysis to remove bromide and brominated DBPs from drinking water. The study was funded by CLWA and AwwaRF. The authors, listed in the blue box, are currently seeking funding for a second phase Tailored Collaboration project to further demonstrate this technology's efficacy, develop a preliminary design of the electrolytic reactor, evaluate safety issues, and quantify capital and operation and maintenance costs. Thus, it is feasible to meet the following targets within the life of the Proposal.



LEGEND:

Groundwater Basin

Hydrologic Region Boundary

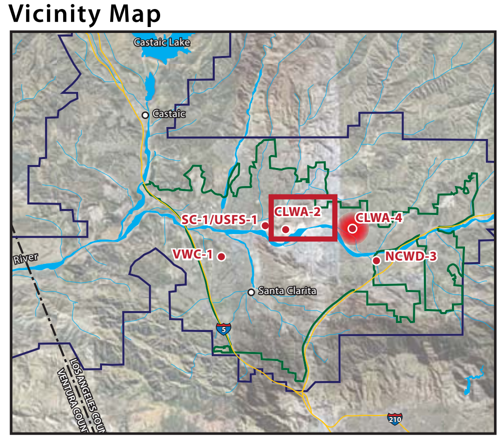
4-17 Basin Number

8-2.05 Subbasin Number

County Line

N

Vicinity Map



Sources:
1. South Coast Hydrologic Region, State of California - Department of Water Resources
2. Google Earth - Image U.S. Geological Survey

CLWA-2
Bromide Removal Project

TABLE 6-4
BROMIDE REMOVAL PROJECT PERFORMANCE MEASURES

Project Goals	Desired Outcomes	Output Indicators	Outcome Indicators	Measurement Tools and Methods	Targets
Improve Water Quality	Reduced import of bromide into the groundwater Basin	Monitoring bromide concentrations in SWP water	Quantification of reduced bromide and DPBs as a result of the project	Part of standard Monitoring data collected by CLWA	Reduction in X tons of bromide per year to the Region over project lifetime
To make feasible the bromide electrolysis and volatilization technology on a large enough scale to be cost effective, and thus beneficial the entire Valley	Provide a proven technology for future electrolysis and volatilization projects similar water types	Preparation of all necessary engineering studies, reports, and plans and make submittals to regulatory agencies	All regulatory permits are issued to construct the Demonstration Project	Submittal and feedback from regulatory agencies and permits issued	Demonstration Project is constructed

Santa Clara River, San Francisquito Creek Arundo and Tamarisk Removal Project (SC – 1/USFS – 1, SCR Arundo Removal)

Project Overview

The Santa Clara River (SCR) Arundo Removal Project is the implementation of a site specific Arundo and Tamarisk removal project within the City of Santa Clarita in a highly visible area bordered by recreational trails to demonstrate a natural resource management project to the public, improve habitat, and increase surface water. Due to the nature of Arundo and Tamarisk, it is necessary to undertake removal and restoration of these invasive plant species, some of which have colonized in large extents in the Upper Santa Clara River watershed, to prevent "re-seeding" of the noxious weed in the lower river reaches.

Performance Measures

The goals of this project are at minimum to successfully eradicate Arundo and Tamarisk from within the Project Area 1, as described in Phase 1 of the work plan. The SCR Arundo Removal project will result in increased river flows via elimination of water loss from evapotranspiration as Arundo consumes almost three times the amount of water used by native species, and studies of arundo in the Santa Clara River have shown transpiration of about 10 acre-feet per acre. One adult tamarisk tree can consume approximately four acre-feet of groundwater annually. With an assumed restoration of at least 20 acres of Arundo and Tamarisk to be removed from the River, the project would save at least 140 acre feet of water on an annual basis. The project meets the IRWMP objective to Promote Resource Stewardship and will contribute to the target of reducing invasive species to 40 percent or less cover of the understory and canopy in years 1 to 5. The project's water savings will help to meet the IRWMP objective Reduce Water Demand and will be applied to the measurable target to reduce overall water demand by 10 percent throughout the region by 2030.

The SCR Arundo Removal Performance Measures are summarized in Table 6-5 and include: eliminating Arundo and Tamarisk from the upper Santa Clara River; improved water quality within the River; and prevention of future reinfestations of the invasive species.

The project sites will be frequently monitored to ensure that any changes, such as additional Arundo resprouts, will be treated in a timely manner. Previous restoration efforts have shown that this after treatment monitoring and maintenance program is essential to the success of the restoration effort. The monitoring and maintenance program is backed by the Santa Clara River Invasive Weeds Task Force and funded through an endowment that the US Fish and Wildlife Service developed specifically to fund long term management of previously cut Arundo infestation areas. The City has been in discussions with US Fish and Wildlife Service to continue the life of this program. Potential monitoring locations are shown on the detailed project map, Figure SC-1/ USFS-1.

1. Is the Project Consistent with the Basin Plan?

Yes, the project is consistent with the Basin Plan. The project does not contribute to the nitrate or chloride TMDLs which are currently listed on the 303(d) lists for the Santa Clara River, nor does the project contribute to an exceedance of any water quality objectives within the watershed. The

Project's design and implementation methods were evaluated as part of the Upper Santa Clara River Arundo/Tamarisk Removal Plan (SCARP). Water quality monitoring for the site specific project was performed before and after implementation. Due to the long-term nature of invasive plant removal benefits, immediate water quality advantages are not necessarily measurable. Results for both baseline and post-treatment sampling at both upstream and downstream sampling sites are well below stated objectives by the Basin Plan for nitrate, nitrite, total dissolved solids, and ammonia.

2. Do the Output Indicators Effectively Track Output?

Re-establishment of native vegetation after treatment
This output indicator will document progress towards elimination of the invasive species by allowing for the native species to regain dominance within the area.

No recurrence of Arundo or Tamarisk
This output indicator will prove that the eradication was a success and provides a measurable scale by which to track project progress.

Re-establishment of native vegetation and species recovery
This output indicator will document the improvement in water quality expected from removing Arundo, a choking weed. Removal of the thick stands of Arundo will also reduce river erosion while protecting adjacent land uses from flooding, allowing for the native vegetation and species recovery to occur.

Development of PAEP and monitoring plan
This output indicator will allow for systematically planning and tracking of eradication efforts so that once the restoration in the Phase 1 (site specific) are complete, there is a plan to continue the efforts into the Angeles Forest area in a similar controlled manner.

3. Are the Outcome Indicators Adequate to Evaluate Change Resulting From the Work?

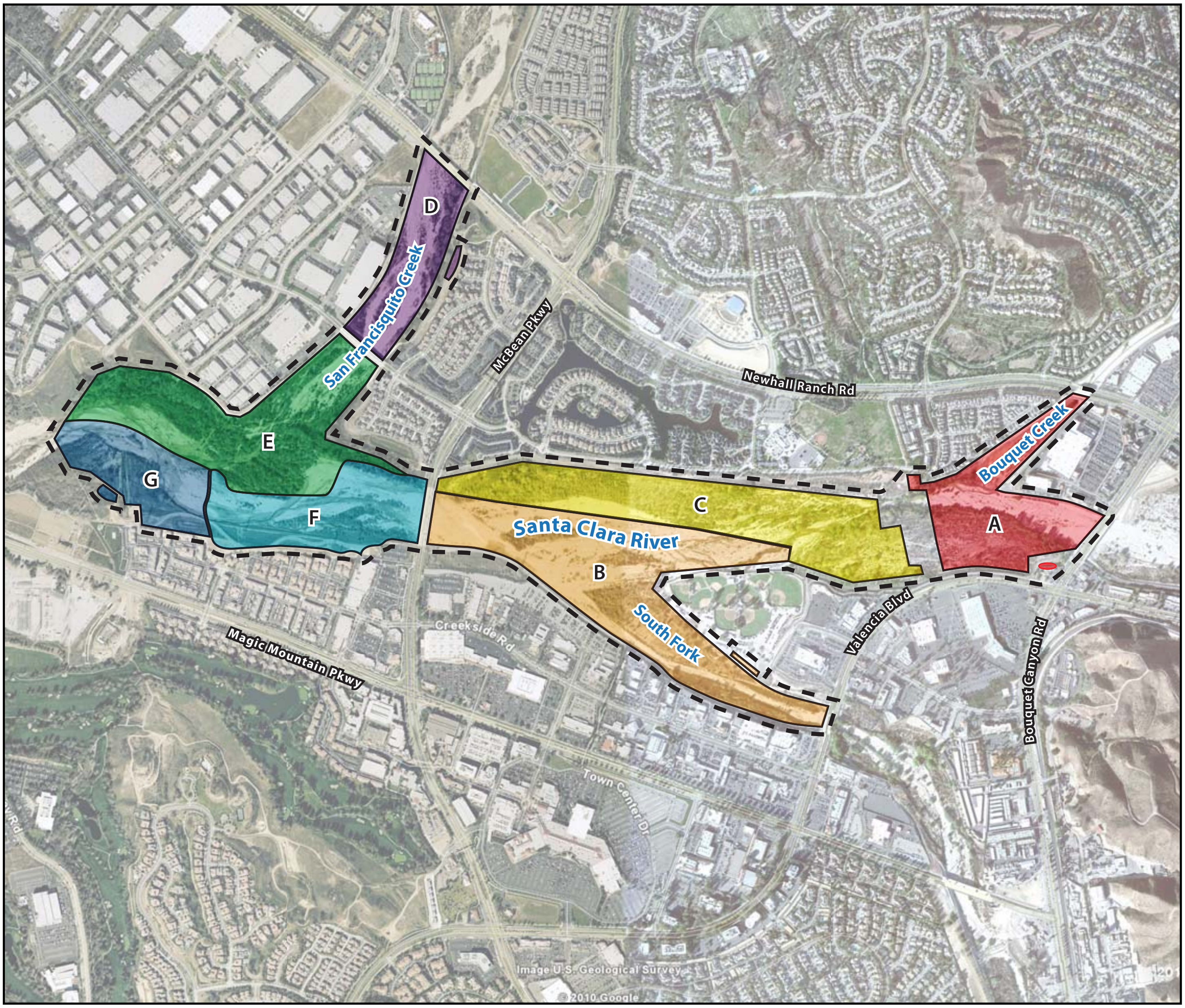
Percent decrease in Arundo and Tamarisk cover
This outcome indicator will provides a measurable scale by which to track project progress.

Improved water quality and species viability
This outcome indicator provides the necessary data needed to determine the environmental benefit result from the project by monitoring the water quality and recurrence of native species to the sites.

Percent recurrence with observed transition to pre-infestation conditions
This outcome indicator allows for tracking of eradication progress as well as indicating how long it will take for regrowth to occur which can be factored into monitoring cycles for new eradication sites.

4. Is it Feasible to Meet the Targets within the Life of the Proposal?

The identified targets in Table 6-5 can be achieved within the life of the Proposal. Restoration efforts at the City's 297-acre site were first implemented in 2006 and 75 acres of Arundo and Tamarisk were successfully removed. A lapse in funding resulted in a hold on the project, however it did allow for gauging how much restoration could be done with what funds and with what

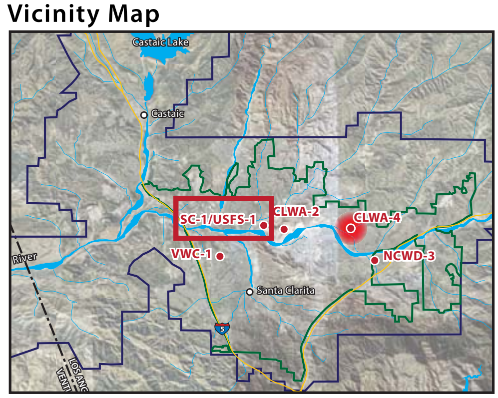


LEGEND:

- Project & Staging Area A
- Project & Staging Area B
- Project & Staging Area C
- Project & Staging Area D
- Project & Staging Area E
- Project & Staging Area F
- Project & Staging Area G
- Project Area of Phase 1

N

Vicinity Map



Sources:

1. Upper Santa Clara River Watershed Arundo and Tamarisk Removal Project (SCARP), Site-Specific Implementation Project (SSIP) Area, Wildscape Restoration, November 2008
2. Google Earth - Image U.S. Geological Survey

FIGURE 1 OF SC-1/USFS-1

Santa Clara River, San Francisquito Creek Arundo & Tamarisk Removal Project, Phase 1 resources. Given the commitment to post eradication monitoring, an endowment from the US Fish and Wildlife Service, it is with high certainty that the targets are feasible.

TABLE 6-5
SCR ARUNDO REMOVAL PROJECT PERFORMANCE MEASURES

Project Goals	Desired Outcomes	Output Indicators	Outcome Indicators	Measurement Tools and Methods	Targets
Eliminate Arundo from the upper Santa Clara River	Complete eradication from the Phase 1, site specific project area site	Re-establishment of native vegetation after treatment No recurrence of Arundo	Percent decrease in Arundo cover	Direct observation and monitoring records of the Task Force and US Fish and Wildlife Service	100 percent eradication of Arundo from the Phase 1,site specific project area site
Eliminate Tamarisk from the upper Santa Clara River	Complete eradication from the Phase 1, site specific project area site	Re-establishment of native vegetation after treatment No recurrence of Tamarisk	Percent decrease in Tamarisk cover	Direct observation and monitoring records of the Task Force and US Fish and Wildlife Service	100 percent eradication of Tamarisk from the Phase 1, site specific project area site
Improve water quality within the Santa Clara River	Improve water quality for habitat and groundwater recharge	Re-establishment of native vegetation and species recovery	Improved water quality and species viability	Monthly monitoring of water quality (dissolved oxygen, pH, temperature, turbidity, conductivity, salinity, TDS)	Overall improvement of water quality, based on upstream of restoration area vs. downstream of restoration area comparisons
Prevent reinfestation of Arundo and Tamarisk	5 years on continuous monitoring with zero infestations	Development of PAEP and monitoring plan	Percent recurrence with observed transition to pre-infestation conditions	Direct observation and monitoring records of the Task Force and US Fish and Wildlife Service	Zero reinfestation for 5 consecutive years during monitoring

ATTACHMENT 7 – ECONOMIC ANALYSIS — WATER SUPPLY BENEFITS

Santa Clarita Valley Water Use Efficiency Program (CLWA-4)

Summary

The Santa Clarita Valley Water Use Efficiency Strategic Plan (SCV WUE Plan) identifies programs and projects that will most effectively reduce per capita water use in the Santa Clarita Valley. The Santa Clarita Valley Water Use Efficiency Program (CLWA-4) will implement four recommended programs identified in the SCV WUE Plan. These programs are designed to reduce water demand, improve operational efficiency, enhance water supply and improve water quality.

The four programs currently being implemented by this project, and a brief description of each, are listed below.

(1) *Santa Clarita Valley Large Landscape Audit and Incentive Program*: The program will offer water audits, equipment incentives, and water budgeting to public and private sector large landscape sites with high water use.

(2) *Santa Clarita CII Audit and Customized Incentive Program*: The program will offer comprehensive water audits and reporting of cost effective recommendations to commercial, industrial and institutional (CII) customers. Customers will be offered rebate incentives based upon the findings of the audit.

(3) *Residential Santa Clarita Valley Landscape Contractor Certification and Weather-Based Irrigation Controller (WBIC) Program*: The program will provide water efficiency training and certification to landscape contractors, maintenance companies and residents in the Santa Clarita Valley. The training will consist of basic irrigation principles, irrigation scheduling, the value of WBICs and guidelines to proper installation and use. After attending the training and receiving certification, the participants will be eligible to receive free WBICs and high efficiency nozzles.

(4) *Santa Clarita Valley High Efficiency Toilet (HET) Rebate Program*: The Program will offer $100 rebates to single family and multi-family residential units for the replacement of toilets in homes older than 1992with a HET. A total of 500 rebates will be available each year.[1]

Table CLWA-4.1 provides an overview of the costs and benefits presented in Attachment 7 and 8. The remainder of this attachment discusses the water supply benefits, as directed for Attachment 7.

1. HET's are designed to use 1.28 gallons per flush on average. Older toilets can use 3.5 or more gallons per flush. (Vickers, 2001).

TABLE CLWA-4.1
BENEFIT-COST ANALYSIS OVERVIEW

	Present Value
Costs – Total Capital and O&M	$1,645,699
Monetizable Benefits	
Water Supply Benefits	
Avoided Imported Water Costs	$3,405,010
Water Quality and Other Benefits	
Avoided Wastewater Treatment Costs	$187,881
Total Monetizable Benefits	$3,592,891
Quantified Benefit or Cost	**Project Life Total**
Water Quality and Other Benefits	
Avoided Introduction of Chlorides into the Basin	638 Metric Tons
Reduced CO2 Emissions	3,106 Metric Tons
Qualitative Benefit or Cost	**Qualitative Indicator***
Water Supply Benefits	+
Increased Water Supply Reliability for CLWA Customers	+
Improved Operational Flexibility for CLWA	+
Water Quality and Other Benefits	+
Reduced Pollution from Dry-Weather Runoff	+
Increased Water Conservation Education	+
Reduced Disinfection By-Products Precursors	+
Reduced Stress on the Sacramento-San Joaquin Delta	+
Reduced Street Maintenance Costs	+

O&M = operations and maintenance
CO2 = carbon dioxide
* Direction and magnitude of effect on net benefits:
+ = Likely to increase net benefits relative to quantified estimates.
++ = Likely to increase net benefits significantly.
– = Likely to decrease net benefits.
– – = Likely to decrease net benefits significantly.
U = Uncertain, could be + or –.

Costs

The project budget is focused on providing the various elements of the four water use efficiency programs, including: large landscape audits and equipment incentives, commercial and industrial audits and equipment incentives, and residential irrigation contractor training and efficient irrigation technology. All costs are considered implementation costs, with no post implementation administration, operations, or maintenance costs as once it have been verified that all equipment has been installed correctly, responsibility for operation and maintenance is the homeowner's. The project costs will be spread evenly over an implementation period of July 2011 through July 2013. Total present value costs of the project amount to $1,645,699.

The "Without Project" Baseline

Four retail water providers in the Santa Clarita Valley are participating in the SCV WUE Plan - Valencia Water Company, Santa Clarita Water Division of CLWA, Newhall County Water District, and the Los Angeles County Waterworks District #36. These water agencies currently supply about 50% of potable water demands within their service areas with water from the Castaic Lake Water Agency (CLWA), the regional water wholesaler. CLWA imports State Water Project (SWP) water from the Sacramento-San Joaquin Delta and other imported supplies to Castaic Lake, through SWP facilities.

CLWA has a contractual Table A amount of 95,200 acre-feet per year (AFY) of water from SWP. However, the marginal source of SWP water for CLWA is the water purchased from the Buena Vista-Rosedale Rio-Bravo Water Districts (BV/RRB) in Kern County. CLWA typically receives part of Buena Vista's Kern River entitlements through exchange of BV/RRB's SWP supplies.

Without the project, the four water providers will continue to provide potable water to meet outdoor water demand for 2,412 residential and 56 large landscape sites proposed for irrigation efficiency improvements. Additionally, the water providers will continue to provide potable water to meet non-potable indoor and outdoor demand for 126 commercial and industrial customers. The availability of imported water is subject to a number of natural and human forces, ranging from increased population growth (and accompanying increased demands on the SWP system), to drought and earthquakes, to environmental regulations and water rights determinations. Thus, if the project is not implemented, water supply reliability within the CLWA service area (including the retail water providers' service areas) will be reduced.

The four retail suppliers compiled data to establish baseline water use for their service areas in 2006. Baseline sites that will be included in the *Large Landscape Audit and Incentive Program* include landscape-specific sites and multi-family residential sites. Landscape specific sites averaged 2,764 hundred cubic feet (ccf) per year (6.35 AFY). Multi-family homes in these service areas averaged 586 ccf per year (1.35 AFY). Baseline water use for sites in the *CII Audit & Customized Incentive Program* averaged 1,600 ccf per year (3.67 AFY). Baseline water use for sites in the *Landscape Contractor Certification and Weather-Based Irrigation Controller Program* averaged 293 ccf per year (0.67 AFY). Baseline use for sites in the *Santa Clarita Valley High Efficiency Toilet (HET) Rebate Program* includes single and multi-family residential sites. These sites average 293 ccf per year and 586 ccf per year, respectively.

Water Supply Benefits

By improving indoor and outdoor water use efficiency and conserving water, this project will reduce water demand, avoid costs for purchase of SWP water, increase water supply reliability for the CLWA customers, and improve operational flexibility for CLWA.

Avoided Imported Water Costs

Large Landscape Audit and Incentive Program

Over the 2-year implementation period of the project, 280 large landscape sites will be targeted and 56 sites will be provided water audits followed by customized repair and upgrade of the irrigation system. The audit will involve an initial site visit to assess the efficiency of the irrigation system and identify leaks and repair opportunities. Following the site visit, an analysis of the irrigation system's efficiency will be conducted to determine the proper watering schedule. Additionally, an analysis of the plant material will be completed to make sure the most ideal types for the Santa Clarita are used Based on this information, a report will be developed detailing upgrade recommendations, available incentives, new irrigation schedules, plant recommendations and a cost/benefit analysis of options.

The report will include an application for available incentives, including high efficiency nozzles and WBICs. The audit and the installed equipment are assumed to result in savings over a 10-year expected equipment lifetime.

Audited sites will achieve savings of 20% compared to baseline water use (A&N Technical Services, 2008). Implementation of the project will start on July 1, 2011 and end on July 1, 2013. In 2011 this project will result in savings of 19.5 acre-feet (AF). In 2012 this project will save 57.5 AF. In 2013 savings will reach their maximum of 76.5 AF. This level of savings will be sustained through 2020. In 2021 and 2022, these savings will be phased-out in accordance with the 10-year expected lifetime of savings.

Santa Clarita Valley CII Audit and Customized Incentive Program

Over the 2-year implementation period of the project, 632 CII sites will be targeted and 126 will be audited. The program will offer comprehensive water audits and report cost effective recommendations in a clear and concise format with a focus on payback. Based on the audit, customers will be offered a per-AF saved incentive.

If customers move forward with the conservation measures, they will be required to submit an application to the water agency. The application will be compared against the report and then the customer will be sent a rebate check by the water retailer or get a credit on their bill from the water retailer.

The targeted equipment for retrofits are high efficiency toilets/urinals, water brooms, commercial/coin operation high efficiency washers, cooling tower repairs and maintenance, landscaping and irrigation, and landscape sub-meters. The audit and the installed equipment are assumed to result in savings over a 10-year expected equipment lifetime.

Audited sites will achieve savings of 20% compared to baseline water use (A&N Technical Services, 2008). Implementation of the project will start on July 1, 2011 and end on July 1, 2013. In 2011, this program will result in savings of 26.5 AF. In 2012, the program will save 78.5 AF. In 2013, savings will reach their maximum of 105 AF. This level of savings will be sustained through 2020. From 2021 through 2022, these savings will be phased-out in accordance with the 10-year expected lifetime of savings.

Santa Clarita Valley Landscape Contractor Certification and Weather-Based Irrigation Controller Program

Over the 2-year implementation period of the project, 75 landscape contractor staff and local residents will complete water use efficiency training. The one-day workshop will consist of training on basic irrigation principles, irrigation scheduling, the value of WBICs, and guidelines to proper irrigation equipment installation and use. Classes will be taught in both English and Spanish and will be offered regularly throughout the year.

After attending the training and receiving certification, landscape contractors will be eligible to receive free WBICs and high efficiency sprinklers. The contractors will receive one WBIC and one set of nozzles after the initial training. They will be required to install them at a customer's site within a participating Santa Clarita Valley water agency. This installation must be inspected and installed properly before the contractor is eligible to receive additional irrigation equipment. Regular customers (not landscape contractors) are also able to participate and attend the classes, but they receive the equipment only for their home. Each person that completes the training will retrofit 12 sites per year. Over the life of the project 2,412 sites will be retrofitted. Each retrofitted site will receive one WBIC and 80 high efficiency sprinkler heads per acre. On average, 20 high efficiency sprinklers per site will be installed (assuming ¼ acre on average per site). Thus, this project will result in the installation of 2,412 WBICs and 48,240 sprinklers.

To calculate the amount of water to be saved annually from this program, the number of planned site retrofits was multiplied the amount of savings per unit of equipment used. WBIC systems are expected to provide 0.0416 AFY savings over a 10-year expected lifetime (A&N Technical Services, 2008). High efficiency sprinklers are expected to provide 0.0051 AFY savings over a 10-year expected lifetime (A&N Technical Services, 2008).

Implementation of the program will begin in July 2011 and end in July 2013. Savings will be phased-in starting in 2011, resulting in 75 AF of savings. In 2012, this project will result in savings of 276. In 2013, savings will reach their maximum of 401.5 AF. This level of savings will be sustained through 2020. From 2021 through 2022, these savings will be phased out in accordance with the 10-year expected lifetime of savings.

Santa Clarita Valley High Efficiency Toilet Rebate Program

Over the 2-year implementation period of the program, 1,004 HETs will replace toilets in homes older than 1992. This program targets both single-family and multi-family residential units. It is assumed for this program that 50% of sites will replace ULFTs and 50% will replace pre-ULF fixtures (A&N Technical Services, 2008).

To calculate the amount of water to be saved annually from this project, the number of planned toilets replacements each year is multiplied by the amount of savings per unit of equipment used. HETs are expected to provide 0.03 AFY of water savings. This benefit will continue to accrue each year over the 25-year expected lifetime (A&N Technical Services, 2008).

Implementation of the project will start in July 2011 and end in July 2013. In 2011 this project will result in savings of 7.5 AF. In 2012 this project will save 22.5 AF. In 2013 savings will reach their maximum of 30 AF. This level of savings will be sustained through 2035. From 2036 through 2037 these savings will be phased-out in accordance with the 25-year expected lifetime of savings.

Total Savings

Implementation of all four programs will result in a phase-in of savings in 2011 through 2013. By 2014, the programs will be fully implemented, achieving a maximum annual savings amount of 613 AF. These savings will be sustained through 2020. From 2021 through 2022, the savings from the *Large Landscape, CII, and Residential Irrigation* programs will be phased-out. Savings from the *High Efficiency Toilet Program* will continue at maximum savings of 30 AFY through 2035. From 2036 through 2037 savings will be phased out. Over the life of the project, total water savings will amount to 6,580 AF.

Total Avoided Cost

The avoided cost of the marginal water source was used to monetize the water savings. For CLWA, the water wholesaler, the marginal source of supply (i.e., the most expensive source of supply) is currently the water being purchased from the BV/RRB Water Districts in Kern County. The cost of this water in 2007 was estimated to be $790/AF, or $822/AF when updated to 2009 dollars. This includes the cost of purchase, wheeling, and treatment, and factors in system losses (A&N Technical Services, 2008). It is assumed that this cost will rise at the rate of inflation after 2009, thus remaining constant in real dollars.

From project implementation in 2011 until the end of the anticipated lifetime of the water saving services and devices in 2037, 6,580 AF of water will be saved, with an avoided cost of $3,405,010 in present-value 2009 dollars.

Increased Water Supply Reliability for CLWA Customers

The reliability of a water supply refers to its ability to meet water demands on a consistent basis, even in times of drought or other constraints on source water availability. The project will help address reliability issues for CLWA retail agencies by offsetting the future use of imported water delivered by CLWA. The reliability of imported water is subject to a number of natural and human forces, ranging from increased population growth (and accompanying increased demands on the SWP system), to drought and earthquakes, to environmental regulations and water rights determinations.

Although interest in water supply reliability is increasing (e.g., due to increasing water demands and concerns over climate-related events), only a few studies have directly attempted to quantify its value (i.e., through nonmarket valuation studies). The results from these studies indicate that residential and industrial (i.e., urban) customers seem to value supply reliability quite highly. Stated preference studies find that water customers are willing to pay $95 to $500 per household per year for total reliability (i.e., a 0% probability of their water supply being interrupted in times of drought).

The challenge for use of these values to determine a value of increased reliability as a result of the Santa Clarita Valley Water Use Efficiency Program is recognizing how to reasonably interpret these survey-based household monetary values. The values noted above reflect a willingness to pay per household to ensure complete reliability (zero drought-related use restrictions in the future), whereas the Water Use Efficiency Program only enhances overall reliability and does not guarantee 100% reliability. Thus, if applied directly to the number of households within the CLWA service area, the dollar values from the studies would overstate the reliability value provided by the project.

A simple way to roughly adjust for this "whole versus part" problem is to attribute a portion of the total value of reliability to the portion of the problem that is solved by the project. To adjust for the partial improvement in reliability from the Santa Clarita Valley Water Use Efficiency Program, it is assumed that household willingness to pay for improved reliability is directly proportional to the amount of recycled water that will offset imported water, as a percentage of the total potable water supply. This represents the percentage of total supply that has been improved in terms of overall reliability (i.e., by offsetting imported water demand with local sources).

For example, the project will offset more than 613 AFY of imported water beginning in 2013. In that year, total imported water demand within the CLWA service area will be about 46,350 AFY (without the project) (CLWA, 2005).[2] Thus, about 1.3% of total potable demand will be met by recycled water made available as a result of the project. To obtain a lower bound estimate for the value of improved reliability associated with this water, it is assumed that households within the CLWA service area are willing to pay about $1.24 per year ($95 multiplied by 1.3%). Applying this dollar value per household to the approximately 95,000 households within the CLWA service area would result in $117,800 of benefits in 2013. Taking into account increasing population and changing demands, this calculation could be completed for each year of the project's useful life.

Due to the uncertainty involved in applying these numbers to this situation, this benefit estimate is not included in the tables. However, it is provided here to give an idea of the potential magnitude of this benefit.

Improved Operational Flexibility for CLWA

At full implementation of the Santa Clarita Valley Water Use Efficiency Program will offset the use of 613 AFY of imported SWP water. This will help CLWA directly in their supply operations, allowing for longer shutdowns and improving system reliability. The value of this increased operational flexibility is not monetized in the benefit tables.

Distribution of Project Benefits, and Identification of Beneficiaries

The Santa Clarita Valley Family of Water Suppliers partnered to establish these water use efficiency programs. This group consists of a wholesale supplier and four retail suppliers. Locally, the four retail agencies and their customers will benefit from avoided water supply costs. Locally and regionally, CLWA and the four retail agencies will benefit from increased water supply reliability within the Santa Clarita Valley, and improved operational flexibility for CLWA. This project will also help meet the statewide goal to reduce per capita urban water use by 20 percent by the year 2020. Reduced demand for water imported from the SWP will have benefits for sensitive ecosystems in the Sacramento-San Joaquin Delta. Table CLWA-4.2 shows a breakdown of project beneficiaries.

2. The CLWA Urban Water Management Plan (UWMP) projects total purveyor demand in 2010 and 2015 will be 86,100 AF and 97,100 AF, respectively. To estimate 2013 demand, demand increases were assumed to be linear in the intervening years. In addition, per the UWMP, the analysis assumes that 50% of total demand is met through imported water.

TABLE CLWA-4.2
PROJECT BENEFICIARIES SUMMARY

Local	Regional	Statewide
Valencia Water Agency, Santa Clarita Water Division of CLWA, Newhall County Water District, Los Angeles County Waterworks District #36	Castaic Lake Water Agency	Statewide Water Use Efficiency Goal, Sacramento-San Joaquin Delta

Project Benefits Timeline Description

The project will be implemented over a 2-year period, beginning in July of 2011 and ending in July of 2013. A water savings lifespan of 10 years has been identified for the *Large Landscape, CII, and Residential Irrigation* programs. Benefits from these programs are expected to extend over 12 years, which allows for phase-in implementation over the first two calendar years and the phase-out benefits at the end of the project. A water savings lifespan of 25 years has been identified for the *High Efficiency Toilet Program*. Benefits from this program are expected extend over 27 years, which allow for phase-in implementation over the first two years and the phase out of benefits at the end of the program.

To calculate water savings by year, it was assumed that the project will be implemented across the timeframe from July 2011 through July 2013. This results in a ramp-up of savings where a cumulative total of approximately 21% of project benefits are realized in 2011, 71% are realized in 2012, and all benefits are realized in 2013. For the three projects with a 10-year lifespan, benefits ramp down in 2021 and 2022. For the *High Efficiency Toilet Program* with the 25-year lifespan, benefits ramp down in 2036 and 2037.

Potential Adverse Effects from the Project

There are no adverse effects anticipated from this project.

Summary of Findings

The monetized benefit of this project is the avoided cost of importing water supplies from the BV/RRB Water Districts in Kern County. The cost to purchase, convey and treat this supply is $822/AF in 2009 dollars. The cost of this supply was assumed to remain constant into the future in real dollars. The present value of avoided water supply costs over the life of the project total $3,405,010 in 2009 dollars. Additional qualitative benefits include increased water supply reliability for Santa Clarita Valley water purveyors and improved operational flexibility for CLWA.

This analysis of costs and benefits is based on available data and some assumptions. As a result, there may be some omissions, uncertainties, and possible biases. In this analysis, the main uncertainties are associated with the assumption of a 10-year lifetime for certain conservation equipment. This assumption is likely to result in more conservative savings estimates. These issues are listed in Table CLWA-4.3.

TABLE CLWA-4.3
OMISSIONS, BIASES, AND UNCERTAINTIES, AND THEIR EFFECT ON THE PROJECT

Benefit or Cost Category	Likely Impact on Net Benefits*	Comment
Avoided Water Cost	+	Lifetime of WBICs and high efficiency nozzles is assumed to be 10 years. A review of the marketplace showed that WBIC lifetime could be 15 years (U.S. EPA, 2009). If a 15-year WBIC lifetime is the correct assumption, then the savings from this portion of the project could be greater than shown in this analysis.
Avoided Water Cost	+	Lifetime of indoor water use equipment used in the CII program is assumed to be 10 years. A review of the marketplace showed that the lifetimes of high efficiency toilets and urinals are 25 years and 33 years respectively. Additionally, commercial high efficiency washers have a lifetime of 16 years (Haasz, 2010). Thus, savings are likely underestimated for these devices.
Increased water supply reliability for CLWA customers	+	The potential benefit of increased water supply reliability as a result of the project has not been included due to uncertainties of applying values from the literature to a partial improvement in water supply reliability.
Project costs	U	The calculation of the present value of costs is a function of the timing of capital outlays and a number of other factors and conditions. Changes in these variables will change the estimate of costs.

*Direction and magnitude of effect on net benefits:
+ = Likely to increase net benefits relative to quantified estimates.
++ = Likely to increase net benefits significantly.
– = Likely to decrease benefits.
– – = Likely to decrease net benefits significantly.
U = Uncertain, could be + or –.

References

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Table 11- Annual Cost of Project (All costs should be in 2009 Dollars) Project: CLWA 4 -Santa Clarita Valley Water Use Efficiency									
	Initial Costs	Operations and Maintenance Costs [1]						Discounting Calculations	
	(a)	(b)	(c)	(d)	(e)	(f)	(g)	(h)	(i)
YEAR	Grand Total Cost From Table 7 (row (i), column(d))	Admin	Operation	Maintenance	Replacement	Other	Total Costs (a) +...+ (f)	Discount Factor	Discounted Costs(g) x (h)
2009							$0	1.000	$0
2010							$0	0.943	$0
2011	$489,500						$489,500	0.890	$435,655
2012	$979,000						$979,000	0.840	$822,360
2013	$489,500						$489,500	0.792	$387,684
Project Life								…	
Total Present Value of Discounted Costs (Sum of Column (i)) Transfer to Table 20, column (c), Exhibit F: Proposal Costs and Benefits Summaries									$1,645,699
Comments: Implementation of the Santa Clarita Valley Water Use Efficiency Program will begin in July 2011 and continue for two years ending July 2013.									

Table 12 - Annual Water Supply Benefits

(All benefits should be in 2009 dollars)

Project: CLWA 4 -Santa Clarita Valley Water Use Efficiency

(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 (f) x (g) (1)	Discount Factor (1)	Discounted Benefits (h) x (i) (1)
2009									
2010									
2011	Avoided SWP Water Use	acre feet	0	128.5	128.5	$822	$105,576	0.890	$93,962
2012	Avoided SWP Water Use	acre feet	0	434.5	434.5	$822	$356,985	0.840	$299,868
2013	Avoided SWP Water Use	acre feet	0	613	613	$822	$503,641	0.792	$398,884
2014	Avoided SWP Water Use	acre feet	0	613	613	$822	$503,641	0.747	$376,220
2015	Avoided SWP Water Use	acre feet	0	613	613	$822	$503,641	0.705	$355,067
2016	Avoided SWP Water Use	acre feet	0	613	613	$822	$503,641	0.665	$334,921
2017	Avoided SWP Water Use	acre feet	0	613	613	$822	$503,641	0.627	$315,783
2018	Avoided SWP Water Use	acre feet	0	613	613	$822	$503,641	0.592	$298,155
2019	Avoided SWP Water Use	acre feet	0	613	613	$822	$503,641	0.558	$281,032
2020	Avoided SWP Water Use	acre feet	0	613	613	$822	$503,641	0.527	$265,419
2021	Avoided SWP Water Use	acre feet	0	492	492	$822	$404,227	0.497	$200,901
2022	Avoided SWP Water Use	acre feet	0	201	201	$822	$165,142	0.469	$77,451
2023	Avoided SWP Water Use	acre feet	0	30	30	$822	$24,648	0.442	$10,894
2024	Avoided SWP Water Use	acre feet	0	30	30	$822	$24,648	0.417	$10,278
2025	Avoided SWP Water Use	acre feet	0	30	30	$822	$24,648	0.394	$9,711
2026	Avoided SWP Water Use	acre feet	0	30	30	$822	$24,648	0.371	$9,144
2027	Avoided SWP Water Use	acre feet	0	30	30	$822	$24,648	0.350	$8,627
2028	Avoided SWP Water Use	acre feet	0	30	30	$822	$24,648	0.331	$8,158
2029	Avoided SWP Water Use	acre feet	0	30	30	$822	$24,648	0.312	$7,690
2030	Avoided SWP Water Use	acre feet	0	30	30	$822	$24,648	0.294	$7,247
2031	Avoided SWP Water Use	acre feet	0	30	30	$822	$24,648	0.278	$6,852
2032	Avoided SWP Water Use	acre feet	0	30	30	$822	$24,648	0.262	$6,458
2033	Avoided SWP Water Use	acre feet	0	30	30	$822	$24,648	0.247	$6,088
2034	Avoided SWP Water Use	acre feet	0	30	30	$822	$24,648	0.233	$5,743
2035	Avoided SWP Water Use	acre feet	0	30	30	$822	$24,648	0.220	$5,423
2036	Avoided SWP Water Use	acre feet	0	22.5	22.5	$822	$18,486	0.207	$3,827
2037	Avoided SWP Water Use	acre feet	0	7.5	7.5	$822	$6,162	0.196	$1,208
Project Life	10 & 25 Year Lifetime			6580	6580			…	
Total Present Value of Discounted Benefits Based on Unit Value (Sum of the values in Column (j) for all Benefits shown in table)									$3,405,010

Comments: Implementation of the Santa Clarita Valley Water Use Efficiency Program will begin July 2011. Water savings will begin immediately upon initiation of audits and installation of water-saving devices. Benefits are assumed to accrue over a 10-year average device lifetime for the Large Landscape, CII, and Residential Irrigation programs. Benefits from these programs are expected to extend over 12 years, which allows for phase-in implementation over the first two years and the phase-out benefits at the end of the project. A water savings lifespan of 25 years has been identified for the High Efficiency Toilet Program. Benefits from this program are expected extend over 27 years, which allow for phase-in implementation over the first two years and the phase out of benefits at the end of the program.

Table 15. Total Water Supply Benefits (All benefits should be in 2009 dollars)			
Project: CLWA 4 -Santa Clarita Valley Water Use Efficiency			
Total Discounted Water Supply Benefits (a)	Total Discounted Avoided Project Costs (b)	Other Discounted Water Supply Benefits (c)	Total Present Value of Discounted Benefits (d) (a) + (c) or (b) + (c)
$3,405,010			$3,405,010
Comments:			

Table 16 - Water Quality and Other Expected Benefits

(All benefits should be in 2009 dollars)

Project: CLWA 4 -Santa Clarita Valley Water Use Efficiency

(a) Year	(b) Type of Benefit	(c) Measure of Benefit (Units)	(d) Without Project	(e) With Project	(f) Change Resulting from Project (e) – (d)	(g) Unit $ Value (1)	(h) Annual $ Value (f) x (g) (1)	(i) Discount Factor (1)	(j) Discounted Benefits (h) x (i) (1)
2009	Avoided Chlorides	Metric Tons	0	0	0				$0
	Avoided CO2	Metric Tons	0	0	0				
	Avoided Wastewater Treatment Costs	Acre-Feet	0	0	0	$550	$0	1.000	$0
2010	Avoided Chlorides	Metric Tons	0	0	0				$0
	Avoided CO2	Metric Tons	0	0	0				
	Avoided Wastewater Treatment Costs	Acre-Feet	0	0	0	$550	$0	0.943	$0
2011	Avoided Chlorides	Metric Tons	0	12.46	12.46				$0
	Avoided CO2	Metric Tons	0	60.65	60.652				
	Avoided Wastewater Treatment Costs	Acre-Feet	0	7.5	7.5	$550	$4,125	0.890	$3,671
2012	Avoided Chlorides	Metric Tons	0	42.15	42.15				$0
	Avoided CO2	Metric Tons	0	205.08	205.084				
	Avoided Wastewater Treatment Costs	Acre-Feet	0	22.5	22.5	$550	$12,375	0.840	$10,395
2013	Avoided Chlorides	Metric Tons	0	59.46	59.46				$0
	Avoided CO2	Metric Tons	0	289.336	289.336				
	Avoided Wastewater Treatment Costs	Acre-Feet	0	30	30	$550	$16,500	0.792	$13,068
2014	Avoided Chlorides	Metric Tons	0	59.46	59.46				$0
	Avoided CO2	Metric Tons	0	289.336	289.336				
	Avoided Wastewater Treatment Costs	Acre-Feet	0	30	30	$550	$16,500	0.747	$12,326
2015	Avoided Chlorides	Metric Tons	0	59.46	59.46				$0
	Avoided CO2	Metric Tons	0	289.336	289.336				
	Avoided Wastewater Treatment Costs	Acre-Feet	0	30	30	$550	$16,500	0.705	$11,633
2016	Avoided Chlorides	Metric Tons	0	59.46	59.46				$0
	Avoided CO2	Metric Tons	0	289.336	289.336				
	Avoided Wastewater Treatment Costs	Acre-Feet	0	30	30	$550	$16,500	0.665	$10,973
2017	Avoided Chlorides	Metric Tons	0	59.46	59.46				$0
	Avoided CO2	Metric Tons	0	289.336	289.336				
	Avoided Wastewater Treatment Costs	Acre-Feet	0	30	30	$550	$16,500	0.627	$10,346
2018	Avoided Chlorides	Metric Tons	0	59.46	59.46				$0
	Avoided CO2	Metric Tons	0	289.336	289.336				
	Avoided Wastewater Treatment Costs	Acre-Feet	0	30	30	$550	$16,500	0.592	$9,768
2019	Avoided Chlorides	Metric Tons	0	59.46	59.46				$0
	Avoided CO2	Metric Tons	0	289.336	289.336				
	Avoided Wastewater Treatment Costs	Acre-Feet	0	30	30	$550	$16,500	0.558	$9,207
2020	Avoided Chlorides	Metric Tons	0	59.46	59.46				$0
	Avoided CO2	Metric Tons	0	289.336	289.336				
	Avoided Wastewater Treatment Costs	Acre-Feet	0	30	30	$550	$16,500	0.527	$8,696
2021	Avoided Chlorides	Metric Tons	0	47.72	47.72				$0
	Avoided CO2	Metric Tons	0	232.224	232.224				
	Avoided Wastewater Treatment Costs	Acre-Feet	0	30	30	$550	$16,500	0.497	$8,201
2022	Avoided Chlorides	Metric Tons	0	19.5	19.5				$0
	Avoided CO2	Metric Tons	0	94.872	94.872				
	Avoided Wastewater Treatment Costs	Acre-Feet	0	30	30	$550	$16,500	0.469	$7,739
2023	Avoided Chlorides	Metric Tons	0	2.91	2.91				$0
	Avoided CO2	Metric Tons	0	14.16	14.16				
	Avoided Wastewater Treatment Costs	Acre-Feet	0	30	30	$550	$16,500	0.442	$7,293
2024	Avoided Chlorides	Metric Tons	0	2.91	2.91				$0
	Avoided CO2	Metric Tons	0	14.16	14.16				
	Avoided Wastewater Treatment Costs	Acre-Feet	0	30	30	$550	$16,500	0.417	$6,881
2025	Avoided Chlorides	Metric Tons	0	2.91	2.91				$0
	Avoided CO2	Metric Tons	0	14.16	14.16				
	Avoided Wastewater Treatment Costs	Acre-Feet	0	30	30	$550	$16,500	0.394	$6,501
2026	Avoided Chlorides	Metric Tons	0	2.91	2.91				$0

Table 16 - Water Quality and Other Expected Benefits
(All benefits should be in 2009 dollars)
Project: CLWA 4 -Santa Clarita Valley Water Use Efficiency

(a) Year	(b) Type of Benefit	(c) Measure of Benefit (Units)	(d) Without Project	(e) With Project	(f) Change Resulting from Project (e) – (d)	(g) Unit $ Value (1)	(h) Annual $ Value (f) x (g) (1)	(i) Discount Factor (1)	(j) Discounted Benefits (h) x (i) (1)
	Avoided CO2	Metric Tons	0	14.16	14.16				
	Avoided Wastewater Treatment Costs	Acre-Feet	0	30	30	$550	$16,500	0.371	$6,122
2027	Avoided Chlorides	Metric Tons	0	2.91	2.91				$0
	Avoided CO2	Metric Tons	0	14.16	14.16				
	Avoided Wastewater Treatment Costs	Acre-Feet	0	30	30	$550	$16,500	0.350	$5,775
2028	Avoided Chlorides	Metric Tons	0	2.91	2.91				$0
	Avoided CO2	Metric Tons	0	14.16	14.16				
	Avoided Wastewater Treatment Costs	Acre-Feet	0	30	30	$550	$16,500	0.331	$5,462
2029	Avoided Chlorides	Metric Tons	0	2.91	2.91				$0
	Avoided CO2	Metric Tons	0	14.16	14.16				
	Avoided Wastewater Treatment Costs	Acre-Feet	0	30	30	$550	$16,500	0.312	$5,148
2030	Avoided Chlorides	Metric Tons	0	2.91	2.91				$0
	Avoided CO2	Metric Tons	0	14.16	14.16				
	Avoided Wastewater Treatment Costs	Acre-Feet	0	30	30	$550	$16,500	0.294	$4,851
2031	Avoided Chlorides	Metric Tons	0	2.91	2.91				$0
	Avoided CO2	Metric Tons	0	14.16	14.16				
	Avoided Wastewater Treatment Costs	Acre-Feet	0	30	30	$550	$16,500	0.278	$4,587
2032	Avoided Chlorides	Metric Tons	0	2.91	2.91				$0
	Avoided CO2	Metric Tons	0	14.16	14.16				
	Avoided Wastewater Treatment Costs	Acre-Feet	0	30	30	$550	$16,500	0.262	$4,323
2033	Avoided Chlorides	Metric Tons	0	2.91	2.91				$0
	Avoided CO2	Metric Tons	0	14.16	14.16				
	Avoided Wastewater Treatment Costs	Acre-Feet	0	30	30	$550	$16,500	0.247	$4,076
2034	Avoided Chlorides	Metric Tons	0	2.91	2.91				$0
	Avoided CO2	Metric Tons	0	14.16	14.16				
	Avoided Wastewater Treatment Costs	Acre-Feet	0	30	30	$550	$16,500	0.233	$3,845
2035	Avoided Chlorides	Metric Tons	0	2.91	2.91				$0
	Avoided CO2	Metric Tons	0	14.16	14.16				
	Avoided Wastewater Treatment Costs	Acre-Feet	0	30	30	$550	$16,500	0.220	$3,630
2036	Avoided Chlorides	Metric Tons	0	2.18	2.18				$0
	Avoided CO2	Metric Tons	0	10.62	10.62				
	Avoided Wastewater Treatment Costs	Acre-Feet	0	22.5	22.5	$550	$12,375	0.207	$2,562
2037	Avoided Chlorides	Metric Tons	0	0.73	0.73				$0
	Avoided CO2	Metric Tons	0	3.54	3.54				
	Avoided Wastewater Treatment Costs	Acre-Feet	0	7.5	7.5	$550	$4,125	0.196	$809
Project Life	Avoided Chlorides	Metric Tons		638.25	638.25				$0
Project Life	Avoided CO2	Metric Tons		3,106	3,106				$0
Project Life	Avoided Wastewater Treatment Costs	Acre-Feet		750	750			…	$187,881
Total Present Value of Discounted Benefits Based on Unit Value (Sum of the values in Column (j) for all Benefits shown in table) Transfer to Table 20, column (f), Exhibit F: Proposal Costs and Benefits Summaries									$187,881

Comments: Avoided use of SWP water avoids introduction of chlorides into the Watershed. The average concentration of chlorides in SWP water was assumed to be 79 mg/l, which is the value at Metropolitan's Jensen Filtration Plant in 2009, and happens to be the middle of the range of chloride content of SWP water over the last 30 years. The project also will avoid emissions of carbon dixoide associated with the energy needed to deliver SWP water to CLWA. Finally, for each AF of indoor water use avoided the project avoids wastewater treatment charges from SCVSD to CLWA of $550 per AF.

Santa Clara River-Sewer Trunk Line Relocation Project (Phase 1) (NCWD-3)

Summary

The Newhall County Water District (NCWD) currently maintains a sewer trunk line that is located within the Santa Clara River in the Canyon Country area of the City of Santa Clarita. During large rainfall events, the Santa Clara River swells, causing debris to be swept into the river and dirt to erode around the sewer trunk line, exposing the line. If a large piece of debris, moving at a high rate of speed, hits the sewer trunk line, the line could break. If the sewer trunk line breaks, raw sewage would be released into the river, impacting nearby domestic groundwater wells and the ecosystem. The sewer trunk line has been maintained by the NCWD since its installation in 1968.

Instead of continuing preventative maintenance and extending the life of the line in place, NCWD proposes to remove the sewer trunk line out of the riverbed and into the public right-of-way. Under this grant application, NCWD is requesting funds for Phase 1 of the project, which consists of the planning, engineering, and design of the sewer trunk line relocation. If the results from Phase 1 are acceptable, Phases 2 and 3 will be carried out. Phase 2 involves the removal and relocation of the current gravity feed portion of the sewer trunk line, while Phase 3 consists of the construction of a sewer lift station, forced sewer main, and the remaining gravity feed portion of the sewer trunk line. Phase 3 is scheduled for completion in June 2016. With a 50-year lifetime, the project's assets are expected to provide benefits through May 2066.

The benefits of this project can only be properly evaluated based on the full implementation of all three phases of the project. Therefore, this economic analysis starts by considering the benefits of complete implementation of all three phases of the project, and then apportions a share of the benefits to this initial planning and design phase. The benefits are apportioned based on the percentage of costs for the planning and design phase compared to the costs for full implementation of the project.

A summary of all benefits and costs of the project are provided in Table NCWD-3.1. Project costs and water supply benefits are discussed in the remainder of this attachment.

TABLE NCWD-3.1
BENEFIT-COST ANALYSIS OVERVIEW –DEMONSTRATION-SCALE PROJECT

	Present Value
Costs – Total Capital and O&M	$202,718
Monetizable Benefits	
Water Supply Benefits	
Avoided Imported Water Supply Costs	$44,117
Water Quality and Other Benefits	
Avoided Costs of Replacing Sections of Existing Sewer Trunk Line	$14,607
Avoided Repair Costs for Existing Pipe	$14,607
Avoided Clean-Up Costs from Sewer Trunk Line Break	$4,180
Total Benefits	$77,511
Qualitative Benefit or Cost	**Qualitative Indicator***
Water Quality Benefits	
Ecosystem Benefits	+

O&M = operations and maintenance
* Direction and magnitude of effect on net benefits:
+ = Likely to increase net benefits relative to quantified estimates.
++ = Likely to increase net benefits significantly.
– = Likely to decrease net benefits.
– – = Likely to decrease net benefits significantly.
U = Uncertain, could be + or –.

Costs

The budgeted costs for Phase 1 of the project total $240,000. These costs include an engineering report, environmental planning documentation and permitting, land title requests, river bank protection, and surveying. Tasks will begin in June 2011 and finish by July 2013. The present value costs are $202,718 in 2009 dollars. There will be no construction during Phase 1, nor are there any annual O&M costs.

If results of the initial phase indicate that the project should proceed, Phase 2, which is estimated to cost $310,000, will occur from July 2014 to June 2015, while Phase 3, which is estimated to cost $3,659,000, will occur from July 2015 to June 2016. After construction is complete in 2016, the incremental O&M costs in comparison to the without project baseline will be $29,150 each year over the 50-year project lifetime. For all three phases of the project, the present value of the capital and the O&M costs total $3,258,126 in 2009 dollars.

Since there will not be any monetary benefits accrued during the planning in Phase 1, it is necessary to calculate the costs and benefits of the entire project so that some of the overall benefits can be allocated to Phase 1. Allocation of benefits to Phase 1 is based on the ratio of the present value of costs in Phase 1 to the present value of costs for all three phases. That ratio is 0.0622 or 6.22% ($202,718/$3,258,126).

The "Without Project" Baseline

If the sewer trunk line is not relocated out of the river, it may be struck during a large runoff event by a large piece of debris and break, releasing raw sewage into the river. This would interrupt water pumping from five downstream Santa Clarita Water Division (SCWD) domestic groundwater wells that produce an average of 3,850 acre-feet per year (AFY). With a sewer trunk line break, it is estimated that these wells would be out of production for two months, causing a loss in pumping of 642 AFY when breaks occur. It is assumed that a sewer trunk line break would occur once every ten years beginning in 2017, the last year of the current sewer trunk line's expected lifetime.

To make up for this loss of water, the SCWD would purchase water from the Castaic Lake Water Agency (CLWA). CLWA imports State Water Project (SWP) water and other water from the Sacramento-San Joaquin Delta to Castaic Lake through SWP facilities. Water from Castaic Lake is treated at CLWA's Earl Schmidt Filtration Plant or the Rio Vista Water Treatment Plant and is delivered to the retail water agencies through transmission lines owned and operated by CLWA. SCWD's service area includes more than 27,000 connections within portions of the City of Santa Clarita and unincorporated portions of Los Angeles County in the communities of Canyon Country, Newhall, and Saugus.

Water Supply Benefits

The Santa Clara River Sewer Trunk Line Relocation project will reduce the amount of water imported from the San Francisco Bay-Delta via the SWP, as described below.

Avoided Imported Water Supply Costs

With completion of all three phases of the project, NCWD will avoid the possibility of a break in the existing sewer trunk line, which is located in the bed of the Santa Clara River. Portions of the line have been exposed due to scouring from past storm events. During large storms, there is a possibility that large debris washed down the stream channel could hit the sewer line and cause a break. Such a break would cause release of raw sewage into the stream channel, requiring SCWD to stop pumping from their five groundwater wells located downstream. Those wells currently pump an average of 3,850 AFY.

A return period for large storms is uncertain, but based on the history of flooding events in the area it is assumed that large storms will occur once every 5 years. A break in the sewer causing a spill is assumed to occur once every other storm, or once every 10 years. When there is a spill, it is assumed that groundwater pumping from SCWD's wells will need to be stopped for 2 months to allow for cleanup. During that time, lost groundwater pumping will be replaced by additional imported water brought to the region by CLWA.

CLWA has a contractual Table A amount of 95,200 AFY of water from SWP. However, the marginal source of SWP water for CLWA, which sells water to SCWD, is water purchased from the Buena Vista-Rosedale Rio-Bravo Water Districts (BV/RRB) in Kern County. CLWA receives part of Buena Vista's Kern River entitlements through exchange of BV/RRB's SWP supplies. The cost of this water in 2007 was estimated to be $790 per AF, or $822 per AF when updated to 2009 dollars. This includes the cost of purchase, wheeling, and treatment, and factors in system losses (A&N Technical Services, 2008). It is assumed that this cost will rise at the rate of inflation after 2009, thus remaining constant in real dollars.

In order to calculate the avoided cost of imported water use, SCWD's pumping loss of 642 AF per event is multiplied by the marginal cost of imported water supplied by CLWA, which is $822 per AF. Therefore, the avoided cost of lost groundwater supply is $527,450 every 10 years beginning in 2017, the last year of the sewer trunk line's expected lifetime. In 2009 dollars, the present value avoided cost over the fifty year project lifetime is $709,062. Phase 1 of the project can be attributed a 6.22% share of benefits of the overall project, which is $44,117 in present value 2009 dollars.

Distribution of Project Benefits, and Identification of Beneficiaries

As shown in Table NCWD-3.2, there will be local, regional, and statewide benefits due to the Sewer Trunk Line Replacement Project. Locally and regionally, SCWD will not have to purchase SWP water from CLWA in order to make up for lost groundwater pumping following spill events associated with the trunk line, benefitting both SCWD and CLWA. There will also be statewide benefits as less demands are placed on water from the Sacramento-San Joaquin Delta via the SWP.

TABLE NCWD-3.2
PROJECT BENEFICIARIES SUMMARY

Local	Regional	Statewide
CLWA Santa Clarita Water Division	Castaic Lake Water Agency	Sacramento-San Joaquin Delta

Project Benefits Timeline Description

If the planning and engineering to take place during Phase 1 indicate that this project should proceed, the relocated sewer trunk line will be operational in June 2016. The expected project lifetime is 50 years, so the project will provide benefits until May 2066. Water supply benefits will occur every 10 years beginning in 2017. In these years, SCWD will not have to utilize 642 AF of SWP water from CLWA as a backup supply.

Potential Adverse Effects from the Project

There are no expected adverse effects expected from this project.

Summary of Findings

With implementation of all three phases of the sewer trunk line relocation project, SCWD will avoid loss of pumping from its groundwater wells after sewage spills due to breaks in the existing sewer trunk line located in the riverbed. Over the life of the full project, SCWD will reduce its demand for SWP water by a total of 3,210 AF. Valuing the SWP water at CLWA's marginal cost for this source, and apportioning these benefits to Phase 1 results in present value benefits of $44,117 in 2009 dollars.

This analysis of costs and benefits is based on available data and some assumptions. As a result, there may be some omissions, uncertainties, and possible biases. In this analysis, the main uncertainty is associated with the frequency of sewer trunk line break in the absence of the project. The frequency of sewer trunk line break determines how often SCWD's groundwater wells are not able to pump water, and thus how often the SCWD needs to purchase SWP water. In this analysis, the sewer trunk line is assumed to break every ten years in the without project baseline. However, the sewer trunk line could break at shorter or longer intervals. This issue is listed in Table NWCD-3.3.

TABLE NCWD-3.3
OMISSIONS, BIASES, AND UNCERTAINTIES, AND THEIR EFFECT ON THE PROJECT

Benefit or Cost Category	Likely Impact on Net Benefits*	Comment
Avoided Imported Water Supply Costs	U	The frequency of sewer trunk line break in the absence of the project determines how often the Santa Clarita Water Division's groundwater wells are not able to pump water. This frequency is assumed to be once every 10 years, but the actual number could be either greater or less than 10.

*Direction and magnitude of effect on net benefits:
+ = Likely to increase net benefits relative to quantified estimates.
++ = Likely to increase net benefits significantly.
– = Likely to decrease net benefits.
– – = Likely to decrease net benefits significantly.
U = Uncertain, could be + or –.

References

A&N Technical Services. 2008. Santa Clarita Valley Water Use Efficiency Plan. Prepared for the Santa Clarita Valley Family of Water Suppliers: Castaic Lake Water Agency, Valencia Water Company, Los Angeles County Waterworks Division #36, Newhall County Water District, Santa Clarita Water Division. August.

Table 11- Annual Cost of Project

(All costs should be in 2009 Dollars)

Project: Santa Clara River Sewer Trunk Line Relocation

	Initial Costs	Operations and Maintenance Costs [1]						Discounting Calculations	
	(a)	(b)	(c)	(d)	(e)	(f)	(g)	(h)	(i)
YEAR	Grand Total Cost From Table 7 (row (i), column(d))	Admin	Operation	Maintenance	Replacement	Other	Total Costs (a) +...+ (f)	Discount Factor	Discounted Costs(g) x (h)
2009	$0	$0	$0	$0	$0	$0	$0	1.000	$0
2010	$0	$0	$0	$0	$0	$0	$0	0.943	$0
2011	$79,231	$0	$0	$0	$0	$0	$79,231	0.890	$70,515
2012	$101,538	$0	$0	$0	$0	$0	$101,538	0.840	$85,292
2013	$59,231	$0	$0	$0	$0	$0	$59,231	0.792	$46,911
2014	$0	$0	$0	$0	$0	$0	$0	--	$0
Project Life	$240,000						$240,000	…	
Total Present Value of Discounted Costs (Sum of Column (i)) Transfer to Table 20, column (c), Exhibit F: Proposal Costs and Benefits Summaries									$202,718

Comments: Costs in this table show the budgeted costs associated with Project Phase 1.

Table 11- Annual Cost of Full-Scale Project (All costs should be in 2009 Dollars) Project: Santa Clara River Sewer Trunk Line Relocation									
	Initial Costs	Operations and Maintenance Costs [(1)]						Discounting Calculations	
	(a)	(b)	(c)	(d)	(e)	(f)	(g)	(h)	(i)
YEAR	Grand Total Cost From Table 7 (row (i), column(d))***	Admin	Operation	Maintenance	Replacement	Other	Total Costs (a) +...+ (f)	Discount Factor	Discounted Costs(g) x (h)
2009	$0						$0	1.000	$0
2010	$0						$0	0.943	$0
2011	$79,231						$79,231	0.890	$70,515
2012	$101,538						$101,538	0.840	$85,254
2013	$59,231						$59,231	0.792	$46,916
2014	$155,000						$155,000	0.747	$115,825
2015	$1,984,500						$1,984,500	0.705	$1,398,994
2016	$1,829,500		$29,150.00				$1,858,650	0.665	$1,236,108
2017	$0		$29,150.00				$29,150	0.627	$18,289
2018	$0		$29,150.00				$29,150	0.592	$17,254
2019	$0		$29,150.00				$29,150	0.558	$16,277
2020	$0		$29,150.00				$29,150	0.527	$15,356
2021	$0		$29,150.00				$29,150	0.497	$14,487
2022	$0		$29,150.00				$29,150	0.469	$13,667
2023	$0		$29,150.00				$29,150	0.442	$12,893
2024	$0		$29,150.00				$29,150	0.417	$12,163
2025	$0		$29,150.00				$29,150	0.394	$11,475
2026	$0		$29,150.00				$29,150	0.371	$10,825
2027	$0		$29,150.00				$29,150	0.350	$10,213
2028	$0		$29,150.00				$29,150	0.331	$9,634
2029	$0		$29,150.00				$29,150	0.312	$9,089
2030	$0		$29,150.00				$29,150	0.294	$8,575
2031	$0		$29,150.00				$29,150	0.278	$8,089
2032	$0		$29,150.00				$29,150	0.262	$7,631
2033	$0		$29,150.00				$29,150	0.247	$7,199
2034	$0		$29,150.00				$29,150	0.233	$6,792
2035	$0		$29,150.00				$29,150	0.220	$6,407
2036	$0		$29,150.00				$29,150	0.207	$6,045
2037	$0		$29,150.00				$29,150	0.196	$5,703
2038	$0		$29,150.00				$29,150	0.185	$5,380
2039	$0		$29,150.00				$29,150	0.174	$5,075
2040	$0		$29,150.00				$29,150	0.164	$4,788
2041	$0		$29,150.00				$29,150	0.155	$4,517
2042	$0		$29,150.00				$29,150	0.146	$4,261
2043	$0		$29,150.00				$29,150	0.138	$4,020
2044	$0		$29,150.00				$29,150	0.130	$3,793
2045	$0		$29,150.00				$29,150	0.123	$3,578
2046	$0		$29,150.00				$29,150	0.116	$3,375
2047	$0		$29,150.00				$29,150	0.109	$3,184
2048	$0		$29,150.00				$29,150	0.103	$3,004
2049	$0		$29,150.00				$29,150	0.097	$2,834
2050	$0		$29,150.00				$29,150	0.092	$2,674
2051	$0		$29,150.00				$29,150	0.087	$2,522
2052	$0		$29,150.00				$29,150	0.082	$2,380
2053	$0		$29,150.00				$29,150	0.077	$2,245
2054	$0		$29,150.00				$29,150	0.073	$2,118
2055	$0		$29,150.00				$29,150	0.069	$1,998
2056	$0		$29,150.00				$29,150	0.065	$1,885
2057	$0		$29,150.00				$29,150	0.061	$1,778
2058	$0		$29,150.00				$29,150	0.058	$1,677
2059	$0		$29,150.00				$29,150	0.054	$1,583
2060	$0		$29,150.00				$29,150	0.051	$1,493
2061	$0		$29,150.00				$29,150	0.048	$1,408
2062	$0		$29,150.00				$29,150	0.046	$1,329
2063	$0		$29,150.00				$29,150	0.043	$1,253
2064	$0		$29,150.00				$29,150	0.041	$1,183
2065	$0		$29,150.00				$29,150	0.038	$1,116
Project Life								...	
Total Present Value of Discounted Costs (Sum of Column (i)) Transfer to Table 20, column (c), Exhibit F: Proposal Costs and Benefits Summaries									$3,258,126
Comments: Costs in this table are associated with Phases I, II, and III. Based on the total present value costs shown in Tables 11A and 11B, Phase I accounts for 6.22% of total project costs.									

Table 12 - Annual Water Supply Benefits
(All benefits should be in 2009 dollars)
Project: Santa Clara River Sewer Trunk Line Relocation

(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 (f) x (g) (1)	Discount Factor (1)	Discounted Benefits (h) x (i) (1)
2009					0		$0	1.000	$0
2010					0		$0	0.943	$0
2011					0		$0	0.890	$0
2012					0		$0	0.840	$0
2013					0		$0	0.792	$0
2014					0		$0	0.747	$0
2015					0		$0	0.705	$0
2016					0		$0	0.665	$0
2017	Avoided SWP water use	acre-feet	0	642	642	$822	$527,724	0.627	$331,101
2018					0		$0	0.592	$0
2019					0		$0	0.558	$0
2020					0		$0	0.527	$0
2021					0		$0	0.497	$0
2022					0		$0	0.469	$0
2023					0		$0	0.442	$0
2024					0		$0	0.417	$0
2025					0		$0	0.394	$0
2026					0		$0	0.371	$0
2027	Avoided SWP water use	acre-feet	0	642	642	$822	$527,724	0.350	$184,885
2028					0		$0	0.331	$0
2029					0		$0	0.312	$0
2030					0		$0	0.294	$0
2031					0		$0	0.278	$0
2032					0		$0	0.262	$0
2033					0		$0	0.247	$0
2034					0		$0	0.233	$0
2035					0		$0	0.220	$0
2036					0		$0	0.207	$0
2037	Avoided SWP water use	acre-feet	0	642	642	$822	$527,724	0.196	$103,239
2038					0		$0	0.185	$0
2039					0		$0	0.174	$0
2040					0		$0	0.164	$0
2041					0		$0	0.155	$0
2042					0		$0	0.146	$0
2043					0		$0	0.138	$0
2044					0		$0	0.130	$0
2045					0		$0	0.123	$0
2046					0		$0	0.116	$0
2047	Avoided SWP water use	acre-feet	0	642	642	$822	$527,724	0.109	$57,648
2048					0		$0	0.103	$0
2049					0		$0	0.097	$0
2050					0		$0	0.092	$0
2051					0		$0	0.087	$0
2052					0		$0	0.082	$0
2053					0		$0	0.077	$0
2054					0		$0	0.073	$0
2055					0		$0	0.069	$0
2056					0		$0	0.065	$0
2057	Avoided SWP water use	acre-feet	0	642	642	$822	$527,724	0.061	$32,190
2058					0		$0	0.058	$0
2059					0		$0	0.054	$0
2060					0		$0	0.051	$0
2061					0		$0	0.048	$0
2062					0		$0	0.046	$0
2063					0		$0	0.043	$0
2064					0		$0	0.041	$0
2065					0		$0	0.038	$0
Project Life	50 years				3,210			…	
Total Present Value of Discounted Benefits Based on Unit Value (Sum of the values in Column (j) for all Benefits shown in table)									$709,062
% Benefit claimed by project									6.22
Total Present Value of Discounted Avoided Project Costs Claimed by alternative Project (Total Present Value of Discounted Costs x % Avoided Cost Claimed by Project)									$44,117

Comments: Relocating the sewer trunk line prevents the line from breaking; thus, there is no discharge of sewage and groundwater wells can continue to pump, so additional SWP water is not needed. CLWA's marginal source of SWP water is the water being purchased from the Buena Vista-Rosedale Rio-Bravo Water Districts (BV/RRB) in Kern County. The cost of this water is estimated to be $822 per AF, when adjusted to 2009 dollars. The total present value of discounted benefits shown is for all phases of the project, which are then adjusted by the ratio of cost of Phase I to the costs of all phases in order to apportion benefits to Phase I.

Table 15. Total Water Supply Benefits

(All benefits should be in 2009 dollars)

Project: ______________________________

Total Discounted Water Supply Benefits (a)	Total Discounted Avoided Project Costs (b)	Other Discounted Water Supply Benefits (c)	Total Present Value of Discounted Benefits (d) (a) + (c) or (b) + (c)
$ 44,117			$ 44,117

Comments:

Table 16 - Water Quality and Other Expected Benefits

(All benefits should be in 2009 dollars)

Project: Santa Clara River Sewer Trunk Line Relocation

(a) Year	(b) Type of Benefit	(c) Measure of Benefit (Units)	(d) Without Project	(e) With Project	(f) Change Resulting from Project (e) – (d)	(g) Unit $ Value (1)	(h) Annual $ Value (f) x (g) (1)	(i) Discount Factor (1)	(j) Discounted Benefits (h) x (i) (1)
2009					0		$0	1.000	$0
2010					0		$0	0.943	$0
2011					0		$0	0.890	$0
2012					0		$0	0.840	$0
2013					0		$0	0.792	$0
2014					0		$0	0.747	$0
2015					0		$0	0.705	$0
2016					0		$0	0.665	$0
2017	Avoided capital replacement costs		$0	$ 100,000	$ 100,000		$100,000	0.627	$62,741
	Avoided sewer line break		$0	$ 50,000	$ 50,000		$50,000	0.627	$31,371
	Avoided repair costs	Number of joint replacements	0	5	5	$20,000	$100,000	0.627	$62,741
2018					0		$0	0.592	$0
2019							$0	0.558	$0
2020					0		$0	0.527	$0
2021					0		$0	0.497	$0
2022	Avoided capital replacement costs		$0	$ 100,000	$ 100,000		$100,000	0.469	$46,884
	Avoided repair costs	Number of joint replacements	0	5	5	$20,000	$100,000	0.469	$46,884
2023					0		$0	0.442	$0
2024					0		$0	0.417	$0
2025					0		$0	0.394	$0
2026							$0	0.371	$0
2027	Avoided capital replacement costs		$0	$ 100,000	$ 100,000		$100,000	0.350	$35,034
	Avoided sewer line break		$0	$ 50,000	$ 50,000		$50,000	0.350	$17,517
	Avoided repair costs	Number of joint	0	5	5	$20,000	$100,000	0.350	$35,034
2028								0.331	$0
2029							$0	0.312	$0
2030							$0	0.294	$0
2031							$0	0.278	$0
2032	Avoided capital replacement costs		$0	$ 100,000	$ 100,000		$100,000	0.262	$26,180
	Avoided repair costs	Number of joint replacements	0	5	5	$20,000	$100,000	0.262	$26,180
2033							$0	0.247	$0
2034							$0	0.233	$0
2035							$0	0.220	$0
2036							$0	0.207	$0
2037	Avoided capital replacement costs		$0	$ 100,000	$ 100,000		$100,000	0.196	$19,563
	Avoided sewer line break		$0	$ 50,000	$ 50,000		$50,000	0.196	$9,782
	Avoided repair costs	Number of joint	0	5	5	$20,000	$100,000	0.196	$19,563
2038							$0	0.185	$0
2039							$0	0.174	$0
2040							$0	0.164	$0
2041							$0	0.155	$0
2042	Avoided capital replacement		$0	$ 100,000	$ 100,000		$100,000	0.146	$14,619
	Avoided repair costs	Number of joint	0	5	5	$20,000	$100,000	0.146	$14,619
2043							$0	0.138	$0
2044							$0	0.130	$0
2045							$0	0.123	$0
2046							$0	0.116	$0
2047	Avoided capital replacement costs		$0	$ 100,000	$ 100,000		$100,000	0.109	$10,924
	Avoided sewer line break		$0	$ 50,000	$ 50,000		$50,000	0.109	$5,462
	Avoided repair costs	Number of joint	$0	5	5	$20,000	$100,000	0.109	$10,924
2048							$0	0.103	$0
2049							$0	0.097	$0
2050							$0	0.092	$0
2051							$0	0.087	$0
2052	Avoided capital replacement costs		$0	$ 100,000	$ 100,000		$100,000	0.082	$8,163
	Avoided repair costs	Number of joint replacements	$0	5	5	$20,000	$100,000	0.082	$8,163
2053							$0	0.077	$0
2054							$0	0.073	$0
2055							$0	0.069	$0
2056							$0	0.065	$0
2057	Avoided capital replacement costs		$0	$ 100,000	$ 100,000		$100,000	0.061	$6,100
	Avoided sewer line break		$0	$ 50,000	$ 50,000		$50,000	0.061	$3,050
	Avoided repair costs	Number of joint replacements	$0	5	5	$20,000	$100,000	0.061	$6,100
2058							$0	0.058	$0
2059							$0	0.054	$0
2060							$0	0.051	$0
2061							$0	0.048	$0
2062	Avoided capital replacement costs		$0	$ 100,000	$ 100,000		$100,000	0.046	$4,558
	Avoided repair costs	Number of joint replacements	$0	5	5	$20,000	$100,000	0.046	$4,558
2063							$0	0.043	$0
2064							$0	0.041	$0
2065							$0	0.038	$0
Project Life	Avoided capital replacement costs		$0	$ 1,000,000	$ 1,000,000				$ 234,766
Project Life	Avoided sewer line break		$0	$ 250,000	$ 250,000				$ 67,181
Project Life	Avoided repair costs	Number of joint replacements	$0	50	50			…	$ 234,766
Total Present Value of Discounted Benefits Based on Unit Value (Sum of the values in Column (j) for all Benefits shown in table) Transfer to Table 20, column (f), Exhibit F: Proposal Costs and Benefits Summaries									$536,713
% Benefit claimed by project									6.22
Total Present Value of Discounted Avoided Project Costs Claimed by alternative Project (Total Present Value of Discounted Costs x % Avoided Cost Claimed by Project)									$33,394

Comments: Relocating the sewer trunk line prevents the need for section replacements and joint repairs (associated with storm events) every 5 years, beginning in 2010. The project will also avoid sewer line breaks associated with storm events every 10 years. The total present value of discounted benefits shown is for all phases of the project, which are then adjusted by the ratio of cost of Phase I to the costs of all phases in order to apportion benefits to Phase I.

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

Santa Clarita Valley Southern End Recycled Water Project (VWC-1)

Summary

The Santa Clarita Valley Southern End Recycled Water Project will expand the existing Santa Clarita Valley recycled water transmission and distribution system to the south in order to supply additional customers within the Valencia Water Company (VWC) service area. The project will provide 910 acre-feet (AF) of recycled water per year to VWC municipal customers for domestic landscape irrigation. The source of this water will be the Valencia Water Reclamation Plant (Valencia WRP), which currently serves as a source of supply for existing Castaic Lake Water Agency (CLWA), the regional water wholesaler, and VWC recycled water customers.

The project includes planning, designing, and constructing additional recycled water infrastructure, including various recycled water pipelines and pumping stations. Specific project components include 31,000 linear feet of transmission main, 2 booster stations, and 69 service meter connections.

In the future, the project will potentially serve as a source of recycled water for customers within the Newhall County Water District and Santa Clarita Water Division service areas. Some preliminary designs for the extension of the recycled water system to serve these areas have been developed. However, the benefits and costs of this potential extension of the project are not included in this analysis.

A summary of all benefits and costs of the project is provided in Table VWC-1.1. Project costs and water supply benefits are discussed in the remainder of this attachment.

Costs

Undiscounted capital costs shown in the project budget total $11,043,500. Construction-related activities (including construction, construction administration, and contingency) account for $10,268,000, or close to 93% of the total. Costs associated with project design, engineering, and environmental documentation account for $497,000, or less than 5% of the total capital budget. Land purchases for the project amount to $250,000. Administration and miscellaneous costs account for the remainder of total capital costs. Capital cost expenditures will be made starting in 2011 and continue through mid-2014.

Operations and maintenance (O&M) costs (including periodic replacement costs) will average about $175,000 per year. Over the 50-year project life (through 2063, 50 years after the project comes online in 2014), the sum of present value capital and O&M costs will amount to $10,974,099.

TABLE VWC-1.1
BENEFIT-COST ANALYSIS OVERVIEW

	Present Value
Costs – Total Capital and O&M	$10,974,099
Monetizable Benefits	
Water Supply Benefits	
Avoided Imported Water Supply Costs	$9,061,140
Water Quality and Other Benefits	
Avoided Alternative Water Resources Management (AWRM) Costs	$6,875,545
Avoided Fertilizer Costs	$215,557
Total Monetizable Benefits	$16,152,242
Quantified Benefit or Cost	**Project Life Total**
Water Quality and Other Benefits	
Avoided Chlorides Discharge and Avoided Introduction of Chlorides into the Watershed	11,982 Metric Tons
Reduced Carbon Dioxide Emissions	10,731 Metric Tons
Qualitative Benefit or Cost	**Qualitative Indicator***
Water Supply Benefits	
Increased Water Supply Reliability for CLWA customers	+
Improved Operational Flexibility for CLWA	+
Water Quality and Other Benefits	
Reduced Disinfection By-product Precursors	+
Reduced Stress on the Sacramento-San Joaquin Delta	+

* Direction and magnitude of effect on net benefits:
+ = Likely to increase net benefits relative to quantified estimates.
++ = Likely to increase net benefits significantly.
– = Likely to decrease net benefits.
– – = Likely to decrease net benefits significantly.
U = Uncertain, could be + or –.

The “Without Project” Baseline

VWC is one of four domestic water purveyors that receive water from CLWA for distribution in the Santa Clarita Valley. CLWA imports State Water Project (SWP) water from the Sacramento-San Joaquin Delta to Castaic Lake through SWP facilities. Water from Castaic Lake is treated at CLWA’s Earl Schmidt Filtration Plant or the Rio Vista Water Treatment Plant and is delivered to VWC through transmission lines owned and operated by CLWA. VWC’s service area includes close to 30,000 connections within a portion of the City of Santa Clarita and unincorporated portions of Los Angeles County in the communities of Castaic, Stevenson Ranch, and Valencia.

VWC currently relies on the purchase of approximately 17,550 acre-feet per year (AFY) of SWP water (imported via CLWA) to meet roughly one-half of its potable water demands.[3] The balance of the VWC's potable demand is met through local groundwater sources. The use of recycled water made available via the Southern End Recycled Water Project will offset the use of 910 AFY of imported water because imported water is the marginal water source (i.e., it is the most expensive source of supply available to VWC).

CLWA has a contractual Table A amount of 95,200 AFY of water from SWP. However, the marginal source of SWP water for CLWA, which sells water to VWC, is the water being purchased from the Buena Vista-Rosedale Rio-Bravo Water Districts (BV/RRB) in Kern County. CLWA receives part of Buena Vista's Kern River entitlements through exchange of BV/RRB's SWP supplies. The cost of this water in 2007 was estimated to be $790/AF, or $822/AF when updated to 2009 dollars. This includes the cost of purchase, wheeling, and treatment, and factors in system losses (A&N Technical Services, 2008). It is assumed that this cost will rise at the rate of inflation after 2009, thus remaining constant in real dollars.

The availability of imported water is subject to a number of natural and human forces, ranging from increased population growth (and accompanying increased demands on the SWP system), to drought and earthquakes, to environmental regulations and water rights determinations. Reduced demand for imported water will improve water supply reliability within the VWC service area. Local groundwater may also be limited in some areas, highlighting the need for additional reliable sources of water to meet current and future demands under all hydrologic conditions.

VWC and CLWA recognize that recycled water is a critical component of the region's water supply portfolio. Implementing and expanding the recycled water system within the CLWA/VWC service area will provide a reliable source of water year-round that can help offset reliance on imported water. By utilizing the effluent from the Valencia WRP, CLWA and its retail water purveyors can more efficiently allocate their potable water and increase the reliability of water supplies in the Santa Clarita Valley.

Water Supply Benefits

This section describes the water supply benefits generated by the Santa Clarita Valley Southern End Recycled Water Project, including avoided imported water supply costs, improved water supply reliability for CLWA customers, and improved operational flexibility for CLWA.

Avoided Imported Water Supply Costs

When the project comes online in mid-2014, it will enable the use of an additional 0.81 million gallons per day (910 AFY) of recycled water.[4] Although VWC uses a mix of imported water and groundwater to supply its customers, imported water is more expensive to provide and is the marginal water source. Thus, reduced overall VWC water demand due to increased use of recycled water will result in reduced reliance on SWP water within the service area.

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3. Estimate based on total projected 2010 demand of 35,100 from 2005 CLWA Urban Water Management Plan.

4 In 2014, this will amount to 455 AFY because the project is scheduled to come online in July. In 2015 through 2063, the project will enable the use of 910 AFY.

To calculate the avoided costs of imported water over time, the amount of avoided imported water each year is multiplied by the marginal cost of SWP water delivered via CLWA, which is $822/AF of water delivered. Over the 50-year life of the project, VWC will avoid the use of 45,045 AF of imported water. Assuming no real increases in CLWA water rates, the total present value benefits associated with the avoided purchase of imported water amounts to about $9.1 million.

Increased Water Supply Reliability for CLWA Customers

The reliability of a water supply refers to its ability to meet water demands on a consistent basis, even in times of drought or other constraints on source water availability. The project will help address reliability issues for CLWA retail agencies by offsetting the future use of imported water delivered by CLWA. The reliability of imported water is subject to a number of natural and human forces, ranging from increased population growth (and accompanying increased demands on the SWP system), to drought and earthquakes, to environmental regulations and water rights determinations.

Although interest in water supply reliability is increasing (e.g., due to increasing water demands and concerns over climate-related events), only a few studies have directly attempted to quantify its value (i.e., through nonmarket valuation studies). The results from these studies indicate that residential and industrial (i.e., urban) customers seem to value supply reliability quite highly. Stated preference studies find that water customers are willing to pay $95 to $500 per household per year for total reliability (i.e., a 0% probability of their water supply being interrupted in times of drought).

The challenge for use of these values to determine a value of increased reliability as a result of the Southern End Recycled Water Project is recognizing how to reasonably interpret these survey-based household monetary values. The values noted above reflect a willingness to pay per household to ensure complete reliability (zero drought-related use restrictions in the future), whereas the Southern End Recycled Water Project only enhances overall reliability and does not guarantee 100% reliability. Thus, if applied directly to the number of households within the CLWA service area, the dollar values from the studies would overstate the reliability value provided by the project.

A simple way to roughly adjust for this “whole versus part” problem is to attribute a portion of the total value of reliability to the portion of the problem that is solved by the project. To adjust for the partial improvement in reliability from the Southern End Recycled Water Project, it is assumed that household willingness to pay for improved reliability is directly proportional to the amount of recycled water that will offset imported water, as a percentage of the total potable water supply. This represents the percentage of total supply that has been improved in terms of overall reliability (i.e., by offsetting imported water demand with local sources).

For example, the project will offset more than 910 AFY of imported water beginning in 2015. In that year, total imported water demand within the CLWA service area will be about 48,550 AFY (without the project) (CLWA, 2005).[5] Thus, about 1.9% of total potable demand will be met by recycled water made available as a result of the project. To obtain a lower bound estimate for the

[5]. The CLWA Urban Water Management Plan projects total purveyor demand in 2015 will be 97,100 AF. Analysis assumes that 50% of total demand is met through imported water.

value of improved reliability associated with this water, it is assumed that households within the CLWA service area are willing to pay about $1.81 per year ($95 multiplied by 1.9%). Applying this dollar value per household to the approximately 97,840 households within the CLWA service area would result in $177,090 of benefits in 2015. Taking into account increasing population and changing demands, this calculation could be completed for each year of the project's useful life.

Due to the uncertainty involved in applying these numbers to this situation, this benefit estimate is not included in the tables. However, it is provided here to give an idea of the potential magnitude of this benefit.

Improved Operational Flexibility for CLWA

As a result of the Southern End Recycled Water Project, the use of recycled water by VWC customers will offset 910 AFY of imported SWP water. This will help CLWA directly in their supply operations, allowing for longer shutdowns and improving system reliability. The value of this increased operational flexibility is not monetized in the benefit tables.

Distribution of Project Benefits and Identification of Beneficiaries

The Southern End Recycled Water Project includes the full range of types of beneficiaries, as is summarized in Table VWC-1.2. At the local level, VWC customers will benefit due to increased reliability of supply and avoided costs associated with importing additional SWP water. Regionally, those dependent on supplies from CLWA will benefit from improved water supply reliability within the CLWA service area and reduced demand on CLWA facilities. The project will provide statewide benefits by reducing future demands on water supplies from the Sacramento-San Joaquin Delta region. The project also helps meet statewide goals to increase use of recycled wastewater by at least 1 million AFY by 2020 and by at least 2 million AFY by 2030 (State Water Resources Control Board, 2009).

TABLE VWC-1.2
PROJECT BENEFICIARIES SUMMARY

Local	Regional	Statewide
VWC and customers	CLWA and Customers, Ventura County Agriculture	Sacramento-San Joaquin-Delta, California's Recycled Water Use Goals

Project Benefits Timeline Description

Design efforts for the Southern End Recycled Water Project should be completed by June 2012 and construction will begin in January 2013. Construction is expected to take 18 months, with operation starting in July 2014. A 50-year useful project life is assumed for this analysis. Selection of this lifetime was based on balancing the long expected life for transmission mains with shorter expected life for booster stations.

Potential Adverse Effects from the Project

The project is not expected to result in any significant adverse effects. Project will be located in a fully developed urbanized area.

Summary of Findings

The monetized water supply benefits from the Southern End Recycled Water Project include the avoided cost of imported SWP supplies. The cost of treated SWP water supply delivered by CLWA to VWC is $822/AF. Over the 50-year life of the project, the avoided water supply costs will total $9.1 million in present value. Non-monetized benefits of the project include improved water supply reliability within the service area and increased operational flexibility for CLWA.

This analysis of costs and benefits is based on available data and some assumptions. As a result, there may be some omissions, uncertainties, and possible biases. In most cases, omissions lead to a downward bias in benefits: the project is expected to be much more beneficial than the subset of benefits that can be monetized would indicate. These issues are listed in Table VWC-1.3.

TABLE VWC-1.3
OMISSIONS, BIASES, AND UNCERTAINTIES, AND THEIR EFFECT ON THE PROJECT

Benefit or Cost Category	Likely Impact on Net Benefits*	Comment
Increased water supply reliability for CLWA customers	+	The potential benefit of increased water supply reliability as a result of the project has not been included due to uncertainties of applying values from the literature to a partial improvement in water supply reliability.
Project costs	U	The calculation of the present value of costs is a function of the timing of capital outlays and a number of other factors and conditions. Changes in these variables will change the estimate of costs.

*Direction and magnitude of effect on net benefits:
+ = Likely to increase net benefits relative to quantified estimates.
++ = Likely to increase net benefits significantly.
– = Likely to decrease net benefits.
–– = Likely to decrease net benefits significantly.
U = Uncertain, could be + or -.

References

A&N Technical Services. 2008. Santa Clarita Valley Water Use Efficiency Plan. Prepared for the Santa Clarita Valley Family of Water Suppliers: Castaic Lake Water Agency, Valencia Water Company, Los Angeles County Waterworks Division #36, Newhall County Water District, Santa Clarita Water Division. August.

CLWA 2005. Urban Water Management Plan. Castaic Lake Water Agency.

State Water Resources Control Board. 2009. Recycled Water Policy. California Environmental Protection Agency. Available: http://www.swrcb.ca.gov/water_issues/programs/water_recycling_policy/docs/recycledwaterpolicy_approved.pdf. Accessed December 13, 2010.

Table 11- Annual Cost of Project (All costs should be in 2009 Dollars) Project: Santa Clarita Valley Southern End Recycled Water Project									
	Initial Costs	Operations and Maintenance Costs [1]						Discounting Calculations	
	(a)	(b)	(c)	(d)	(e)	(f)	(g)	(h)	(i)
YEAR	Grand Total Cost From Table 7 (row (i), column(d))	Admin	Operation	Maintenance	Replacement	Other	Total Costs (a) +...+ (f)	Discount Factor	Discounted Costs(g) x (h)
2009							$0	1.00	$0
2010							$0	0.943	$0
2011	$386,523						$386,523	0.890	$344,005
2012	$3,423,485						$3,423,485	0.840	$2,875,727
2013	$5,135,228						$5,135,228	0.792	$4,067,100
2014	$2,098,265	$12,500	$37,500	$25,000	$12,500		$2,185,765	0.747	$1,632,766
2015		$25,000	$75,000	$50,000	$25,000		$175,000	0.705	$123,375
2016		$25,000	$75,000	$50,000	$25,000		$175,000	0.665	$116,375
2017		$25,000	$75,000	$50,000	$25,000		$175,000	0.627	$109,725
2018		$25,000	$75,000	$50,000	$25,000		$175,000	0.592	$103,600
2019		$25,000	$75,000	$50,000	$25,000		$175,000	0.558	$97,650
2020		$25,000	$75,000	$50,000	$25,000		$175,000	0.527	$92,225
2021		$25,000	$75,000	$50,000	$25,000		$175,000	0.497	$86,975
2022		$25,000	$75,000	$50,000	$25,000		$175,000	0.469	$82,075
2023		$25,000	$75,000	$50,000	$25,000		$175,000	0.442	$77,350
2024		$25,000	$75,000	$50,000	$25,000		$175,000	0.417	$72,975
2025		$25,000	$75,000	$50,000	$25,000		$175,000	0.394	$68,950
2026		$25,000	$75,000	$50,000	$25,000		$175,000	0.371	$64,925
2027		$25,000	$75,000	$50,000	$25,000		$175,000	0.350	$61,250
2028		$25,000	$75,000	$50,000	$25,000		$175,000	0.331	$57,925
2029		$25,000	$75,000	$50,000	$25,000		$175,000	0.312	$54,600
2030		$25,000	$75,000	$50,000	$25,000		$175,000	0.294	$51,450
2031		$25,000	$75,000	$50,000	$25,000		$175,000	0.278	$48,650
2032		$25,000	$75,000	$50,000	$25,000		$175,000	0.262	$45,850
2033		$25,000	$75,000	$50,000	$25,000		$175,000	0.247	$43,225
2034		$25,000	$75,000	$50,000	$25,000		$175,000	0.233	$40,775
2035		$25,000	$75,000	$50,000	$25,000		$175,000	0.220	$38,500
2036		$25,000	$75,000	$50,000	$25,000		$175,000	0.207	$36,225
2037		$25,000	$75,000	$50,000	$25,000		$175,000	0.196	$34,300
2038		$25,000	$75,000	$50,000	$25,000		$175,000	0.185	$32,375
2039		$25,000	$75,000	$50,000	$25,000		$175,000	0.174	$30,450
2040		$25,000	$75,000	$50,000	$25,000		$175,000	0.164	$28,700
2041		$25,000	$75,000	$50,000	$25,000		$175,000	0.155	$27,125
2042		$25,000	$75,000	$50,000	$25,000		$175,000	0.146	$25,550
2043		$25,000	$75,000	$50,000	$25,000		$175,000	0.138	$24,150
2044		$25,000	$75,000	$50,000	$25,000		$175,000	0.130	$22,750
2045		$25,000	$75,000	$50,000	$25,000		$175,000	0.123	$21,525
2046		$25,000	$75,000	$50,000	$25,000		$175,000	0.116	$20,300
2047		$25,000	$75,000	$50,000	$25,000		$175,000	0.109	$19,075
2048		$25,000	$75,000	$50,000	$25,000		$175,000	0.103	$18,025
2049		$25,000	$75,000	$50,000	$25,000		$175,000	0.097	$16,975
2050		$25,000	$75,000	$50,000	$25,000		$175,000	0.092	$16,100
2051		$25,000	$75,000	$50,000	$25,000		$175,000	0.087	$15,225
2052		$25,000	$75,000	$50,000	$25,000		$175,000	0.082	$14,350
2053		$25,000	$75,000	$50,000	$25,000		$175,000	0.077	$13,475
2054		$25,000	$75,000	$50,000	$25,000		$175,000	0.073	$12,775
2055		$25,000	$75,000	$50,000	$25,000		$175,000	0.069	$12,075
2056		$25,000	$75,000	$50,000	$25,000		$175,000	0.065	$11,375
2057		$25,000	$75,000	$50,000	$25,000		$175,000	0.061	$10,675
2058		$25,000	$75,000	$50,000	$25,000		$175,000	0.058	$10,150
2059		$25,000	$75,000	$50,000	$25,000		$175,000	0.054	$9,450
2060		$25,000	$75,000	$50,000	$25,000		$175,000	0.051	$8,925
2061		$25,000	$75,000	$50,000	$25,000		$175,000	0.048	$8,400
2062		$25,000	$75,000	$50,000	$25,000		$175,000	0.046	$8,050
2063		$25,000	$75,000	$50,000	$25,000		$175,000	0.043	$7,525
Total Present Value of Discounted Costs (Sum of Column (i)) Transfer to Table 20, column (c), Exhibit F: Proposal Costs and Benefits Summaries									$10,974,099

Comments: Operation of the Southern End Reycled Water Project is assumed to begin in mid-2014, and have a useful life of 50 years.

Table 12 - Annual Water Supply Benefits

(All benefits should be in 2009 dollars)

Project: Santa Clarita Valley Southern End Recycled Water Project

(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 (f) x (g) (1)	Discount Factor (1)	Discounted Benefits (h) x (i) (1)
2009								1.00	$0
2010								0.943	$0
2011								0.890	$0
2012								0.840	$0
2013								0.792	$0
2014	Avoided imported water use	AF	0	455	455	$822	$374,010	0.747	$279,385
2015	Avoided imported water use	AF	0	910	910	$822	$748,020	0.705	$527,354
2016	Avoided imported water use	AF	0	910	910	$822	$748,020	0.665	$497,433
2017	Avoided imported water use	AF	0	910	910	$822	$748,020	0.627	$469,009
2018	Avoided imported water use	AF	0	910	910	$822	$748,020	0.592	$442,828
2019	Avoided imported water use	AF	0	910	910	$822	$748,020	0.558	$417,395
2020	Avoided imported water use	AF	0	910	910	$822	$748,020	0.527	$394,207
2021	Avoided imported water use	AF	0	910	910	$822	$748,020	0.497	$371,766
2022	Avoided imported water use	AF	0	910	910	$822	$748,020	0.469	$350,821
2023	Avoided imported water use	AF	0	910	910	$822	$748,020	0.442	$330,625
2024	Avoided imported water use	AF	0	910	910	$822	$748,020	0.417	$311,924
2025	Avoided imported water use	AF	0	910	910	$822	$748,020	0.394	$294,720
2026	Avoided imported water use	AF	0	910	910	$822	$748,020	0.371	$277,515
2027	Avoided imported water use	AF	0	910	910	$822	$748,020	0.350	$261,807
2028	Avoided imported water use	AF	0	910	910	$822	$748,020	0.331	$247,595
2029	Avoided imported water use	AF	0	910	910	$822	$748,020	0.312	$233,382
2030	Avoided imported water use	AF	0	910	910	$822	$748,020	0.294	$219,918
2031	Avoided imported water use	AF	0	910	910	$822	$748,020	0.278	$207,950
2032	Avoided imported water use	AF	0	910	910	$822	$748,020	0.262	$195,981
2033	Avoided imported water use	AF	0	910	910	$822	$748,020	0.247	$184,761
2034	Avoided imported water use	AF	0	910	910	$822	$748,020	0.233	$174,289
2035	Avoided imported water use	AF	0	910	910	$822	$748,020	0.220	$164,564
2036	Avoided imported water use	AF	0	910	910	$822	$748,020	0.207	$154,840
2037	Avoided imported water use	AF	0	910	910	$822	$748,020	0.196	$146,612
2038	Avoided imported water use	AF	0	910	910	$822	$748,020	0.185	$138,384
2039	Avoided imported water use	AF	0	910	910	$822	$748,020	0.174	$130,155
2040	Avoided imported water use	AF	0	910	910	$822	$748,020	0.164	$122,675
2041	Avoided imported water use	AF	0	910	910	$822	$748,020	0.155	$115,943
2042	Avoided imported water use	AF	0	910	910	$822	$748,020	0.146	$109,211
2043	Avoided imported water use	AF	0	910	910	$822	$748,020	0.138	$103,227
2044	Avoided imported water use	AF	0	910	910	$822	$748,020	0.130	$97,243
2045	Avoided imported water use	AF	0	910	910	$822	$748,020	0.123	$92,006
2046	Avoided imported water use	AF	0	910	910	$822	$748,020	0.116	$86,770
2047	Avoided imported water use	AF	0	910	910	$822	$748,020	0.109	$81,534
2048	Avoided imported water use	AF	0	910	910	$822	$748,020	0.103	$77,046
2049	Avoided imported water use	AF	0	910	910	$822	$748,020	0.097	$72,558
2050	Avoided imported water use	AF	0	910	910	$822	$748,020	0.092	$68,818
2051	Avoided imported water use	AF	0	910	910	$822	$748,020	0.087	$65,078
2052	Avoided imported water use	AF	0	910	910	$822	$748,020	0.082	$61,338
2053	Avoided imported water use	AF	0	910	910	$822	$748,020	0.077	$57,598
2054	Avoided imported water use	AF	0	910	910	$822	$748,020	0.073	$54,605
2055	Avoided imported water use	AF	0	910	910	$822	$748,020	0.069	$51,613
2056	Avoided imported water use	AF	0	910	910	$822	$748,020	0.065	$48,621
2057	Avoided imported water use	AF	0	910	910	$822	$748,020	0.061	$45,629
2058	Avoided imported water use	AF	0	910	910	$822	$748,020	0.058	$43,385
2059	Avoided imported water use	AF	0	910	910	$822	$748,020	0.054	$40,393
2060	Avoided imported water use	AF	0	910	910	$822	$748,020	0.051	$38,149
2061	Avoided imported water use	AF	0	910	910	$822	$748,020	0.048	$35,905
2062	Avoided imported water use	AF	0	910	910	$822	$748,020	0.046	$34,409
2063	Avoided imported water use	AF	0	910	910	$822	$748,020	0.043	$32,165
Total Present Value of Discounted Benefits Based on Unit Value (Sum of the values in Column (j) for all Benefits shown in table)									$9,061,140

Comments: The Santa Clarita Valley Southern End Recycled Water Project will avoid the use of 910 AFY of State Water Project water. The marginal cost of imported water to CLWA is $822 AF in 2009 dollars. The project will be come operational in mid-2014, so use of 455 AF of imported is avoided in that year.

Table 15. Total Water Supply Benefits

(All benefits should be in 2009 dollars)

Project: Santa Clarita Valley Southern End Recycled Water Project

Total Discounted Water Supply Benefits (a)	Total Discounted Avoided Project Costs (b)	Other Discounted Water Supply Benefits (c)	Total Present Value of Discounted Benefits (d) (a) + (c) or (b) + (c)
$ 9,061,140			$ 9,061,140

Comments:

Table 16 - Water Quality and Other Expected Benefits

(All benefits should be in 2009 dollars)

Project: Santa Clarita Valley Southern End Recycled Water Project

(a) Year	(b) Type of Benefit	(c) Measure of Benefit (Units)	(d) Without Project	(e) With Project	(f) Change Resulting from Project (e) – (d)	(g) Unit $ Value (1)	(h) Annual $ Value (f) x (g) (1)	(i) Discount Factor (1)	(j) Discounted Benefits (h) x (i) (1)
2009								1.00	
2010								0.943	
2011								0.890	
2012								0.840	
2013								0.792	$0
2014	Avoided fertilizer use	lbs of fertilizer	0	27,461	27,461	$0.32	$8,897	0.747	$6,646
	Avoided introduction/ discharge of chlorides	MT of chlorides		121	121				$0
	Reduced CO2 Emissions	MT of CO_2	0	108	108				$0
2015	Avoided fertilizer use	lbs of fertilizer	0	54,922	54,922	$0.32	$17,795	0.705	$12,545
	Avoided introduction/ discharge of chlorides	MT of chlorides		242	242				$0
	Reduced CO2 Emissions	MT of CO_2	0	217	217				$0
2016	Avoided fertilizer use	lbs of fertilizer	0	54,922	54,922	$0.32	$17,795	0.665	$11,834
	Avoided introduction/ discharge of chlorides	MT of chlorides		242	242				$0
	Reduced CO2 Emissions	MT of CO_2	0	217	217				$0
2017	Avoided fertilizer use	lbs of fertilizer	0	54,922	54,922	$0.32	$17,795	0.627	$11,157
	Avoided introduction/ discharge of chlorides	MT of chlorides		242	242				$0
	Reduced CO2 Emissions	MT of CO_2	0	217	217				$0
2018	Avoided fertilizer use	lbs of fertilizer	0	54,922	54,922	$0.32	$17,795	0.592	$10,534
	Avoided introduction/ discharge of chlorides	MT of chlorides		242	242				$0
	Reduced CO2 Emissions	MT of CO_2	0	217	217				$0
2019	Avoided fertilizer use	lbs of fertilizer	0	54,922	54,922	$0.32	$17,795	0.558	$9,929
	Avoided introduction/ discharge of chlorides	MT of chlorides		242	242				$0
	Reduced CO2 Emissions	MT of CO_2	0	217	217				$0
2020	Avoided fertilizer use	lbs of fertilizer	0	54,922	54,922	$0.32	$17,795	0.527	$9,378
	Avoided introduction/ discharge of chlorides	MT of chlorides		242	242				$0
	Reduced CO2 Emissions	MT of CO_2	0	217	217				$0
2021	Avoided fertilizer use	lbs of fertilizer	0	54,922	54,922	$0.32	$17,795	0.497	$8,844
	Avoided introduction/ discharge of chlorides	MT of chlorides		242	242				$0
	Reduced CO2 Emissions	MT of CO_2	0	217	217				$0
2022	Avoided fertilizer use	lbs of fertilizer	0	54,922	54,922	$0.32	$17,795	0.469	$8,346
	Avoided introduction/ discharge of chlorides	MT of chlorides		242	242				$0
	Reduced CO2 Emissions	MT of CO_2	0	217	217				$0
2023	Avoided fertilizer use	lbs of fertilizer	0	54,922	54,922	$0.32	$17,795	0.442	$7,865
	Avoided introduction/ discharge of chlorides	MT of chlorides		242	242				$0
	Reduced CO2 Emissions	MT of CO_2	0	217	217				$0
2024	Avoided fertilizer use	lbs of fertilizer	0	54,922	54,922	$0.32	$17,795	0.417	$7,420
	Avoided introduction/ discharge of chlorides	MT of chlorides		242	242				$0
	Reduced CO2 Emissions	MT of CO_2	0	217	217				$0
2025	Avoided fertilizer use	lbs of fertilizer	0	54,922	54,922	$0.32	$17,795	0.394	$7,011
	Avoided introduction/ discharge of chlorides	MT of chlorides		242	242				$0
	Reduced CO2 Emissions	MT of CO_2	0	217	217				$0
2026	Avoided fertilizer use	lbs of fertilizer	0	54,922	54,922	$0.32	$17,795	0.371	$6,602
	Avoided introduction/ discharge of chlorides	MT of chlorides		242	242				$0
	Reduced CO2 Emissions	MT of CO_2	0	217	217				$0
2027	Avoided fertilizer use	lbs of fertilizer	0	54,922	54,922	$0.32	$17,795	0.350	$6,228
	Avoided introduction/ discharge of chlorides	MT of chlorides		242	242				$0
	Reduced CO2 Emissions	MT of CO_2	0	217	217				$0
2028	Avoided fertilizer use	lbs of fertilizer	0	54,922	54,922	$0.32	$17,795	0.331	$5,890
	Avoided introduction/ discharge of chlorides	MT of chlorides		242	242				$0
	Reduced CO2 Emissions	MT of CO_2	0	217	217				$0
2029	Avoided fertilizer use	lbs of fertilizer	0	54,922	54,922	$0.32	$17,795	0.312	$5,552
	Avoided introduction/ discharge of chlorides	MT of chlorides		242	242				$0
	Reduced CO2 Emissions	MT of CO_2	0	217	217				$0
2030	Avoided fertilizer use	lbs of fertilizer	0	54,922	54,922	$0.32	$17,795	0.294	$5,232
	Avoided introduction/ discharge of chlorides	MT of chlorides		242	242				$0
	Reduced CO2 Emissions	MT of CO_2	0	217	217				$0
2031	Avoided fertilizer use	lbs of fertilizer	0	54,922	54,922	$0.32	$17,795	0.278	$4,947
	Avoided introduction/ discharge of chlorides	MT of chlorides		242	242				$0
	Reduced CO2 Emissions	MT of CO_2	0	217	217				$0
2032	Avoided fertilizer use	lbs of fertilizer	0	54,922	54,922	$0.32	$17,795	0.262	$4,662
	Avoided introduction/ discharge of chlorides	MT of chlorides		242	242				$0
	Reduced CO2 Emissions	MT of CO_2	0	217	217				$0
2033	Avoided fertilizer use	lbs of fertilizer	0	54,922	54,922	$0.32	$17,795	0.247	$4,395
	Avoided introduction/ discharge of chlorides	MT of chlorides		242	242				$0
	Reduced CO2 Emissions	MT of CO_2	0	217	217				$0
2034	Avoided fertilizer use	lbs of fertilizer	0	54,922	54,922	$0.32	$17,795	0.233	$4,146
	Avoided introduction/ discharge of chlorides	MT of chlorides		242	242				$0
	Reduced CO2 Emissions	MT of CO_2	0	217	217				$0
2035	Avoided fertilizer use	lbs of fertilizer	0	54,922	54,922	$0.32	$17,795	0.220	$3,915
	Avoided introduction/ discharge of chlorides	MT of chlorides		242	242				$0
	Reduced CO2 Emissions	MT of CO_2	0	217	217				$0
2036	Avoided fertilizer use	lbs of fertilizer	0	54,922	54,922	$0.32	$17,795	0.207	$3,684
	Avoided introduction/ discharge of chlorides	MT of chlorides		242	242				$0
	Reduced CO2 Emissions	MT of CO_2	0	217	217				$0
2037	Avoided fertilizer use	lbs of fertilizer	0	54,922	54,922	$0.32	$17,795	0.196	$3,488
	Avoided introduction/ discharge of chlorides	MT of chlorides		242	242				$0
	Reduced CO2 Emissions	MT of CO_2	0	217	217				$0
2038	Avoided fertilizer use	lbs of fertilizer	0	54,922	54,922	$0.32	$17,795	0.185	$3,292
	Avoided introduction/ discharge of chlorides	MT of chlorides		242	242				$0
	Reduced CO2 Emissions	MT of CO_2	0	217	217				$0
2039	Avoided fertilizer use	lbs of fertilizer	0	54,922	54,922	$0.32	$17,795	0.174	$3,096
	Avoided introduction/ discharge of chlorides	MT of chlorides		242	242				$0
	Reduced CO2 Emissions	MT of CO_2	0	217	217				$0
2040	Avoided fertilizer use	lbs of fertilizer	0	54,922	54,922	$0.32	$17,795	0.164	$2,918
	Avoided introduction/ discharge of chlorides	MT of chlorides		242	242				$0
	Reduced CO2 Emissions	MT of CO_2	0	217	217				$0
2041	Avoided fertilizer use	lbs of fertilizer	0	54,922	54,922	$0.32	$17,795	0.155	$2,758
	Avoided introduction/ discharge of chlorides	MT of chlorides		242	242				$0

Table 16 - Water Quality and Other Expected Benefits

(All benefits should be in 2009 dollars)

Project: Santa Clarita Valley Southern End Recycled Water Project

(a) Year	(b) Type of Benefit	(c) Measure of Benefit (Units)	(d) Without Project	(e) With Project	(f) Change Resulting from Project (e) – (d)	(g) Unit $ Value (1)	(h) Annual $ Value (f) x (g) (1)	(i) Discount Factor (1)	(j) Discounted Benefits (h) x (i) (1)
	Reduced CO2 Emissions	MT of CO_2	0	217	217				$0
2042	Avoided fertilizer use	lbs of fertilizer	0	54,922	54,922	$0.32	$17,795	0.146	$2,598
	Avoided introduction/ discharge of chlorides	MT of chlorides		242	242				$0
	Reduced CO2 Emissions	MT of CO_2	0	217	217				$0
2043	Avoided fertilizer use	lbs of fertilizer	0	54,922	54,922	$0.32	$17,795	0.138	$2,456
	Avoided introduction/ discharge of chlorides	MT of chlorides		242	242				$0
	Reduced CO2 Emissions	MT of CO_2	0	217	217				$0
2044	Avoided fertilizer use	lbs of fertilizer	0	54,922	54,922	$0.32	$17,795	0.130	$2,313
	Avoided introduction/ discharge of chlorides	MT of chlorides		242	242				$0
	Reduced CO2 Emissions	MT of CO_2	0	217	217				$0
2045	Avoided fertilizer use	lbs of fertilizer	0	54,922	54,922	$0.32	$17,795	0.123	$2,189
	Avoided introduction/ discharge of chlorides	MT of chlorides		242	242				$0
	Reduced CO2 Emissions	MT of CO_2	0	217	217				$0
2046	Avoided fertilizer use	lbs of fertilizer	0	54,922	54,922	$0.32	$17,795	0.116	$2,064
	Avoided introduction/ discharge of chlorides	MT of chlorides		242	242				$0
	Reduced CO2 Emissions	MT of CO_2	0	217	217				$0
2047	Avoided fertilizer use	lbs of fertilizer	0	54,922	54,922	$0.32	$17,795	0.109	$1,940
	Avoided introduction/ discharge of chlorides	MT of chlorides		242	242				$0
	Reduced CO2 Emissions	MT of CO_2	0	217	217				$0
2048	Avoided fertilizer use	lbs of fertilizer	0	54,922	54,922	$0.32	$17,795	0.103	$1,833
	Avoided introduction/ discharge of chlorides	MT of chlorides		242	242				$0
	Reduced CO2 Emissions	MT of CO_2	0	217	217				$0
2049	Avoided fertilizer use	lbs of fertilizer	0	54,922	54,922	$0.32	$17,795	0.097	$1,726
	Avoided introduction/ discharge of chlorides	MT of chlorides		242	242				$0
	Reduced CO2 Emissions	MT of CO_2	0	217	217				$0
2050	Avoided fertilizer use	lbs of fertilizer	0	54,922	54,922	$0.32	$17,795	0.092	$1,637
	Avoided introduction/ discharge of chlorides	MT of chlorides		242	242				$0
	Reduced CO2 Emissions	MT of CO_2	0	217	217				$0
2051	Avoided fertilizer use	lbs of fertilizer	0	54,922	54,922	$0.32	$17,795	0.087	$1,548
	Avoided introduction/ discharge of chlorides	MT of chlorides		242	242				$0
	Reduced CO2 Emissions	MT of CO_2	0	217	217				$0
2052	Avoided fertilizer use	lbs of fertilizer	0	54,922	54,922	$0.32	$17,795	0.082	$1,459
	Avoided introduction/ discharge of chlorides	MT of chlorides		242	242				$0
	Reduced CO2 Emissions	MT of CO_2	0	217	217				$0
2053	Avoided fertilizer use	lbs of fertilizer	0	54,922	54,922	$0.32	$17,795	0.077	$1,370
	Avoided introduction/ discharge of chlorides	MT of chlorides		242	242				$0
	Reduced CO2 Emissions	MT of CO_2	0	217	217				$0
2054	Avoided fertilizer use	lbs of fertilizer	0	54,922	54,922	$0.32	$17,795	0.073	$1,299
	Avoided introduction/ discharge of chlorides	MT of chlorides		242	242				$0
	Reduced CO2 Emissions	MT of CO_2	0	217	217				$0
2055	Avoided fertilizer use	lbs of fertilizer	0	54,922	54,922	$0.32	$17,795	0.069	$1,228
	Avoided introduction/ discharge of chlorides	MT of chlorides		242	242				$0
	Reduced CO2 Emissions	MT of CO_2	0	217	217				$0
2056	Avoided fertilizer use	lbs of fertilizer	0	54,922	54,922	$0.32	$17,795	0.065	$1,157
	Avoided introduction/ discharge of chlorides	MT of chlorides		242	242				$0
	Reduced CO2 Emissions	MT of CO_2	0	217	217				$0
2057	Avoided fertilizer use	lbs of fertilizer	0	54,922	54,922	$0.32	$17,795	0.061	$1,085
	Avoided introduction/ discharge of chlorides	MT of chlorides		242	242				$0
	Reduced CO2 Emissions	MT of CO_2	0	217	217				$0
2058	Avoided fertilizer use	lbs of fertilizer	0	54,922	54,922	$0.32	$17,795	0.058	$1,032
	Avoided introduction/ discharge of chlorides	MT of chlorides		242	242				$0
	Reduced CO2 Emissions	MT of CO_2	0	217	217				$0
2059	Avoided fertilizer use	lbs of fertilizer	0	54,922	54,922	$0.32	$17,795	0.054	$961
	Avoided introduction/ discharge of chlorides	MT of chlorides		242	242				$0
	Reduced CO2 Emissions	MT of CO_2	0	217	217				$0
2060	Avoided fertilizer use	lbs of fertilizer	0	54,922	54,922	$0.32	$17,795	0.051	$908
	Avoided introduction/ discharge of chlorides	MT of chlorides		242	242				$0
	Reduced CO2 Emissions	MT of CO_2	0	217	217				$0
2061	Avoided fertilizer use	lbs of fertilizer	0	54,922	54,922	$0.32	$17,795	0.048	$854
	Avoided introduction/ discharge of chlorides	MT of chlorides		242	242				$0
	Reduced CO2 Emissions	MT of CO_2	0	217	217				$0
2062	Avoided fertilizer use	lbs of fertilizer	0	54,922	54,922	$0.32	$17,795	0.046	$819
	Avoided introduction/ discharge of chlorides	MT of chlorides		242	242				$0
	Reduced CO2 Emissions	MT of CO_2	0	217	217				$0
2063	Avoided fertilizer use	lbs of fertilizer		54,922	54,922	$0.32	$17,795	0.043	$765
	Avoided introduction/ discharge of chlorides	MT of chlorides		242	242				$0
	Reduced CO2 Emissions	MT of CO_2		217	217				
Project Life	Avoided fertilizer use	lbs of fertilizer	0	2,663,722	2,663,722	$0.32	$ 863,046		$ 215,557
Project Life	Avoided introduction/ discharge of chlorides	MT of chlorides		11,982	11,982				
Project Life	Reduced CO2 Emissions	MT of CO_2	0	10,731	10,731				

Comments: Recycled water contains nitrogen, phosphorous and potassium not found in potable water. Use of recycled water for domestic landscape irrigation will avoid the use of 54,922 lbs of fertilizer per year. The average commercial value of fertilzier was used to compute the avoided fertilizer cost. Avoided use of SWP water avoids introduction of chlorides into the Watershed. The average concentration of chlorides in SWP water was assumed to be 79 mg/l, which is the value at Jensen filtration plant in 2009 and happens to be the middle of the range of chloride content of SWP water over the last 30 years. Use of recycled water from this project also avoids discharge of chlorides to the Santa Clara River. The average chloride concentration of discharges from the Valencia WRP is 137 mg/l. The project also will avoid emissions of carbon dixoide associated with the energy needed to deliver SWP water to CLWA.

Table 16a - Annual Costs of Avoided Projects

(All avoided costs should be in 2009 dollars)

Project: Santa Clarita Valley Southern End Recycled Water Project

	Costs				Discounting Calculations	
(a)	(b)	(c)	(d)	(e)	(f)	(g)
YEAR	Alternative (Avoided Project Name): Alternative Water Resources Management Program *Avoided Project Description: The purpose of the AWRM Program is to develop a regional watershed solution for chlorides. If the recycled water project is implemented, the AWRM program will be designed to treat 910 AFY less than currently planned. ·A descripton of the AWRM is included in Attachment 8 for the VWC Southern End Recycled Water Project.*				Discount Factor	Discounted Costs (e) x (f)
	Avoided Capital Costs	Avoided Replacement Costs	Avoided Operations and Maintenance Costs	Total Cost Avoided for Individual Alternatives (b) + (c) + (d)		
2009				$ -	1.00	$0
2010				$ -	0.943	$0
2011				$ -	0.890	$0
2012	$ 62,500,000			$ 62,500,000	0.840	$52,500,000
2013	$ 62,500,000			$ 62,500,000	0.792	$49,500,000
2014	$ 62,500,000			$ 62,500,000	0.747	$46,687,500
2015	$ 62,500,000			$ 62,500,000	0.705	$44,062,500
2016			4,471,830	$ 4,471,830	0.665	$2,973,767
2017			4,471,830	$ 4,471,830	0.627	$2,803,837
2018			4,471,830	$ 4,471,830	0.592	$2,647,323
2019			4,471,830	$ 4,471,830	0.558	$2,495,281
2020			4,471,830	$ 4,471,830	0.527	$2,356,654
2021			4,471,830	$ 4,471,830	0.497	$2,222,500
2022			4,471,830	$ 4,471,830	0.469	$2,097,288
2023			4,471,830	$ 4,471,830	0.442	$1,976,549
2024			4,471,830	$ 4,471,830	0.417	$1,864,753
2025			4,471,830	$ 4,471,830	0.394	$1,761,901
2026			4,471,830	$ 4,471,830	0.371	$1,659,049
2027			4,471,830	$ 4,471,830	0.350	$1,565,141
2028			4,471,830	$ 4,471,830	0.331	$1,480,176
2029			4,471,830	$ 4,471,830	0.312	$1,395,211
2030			4,471,830	$ 4,471,830	0.294	$1,314,718
2031			4,471,830	$ 4,471,830	0.278	$1,243,169
2032			4,471,830	$ 4,471,830	0.262	$1,171,619
2033			4,471,830	$ 4,471,830	0.247	$1,104,542
2034			4,471,830	$ 4,471,830	0.233	$1,041,936
2035			4,471,830	$ 4,471,830	0.220	$983,803
2036			4,471,830	$ 4,471,830	0.207	$925,669
2037			4,471,830	$ 4,471,830	0.196	$876,479
2038			4,471,830	$ 4,471,830	0.185	$827,289
2039			4,471,830	$ 4,471,830	0.174	$778,098
2040			4,471,830	$ 4,471,830	0.164	$733,380
2041			4,471,830	$ 4,471,830	0.155	$693,134
2042			4,471,830	$ 4,471,830	0.146	$652,887
2043			4,471,830	$ 4,471,830	0.138	$617,113
2044			4,471,830	$ 4,471,830	0.130	$581,338
2045			4,471,830	$ 4,471,830	0.123	$550,035
2046			4,471,830	$ 4,471,830	0.116	$518,732
2047			4,471,830	$ 4,471,830	0.109	$487,429
2048			4,471,830	$ 4,471,830	0.103	$460,598
2049			4,471,830	$ 4,471,830	0.097	$433,768
2050			4,471,830	$ 4,471,830	0.092	$411,408
2051			4,471,830	$ 4,471,830	0.087	$389,049
2052			4,471,830	$ 4,471,830	0.082	$366,690
2053			4,471,830	$ 4,471,830	0.077	$344,331
2054			4,471,830	$ 4,471,830	0.073	$326,444
2055			4,471,830	$ 4,471,830	0.069	$308,556
2056			4,471,830	$ 4,471,830	0.065	$290,669
2057			4,471,830	$ 4,471,830	0.061	$272,782
2058			4,471,830	$ 4,471,830	0.058	$259,366
2059			4,471,830	$ 4,471,830	0.054	$241,479
2060			4,471,830	$ 4,471,830	0.051	$228,063
2061			4,471,830	$ 4,471,830	0.048	$214,648
2062			4,471,830	$ 4,471,830	0.046	$205,704
2063			4,471,830	$ 4,471,830	0.043	$192,289
Total Present Value of Discounted Costs (Sum of Column (g))						$242,096,644
(%) Avoided Cost Claimed by Project						2.8%
Total Present Value of Discounted Avoided Project Costs Claimed by alternative Project (Total Present Value of Discounted Costs x % Avoided Cost Claimed by Project)						$6,875,545

Comments: . The use for domestic landscape irrigation of tertiary-treated effluent from the Valencia WRP will reduce AWRM implementation costs. Avoided costs for all of AWRM are shown in the tables, and 2.8% of this avoided cost is claimed for the Southern End Recycled Water Project. The 2.8% share was derived in the following manner: AWRM is designed to accommodate the wastewater effluent from the Valencia and Saugus WRPs, which treat about 32,000 AFY. As a result of the Southern End Recycled Water Project, SVCSD can design the AWRM to treat 910 less AFY of wastewater effluent. 910 AFY is 2.8% of 32,000 AFY.

Electrolysis and Volatilization for Bromide Removal and Disinfectant By-product Reduction Pilot Plant (CLWA-2)

Summary

This project will expand an innovative water treatment technique from a small pilot scale to a demonstration scale that will treat 350,000 gallons per day (gpd) of source water. This new technique, pioneered by the Castaic Lake Water Agency (CLWA), was developed to reduce the level of brominated disinfection by-products (DBPs) in finished drinking water by removing bromide from source waters received from the State Water Project (SWP). Brominated DBPs result from a reaction between naturally occurring bromide anions and disinfectants. CLWA's new treatment technique relies on passing source water through metal anodes where it undergoes both an electrolysis and volatilization process that oxidizes the brominated DBPs into bromine. This reduces the risk of adverse health impacts associated with brominated DBPs. CLWA's pilot project has demonstrated that this treatment technique can successfully reduce levels of brominated DBPs. If the demonstration project is shown to cost-effectively remove brominated DBPs at a greater scale, CLWA will incorporate the existing equipment into a larger project that will treat 7 million gallons per day (MGD), approximately one-half of daily plant wide production.

The benefits of this project can only be properly evaluated based on the full-scale implementation of the innovative technology being demonstrated. Therefore this economic analysis starts by considering the benefits of the larger-scale facility, and then apportions a share of the benefits to the smaller-scale demonstration project. The benefits are apportioned based on the percentage of the full-scale costs represented by this demonstration project.

A summary the benefits and costs of the demonstration project is provided in Table CLWA-2.1. Project costs and water supply benefits are discussed in the remainder of this attachment.

TABLE CLWA-2.1
BENEFIT-COST ANALYSIS OVERVIEW –DEMONSTRATION-SCALE PROJECT

	Present Value
Costs – Total Capital and O&M	$1,072,533
Monetizable Benefits	
Water Supply Benefits	
Avoided Flushing Due to Nitrification	$147,960
Water Quality Benefits	
Reduction in Chemical Costs	$53,055
Health Benefits From Improved Water Quality	$624,407
Avoided Costs Associated With Switching From Chloramine Treatment to Free Chlorine	$95,173
Total Monetized Benefits	$920,595
Qualitative Benefit or Cost	**Qualitative Indicator***
Water Quality and Other Benefits	
Developing an Innovative New Technique to Reduce Human Exposure to Brominated DBPs	++
More Effective and Flexible Drinking Water Disinfection Treatment	++
Modest Reduction in Influent Levels of Chloride, Ammonia, Brominated DBPs and Nutrients at the Wastewater Treatment Plant	+
Reduced Stress on Sacramento-San Joaquin Delta	+

O&M = operations and maintenance
* Direction and magnitude of effect on net benefits:
+ = Likely to increase net benefits relative to quantified estimates.
++ = Likely to increase net benefits significantly.
– = Likely to decrease net benefits.
– – = Likely to decrease net benefits significantly.
U = Uncertain, could be + or –.

Costs

The budgeted costs for the demonstration project total $1,261,210. The majority of these funds (approximately $975,450) will be allocated for construction and implementation of the demonstration project. Specific cost components include: mobilization and site preparation, project construction, and performance testing and demobilization. Remaining funds will be used on direct project administration costs, including general administration and a labor compliance program, along with planning and designing the demonstration project. Present value costs for the demonstration project total $1,072,533.

If the demonstration project is shown to successfully remove brominated DBPs, CLWA will scale this technology to treat 7 MGD. Scaling this technology will result in an initial capital cost of $14,000,000 in 2018. Operations costs are estimated to be $567,210 annually for the 30-year life of the full-scale project. The present value capital and O&M costs for the full-scale project are $11,906,334. Thus, the demonstration project represents roughly 9% of the present value costs of the full-scale project.

The "Without Project" Baseline

The Castaic Lake Water Agency (CLWA) provides customers with a blend of imported water from California's State Water Project and local groundwater. In 2010, CLWA imported close to 74,000 acre-feet of water. Much of this surface water originates from Lake Oroville near Sacramento. Source water flows through three power plants once it reaches the Oroville Dam before traveling down the Feather and Sacramento Rivers to reach the Sacramento-San Joaquin Delta. Source water then moves through the Delta to the Harvey O. Bank pumping plant where water then travels 300 miles south via the California Aqueduct. Finally, source water reaches the A.D. Edmonston Pumping Plant where it is pumped south through the West Branch of the California Aqueduct to Quail Lake, Pyramid, Lake and Castaic Lake to be processed by CLWA. In addition to SWP water, about 1/3 of CLWA's water supply consists of local groundwater. This mix is distributed to the following local water retailers: Los Angeles County Water District #36, Newhall County Water District, CLWA Santa Clarita Water Division, and Valencia Water Company.

SWP water has a number of water quality constituents that affect its suitability as a drinking water source. SWP water contains relatively high levels of bromide and total organic carbon (TOC), two elements that are of particular concern to drinking water agencies. Bromide and TOC combine with chemicals used in the water treatment process to form DBPs such as trihalomethanes (THMs), which are strictly regulated under the federal Safe Drinking Water Act. Currently, there are no standards for bromide or TOC in drinking water. Water treated by CLWA currently meets all federal and state drinking water standards. However, current levels of bromide and TOC are significantly higher than target levels identified by an expert panel hired by the California Urban Water Agencies. These levels are 50 parts per billion (ppb) for bromide and 3 parts per million (ppm) for TOC. Average SWP levels are significantly higher: up to 600% above the target level for bromide and 10% above the target level for TOC (Owen et al., 1998).

Without the project, CLWA will continue to receive SWP water with elevated bromide levels, and distribute water that meets current federal and state health standards but has elevated brominated DBPs (notably, bromate). CLWA will also need to retain its current reliance on chloramine disinfection in order to manage DBP levels while concurrently providing suitable microbial control. The continued reliance on chloramines is expensive, limits operational flexibility (e.g., allowing better use of existing ozonation disinfection facilities), and periodically leads to nitrification of the treated water (due to the ammonia levels associated with chloramine production). During episodes of elevated nitrification, the finished drinking water cannot be served to the public and instead must be flushed from the distribution system and replaced with other water.

If this demonstration project performs as anticipated, based on the pilot study, CLWA can move forward with larger-scale implementation of the technology. Thus, this demonstration-scale project is a gateway to a wide range of highly valuable benefits for the CLWA and its retail water purveyor. In other words, the benefits of the demonstration-scale project are integrally linked to the anticipated benefits of full-scale implementation. If the demonstration project performs as anticipated, the benefits will be realized as described in these Attachments 7 and 8, and a portion of the full-scale benefits can be attributed to the demonstration-scale project.

If, on the other hand, the project indicates problems with the technology at the demonstration scale, then the CLWA will realize benefits by avoiding the cost associated with full-scale implementation of an approach that does not perform as anticipated from the pilot test alone (e.g., a substantial cost savings will be realized by CLWA by avoiding a poor investment). Or, the limitations made evident by the demonstration project can lead to technology and/or operational improvements that might enhance the new approach and increase its net benefits. These scenarios are not included in this assessment, but they indicate in a qualitative manner how the demonstration project can provide benefits even if it does not perform as well as anticipated.

Water Supply Benefits

This section describes the water supply benefits generated by the development of a full-scale treatment process that will remove brominated DBPs from source water, including the avoided cost from a decrease in water flushed as a result of nitrification. The demonstration-scale project is then assigned benefits according to the ratio of the costs of the demonstration-scale project to the full-scale project.

Avoided Flushing Due to Nitrification

The full-scale project will allow CLWA to reduce the amount of ammonia used in chloramine chemical treatment. This will result in a corresponding decrease in nitrification of finished water. Because nitrification results in taste and odor problems, much of this water must be flushed instead of provided to local water retailers. Without this project, source water will continue to experience nitrification, forcing CLWA to replace flushed water with additional purchases of imported water through the SWP.

The completion of the full scale project will result in a total savings of 159 acre-feet per year (AFY), based on current water use levels. Water demand in this region is expected to increase by 2.2% per year, in line with population growth, and so the amount of water saved can also be anticipated to increase by this amount per year.

To monetize the water supply savings, the expected water savings per year is multiplied by CLWA's costs associated with importing water. CLWA has a contractual Table A amount of 95,200 AFY of water from SWP. However, the marginal source of SWP water for CLWA is the water being purchased from the Buena Vista-Rosedale Rio-Bravo Water Districts (BV/RRB) in Kern County. CLWA receives part of Buena Vista's Kern River entitlements through exchange of BV/RRB's SWP supplies. The cost of this water in 2007 was estimated to be $790/AF, or $822/AF when updated to 2009 dollars. This includes the cost of purchase, wheeling, and treatment, and factors in system losses (A&N Technical Services, 2008). It is assumed that this cost will rise at the rate of inflation after 2009, thus remaining constant in real dollars.

Over the lifetime of the full-scale project, this results in a total present value benefit from avoided water flushing due to nitrification of $1,642,519 over the assumed 30-year life of the project. The demonstration project can be attributed a 9% share of these benefits based on the ratio of cost of the demonstration-scale project relative to the cost of the full-scale project. Thus, the present value of benefit attributed to the demonstration-scale project is $147,960.

Distribution of Project Benefits, and Identification of Beneficiaries

The bromide removal project includes the full range of beneficiaries, as is shown in Table CLWA-2.2. The decrease in the amount of source water that must be flushed due to nitrification will benefit CLWA and its retail water purveyors, and will provide statewide benefits by reducing future demands on water supplies from the Sacramento-San Joaquin Delta region.

TABLE CLWA-2.2
PROJECT BENEFICIARIES SUMMARY

Local	Regional	Statewide
CLWA Santa Clarita Water Division, LA County Waterworks District 36, Newhall County Water District, Valencia Water Company	Castaic Lake Water Agency, Santa Clarita Valley Sanitation District	Sacramento-San Joaquin Delta

Project Benefits Timeline Description

This demonstration-scale project will treat 350,000 gpd for three years, beginning in July 2011 and lasting until July 2014. If this technology proves to be effective, it will be scaled up to a full-scale treatment project capable of treating 7 MGD. Construction of the full-scale project would begin January 2017 and end July 2018. Once the full-scale treatment process has been completed, it will provide water treatment benefits for approximately 30 years.

Potential Adverse Effects from the Project

This technology, which relies on metal anode plates to treat source water, is highly energy intensive. The project will demand greater amounts of energy than the water treatment facility has used in the past. If this energy is not procured from renewable sources, then this project will result in an increase in GHG emissions and the associated carbon footprint of the CLWA. However, reduced GHG emissions from reduced SWP water imports will at least partially offset this effect. CLWA is also in the process of constructing a solar power plant at the Rio Vista Water Treatment Plant to offset its electrical demand.

Summary of Findings

This project will allow CLWA to reduce the amount of water it must flush due to nitrification. CLWA will be able to purchase less imported water, resulting in a decrease in demand on existing water supplies and substantial costs savings, totaling a present value of $152,510 for the demonstration-scale project.

This analysis of costs and benefits is based on available data and some assumptions. As a result, there may be some omissions, uncertainties, and possible biases. In this analysis, the main uncertainties are associated with the attribution of demonstration-scale benefits to full-scale implementation. This issue is discussed in Table CLWA-2.3.

TABLE CLWA-2.3
OMISSIONS, BIASES, AND UNCERTAINTIES, AND THEIR EFFECT ON THE PROJECT

Benefit or Cost Category	Likely Impact on Net Benefits*	Comment
Basing demonstration-scale benefits on a cost-based percentage of the benefits of full-scale implementation of the innovative bromide control technology.	U	The benefits of the demonstration-scale project are linked to the anticipated benefits of full-scale implementation. If the demonstration projects performs as anticipated, the benefits will be realized as described in Attachments 7 and 8. If the project indicates problems with the technology at the demonstration scale, then CLWA will realize benefits by avoiding full-scale implementation of an approach that does not perform as anticipated from the pilot test alone (e.g., a substantial savings from avoiding a poor investment), or can lead to technology improvements that enhance the new approach and its net benefits.

*Direction and magnitude of effect on net benefits:
+ = Likely to increase net benefits relative to quantified estimates.
++ = Likely to increase net benefits significantly.
– = Likely to decrease net benefits.
– – = Likely to decrease net benefits significantly.
U = Uncertain, could be + or –.

References

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Table 11- Annual Cost of Demonstration Project (All costs should be in 2009 Dollars) Project: Electrolysis and Volatilization for Bromide Removal and Disinfectant Byproduct Reduction Pilot Plant (CLWA-2)									
	Initial Costs	Operations and Maintenance Costs [1]						Discounting Calculations	
	(a)	(b)	(c)	(d)	(e)	(f)	(g)	(h)	(i)
YEAR	Grand Total Cost From Table 7 (row (i), column(d))***	Admin	Operation	Maintenance	Replacement	Other	Total Costs (a) +...+ (f)	Discount Factor	Discounted Costs(g) x (h)
2009	$0						$0	1.000	$0
2010	$0						$0	0.943	$0
2011	$504,484						$504,484	0.890	$448,991
2012	$504,484						$504,484	0.840	$423,767
2013	$252,242						$252,242	0.792	$199,776
2014	$0						$0	0.747	$0
Project Life	$1,261,210							…	
Total Present Value of Discounted Costs (Sum of Column (i)) Transfer to Table 20, column (c), Exhibit F: Proposal Costs and Benefits Summaries									$1,072,533
Comments: Costs in this table show the budgeted costs associated with constructing and operating the demonstration-scale project.									

Table 11- Annual Cost of Full-Scale Project

(All costs should be in 2009 Dollars)

Project: Electrolysis and Volatilization for Bromide Removal and Disinfectant Byproduct Reduction Pilot Plant (CLWA-2)

	Initial Costs	Operations and Maintenance Costs [1]						Discounting Calculations	
	(a)	(b)	(c)	(d)	(e)	(f)	(g)	(h)	(i)
YEAR	Grand Total Cost From Table 7 (row (i), column(d))***	Admin	Operation	Maintenance	Replacement	Other	Total Costs (a) +…+ (f)	Discount Factor	Discounted Costs(g) x (h)
2009	$0						$0	1.000	$0
2010	$0						$0	0.943	$0
2011	$0						$0	0.890	$0
2012	$0						$0	0.840	$0
2013	$0						$0	0.792	$0
2014	$0						$0	0.747	$0
2015	$0						$0	0.705	$0
2016	$0						$0	0.665	$0
2017	$9,333,333						$9,333,333	0.558	$5,211,685
2018	$4,666,667		$283,605.00				$4,950,272	0.527	$2,607,741
2019	$0		$567,210.00				$567,210	0.497	$281,886
2020	$0		$567,210.00				$567,210	0.469	$265,930
2021	$0		$567,210.00				$567,210	0.442	$250,878
2022	$0		$567,210.00				$567,210	0.417	$236,677
2023	$0		$567,210.00				$567,210	0.394	$223,280
2024	$0		$567,210.00				$567,210	0.371	$210,642
2025	$0		$567,210.00				$567,210	0.350	$198,719
2026	$0		$567,210.00				$567,210	0.331	$187,470
2027	$0		$567,210.00				$567,210	0.312	$176,859
2028	$0		$567,210.00				$567,210	0.294	$166,848
2029	$0		$567,210.00				$567,210	0.278	$157,404
2030	$0		$567,210.00				$567,210	0.262	$148,494
2031	$0		$567,210.00				$567,210	0.247	$140,089
2032	$0		$567,210.00				$567,210	0.233	$132,159
2033	$0		$567,210.00				$567,210	0.220	$124,678
2034	$0		$567,210.00				$567,210	0.207	$117,621
2035	$0		$567,210.00				$567,210	0.196	$110,963
2036	$0		$567,210.00				$567,210	0.185	$104,682
2037	$0		$567,210.00				$567,210	0.174	$98,757
2038	$0		$567,210.00				$567,210	0.164	$93,167
2039	$0		$567,210.00				$567,210	0.155	$87,893
2040	$0		$567,210.00				$567,210	0.146	$82,918
2041	$0		$567,210.00				$567,210	0.138	$78,225
2042	$0		$567,210.00				$567,210	0.130	$73,797
2043	$0		$567,210.00				$567,210	0.123	$69,620
2044	$0		$567,210.00				$567,210	0.116	$65,679
2045	$0		$567,210.00				$567,210	0.109	$61,961
2046	$0		$567,210.00				$567,210	0.103	$58,454
2047	$0		$567,210.00				$567,210	0.097	$55,145
2048	$0		$283,605.00				$283,605	0.092	$26,012
Project Life								…	
Total Present Value of Discounted Costs (Sum of Column (i)) Transfer to Table 20, column (c), Exhibit F: Proposal Costs and Benefits Summaries									$11,906,334

Comments: Costs in this table are associated with constructing and operating the full-scale project, assuming the demonstration project is successful.

Table 12 - Annual Water Supply Benefits

(All benefits should be in 2009 dollars)

Project: Electrolysis and Volatilization for Bromide Removal and Disinfectant Byproduct Reduction Pilot Plant (CLWA-2)

(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 (f) x (g) (1)	Discount Factor (1)	Discounted Benefits (h) x (i) (1)
2009	Reduced Flushing due to Nitrification	Acre Feet per Year (AFY)	0	0	0	$822	$0	1.000	$0
2010	Reduced Flushing due to Nitrification	AFY	0	0	0	$822	$0	0.943	$0
2011	Reduced Flushing due to Nitrification	AFY	0	0	0	$822	$0	0.890	$0
2012	Reduced Flushing due to Nitrification	AFY	0	0	0	$822	$0	0.840	$0
2013	Reduced Flushing due to Nitrification	AFY	0	0	0	$822	$0	0.792	$0
2014	Reduced Flushing due to Nitrification	AFY	0	0	0	$822	$0	0.747	$0
2015	Reduced Flushing due to Nitrification	AFY	0	0	0	$822	$0	0.705	$0
2016	Reduced Flushing due to Nitrification	AFY	0	0	0	$822	$0	0.665	$0
2017	Reduced Flushing due to Nitrification	AFY	0	0	0	$822	$0	0.627	$0
2018	Reduced Flushing due to Nitrification	AFY	0	93	93	$822	$76,102	0.592	$45,045
2019	Reduced Flushing due to Nitrification	AFY	0	189	189	$822	$155,552	0.558	$86,860
2020	Reduced Flushing due to Nitrification	AFY	0	193	193	$822	$158,974	0.527	$83,746
2021	Reduced Flushing due to Nitrification	AFY	0	198	198	$822	$162,472	0.497	$80,743
2022	Reduced Flushing due to Nitrification	AFY	0	202	202	$822	$166,046	0.469	$77,849
2023	Reduced Flushing due to Nitrification	AFY	0	206	206	$822	$169,699	0.442	$75,058
2024	Reduced Flushing due to Nitrification	AFY	0	211	211	$822	$173,433	0.417	$72,367
2025	Reduced Flushing due to Nitrification	AFY	0	216	216	$822	$177,248	0.394	$69,773
2026	Reduced Flushing due to Nitrification	AFY	0	220	220	$822	$181,148	0.371	$67,272
2027	Reduced Flushing due to Nitrification	AFY	0	225	225	$822	$185,133	0.350	$64,860
2028	Reduced Flushing due to Nitrification	AFY	0	230	230	$822	$189,206	0.331	$62,535
2029	Reduced Flushing due to Nitrification	AFY	0	235	235	$822	$193,368	0.312	$60,293
2030	Reduced Flushing due to Nitrification	AFY	0	240	240	$822	$197,622	0.294	$58,132
2031	Reduced Flushing due to Nitrification	AFY	0	246	246	$822	$201,970	0.278	$56,048
2032	Reduced Flushing due to Nitrification	AFY	0	251	251	$822	$206,413	0.262	$54,038
2033	Reduced Flushing due to Nitrification	AFY	0	257	257	$822	$210,954	0.247	$52,101
2034	Reduced Flushing due to Nitrification	AFY	0	262	262	$822	$215,595	0.233	$50,233
2035	Reduced Flushing due to Nitrification	AFY	0	268	268	$822	$220,339	0.220	$48,433
2036	Reduced Flushing due to Nitrification	AFY	0	274	274	$822	$225,186	0.207	$46,696
2037	Reduced Flushing due to Nitrification	AFY	0	280	280	$822	$230,140	0.196	$45,022
2038	Reduced Flushing due to Nitrification	AFY	0	286	286	$822	$235,203	0.185	$43,408
2039	Reduced Flushing due to Nitrification	AFY	0	292	292	$822	$240,378	0.174	$41,852
2040	Reduced Flushing due to Nitrification	AFY	0	299	299	$822	$245,666	0.164	$40,352
2041	Reduced Flushing due to Nitrification	AFY	0	305	305	$822	$251,071	0.155	$38,905
2042	Reduced Flushing due to Nitrification	AFY	0	312	312	$822	$256,594	0.146	$37,511
2043	Reduced Flushing due to Nitrification	AFY	0	319	319	$822	$262,239	0.138	$36,166
2044	Reduced Flushing due to Nitrification	AFY	0	326	326	$822	$268,008	0.130	$34,869
2045	Reduced Flushing due to Nitrification	AFY	0	333	333	$822	$273,905	0.123	$33,619
2046	Reduced Flushing due to Nitrification	AFY	0	341	341	$822	$279,931	0.116	$32,414
2047	Reduced Flushing due to Nitrification	AFY	0	348	348	$822	$286,089	0.109	$31,252
2048	Reduced Flushing due to Nitrification	AFY	0	178	178	$822	$146,191	0.103	$15,066
Project Life								…	
Total Present Value of Discounted Benefits Based on Unit Value (Sum of the values in Column (j) for all Benefits shown in table)									**$1,642,519**
(%) Benefit Claimed by Project									**9.0%**
Total Present Value of Discounted Avoided Project Costs Claimed by alternative Project (Total Present Value of Discounted Costs x % Avoided Cost Claimed by Project)									**$147,960**

Comments: Reduced flushing due to nitrification leads to decreased use of SWP water. CLWA's marginal source of SWP water is the water being purchased from the Buena Vista-Rosedale Rio-Bravo Water Districts (BV/RRB) in Kern County. The cost of this water is estimated to be $822 per AF, when adjusted to 2009 dollars. The total present value of discounted benefits shown is for the full-scale treatment project, which are then adjusted by the ratio of cost of the demonstration phase to the full-scale phase in order to apportion benefits to the demonstration phase.

Table 15. Total Water Supply Benefits (All benefits should be in 2009 dollars)			
Project: Electrolysis and Volatilization for Bromide Removal and Disinfectant Byproduct Reduction Pilot Plant (CLWA-2)			
Total Discounted Water Supply Benefits (a)	Total Discounted Avoided Project Costs (b)	Other Discounted Water Supply Benefits (c)	Total Present Value of Discounted Benefits (d) (a) + (c) or (b) + (c)
$ 147,960			$ 147,960
Comments:			

Table 16 - Water Quality and Other Expected Benefits

(All benefits should be in 2009 dollars)

Project: Electrolysis and Volatilization for Bromide Removal and Disinfectant Byproduct Reduction Pilot Plant (CLWA-2)

(a) Year	(b) Type of Benefit	(c) Measure of Benefit (Units)	(d) Without Project	(e) With Project	(f) Change Resulting from Project (e) – (d)	(g) Unit $ Value (1)	(h) Annual $ Value (f) x (g) (1)	(i) Discount Factor (1)	(j) Discounted Benefits (h) x (i) (1)
2009	Reduction in Chemical Costs	Dollars	$0	$0.00	0		$0	1.000	$0
	Health Benefit	0.118 (Cases Avoided Annualy)	$0	$0.00	0		$0	1.000	$0
	Switching to Free Chlorine	Dollars	$0	$0	0		$0	1.000	$0
	..				0		$0	1.000	$0
2010	Reduction in Chemical Costs	Dollars	$0	$0.00	0		$0	0.943	$0
	Health Benefit	0.118 (Cases Avoided Annualy)	$0	$0.00	0		$0	0.943	$0
	Switching to Free Chlorine	Dollars	$0	$0	0		$0	0.943	$0
	..				0		$0	0.943	$0
2011	Reduction in Chemical Costs	Dollars	$0	$0.00	0	$1	$0	0.890	$0
	Health Benefit	0.118 (Cases Avoided Annualy)	$0	$0.00	0	$1	$0	0.890	$0
	Switching to Free Chlorine	Dollars	$0	$0	0	$1	$0	0.890	$0
	..								
2012	Reduction in Chemical Costs	Dollars	$0	$0.00	0	$1	$0	0.840	$0
	Health Benefit	0.118 (Cases Avoided Annualy)	$0	$0.00	0	$1	$0	0.840	$0
	Switching to Free Chlorine	Dollars	$0	$0	0	$1	$0	0.840	$0
	..								
2013	Reduction in Chemical Costs	Dollars	$0	$0.00	0	$1	$0	0.792	$0
	Health Benefit	0.118 (Cases Avoided Annualy)	$0	$0.00	0	$1	$0	0.792	$0
	Switching to Free Chlorine	Dollars	$0	$0	0	$1	$0	0.792	$0
	..								
2014	Reduction in Chemical Costs	Dollars	$0	$0.00	0	$1	$0	0.747	$0
	Health Benefit	0.118 (Cases Avoided Annualy)	$0	$0.00	0	$1	$0	0.747	$0
	Switching to Free Chlorine	Dollars	$0	$0	0	$1	$0	0.747	$0
	..								
2015	Reduction in Chemical Costs	Dollars	$0	$0.00	0	$1	$0	0.705	$0
	Health Benefit	0.118 (Cases Avoided Annualy)	$0	$0.00	0	$1	$0	0.705	$0
	Switching to Free Chlorine	Dollars	$0	$0	0	$1	$0	0.705	$0
	..								
2016	Reduction in Chemical Costs	Dollars	$0	$0.00	0	$1	$0	0.665	$0
	Health Benefit	0.118 (Cases Avoided Annualy)	$0	$0.00	0	$1	$0	0.665	$0
	Switching to Free Chlorine	Dollars	$0	$0	0	$1	$0	0.665	$0
	..								
2017	Reduction in Chemical Costs	Dollars	$0	$0.00	0	$1	$0	0.627	$0
	Health Benefit	0.118 (Cases Avoided Annualy)	$0	$0.00	0	$1	$0	0.627	$0
	Switching to Free Chlorine	Dollars	$0	$0	0	$1	$0	0.627	$0
	..								
2018	Reduction in Chemical Costs	Dollars	$0	$35,092	$35,092	$1	$35,092	0.592	$20,771
	Health Benefit	0.118 (Cases Avoided Annualy)	$0	$413,000	$413,000	$1	$413,000	0.592	$244,454
	Switching to Free Chlorine	Dollars	$0	$62,950	$62,950	$1	$62,950	0.592	$37,260
	..								
2019	Reduction in Chemical Costs	Dollars	$0	$70,184	$70,184	$1	$70,184	0.558	$39,190
	Health Benefit	0.118 (Cases Avoided Annualy)	$0	$826,000	$826,000	$1	$826,000	0.558	$461,234
	Switching to Free Chlorine	Dollars	$0	$125,900	$125,900	$1	$125,900	0.558	$70,302
	..								
2020	Reduction in Chemical Costs	Dollars	$0	$70,184	$70,184	$1	$70,184	0.527	$36,972
	Health Benefit	0.118 (Cases Avoided Annualy)	$0	$826,000	$826,000	$1	$826,000	0.527	$435,126
	Switching to Free Chlorine	Dollars	$0	$125,900	$125,900	$1	$125,900	0.527	$66,323
	..								
2021	Reduction in Chemical Costs	Dollars	$0	$70,184	$70,184	$1	$70,184	0.497	$34,879
	Health Benefit	0.118 (Cases Avoided Annualy)	$0	$826,000	$826,000	$1	$826,000	0.497	$410,497
	Switching to Free Chlorine	Dollars	$0	$125,900	$125,900	$1	$125,900	0.497	$62,568
	..								
2022	Reduction in Chemical Costs	Dollars	$0	$70,184	$70,184	$1	$70,184	0.469	$32,905
	Health Benefit	0.118 (Cases Avoided Annualy)	$0	$826,000	$826,000	$1	$826,000	0.469	$387,261
	Switching to Free Chlorine	Dollars	$0	$125,900	$125,900	$1	$125,900	0.469	$59,027
	..								
2023	Reduction in Chemical Costs	Dollars	$0	$70,184	$70,184	$1	$70,184	0.442	$31,043
	Health Benefit	0.118 (Cases Avoided Annualy)	$0	$826,000	$826,000	$1	$826,000	0.442	$365,341
	Switching to Free Chlorine	Dollars	$0	$125,900	$125,900	$1	$125,900	0.442	$55,686
	..								
2024	Reduction in Chemical Costs	Dollars	$0	$70,184	$70,184	$1	$70,184	0.417	$29,285
	Health Benefit	0.118 (Cases Avoided Annualy)	$0	$826,000	$826,000	$1	$826,000	0.417	$344,661
	Switching to Free Chlorine	Dollars	$0	$125,900	$125,900	$1	$125,900	0.417	$52,534
	..								
2025	Reduction in Chemical Costs	Dollars	$0	$70,184	$70,184	$1	$70,184	0.394	$27,628
	Health Benefit	0.118 (Cases Avoided Annualy)	$0	$826,000	$826,000	$1	$826,000	0.394	$325,152
	Switching to Free Chlorine	Dollars	$0	$125,900	$125,900	$1	$125,900	0.394	$49,560
	..								
2026	Reduction in Chemical Costs	Dollars	$0	$70,184	$70,184	$1	$70,184	0.371	$26,064
	Health Benefit	0.118 (Cases Avoided Annualy)	$0	$826,000	$826,000	$1	$826,000	0.371	$306,747
	Switching to Free Chlorine	Dollars	$0	$125,900	$125,900	$1	$125,900	0.371	$46,755
	..								
2027	Reduction in Chemical Costs	Dollars	$0	$70,184	$70,184	$1	$70,184	0.350	$24,589
	Health Benefit	0.118 (Cases Avoided Annualy)	$0	$826,000	$826,000	$1	$826,000	0.350	$289,384
	Switching to Free Chlorine	Dollars	$0	$125,900	$125,900	$1	$125,900	0.350	$44,108
	..								
2028	Reduction in Chemical Costs	Dollars	$0	$70,184	$70,184	$1	$70,184	0.331	$23,197
	Health Benefit	0.118 (Cases Avoided Annualy)	$0	$826,000	$826,000	$1	$826,000	0.331	$273,004
	Switching to Free Chlorine	Dollars	$0	$125,900	$125,900	$1	$125,900	0.331	$41,612
	..								
2029	Reduction in Chemical Costs	Dollars	$0	$70,184	$70,184	$1	$70,184	0.312	$21,884
	Health Benefit	0.118 (Cases Avoided Annualy)	$0	$826,000	$826,000	$1	$826,000	0.312	$257,551
	Switching to Free Chlorine	Dollars	$0	$125,900	$125,900	$1	$125,900	0.312	$39,256
	..								
2030	Reduction in Chemical Costs	Dollars	$0	$70,184	$70,184	$1	$70,184	0.294	$20,645
	Health Benefit	0.118 (Cases Avoided Annualy)	$0	$826,000	$826,000	$1	$826,000	0.294	$242,972
	Switching to Free Chlorine	Dollars	$0	$125,900	$125,900	$1	$125,900	0.294	$37,034
	..								
2031	Reduction in Chemical Costs	Dollars	$0	$70,184	$70,184	$1	$70,184	0.278	$19,476
	Health Benefit	0.118 (Cases Avoided Annualy)	$0	$826,000	$826,000	$1	$826,000	0.278	$229,219
	Switching to Free Chlorine	Dollars	$0	$125,900	$125,900	$1	$125,900	0.278	$34,938

Table 16 - Water Quality and Other Expected Benefits

(All benefits should be in 2009 dollars)

Project: Electrolysis and Volatilization for Bromide Removal and Disinfectant Byproduct Reduction Pilot Plant (CLWA-2)

(a) Year	(b) Type of Benefit	(c) Measure of Benefit (Units)	(d) Without Project	(e) With Project	(f) Change Resulting from Project (e) – (d)	(g) Unit $ Value (1)	(h) Annual $ Value (f) x (g) (1)	(i) Discount Factor (1)	(j) Discounted Benefits (h) x (i) (1)
	..								
2032	Reduction in Chemical Costs	Dollars	$0	$70,184	$70,184	$1	$70,184	0.262	$18,374
	Health Benefit	0.118 (Cases Avoided Annualy)	$0	$826,000	$826,000	$1	$826,000	0.262	$216,245
	Switching to Free Chlorine	Dollars	$0	$125,900	$125,900	$1	$125,900	0.262	$32,960
	..								
2033	Reduction in Chemical Costs	Dollars	$0	$70,184	$70,184	$1	$70,184	0.247	$17,334
	Health Benefit	0.118 (Cases Avoided Annualy)	$0	$826,000	$826,000	$1	$826,000	0.247	$204,004
	Switching to Free Chlorine	Dollars	$0	$125,900	$125,900	$1	$125,900	0.247	$31,095
	..								
2034	Reduction in Chemical Costs	Dollars	$0	$70,184	$70,184	$1	$70,184	0.233	$16,353
	Health Benefit	0.118 (Cases Avoided Annualy)	$0	$826,000	$826,000	$1	$826,000	0.233	$192,457
	Switching to Free Chlorine	Dollars	$0	$125,900	$125,900	$1	$125,900	0.233	$29,335
	..								
2035	Reduction in Chemical Costs	Dollars	$0	$70,184	$70,184	$1	$70,184	0.220	$15,427
	Health Benefit	0.118 (Cases Avoided Annualy)	$0	$826,000	$826,000	$1	$826,000	0.220	$181,563
	Switching to Free Chlorine	Dollars	$0	$125,900	$125,900	$1	$125,900	0.220	$27,674
	..								
2036	Reduction in Chemical Costs	Dollars	$0	$70,184	$70,184	$1	$70,184	0.207	$14,554
	Health Benefit	0.118 (Cases Avoided Annualy)	$0	$826,000	$826,000	$1	$826,000	0.207	$171,286
	Switching to Free Chlorine	Dollars	$0	$125,900	$125,900	$1	$125,900	0.207	$26,108
	..								
2037	Reduction in Chemical Costs	Dollars	$0	$70,184	$70,184	$1	$70,184	0.196	$13,730
	Health Benefit	0.118 (Cases Avoided Annualy)	$0	$826,000	$826,000	$1	$826,000	0.196	$161,590
	Switching to Free Chlorine	Dollars	$0	$125,900	$125,900	$1	$125,900	0.196	$24,630
	..								
2038	Reduction in Chemical Costs	Dollars	$0	$70,184	$70,184	$1	$70,184	0.185	$12,953
	Health Benefit	0.118 (Cases Avoided Annualy)	$0	$826,000	$826,000	$1	$826,000	0.185	$152,444
	Switching to Free Chlorine	Dollars	$0	$125,900	$125,900	$1	$125,900	0.185	$23,236
	..								
2039	Reduction in Chemical Costs	Dollars	$0	$70,184	$70,184	$1	$70,184	0.174	$12,220
	Health Benefit	0.118 (Cases Avoided Annualy)	$0	$826,000	$826,000	$1	$826,000	0.174	$143,815
	Switching to Free Chlorine	Dollars	$0	$125,900	$125,900	$1	$125,900	0.174	$21,920
	..								
2040	Reduction in Chemical Costs	Dollars	$0	$70,184	$70,184	$1	$70,184	0.164	$11,528
	Health Benefit	0.118 (Cases Avoided Annualy)	$0	$826,000	$826,000	$1	$826,000	0.164	$135,674
	Switching to Free Chlorine	Dollars	$0	$125,900	$125,900	$1	$125,900	0.164	$20,680
	..								
2041	Reduction in Chemical Costs	Dollars	$0	$70,184	$70,184	$1	$70,184	0.155	$10,876
	Health Benefit	0.118 (Cases Avoided Annualy)	$0	$826,000	$826,000	$1	$826,000	0.155	$127,995
	Switching to Free Chlorine	Dollars	$0	$125,900	$125,900	$1	$125,900	0.155	$19,509
	..								
2042	Reduction in Chemical Costs	Dollars	$0	$70,184	$70,184	$1	$70,184	0.146	$10,260
	Health Benefit	0.118 (Cases Avoided Annualy)	$0	$826,000	$826,000	$1	$826,000	0.146	$120,750
	Switching to Free Chlorine	Dollars	$0	$125,900	$125,900	$1	$125,900	0.146	$18,405
	..								
2043	Reduction in Chemical Costs	Dollars	$0	$70,184	$70,184	$1	$70,184	0.138	$9,679
	Health Benefit	0.118 (Cases Avoided Annualy)	$0	$826,000	$826,000	$1	$826,000	0.138	$113,915
	Switching to Free Chlorine	Dollars	$0	$125,900	$125,900	$1	$125,900	0.138	$17,363
	..								
2044	Reduction in Chemical Costs	Dollars	$0	$70,184	$70,184	$1	$70,184	0.130	$9,131
	Health Benefit	0.118 (Cases Avoided Annualy)	$0	$826,000	$826,000	$1	$826,000	0.130	$107,467
	Switching to Free Chlorine	Dollars	$0	$125,900	$125,900	$1	$125,900	0.130	$16,380
	..								
2045	Reduction in Chemical Costs	Dollars	$0	$70,184	$70,184	$1	$70,184	0.123	$8,614
	Health Benefit	0.118 (Cases Avoided Annualy)	$0	$826,000	$826,000	$1	$826,000	0.123	$101,384
	Switching to Free Chlorine	Dollars	$0	$125,900	$125,900	$1	$125,900	0.123	$15,453
	..								
2046	Reduction in Chemical Costs	Dollars	$0	$70,184	$70,184	$1	$70,184	0.116	$8,127
	Health Benefit	0.118 (Cases Avoided Annualy)	$0	$826,000	$826,000	$1	$826,000	0.116	$95,645
	Switching to Free Chlorine	Dollars	$0	$125,900	$125,900	$1	$125,900	0.116	$14,578
	..								
2047	Reduction in Chemical Costs	Dollars	$0	$70,184	$70,184	$1	$70,184	0.109	$7,667
	Health Benefit	0.118 (Cases Avoided Annualy)	$0	$826,000	$826,000	$1	$826,000	0.109	$90,231
	Switching to Free Chlorine	Dollars	$0	$125,900	$125,900	$1	$125,900	0.109	$13,753
	..								
2048	Reduction in Chemical Costs	Dollars	$0	$35,092	$35,092	$1	$35,092	0.103	$3,616
	Health Benefit	0.118 (Cases Avoided Annualy)	$0	$413,000	$413,000	$1	$413,000	0.103	$42,562
	Switching to Free Chlorine	Dollars	$0	$62,950	$62,950	$1	$62,950	0.103	$6,487
Project Life								…	
Total Present Value of Discounted Benefits Based on Unit Value (Sum of the values in Column (j) for all Benefits shown in table)									**$8,577,130**
(%) Benefit Claimed by Project									**9.0%**
Total Present Value of Discounted Avoided Project Costs Claimed by alternative Project (Total Present Value of Discounted Costs x % Avoided Cost Claimed by Project)									**$772,635**

Comments: For the CLWA, this new treatment technique will allow the water utility to reduce its costs in the amount of chlorine and ammonia necessary for achieving water treatment standards.This treatment technique will result in monetizable health benefits for customers who drink this water, due to reduced cancer risk. Additionally there are savings from switching from chloramines to free clorine from not using chemcials necessary to make chloramines including salt, ammonioum hydroxide, sampling reagents and sodium hypochlorite, along with using less electricity and labor. The total present value of discounted benefits shown is for the full-scale treatment project, which are then adjusted by the ratio of cost of the demonstration phase to the full-scale phase in order to apportion benefits to the demonstration phase.

Santa Clara River, San Francisquito Creek Arundo and Tamarisk Removal Project (SC-1/USFS-1)

Summary

The Santa Clara River Arundo and Tamarisk Removal Plan (SCARP) identifies programs and projects that will most effectively remove arundo, tamarisk, and other invasive plants from the Upper Santa Clara River. Implementation of the SCARP within the Upper Santa Clara River Watershed (Watershed) will be conducted in two phases. Phase 1 of the project will remove arundo and tamarisk in the site specific implementation area (Project Area 1), which includes approximately 297 acres. Phase 2 of the project will continue the removal of arundo and tamarisk outside of Project Area 1, up into City- owned reaches along San Franciscquito and Bouquet Canyon Creeks, and eventually into Angeles National Forest.

The Santa Clara River, San Francisquito Creek Arundo and Tamarisk Removal Project will finish the implementation of the Santa Clarita Site Specific Plan (SSP), and move SCARP into the Santa Clara River Long Term Implementation Plan. The project will implement Phases D through G of the SSP, which includes the removal of arundo and tamarisk within roughly half of the total SSP project area (about 150 of the 297 acres). In total, 20 acres of arundo and tamarisk will be removed from targeted locations throughout the 150-acre project area.

Two types of restoration efforts will be employed to ensure effective eradication of the invasive species. The first effort will include non-native biomass removal and herbicide application. Arundo may be ground in place with mechanical equipment such as a brush grinder (where appropriate), or removed by manual means employing tools such as chainsaws and brush cutters. Herbicide application will ensure after removal. After this initial treatment, a diligent monitoring and maintenance program will be implemented to facilitate re-treatments, and avoid re-infestation of the site.

Native species common to this area such as willows (Salix sp.) and mule fat (Baccharis salicifolia) will reestablish readily through natural recruitment once competition from non-native species is removed. Additionally, native plant restoration will ensure reestablishment in areas that require more rapid enhancement than natural recruitment can provide.

A summary of all benefits and costs of the project are provided in Table SC-1.1. Project costs and water supply benefits are discussed in the remainder of this attachment.

TABLE SC-1.1
BENEFIT-COST ANALYSIS OVERVIEW –DEMONSTRATION-SCALE PROJECT

	Present Value
Costs	$648,310
Monetizable Benefits	
Water Supply Benefits	
Avoided Imported Water Costs	$674,560
Total Monetized Benefits	$674,560
Qualitative Benefit or Cost	**Qualitative Indicator***
Water Supply Benefits	
Increased Water Supply Reliability	+
Improved Operational Flexibility for CLWA	+
Water Quality Benefits	
Improved Surface Water Quality	++
Reduced Salt Loading	+
Decreased Streambank Erosion	++
Restoration of Native Habitat	++
Reduced Fire Hazard	++
Reduced CO_2 Emissions	+
Reduced Stress on the Sacramento-San Joaquin Delta	+
Increased Educational Opportunities	+
Flood Control Benefits	
Reduced Flooding Incidence	++

O&M = operations and maintenance
* Direction and magnitude of effect on net benefits:
+ = Likely to increase net benefits relative to quantified estimates.
++ = Likely to increase net benefits significantly.
– = Likely to decrease net benefits.
– – = Likely to decrease net benefits significantly.
U = Uncertain, could be + or –.

Costs

Undiscounted expenditures shown in the project budget total $765,013. The majority of the budget will be expended in 2011 and 2012. Direct costs for removal of arundo and tamarisk will account for about $500,000, or close to 65%, of the total capital budget. Costs associated with project design, engineering, and environmental documentation account for $60,000 of total costs, while environmental mitigation accounts for $77,700. Administration and miscellaneous costs account for the remainder of total capital costs. Expenditures made in 2013 to 2015 will include follow-up monitoring and maintenance to help ensure removal.

Over the 50-year project life (through 2062, which is 50 years after the eradication of arundo and tamarisk is completed in 2013), the sum of present value capital costs will amount to $648,310.

The "Without Project" Baseline

The Santa Clara River, San Francisquito Creek Arundo and Tamarisk Removal Project is located near the City of Santa Clarita, within the Upper Santa Clara River Watershed (Watershed). The project area includes a highly-visible 150-acre reach of the Santa Clara River, and the lower reaches of two major tributaries just above the confluence of San Francisquito Creek and the South Fork of the Santa Clara River.

Estimates for the broader SSP project area indicate that infestation by arundo, and to a lesser extent tamarisk, is pervasive, extending throughout the site. Arundo infestations are particularly dense in the site's western (downstream) and central reaches, where large areas of the main stem exhibit historic infestation levels of 51 to 75% cover. While arundo historically tends to exhibit lower density infestation levels in the site's upstream areas, large areas are still infested, with significant areas of 26 percent to 50 percent arundo cover. Tamarisk infestations are concentrated in the east (upstream) portions of the SSP project area. These infestations typically range from 1 percent to 50 percent cover. Project Phases D through G (covered under this grant proposal) are located within the western portions of the SSP project area.

Both arundo and tamarisk consume large amounts of water, which negatively affects both instream and groundwater availability. Reduced water availability also adversely affects water-dependent plants and wildlife, and reduces the water available for beneficial municipal and agricultural uses. Although native riparian plants have similar transpiration rates per unit of surface area to arundo and tamarisk, arundo and tamarisk have approximately two or more times greater leaf surface area. Therefore, they transpire more water than native plants (VCRCD 2006 from Kelly 2003). Water consumption by these species is so high that dense infestations can desiccate riparian areas (seeps, springs, rivers) in arid habitats (VCRCD 2006 from Egan and Walker 2000; Dudley 2000).

The Castaic Lake Water Agency (CLWA) is wholesale water provider in the Watershed. CLWA imports State Water Project (SWP) and other imported water from the Sacramento-San Joaquin Delta to Castaic Lake through SWP facilities. CLWA currently provides about 43,000 acre-feet per year (AFY) of imported water (imported via CLWA) to four water purveyors within the Watershed. This amounts to roughly one-half of total service area potable water demands.[6] The balance of potable demand within the service area is met through local groundwater sources.

The availability of imported water is subject to a number of natural and human forces, ranging from increased population growth (and accompanying increased demands on the SWP system), to drought and earthquakes, to environmental regulations and water rights determinations. Reduced demand for imported water will improve water supply reliability within the CLWA service area.

Without the project, arundo and tamarisk will continue to spread, covering a greater percentage of the watershed. Due to their high rate of water consumption and transpiration, the expansion of these species will have a negative impact on groundwater supply and surface water flows downstream. Thus, if the project is not implemented, reliance on imported SWP water from CLWA will increase.

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[6]. Estimate based on total projected 2010 demand of 86,000 from 2005 CLWA Urban Water Management Plan.

Water Supply Benefits

This section describes the water supply benefits generated by the Santa Clara River, San Francisquito Creek Arundo and Tamarisk Removal, including avoided imported water supply costs, improved water supply reliability for CLWA customers, and improved operational flexibility for CLWA.

Avoided Imported Water Supply Costs

Both arundo and tamarisk consume large amounts of water, which negatively affects both surface water and groundwater availability. Dudley (personal communication 2010) estimates from preliminary data that every acre of arundo removal in this area will result in a water savings of approximately 10 AFY. Hendrickson and McGaugh (2005) estimate that savings associated with an acre of tamarisk removal amount to about 4 AFY. Native vegetation that replaces the arundo and tamarisk once it is removed uses about 2 AFY per acre. Thus, every acre of arundo removed will result in 8 AFY of water savings. Every acre of tamarisk removed will result in a savings of 2 AFY.

This project will treat a total of 20 acres for arundo and tamarisk removal. About 70% of these acres are infested with Arundo, while 30% are infested with Tamarisk. Thus, average savings per treated acre will result in a savings of 6.2 AFY. It is estimated that on average about 50% of the water saved as a result of this project will be recovered from the groundwater aquifer.7 The remaining water will be available groundwater percolation that is not used, and as surface flows downstream. CLWA purveyors will use the groundwater made available by this project in lieu of imported SWP water, because groundwater is a much less expensive source of supply.

CLWA has a contractual Table A amount of 95,200 AFY of water from SWP. However, the marginal source of SWP water for CLWA purveyors is the water being purchased from the Buena Vista Water District in Kern County. CLWA receives part of Buena Vista's Kern River entitlements through exchange of Buena Vista's SWP supplies. The cost of this water in 2007 was estimated to be $790/AF, or $822/AF when updated to 2009 dollars. This includes the cost of purchase, wheeling, and treatment, and factors in system losses (A&N Technical Services, 2008). It is assumed that this cost will rise at the rate of inflation after 2009, thus remaining constant in real dollars.

With the project, a total of 62 AFY of water will be added to the groundwater supply pool. To calculate the avoided costs of imported water over time, the amount of avoided imported water each year is multiplied by the marginal cost of SWP water delivered by CLWA. As a result of the project, CLWA retail water purveyors will avoid the use of 3,100 AF of imported water over the 50-year project life. Assuming no real increases in CLWA water rates, the total present value benefits associated with the avoided purchase of imported water amounts to $674,560.

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[7]. This assumption reflects expected groundwater recovery during normal precipitation years. During dry years, recovery is expected to reach up to 100%, and during wet years recovery is expected to approach 0%.

Increased Water Supply Reliability for CLWA Customers

The reliability of a water supply refers to its ability to meet water demands on a consistent basis, even in times of drought or other constraints on source water availability. The project will help address reliability issues for CLWA retail agencies by offsetting the use of imported water delivered by CLWA. The reliability of imported water is subject to a number of natural and human forces, ranging from increased population growth (and accompanying increased demands on the SWP system), to drought and earthquakes, to environmental regulations and water rights determinations.

Although interest in water supply reliability is increasing (e.g., due to increasing water demands and concerns over climate-related events), only a few studies have directly attempted to quantify its value (i.e., through nonmarket valuation studies). The results from these studies indicate that residential and industrial (i.e., urban) customers seem to value supply reliability quite highly. Stated preference studies find that water customers are willing to pay $95 to $500 per household per year for total reliability (i.e., a 0% probability of their water supply being interrupted in times of drought).

The challenge for use of these values to determine a value of increased reliability as a result of the Arundo and Tamarisk Removal Project is recognizing how to reasonably interpret these survey-based household monetary values. The values noted above reflect a willingness-to-pay per household to ensure complete reliability (zero drought-related use restrictions in the future), whereas the Arundo and Tamarisk Removal Project only enhances overall reliability and does not guarantee 100% reliability. Thus, if applied directly to the number of households within the CLWA service area, the dollar values from the studies would overstate the reliability value provided by the project.

Due to the uncertainty involved in applying these numbers to this situation, this benefit estimate is not monetized, but is instead assessed qualitatively.

Improved Operational Flexibility for CLWA

Water savings achieved by the Arundo and Tamarisk Removal Project will offset the use of 62 AFY of imported SWP water. This will help CLWA directly in its supply operations, allowing for longer shutdowns and improving system reliability. The value of this increased operational flexibility is not monetized in the benefit tables.

Distribution of Project Benefits and Identification of Beneficiaries

The Arundo and Tamarisk Removal Project includes the full range of types of beneficiaries, as is summarized in Table SC-1.2. At the local and regional level, CLWA and its retail water purveyors will benefit due avoided costs associated with importing additional SWP water, improved operational flexibility for CLWA and increased reliability of supply. The project will provide statewide benefits by reducing demands on water supplies from the Sacramento-San Joaquin Delta.

TABLE SC-1.2
PROJECT BENEFICIARIES SUMMARY

Local	Regional	Statewide
CLWA Santa Clarita Water Division, LA County Waterworks District 36, Newhall County Water District, Valencia Water Company	Castaic Lake Water Agency, Ventura Co. Agricultural Interests	Sacramento-San Joaquin Delta

Project Benefits Timeline Description

Project implementation will be completed in December of 2012, with some administration and monitoring activities taking place through 2015. A 50-year useful project life is assumed for this analysis. Thus, benefits are calculated through 2062 (50 years after the project begins providing benefits in 2013).

Potential Adverse Effects from the Project

The Santa Clara River, San Francisquito Creek Arundo and Tamarisk Removal Project may have short-term negative impacts during removal work, but steps will be taken to avoid long-term disturbance to habitat and native species living in the area. A CEQA document is being prepared and will address any potential adverse impacts.

Summary of Findings

The monetized water supply benefits from the Arundo and Tamarisk Removal Project include the avoided cost of imported SWP supplies. The cost of treated SWP water supply delivered by CLWA is $822/AF. Over the 50-year life of the project, the avoided water supply costs will total $674,560 in present value. Nonmonetized benefits of the project include improved water supply reliability within the service area and increased operational flexibility for CLWA.

This analysis of costs and benefits is based on available data and some assumptions. As a result, there may be some omissions, uncertainties, and possible biases. In most cases, omissions lead to a downward bias in benefits: the project is expected to be much more beneficial than the subset of benefits that can be monetized would indicate. These issues are listed in Table SC-1.3.

TABLE SC-1.3
OMISSIONS, BIASES, AND UNCERTAINTIES, AND THEIR EFFECT ON THE PROJECT

Benefit or Cost Category	Likely Impact on Net Benefits*	Comment
Increased water supply reliability for CLWA customers	+	The potential benefit of increased water supply reliability as a result of the project has not been included due to uncertainties of applying values from the literature to a partial improvement in water supply reliability.
Avoided imported water costs	+	The estimated water savings of 10 AFY per acre of arundo removal is conservative. For example, the estimate included in the Upper Santa Clara River Watersehd Arundo and Tamarisk Removal Progarm Long-Term Implementation Plan is almost 21 AFY per acre of arundo removal. If additional savings are achieved, this would result in additional groundwater availability. Thus, avoided imported water costs would be higher.
Project costs	U	The calculation of the present value of costs is a function of the timing of expenditures and a number of other factors and conditions. Changes in these variables will change the estimate of costs.

*Direction and magnitude of effect on net benefits:
+ = Likely to increase net benefits relative to quantified estimates.
++ = Likely to increase net benefits significantly.
– = Likely to decrease net benefits.
– – = Likely to decrease net benefits significantly.
U = Uncertain, could be + or –.

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Table 11- Annual Cost of Project

(All costs should be in 2009 Dollars)

Project: Santa Clara River, San Francisquito Creek Arundo and Tamarisk Removal Project

	Initial Costs	Operations and Maintenance Costs [1]						Discounting Calculations	
	(a)	(b)	(c)	(d)	(e)	(f)	(g)	(h)	(i)
YEAR	Grand Total Cost From Table 7 (row (i), column(d))	Admin	Operation	Maintenance	Replacement	Other	Total Costs (a) +...+ (f)	Discount Factor	Discounted Costs(g) x (h)
2009	$0						$0	1.00	$0
2010	$0						$0	0.943	$0
2011	$325,132						$325,132	0.890	$289,367
2012	$325,132						$325,132	0.840	$273,110
2013	$38,250						$38,250	0.792	$30,294
2014	$38,250						$38,250	0.747	$28,573
2015	$38,250						$38,250	0.705	$26,966
2016	$0						$0	0.665	$0
Project Life	$765,013						$765,013		
Total Present Value of Discounted Costs (Sum of Column (i)) Transfer to Table 20, column (c), Exhibit F: Proposal Costs and Benefits Summaries									$648,310

Comments:

Table 12 - Annual Water Supply Benefits

(All benefits should be in 2009 dollars)

Project: Santa Clara River, San Francisquito Creek Arundo and Tamarisk Removal Project

(a) Year	(b) Type of Benefit	(c) Measure of Benefit (Units)	(d) Without Project	(e) With Project	(f) Change Resulting from Project (e) – (d)	(g) Unit $ Value (1)	(h) Annual $ Value (f) x (g) (1)	(i) Discount Factor (1)	(j) Discounted Benefits (h) x (i) (1)
2009								1.00	$0
2010								0.943	$0
2011								0.890	$0
2012								0.840	$0
2013	Avoided imported water use	AF	0	62	62	$822	$50,964	0.792	$40,363
2014	Avoided imported water use	AF	0	62	62	$822	$50,964	0.747	$38,070
2015	Avoided imported water use	AF	0	62	62	$822	$50,964	0.705	$35,930
2016	Avoided imported water use	AF	0	62	62	$822	$50,964	0.665	$33,891
2017	Avoided imported water use	AF	0	62	62	$822	$50,964	0.627	$31,954
2018	Avoided imported water use	AF	0	62	62	$822	$50,964	0.592	$30,171
2019	Avoided imported water use	AF	0	62	62	$822	$50,964	0.558	$28,438
2020	Avoided imported water use	AF	0	62	62	$822	$50,964	0.527	$26,858
2021	Avoided imported water use	AF	0	62	62	$822	$50,964	0.497	$25,329
2022	Avoided imported water use	AF	0	62	62	$822	$50,964	0.469	$23,902
2023	Avoided imported water use	AF	0	62	62	$822	$50,964	0.442	$22,526
2024	Avoided imported water use	AF	0	62	62	$822	$50,964	0.417	$21,252
2025	Avoided imported water use	AF	0	62	62	$822	$50,964	0.394	$20,080
2026	Avoided imported water use	AF	0	62	62	$822	$50,964	0.371	$18,908
2027	Avoided imported water use	AF	0	62	62	$822	$50,964	0.350	$17,837
2028	Avoided imported water use	AF	0	62	62	$822	$50,964	0.331	$16,869
2029	Avoided imported water use	AF	0	62	62	$822	$50,964	0.312	$15,901
2030	Avoided imported water use	AF	0	62	62	$822	$50,964	0.294	$14,983
2031	Avoided imported water use	AF	0	62	62	$822	$50,964	0.278	$14,168
2032	Avoided imported water use	AF	0	62	62	$822	$50,964	0.262	$13,353
2033	Avoided imported water use	AF	0	62	62	$822	$50,964	0.247	$12,588
2034	Avoided imported water use	AF	0	62	62	$822	$50,964	0.233	$11,875
2035	Avoided imported water use	AF	0	62	62	$822	$50,964	0.220	$11,212
2036	Avoided imported water use	AF	0	62	62	$822	$50,964	0.207	$10,550
2037	Avoided imported water use	AF	0	62	62	$822	$50,964	0.196	$9,989
2038	Avoided imported water use	AF	0	62	62	$822	$50,964	0.185	$9,428
2039	Avoided imported water use	AF	0	62	62	$822	$50,964	0.174	$8,868
2040	Avoided imported water use	AF	0	62	62	$822	$50,964	0.164	$8,358
2041	Avoided imported water use	AF	0	62	62	$822	$50,964	0.155	$7,899
2042	Avoided imported water use	AF	0	62	62	$822	$50,964	0.146	$7,441
2043	Avoided imported water use	AF	0	62	62	$822	$50,964	0.138	$7,033
2044	Avoided imported water use	AF	0	62	62	$822	$50,964	0.130	$6,625
2045	Avoided imported water use	AF	0	62	62	$822	$50,964	0.123	$6,269
2046	Avoided imported water use	AF	0	62	62	$822	$50,964	0.116	$5,912
2047	Avoided imported water use	AF	0	62	62	$822	$50,964	0.109	$5,555
2048	Avoided imported water use	AF	0	62	62	$822	$50,964	0.103	$5,249
2049	Avoided imported water use	AF	0	62	62	$822	$50,964	0.097	$4,944
2050	Avoided imported water use	AF	0	62	62	$822	$50,964	0.092	$4,689
2051	Avoided imported water use	AF	0	62	62	$822	$50,964	0.087	$4,434
2052	Avoided imported water use	AF	0	62	62	$822	$50,964	0.082	$4,179
2053	Avoided imported water use	AF	0	62	62	$822	$50,964	0.077	$3,924
2054	Avoided imported water use	AF	0	62	62	$822	$50,964	0.073	$3,720
2055	Avoided imported water use	AF	0	62	62	$822	$50,964	0.069	$3,517
2056	Avoided imported water use	AF	0	62	62	$822	$50,964	0.065	$3,313
2057	Avoided imported water use	AF	0	62	62	$822	$50,964	0.061	$3,109
2058	Avoided imported water use	AF	0	62	62	$822	$50,964	0.058	$2,956
2059	Avoided imported water use	AF	0	62	62	$822	$50,964	0.054	$2,752
2060	Avoided imported water use	AF	0	62	62	$822	$50,964	0.051	$2,599
2061	Avoided imported water use	AF	0	62	62	$822	$50,964	0.048	$2,446
2062	Avoided imported water use	AF	0	62	62	$822	$50,964	0.046	$2,344
Project Life	Avoided imported water use	AF	0	3,100	3,100				
Total Present Value of Discounted Benefits Based on Unit Value (Sum of the values in Column (j) for all Benefits shown in table)									$674,560

Comments: The Santa Clara River, San Francisquito Creek Arundo and Tamarisk Removal Project will avoid the use of 62 AFY of State Water Project water. The marginal cost of imported water to CLWA is $822 AF in 2009 dollars.

Table 15. Total Water Supply Benefits

(All benefits should be in 2009 dollars)

Project: Santa Clara River, San Francisquito Creek Arundo and Tamarisk Removal Project

Total Discounted Water Supply Benefits (a)	Total Discounted Avoided Project Costs (b)	Other Discounted Water Supply Benefits (c)	Total Present Value of Discounted Benefits (d) (a) + (c) or (b) + (c)
$ 674,560			$ 674,560

Comments:

ATTACHMENT 8 - ECONOMIC ANALYSIS — WATER QUALITY AND OTHER BENEFITS

Santa Clarita Valley Water Use Efficiency Program (CLWA-4)

Summary

The Santa Clarita Valley Water Use Efficiency Strategic Plan (SCV WUE Plan) identifies programs and projects that will most effectively reduce per capita water use in the Santa Clarita Valley. The Santa Clarita Valley Water Use Efficiency Program (CLWA-4) will implement four recommended programs identified in the SCV WUE Plan. These programs are designed to reduce water demand, improve operational efficiency, enhance water supply and improve water quality.

The four programs currently being implemented by this project, and a brief description of each, are listed below.

(1) *Santa Clarita Valley Large Landscape Audit and Incentive Program*: The program will offer water audits, equipment incentives, and water budgeting to public and private sector large landscape sites with high water use.

(2) *Santa Clarita CII Audit and Customized Incentive Program*: The program will offer comprehensive water audits and reporting of cost effective recommendations commercial, industrial and institutional (CII) customers. Customers will be offered rebate incentives based upon the findings of the audit.

(3) *Residential Santa Clarita Valley Landscape Contractor Certification and Weather-Based Irrigation Controller (WBIC) Program*: The program will provide water efficiency training and certification to landscape contractors, maintenance companies and residents in the Santa Clarita Valley. The training will consist of basic irrigation principles, irrigation scheduling, the value of WBICs and guidelines to proper installation and use. After attending training and receiving certification, the participants will be eligible to receive free WBICs and high efficiency nozzles.

(4) *Santa Clarita Valley High Efficiency Toilet (HET) Rebate Program*: The Program will offer $100 rebates to single family and multi-family residential units for the replacement of toilets in homes older than 1992 with a HET.[1] A total of 500 rebates will be available each year.

Table CLWA-4.1 provides an overview of the costs and benefits presented in attachment 7 and 8. The remainder of this attachment discusses the water quality and other benefits, as directed for Attachment 8.

[1]. HET's are designed to use 1.28 gallons per flush on average. Older toilets can use 3.5 or more gallons per flush. (Vickers, 2001).

TABLE CLWA-4.1
BENEFIT-COST ANALYSIS OVERVIEW

	Present Value
Costs – Total Capital and O&M	$1,645,699
Monetizable Benefits	
Water Supply Benefits	
Avoided Imported Water Costs	$3,405,010
Water Quality and Other Benefits	
Avoided Wastewater Treatment Costs	$187,881
Total Monetizable Benefits	$3,592,891
Quantified Benefit or Cost	**Project Life Total**
Water Quality and Other Benefits	
Avoided Introduction of Chlorides into the Basin	**638 Metric Tons**
Reduced CO_2 Emissions	**3,106 Metric Tons**
Qualitative Benefit or Cost	**Qualitative Indicator***
Water Supply Benefits	+
Increased Water Supply Reliability for CLWA customers	+
Improved Operational Flexibility for CLWA	+
Water Quality and Other Benefits	+
Reduced Pollution from Dry-Weather Runoff	+
Increased Water Conservation Education	+
Reduced Disinfection By-Products Precursors	+
Reduced Stress on the Sacramento-San Joaquin Delta	+
Reduced Street Maintenance Costs	+

O&M = operations and maintenance
CO_2 = carbon dioxide
* Direction and magnitude of effect on net benefits:
+ = Likely to increase net benefits relative to quantified estimates.
++ = Likely to increase net benefits significantly.
– = Likely to decrease net benefits.
– – = Likely to decrease net benefits significantly.
U = Uncertain, could be + or –.

The "Without Project" Baseline

Four retail water providers in the Santa Clarita Valley are participating in the SCV WUE Plan - Valencia Water Company, Santa Clarita Water Division of CLWA, Newhall County Water District, and Los Angeles County Waterworks District #36. Without the project, these retail water providers will continue to provide potable water to meet outdoor water demand for 2,412 residential and 56 large landscape sites proposed for irrigation efficiency improvements. Additionally, the water purveyors included will continue to provide potable water to meet indoor and outdoor non-potable demand for 126 commercial and industrial customers. Without the project, water savings totaling 6,580 acre-feet (AF) over the project lifetime will not be achieved.

Runoff from overwatering landscapes in the participating agencies' service areas currently ponds in streets and gutters, and runs into local retention basins. Stagnant water in these areas is hard to drain and contributes to mosquito problems. In addition, the runoff contains fertilizers and pesticides that have been applied to the landscapes, along with other pollutants including salts, pathogens, and fecal coliform bacteria. Runoff from excessive irrigation in each of the participating retail water providers eventually drains into the Santa Clara River.

The Santa Clara River is the largest river system in Southern California that remains in a relatively natural state. The river originates on the northern slope of the San Gabriel Mountains in Los Angeles County, traverses Ventura County, and flows into the Pacific Ocean between the cities of San Buenaventura (Ventura) and Oxnard. Municipalities within the watershed include Santa Clarita, Fillmore, Santa Paula, and Ventura (LAWQCB 2006).

Extensive patches of high quality riparian habitat exist along the length of the river and its tributaries. Two endangered fish, the unarmored three-spined stickleback and the steelhead trout, are residents in the river. One of the Santa Clara River's largest tributaries, Sespe Creek, is designated a wild trout stream by the state of California and a wild and scenic river by the United States Forest Service. Piru and Santa Paula Creeks, tributaries to the Santa Clara River, also support steelhead habitat. In addition, the river serves as an important wildlife corridor. The Santa Clara River drains to the Pacific Ocean through a lagoon that supports a large variety of wildlife.

Most of the soils, surface water, and groundwater in the Upper Santa Clara River Watershed contain chloride. Primary sources of chlorides in surface water and groundwater include imported surface water (i.e., SWP supplies), geologic formations through which both surface and groundwater flow and discharges from wastewater plants (i.e., Valencia and Saugus Water Reclamation Plants). Since the 1970s, growth in the Santa Clarita Valley has led to chloride levels that exceed water quality objectives (WQOs) and impair beneficial uses for agricultural supply, and groundwater recharge. As a result of these factors, a total maximum daily load (TMDL) for chlorides has been established for the Watershed.

A TMDL for nutrients also has been established for the Watershed. The Santa Clara River is listed as impaired by ammonia in Reach 3 and by nitrate plus nitrite in Reach 7 on the 2002 303(d) list of impaired water bodies. Reach 7 includes the project area while Reach 3 is downstream in Ventura County.

Water Quality and Other Benefits

The project will provide water quality benefits as well as other benefits. This section provides discussion and details on estimation of these benefits including avoided introduction of additional chlorides into the basin, reduced CO_2 emissions, increased water conservation education, reduced pollution from dry-weather irrigation runoff, reduced disinfection by-product precursors, reduced stress on the Sacramento-San Joaquin Delta, and reduced street maintenance costs.

Avoided Wastewater Treatment Costs

Water savings from the project will result in a reduction in the volume of wastewater to be treated, which in turn, results in avoided wastewater treatment costs. The cost charged by the Santa Clarita Valley Sanitation District to CLWA to receive, treat and discharge wastewater not requiring solids treatment is $550 per AF. It is assumed that this cost will rise at the rate of inflation after 2009, thus remaining constant in real dollars over the life of the project.

This project will only avoid wastewater treatment charges for water saving measures that avoid indoor uses that end up in the sewer system. The HET rebate program and the CII audit and incentive program will result in indoor water savings. However, indoor water use savings could only be separated out for the HET rebate program, while the CII audit and incentive program results in more than just indoor water savings. From project implementation in 2011 until the end of the anticipated lifetime of the water saving services and devices in 2037, 750 AF of wastewater will be avoided from the HET program, with an avoided cost of $187,881 in present-value 2009 dollars.

Avoided Introduction of Additional Chlorides into the Watershed

Reduced demand for imported water as a result of the project will avoid additional accumulation of chlorides in the Watershed. SWP water, which is imported from outside of the Watershed, contains salts, nutrients, and other constituents. When this water is used in the Watershed, some of those salts, nutrients, and other constituents remain behind. Reducing future SWP water imports through conservation efforts will effectively prevent the import of additional salts, including chlorides, and other constituents into the Watershed.

The average chloride concentration in SWP water is approximately 79 milligrams per liter (mg/L) (Metropolitan, 2010). Therefore, each AF of SWP water contains, on average, 0.097 metric tons (MT) of chlorides per AF.[2] By eliminating the future use 6,580 AF of imported SWP water over the 27-year project life, the project will avoid the introduction of about 638 MT of chlorides into the Watershed.

Reduced CO2 Emissions

By reducing imported water demands due to decreased demand, the project will avoid emissions of CO2 (a greenhouse gas) generated by the production of energy required to transport SWP water to CLWA service area.

CO2 emissions resulting from the production of electricity, measured as tons of CO2 per megawatt-hour (MWh), vary by energy source. Hydroelectric power plants are assumed to generate relatively little CO2 emissions, on the order of 0.005 to 0.02 MT/MWh (van de Vate, 2002). For the Pacific region of the United States, CO2 emissions from coal-fired plants and natural gas-powered plants are estimated to be 0.976 MT CO2/MWh and 0.561 MT CO2/MWh, respectively (DOE/EPA, 2000). In California, electricity production relies on a range of energy sources, including those located within California and those located outside of the state. The California Department of Water Resources (DWR) estimates that the CO_2 emissions rate for all electricity sources providing electricity to DWR is 0.325 MT of CO_2/MWh (Climate Registry, 2010).

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[2]. 1 acre-foot = 1,233,482 liters; 97 mg/L = 97,445,078 mg/AF or 0.097 MT/AF.

The California Energy Commission estimates that the electricity required for the conveyance of 1 AF of SWP water to Castaic Lake, where SWP water is stored for later use, is 1.17 MWh[3] (CEC, 2010). When energy requirements for treatment are taken into account, the total amount of energy required for every AF of SWP water delivered to Castaic Lake and treated at Castaic Lake Water Agency (CLWA) treatment plants (for ultimate delivery to SCV WUE Plan water purveyors) amounts to 1.451 MWh.[4]

Using the DWR CO_2 emissions rate of 0.325 MT/MWh, 0.472 MT of CO_2 are produced for every AF of water delivered and treated within the CLWA service area (1.451 MWh/AF multiplied by 0.325 MT/MWh). Thus, by eliminating the use of 6,580 AF of SWP water over the assumed project life, the project will avoid emissions of 3,106 MT of CO_2.

Reduced Pollution from Dry-Weather Irrigation Runoff

Runoff from landscape irrigation is a significant source on non-point source pollution in urban environments. The use of WBICs will reduce runoff from landscapes that are over-watered until soil is supersaturated and/or have a significant amount of overspray onto sidewalks, driveways, streets, and other hard surfaces due to poor design and/or maintenance. This will reduce the resulting dry-weather irrigation runoff, which carries fertilizers, pesticides, and other pollutants (e.g., pathogens, fecal coliform bacteria, salts) into the storm drain system and/or into local creeks and rivers. According to a study conducted by the Municipal Water District of Orange County and the Irvine Ranch Water District (MWDOC and IRWD, 2004), the installation of WBICs reduced runoff by 50% compared to post-intervention runoff and 71% compared to a control group. The study also noted that a reduction in the volume of runoff did not increase the concentration of pollutants in the runoff. This means that the reduction in total pollutants transported through runoff will likely be possible through a reduction in total runoff.

Reduced runoff that will result from this project will also reduce areas of ponded water in gutters and local retention basins, which will lessen problems with mosquitoes in the area.

Increased Water Conservation Education

The project will provide education on the benefits associated with reducing overwatering of lawns and how to reduce irrigation while maintaining healthy lawns by using WBICs and other methods. During landscape irrigation surveys, water customers will be educated about the importance of actively maintaining their irrigation systems, both to reduce water waste and save on their water bills. Customers can also be introduced to their water agency's other water conservation programs during the survey, creating a greater opportunity for water conservation. Due to the uncertainty associated with landscapes that will be selected for the project, it is not possible to accurately predict the number of persons who will benefit from increased water conservation education.

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[3] http://www.energy.ca.gov/research/iaw/industry/water.html

[4] CLWA estimates the energy requirement for treatment to be 0.285 MWh/AF.

Reduced Disinfection By-product Precursors

SWP water has a number of water quality constituents that affect its suitability as a drinking water source. SWP water contains relatively high levels of bromide and total organic carbon (TOC), two elements that are of particular concern to drinking water agencies. Bromide and TOC combine with chemicals used in the water treatment process to form disinfection by-products such as trihalomethanes (THMs), which are strictly regulated under the federal Safe Drinking Water Act. Currently, there are no standards for bromide or TOC in drinking water; however, current levels of bromide and TOC are significantly higher than target levels identified by an expert panel hired by the California Urban Water Agencies (CUWA) of 50 parts per billion (ppb) for bromide and 3 parts per million (ppm) for TOC. Average SWP levels were significantly higher: up to 600% above the target level for bromide and 10% above the target level for TOC (Owen et al., 1998).

Water agencies treat all water to meet stringent state and federal drinking water standards before delivering it to their customers. Water treated by CLWA currently meets all federal and state drinking water standards. However, source water of poor quality makes it increasingly expensive and difficult to meet such standards. Increased levels of constituents that aid in the formation of THMs can mean more time spent monitoring finished water in the distribution systems. Increased levels of these constituents may also lead to the use of increased proportions of groundwater in the blend of water supplies in order to control THMs. However, reduced imports of SWP water will reduce the need for such preventative measures.

Reduced Stress on the Sacramento-San Joaquin Delta

By conserving water used for irrigation, the project will offset future SWP water imports. This water can be left as future instream flows in the Sacramento-San Joaquin Delta or can be used to offset other future diversions that may otherwise reduce flows. Reduced demands on Delta supplies also will help reduce the overall salinity of the Delta and improve Delta habitat.

Maintaining the Delta's environmental condition is vital to maintaining and improving the viability of the region. The Delta provides drinking water to 25 million people, supports irrigation of 4.5 million acres of agriculture, and serves as a home to 750 plant and animal species. The Delta's 1,600 square miles of marshes, islands and sloughs support at least half of migratory water birds on the Pacific Flyway, 80 percent of California's commercial fisheries and recreational uses including boating, fishing and windsurfing.

Delta resources are in a state of crisis. Fish populations including salmon and Delta smelt have declined dramatically in recent years. The levee system is aging, and vulnerability of the Delta to flooding, sea-level rise, or a major earthquake have contributed concerns about possible levee collapse which would result in devastating impacts to both water supply and habitat.

Reduced Street Maintenance Costs

The project will reduce street maintenance costs by reducing the amount of dry-weather runoff to streets in the participating agencies' service areas. The project will reduce ponding on streets and minimize the effect of moisture in creating potholes and cracks, which make up a significant portion of street maintenance costs.

Distribution of Project Benefits, and Identification of Beneficiaries

As summarized in Table CLWA-4.2, this project includes the full range of types of beneficiaries. The Santa Clarita Valley Family of Water Suppliers partnered to establish these water use efficiency programs. This group consists of a wholesale supplier (CLWA) and four retail suppliers. At the local and regional level, benefits will accrue to these agencies and their customers while helping meet the statewide goal to reduce per capita urban water use by 20 percent by the year 2020. Reduced demand for water imported from the SWP will have benefits for sensitive ecosystems in the Sacramento-San Joaquin Delta.

TABLE CLWA-4.2
PROJECT BENEFICIARIES SUMMARY

Local	Regional	Statewide
Valencia Water Agency, Santa Clarita Water Division of CLWA, Newhall County Water District, Los Angeles County Waterworks District #36, City of Santa Clarita	Castaic Lake Water Agency, Santa Clarita Valley Sanitation District	Statewide Water Use Efficiency Goal, Sacramento-San Joaquin Delta

Project Benefits Timeline Description

The project will be implemented over a 2-year period, beginning in July of 2011 and ending in July of 2013. A water savings lifespan of 10 years has been identified for the *Large Landscape, CII, and Residential Irrigation* programs. Benefits from these programs are expected to extend over 12 years, which allows for phase-in implementation over the first three years and the phase-out benefits at the end of the project. A water savings lifespan of 25 years has been identified for the *High Efficiency Toilet Program*. Benefits from this program are expected extend over 27 years, which allow for phase-in implementation over the first three calendar years and the phase out of benefits at the end of the program.

To quantify water quality and other benefits by year, it was assumed that the project will be implemented across the timeframe from July 2011 through July 2013. This results in a ramp-up period where approximately 21% of project benefits are realized in 2011, 71% are realized in 2012, and all benefits are realized in 2013. For the three projects with a 10-year lifespan, benefits ramp down in 2021 and 2022. For the *High Efficiency Toilet Program* with the 25-year lifespan, benefits ramp down in 2036 and 2037.

Potential Adverse Effects from the Project

There are no adverse effects anticipated from this project.

Summary of Findings

The project will provide a range of both water quality and other benefits. The water savings associated with high efficiency toilet and urinal installation will avoid the treatment of 750 AF of wastewater, avoiding $187,881 in wastewater treatment costs. By avoiding the use of 6,580 AF of

SWP water through 2037, this project will avoid the introduction of 638 MT of chlorides into Watershed, and avoidance of 3,106 MT of CO_2 emissions.

Additional qualitative benefits from the project include reduced pollution from dry-weather runoff, increased water conservation education, reduced DBP precursors, reduced stress on the Sacramento-San Joaquin Delta, and reduced street maintenance costs. These qualitative benefits and their magnitudes are summarized in Table CLWA-4.3.

TABLE CLWA-4.3
QUALITATIVE BENEFITS SUMMARY – WATER QUALITY AND OTHER BENEFITS

Benefit	Qualitative Indicator
Reduced Pollution from Dry-Weather Runoff	+
Increased Water Conservation Education	+
Reduced Disinfection By-Products Precursors	+
Reduced Stress on the Sacramento-San Joaquin Delta	+
Reduced Street Maintenance Costs	+

This analysis of costs and benefits is based on available data and some assumptions. As a result, there may be some omissions, uncertainties, and possible biases. These issues are listed in Table CLWA-4.4.

TABLE CLWA-4.4
OMISSIONS, BIASES, AND UNCERTAINTIES, AND THEIR EFFECT ON THE PROJECT

Benefit or Cost Category	Likely Impact on Net Benefits*	Comment
Avoided Wastewater Treatment Costs	++	Avoided wastewater treatment costs were estimated based on water savings from the HET installation program. However, the CII Audit Program includes the installation of HETs. The savings from the HET portion of the CII Audit Program could not be separately estimated, and as such could not be included in the monetized benefit. Additionally, the lifetime of indoor water use equipment used in the CII program is assumed to be 10 years. A review of the marketplace showed that high efficiency toilet and urinals are 25 years and 33 years respectively. Avoided wastewater costs will be significantly higher than indicated.
Reduced CO_2 Emissions	+	Lifetime of WBICs and high efficiency nozzles is assumed to be 10 years. A review of the marketplace showed that WBIC lifetime could be 15 years (U.S. EPA, 2009). If the longer WBIC lifetime applies then the associated savings from this portion of the project would be greater than shown here. This would result in greater CO_2 emissions reductions.

Benefit or Cost Category	Likely Impact on Net Benefits*	Comment
Reduced CO_2 Emissions	+	Lifetime of indoor water use equipment used in the CII program is assumed to be 10 years. A review of the marketplace showed that high efficiency toilet and urinals are 25 years and 33 years, respectively. Additionally, commercial high efficiency washers have a lifetime of 16 years (Haasz, 2010). If the longer lifetime applies then the associated savings form this portion of the program would be greater than shown here.
Reduced CO_2 Emissions	+	The energy required to distribute water from CLWA treatment plants to the SCV WUE Plan water purveyors is unknown. The CO_2 emissions reductions associated with these energy requirements are therefore not quantified.
Avoided Introduction of Chlorides into the Basin	+	Lifetime of WBIC and high efficiency nozzles is assumed to be 10 years. A review of the marketplace showed that WBIC lifetime could be 15 years (U.S. EPA, 2009). If the longer WBIC lifetime applies then the associated savings from this portion of the project would be greater than shown here. This would result in greater avoided introduction of chlorides than shown in this analysis.
Avoided Introduction of Chlorides into the Basin	+	Lifetime of indoor water use equipment used in the CII program is assumed to be 10 years. A review of the marketplace showed that high efficiency toilet and urinals are 25 years and 33 years respectively. Additionally, commercial high efficiency washers have a lifetime of 16 years (Haasz, 2010). If the longer lifetime applies, then the associated avoided introduction of chlorides from this portion of the program would be greater than shown here.

*Direction and magnitude of effect on net benefits:
+ = Likely to increase net benefits relative to quantified estimates.
++ = Likely to increase net benefits significantly.
– = Likely to decrease benefits.
– – = Likely to decrease net benefits significantly.
U = Uncertain, could be + or –.

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Santa Clara River-Sewer Trunk Line Relocation Project (Phase 1) (NCWD-3)

Summary

The Newhall County Water District (NCWD) currently maintains a sewer trunk line that is located within the Santa Clara River in the Canyon Country area of the City of Santa Clarita. During large rainfall events, the Santa Clara River swells, causing debris to be swept into the river and dirt to erode around the sewer trunk line, exposing the line. If a large piece of debris, moving at a high rate of speed, hits the sewer trunk line, the line could break. If the sewer trunk line breaks, raw sewage would be released into the river, impacting nearby domestic groundwater wells and the ecosystem. The sewer trunk line has been maintained by the NCWD since its installation in 1968.

Instead of continuing preventative maintenance and extending the life of the line in place, NCWD proposes to remove the sewer trunk line out of the riverbed and into the public right-of-way. Under this grant application, NCWD is requesting funds for Phase 1 of the project, which consists of the planning, engineering, and design of the sewer trunk line relocation. If the results from Phase 1 are acceptable, Phases 2 and 3 will be carried out. Phase 2 involves the removal and relocation of the current gravity feed portion of the sewer trunk line, while Phase 3 consists of the construction of a sewer lift station, forced sewer main, and the remaining gravity feed portion of the sewer trunk line. Phase 3 is scheduled for completion in June 2016. With a 50-year lifetime, the project's assets are expected to provide benefits through May 2066.

The benefits of this project can only be properly evaluated based on the full implementation of all three phases of the project. Therefore, this economic analysis starts by considering the benefits of complete implementation of all three phases of the project, and then apportions a share of the benefits to this initial planning and design phase. The benefits are apportioned based on the percentage of costs for the planning and design phase compared to the costs for full implementation of the project.

A summary of all benefits and costs of the project are provided in Table NCWD-3.1. Project costs and water supply benefits are discussed in the remainder of this attachment.

The "Without Project" Baseline

The Santa Clara River Sewer Trunk Line Relocation Project is located in the Canyon Country section of the City of Santa Clarita within NCWD's service area. Located in the bed of the Santa Clara River, the sewer trunk line is made of vitrified clay pipe (VCP) which was installed in 1968 and has an expected useful life of 50 years. The section that NCWD wishes to relocate out of the riverbed is 750 feet long and has 94 joints. Regardless of their age, when these joints are located in an area where the pipe has been exposed in the river bed, they are susceptible to breaking. Without the project, large debris in large flood events could hit the sewer line and cause a break

The sewer trunk line will reach the end of its expected useful life in 2017. However, in absence of the project, it is assumed that the sewer trunk line would continue to be used beyond 2017. This would result in the need for more than normal periodic replacement of parts due to extend use the pipe more than its assumed 50-year life. To extend use of the existing pipe, NCWD estimates that one section of pipe would need to be replaced every five years beginning in 2017, costing $100,000. One section of pipe stretches from manhole to manhole and is approximately 350 feet.

The Santa Clarita area is subject to large storm events approximately every five years. In 2005, heavy rain caused the volume in the Santa Clara River to increase significantly, ultimately damaging five of the 94 susceptible joints. NCWD has been replacing an average of 5 joints in response to recent large flood events. Replacing 5 joints costs NCWD $100,000. For this analysis, it is assumed that without the project, NCWD will replace 5 joints every 5 years beginning in 2017 at a cost of $100,000 for all joints.

Moreover, if the sewer trunk line were to break with a resulting spill, there would be costs to remove solids discharged into the river and to monitor the river's health. It is assumed that a decent sized release would occur once every ten years beginning in 2017 and cost $50,000 to clean up.

Finally, if the sewer trunk line were to break with a resulting spill, the discharge of raw sewage would have a negative impact on the surrounding ecosystem. Extensive patches of high-quality riparian habitat exist along the length of the Santa Clara River. Two endangered fish, the unarmored three-spined stickleback and the steelhead trout, are resident in the river (LAWQCB, 2010). In addition, the river serves as an important wildlife corridor.

TABLE NCWD-3.1
BENEFIT-COST ANALYSIS OVERVIEW

	Present Value
Costs – Total Capital and O&M	$202,718
Monetizable Benefits	
Water Supply Benefits	
Avoided Imported Water Supply Costs	$44,117
Water Quality and Other Benefits	
Avoided Costs of Replacing Sections of Existing Sewer Trunk Line	$14,607
Avoided Repair Costs for Existing Pipe	$14,607
Avoided Clean-Up Costs from Sewer Trunk Line Break	$4,180
Total Benefits	$77,511
Quantified Benefit or Cost	**Project Life Total**
Water Quality Benefits	
Ecosystem Benefits	+

O&M = operations and maintenance

* Direction and magnitude of effect on net benefits:
+ = Likely to increase net benefits relative to quantified estimates.
++ = Likely to increase net benefits significantly.
– = Likely to decrease net benefits.
– – = Likely to decrease net benefits significantly.
U = Uncertain, could be + or –.

Water Quality and Other Benefits

The Santa Clara River Sewer Trunk Line Relocation Project will provide several water quality and other benefits, including avoided capital costs associated with replacing sections of the existing sewer trunk line, avoided pipeline repair costs, avoided clean up costs associated with a break in the pipeline, and avoided adverse impacts to the Santa Clara River ecosystem. This section provides discussion of these benefits.

Since there will not be any monetary benefits accrued during the planning in Phase 1, it is necessary to calculate the costs and benefits of the entire project so that some of the overall benefits can be allocated to Phase 1. Allocation of benefits to Phase 1 is based on the ratio of the present value of costs in Phase 1 to the present value of costs for all three phases. That ratio is 0.0622 or 6.22% ($202,718/$3,258,126).

Avoided Costs of Replacing Sections of Existing Sewer Trunk Line

If the full project proceeds, implementation of all phases of the project will avoid the need to replace a section of the pipeline every five years, as assumed in the without-project baseline. NWCD's avoided cost of not having to replace a section of the sewer trunk line is $100,000 every five years beginning in 2017, the last year of the sewer trunk line's expected lifetime. In 2009 dollars, the present value avoided cost over the 50-year project lifetime amounts to $234,766. The share of benefits apportioned to Phase 1 of the project totals $14,607 (6.22% multiplied by $234,766).

Avoided Repair Costs for Existing Pipe

The removal of the sewer trunk line out of the riverbed reduces repair costs because the pipeline joints will not need to be replaced every five years due to damage during heavy storm events. NCWD's avoided cost of not having to replace five joints is $100,000 every five years beginning in 2017. In 2009 dollars, the present value avoided repair cost over the 50-year project life is $234,766. The share of benefits apportioned to Phase 1 of the project totals $14,607 (6.22% multiplied by $234,766).

Avoided Clean-Up Costs from Sewer Trunk Line Break

With the relocation of the sewer trunk line out of the riverbed, the VCP can no longer break, thus eliminating the costs associated with cleaning up the raw sewage released into the river when a break occurs. NCWD's avoided cost of hiring a contractor to cleaning up spills is $50,000 per spill. It is uncertain as to how often a break would occur in pipe that is being utilized past its 50-year expected lifetime through replacement of sections of this pipe every 5 years. It is assumed that spills will occur every ten years beginning in 2017, the last year of the sewer line's expected lifetime. In 2009 dollars, the present value avoided clean up costs associated with the project amount to $67,181 over the 50-year project life. The share of benefits apportioned to Phase 1 of the project totals $4,180 (6.22% multiplied by $67,181).

Ecosystem Benefits

Extensive patches of high-quality riparian habitat exist along the length of the Santa Clara River downstream of the project area. In addition, the river serves as an important wildlife corridor. Without the project, when a raw sewage spill occurs as a result of a break of the sewer line, it will be discharged directly into the river. This would result in short-term adverse effects on the surrounding Santa Clara River ecosystem.

According to the California Natural Diversity Database and the California Native Plant Society, 17 special-status plant species have been recorded as present within the project region (City of Santa Clarita, 2010). This includes 4 species federally listed as endangered. In addition, 26 special-status wildlife species have been recorded within the region, including two endangered fish, the unarmored three-spined stickleback and the steelhead trout, and three other federal endangered species including the southwestern willow flycatcher, yellow-legged frog, and the Arroyo toad. An additional 14 special-status species have been identified as having the potential to occur within the project area (City of Santa Clarita, 2010). Avoiding potential future releases of raw sewage into the riverbed will help protect these species and the habitat on which they depend.

Distribution of Project Benefits and Identification of Beneficiaries

There will be water quality and other benefits on the local and regional levels from the Santa Clara River Sewer Trunk Line Relocation Project. NCWD benefits due to the avoided costs associated with replacing sections of the VCP and repairing joints damaged during heavy rain events. Moreover, NCWD will avoid costs associated with cleaning up the river if the sewer trunk line were to have a break resulting in a spill. The ecosystem surrounding the Santa Clara River also benefits because the removal of the sewer trunk line ensures that raw sewage is not discharged into the river.

TABLE NCWD-3.2
PROJECT BENEFICIARIES SUMMARY

Local	Regional	Statewide
Newhall County Water District	Santa Clara River Ecosystem	--

Project Benefits Timeline Description

Phase 1 of the project is scheduled to be completed in July 2013. All phases of the project are scheduled to be completed in June 2016, although benefits will not assumed to be accrued until 2017. In 2017, if the sewer trunk line has not been relocated out of the riverbed, it is assumed that a section of the VCP would need to be replaced, joints sections would need to be repaired, and a line break would have occurred that results in spilling raw sewage into the river. In this analysis, section replacements and joint repairs are assumed to take place every five years, while sewer trunk line breakages resulting in raw sewage spills occur every ten years. The relocated sewer line is assumed to have a 50-year lifetime, during which avoided costs from the baseline assumptions accrue.

Potential Adverse Effects from the Project

There are no adverse impacts anticipated from this project.

Summary of Findings

The proposed project will provide a range of both water quality and other benefits. After apportioning 6.22% of the benefits of the overall relocation project to Phase 1, the project will result in $14,607 in present value avoided capital costs due to no longer having to replace sections of the existing sewer trunk line. As a result of the project, the NCWD will also avoid $14,607 in repair costs for the existing pipeline, and $4,180 in clean up costs associated with a break in the pipeline. Over the 50-year project life, total present value monetized benefits associated with the project amounts to $33,394. In addition, by avoiding the discharge of raw sewage into the river, the project will avoid adverse impacts to the Santa Clara River ecosystem.

This analysis of costs and benefits is based on available data and some assumptions. As a result, there may be some omissions, uncertainties, and possible biases. In particular, the analysis has assumed that VCP sections would be replaced every five years, joints would be repaired every five years, and sewer trunk line breaks would occur every ten years, and that all would happen starting in 2017. It is possible that replacements, repairs, and breaks occur more or less frequently or that 2017 is not the first year that they occur. These issues are listed in Table NCWD-3.3.

TABLE NCWD-3.3
OMISSIONS, BIASES, AND UNCERTAINTIES, AND THEIR EFFECT ON THE PROJECT

Benefit or Cost Category	Likely Impact on Net Benefit	Comment
Avoided Capital Costs of Replacing Sections of Sewer Trunk Line	U	The frequency of section replacement is assumed to be every five years; net benefits would be impacted by more or less frequent replacements.
Avoided Repair Costs for Existing Pipe	U	The frequency of joint repairs is assumed to be every five years; net benefits would be impacted by more or less frequent replacements.
Avoided Clean-Up Costs from Sewer Trunk Line Break	U	The frequency of sewer trunk line breaks resulting in raw sewage spills is assumed to be every ten years; net benefits would be impacted by more or less frequent replacements.

*Direction and magnitude of effect on net benefits:
+ = Likely to increase net benefits relative to quantified estimates.
++ = Likely to increase net benefits significantly.
– = Likely to decrease net benefits.
– – = Likely to decrease net benefits significantly.
U = Uncertain, could be + or –.

References

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LARWQCB. 2010. Watershed Management Initiatives. Santa Clara River Watershed Summary. Los Angeles Regional Water Quality Control Board. Available: http://www.swrcb.ca.gov/rwqcb4/water_issues/programs/regional_program/wmi/santa_clara_river_watershed/santa_clara_river_watershed.doc. Accessed December 2010.

Santa Clarita Valley Southern End Recycled Water Project (VWC-1)

Summary

The Santa Clarita Valley Southern End Recycled Water Project will expand the existing Santa Clarita Valley recycled water transmission and distribution system to the southern end of the Santa Clarita Valley in order to supply additional customers within the Valencia Water Company (VWC) service area. The project will provide 910 acre-feet (AF) of recycled water per year to VWC municipal customers for domestic landscape irrigation. The source of this water will be the Valencia Water Reclamation Plant (Valencia WRP), which currently serves as a source of supply for existing Castaic Lake Water Agency (CLWA) and VWC recycled water customers.

The project includes planning, designing, and constructing additional recycled water infrastructure, including various recycled water pipelines and pumping stations. Specific project components include 31,000 linear feet of transmission main, 2 booster stations, and 69 service meter connections.

In the future, the project will potentially serve as a source of recycled water for customers within the Newhall County Water District and Santa Clarita Water Division service areas. Some preliminary designs for the extension of the recycled water system to serve these areas have been developed. However, the benefits and costs of this potential extension of the project are not included in this analysis.

A summary of all benefits and costs of the project is provided in Table VWC-1.1. Water quality and other benefits are discussed in the remainder of this attachment.

The “Without Project” Baseline

The Southern End Recycled Water Project will be located within the City of Santa Clarita, in the Upper Santa Clara River Watershed (Watershed). The Santa Clara River is the largest river system in Southern California that is still in a relatively natural state. The river originates on the northern slope of the San Gabriel Mountains in Los Angeles County, traverses Ventura County, and flows into the Pacific Ocean between the cities of San Buenaventura (Ventura) and Oxnard. Municipalities within the Watershed include Santa Clarita, Fillmore, Santa Paula, and Ventura (LAWQCB, 2006).

Extensive patches of high-quality riparian habitat exist along the length of the river and its tributaries. Two endangered fish, the unarmored stickleback and the steelhead trout, are resident in the river (LAWQCB, 2006). One of the Santa Clara River’s largest tributaries, Sespe Creek, is designated a Wild Trout Stream by the State of California and a Wild and Scenic River by the U.S. Forest Service. Piru and Santa Paula creeks, tributaries to the Santa Clara River, also support steelhead habitat. In addition, the river serves as an important wildlife corridor. The Santa Clara River drains to the Pacific Ocean through a lagoon that supports a large variety of wildlife.

TABLE VWC-1.1
BENEFIT-COST ANALYSIS OVERVIEW

	Present Value
Costs – Total Capital and O&M	$10,974,099
Monetizable Benefits	
Water Supply Benefits	
Avoided Imported Water Supply Costs	$9,061,140
Water Quality Benefits	
Avoided Alternative Water Resources Management (AWRM) Costs	**$6,875,545**
Avoided Fertilizer Costs	**$215,557**
Total Monetizable Benefits	**$16,152,242**
Quantified Benefit or Cost	**Project Life Total**
Water Quality and Other Benefits	
Avoided Chlorides Discharge and Avoided Introduction of Chlorides into the Watershed	11,982 Metric Tons
Reduced CO_2 Emissions	10,731 Metric Tons
Qualitative Benefit or Cost	**Qualitative Indicator***
Water Supply Benefits	
Increased Water Supply Reliability for CLWA customers	+
Improved Operational Flexibility for CLWA	+
Water Quality and Other Benefits	
Reduced DBP Precursors	+
Reduced Stress on the Sacramento-San Joaquin Delta	+

CO_2 = carbon dioxide.
DPB = disinfection by-product.
O&M = operations and maintenance.
* Direction and magnitude of effect on net benefits:
+ = Likely to increase net benefits relative to quantified estimates.
++ = Likely to increase net benefits significantly.
– = Likely to decrease net benefits.
– – = Likely to decrease net benefits significantly.
U = Uncertain, could be + or –.

The predominant land uses in the Watershed include agriculture, open space, and residential uses. Revenue from the agricultural industry within the Watershed is estimated at more than $700 million annually. Residential use is increasing rapidly both in the upper and lower watersheds. The population within the Santa Clarita Valley alone is expected to grow from 187,172 in 1998 to more than 350,000 by 2025 (SCAG, 2009).

Most of the soils, surface water, and groundwater in the Watershed contain moderately high levels of chloride. Primary sources of chlorides in surface water and groundwater include imported surface water [i.e., State Water Project (SWP) supplies], local geologic formations and discharges from wastewater plants (i.e., Valencia and Saugus water reclamation plants).5 Since the 1970s, growth in the Santa Clarita Valley has led to chloride levels that exceed water quality objectives (WQOs) and impair beneficial uses for agricultural supply and groundwater recharge. As a result of these factors, a total maximum daily load (TMDL) for chlorides has been established for the Watershed.

Currently, the Valencia WRP discharges wastewater effluent directly into the Santa Clara River. Due to requirements associated with the established TMDL for chloride, the Santa Clarita Valley Sanitation District (SCVSD) will face penalties for continued discharging wastewater to the river unless source control measures are implemented to reduce chloride levels in Valencia WRP influent and/or the effluent is highly treated using advanced treatment technologies [i.e., through microfiltration/reverse osmosis (MF/RO)] prior to discharge. Both of these measures are included as components of the current AWRM, which was developed to address WQOs associated with the Upper Santa Clara River (USCR) Chloride TMDL.

By providing an alternative to discharge through the use of recycled water, the Southern End Recycled Water Project will reduce the amount of water that would be treated or managed via the AWRM. This will help to reduce costs associated with the planned project. In addition, reduced future reliance on SWP water as a result of the project will (1) reduce CO2 emissions associated with the production of SWP water, (2) reduce the importation of chlorides and other potentially harmful water quality constituents into the Watershed, and (3) result in ecological benefits for the Sacramento-San Joaquin Delta ecosystem. The use of recycled water for irrigation in lieu of potable water will also reduce fertilizer costs for domestic landscape irrigation; recycled water typically contains fertilizing nutrients (e.g., nitrate, phosphorus, and potassium) that are not found in potable water.

Water Quality and Other Benefits

The project will provide a range of water quality and other benefits. This section provides discussion and details on benefit estimation for benefits including avoided wastewater treatment costs (i.e., reduced AWRM costs), avoided fertilizer costs, avoided introduction of additional chlorides into the Watershed, removal of chlorides from effluent discharge, reduced CO_2 emissions, reduced DPB precursors, and ecological benefits in the Sacramento-San Joaquin Delta.

Avoided AWRM Costs

Since November 2007, SCVSD, the Ventura County Agricultural Water Quality Coalition, the United Water Conservation District, and the Upper Basin Water Purveyors (including VWC and CLWA) have been working together to develop an AWRM Program to address WQOs associated with the USCR Chloride TMDL. SCVSD is the lead implementation agency for the AWRM.

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[5]. The WRP effluent chloride load is comprised of two main sources: chloride present in the blended water supply and chloride added by residents, businesses, and institutions in the Saugus and Valencia WRP service area. The chloride load added by users can be further divided into two parts: brine discharge from self-regenerating water softeners (SRWSs) and all other loads added by users. Excluding the imported chloride load that exists in the water supply, non-SRWS sources of chloride include groundwater; residential, commercial, and industrial water treatment; infiltration; and wastewater disinfection.

The purpose of the AWRM Program is to develop a regional watershed solution for chlorides as an alternative to compliance with the existing 100 milligrams per liter (mg/L) WQO. The AWRM was developed in recognition that compliance with the existing 100-mg/L WQO would be a challenging and costly project, requiring many years to implement. The AWRM Program considers the use of site-specific objectives and water resource management facilities that would allow for full protection of all beneficial uses while simultaneously providing a more feasible compliance solution. The AWRM Program is designed to maintain a chloride balance in the Watershed while providing salt export and water supply benefits to Ventura County stakeholders.

Key elements of the AWRM Program include:

- Implementing measures to reduce chloride in the recycled water produced at SCVSD's Saugus and Valencia WRPs.
- Constructing an advanced treatment facility (i.e., MF/RO) to treat wastewater effluent produced at the Valencia WRP.
- Procuring supplemental water (i.e., local groundwater or surface water) for release to the Santa Clara River to improve water quality and attain WQOs (this would be an interim measure that would be implemented prior to construction of the MF/RO facility and in times of prolonged drought).
- Constructing water supply facilities that would allow for salt export and water supply benefits by blending high-quality Valencia RO product water with more saline groundwater. This would allow for a blended water supply with less than 95 mg/L chloride.
- Providing alternative water supply to protect salt-sensitive agricultural beneficial uses of the Santa Clara River (i.e., by blending irrigation supplies with RO product water).
- Supporting the expansion of recycled water uses within the Santa Clarita Valley.
- Revising the surface water and groundwater WQOs to support all of these elements.

By providing for beneficial use of 910 acre-feet per year (AFY) of tertiary-treated effluent from the Valencia WRP, implementation of the Southern End Recycled Water Project will allow SVCSD to design the AWRM to manage 910 AFY less of wastewater effluent.

The AWRM is expected to be completed by the end of 2015, with construction beginning in 2012. Total estimated capital costs for all AWRM components amount to $250 million. Annual O&M costs associated with the AWRM will be $4,471,830 through 2063 (the end of the Southern End Recycled Water Project's useful life); total present value capital and O&M costs associated with the AWRM will amount to $242,096,644. CLWA estimates that by reducing the amount of wastewater effluent discharged to the Santa Clara River, the Southern End Recycled Water Project will reduce total AWRM capital costs by 2.8%.[6] Thus, total avoided costs as a result of AWRM are $6,875,545.

[6]. The Valencia and Saugus WRPs treat about 32,000 AFY of wastewater effluent. Thus, the AWRM is designed to accommodate this amount. As a result of the Southern End Recycled Water Project, SVCSD can design the AWRM to treat 910 less AFY of wastewater effluent. 910 AFY is 2.8% of 32,000 AFY.

Avoided Fertilizer Costs

Fertilizing compounds commonly present in recycled water are typically not found in potable water (e.g., nitrogen, phosphorus, potassium). Thus, the use of recycled water for domestic landscape irrigation will reduce fertilizer costs associated with the properties that will be serviced by the project.

The exact offset of fertilizer use from using recycled water is difficult to predict due to daily and seasonal nutrient variations in the recycled water. However, the amount of nutrients (i.e., pounds of fertilizer) per AF of recycled water can be calculated from average effluent values for the Valencia WRP. The recycled water from the Valencia WRP contains 9.5 pounds (lbs) of nitrogen per AF and 50.9 lbs of potassium per AF (data for the amount of phosphorus present in the recycled water is not available). Thus, for every AF of recycled water used in lieu of potable water, VWC recycled water customers will avoid the use of a total of 60.4 lbs of fertilizer. The weighted average commercial value of this fertilizer is $0.324/lb.[7]

For the 910 AF of recycled water applied each year in lieu of imported water, recycled water customers serviced by the project will avoid the use of 54,922 lbs of fertilizer. This will result in avoided costs of $17,795 per year. Over the lifetime of the project, total present value avoided fertilizer costs will amount to $215,557. Additional benefits would be expected for avoided fertilizer costs due to increased levels of phosphorus in recycled water compared to potable supplies.

Avoided Chloride Discharge and Avoided Introduction of Chlorides into the Watershed

Reduced demand for imported water as a result of the proposed project will allow the Watershed to avoid accumulation of 4,369 metric tons (MT) of chlorides over the 50-year project life. In addition, by enabling the use of tertiary-treated effluent from the Valencia WRP for domestic landscape irrigation, the project will avoid the discharge of 7,613 MT of chlorides into the Santa Clara River.

To calculate the avoided importation of chlorides due to reduced future imports of SWP water, it is assumed that the average chloride concentration in SWP water is 79 mg/L[8] (Metropolitan, 2010). Therefore, each AF of SWP water contains 0.097 MT of chlorides, on average.[9] Starting in 2015, avoided imported water use will amount to 910 AFY (in 2014, the project will avoid 455 AF). Thus, the introduction of about 88 MT of chlorides will be avoided each year. Over 50 years, the project will avoid the import of 45,045 AF of SWP water, and 4,369 MT of chlorides will not be introduced into the Watershed.

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[7] This represents the average weighted cost of nitrogen and potassium. Source: Asano, 1981, updated to 2006 using the national fertilizer price index. Updated from 2006 to 2009 based on the Consumer Price Index (CPI).

[8]. This is the highest rolling average value at Metropolitan Water District of Southern California's Jensen Filtration Plant, which is the closest measurement point to CLWA for which data were available. Chloride concentrations in SWP water have ranged from about 28 mg/L to 128 mg/L over the past 30 years (LARWQCB, 2008).

[9]. 1 acre-foot = 1,233,482 liters; 79 mg/L = 97,445,078 mg/AF = 0.097 MT/AF.

To determine the amount of chlorides that will not be discharged from the WRP into the Santa Clara River, it is assumed that the average chloride concentration of recycled water from the Valencia WRP will be 137 mg/L,[10] or 0.169 MT/AF. Thus, each year, the project will avoid the discharge of 154 MT of chlorides (0.169 MT/AF multiplied by 910 AF). Over the 50-year project life, this will amount to the avoided discharge of 7,613 MT of chlorides into the Santa Clara River.

In total, the project will avoid the introduction or direct discharge of 7,613 MT of chlorides. This will reduce chloride loading into the Santa Clara River and improve water quality for beneficial uses.

Reduced CO2 Emissions

By offsetting imported water demands with locally produced water, the project will avoid emissions of CO2 (a greenhouse gas) generated by the production of energy required to transport SWP water to VWC service area.

CO2 emissions resulting from the production of electricity, measured as tons of CO2 per megawatt-hour (MWh), vary by energy source. Hydroelectric power plants are assumed to generate relatively little CO2 emissions, on the order of 0.005 to 0.02 MT/MWh (van de Vate, 2002). For the Pacific region of the United States, CO2 emissions from coal-fired plants and natural gas-powered plants are estimated to be 0.976 MT CO2/MWh and 0.561 MT CO2/MWh, respectively (U.S. DOE and U.S. EPA, 2000). In California, electricity production relies on a range of energy sources, including those located within California and those located outside of the state. The California Department of Water Resources (DWR) estimates that the CO2 emissions rate for all electricity sources providing electricity to the SWP is 0.325 MT CO2/MWh (Climate Registry, 2010).

The California Energy Commission estimates that the electricity required for the conveyance of 1 AF of SWP water imported to Castaic Lake is 1.17 MWh (CEC, 2010). When energy requirements for treatment are taken into account, the total amount of energy required for every AF of water delivered to CLWA and VWC amounts to 1.451 MWh.[11,12]

Using the DWR CO2 emissions rate of 0.325 MT of CO2 emitted per MWh, 0.472 MT of CO2 are produced for every AF of water delivered and treated within the CLWA service area (1.451 MWh/AF multiplied by 0.325 MT/MWh). By eliminating use of 45,045 AF of imported SWP water over the assumed project life, the project will avoid emissions of 21,237 MT of CO2.

Avoided CO2 emissions will be offset to some extent by CO2 emissions from pumping and distributing recycled water from the Valencia WRP to customers. CLWA estimates that 1.001 MWh will be required to produce and deliver 1 AF of the recycled water to VWC customers. In addition,

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[10]. This reflects the average annual concentration reported in the 2009 Valencia WRP Annual Monitoring Report (Sanitation Districts of Los Angeles County, 2009).

[11]. CLWA estimates energy requirements for treatment to be 0.285 MWh/AF.

[12]. Energy required to transmit treated water from CLWA treatment plants to VWC is not included in this analysis due to unavailable data.

the CO_2 emissions rate for the mix of electricity used within the CLWA service area is 0.233 MT CO_2/MWh. Over the 50-year project life, CO_2 emissions associated with recycled water use will amount to 10,506 MT. Thus, with the project, net avoided carbon emissions will be 10,731 MT.

Reduced DBP Precursors

SWP water has a number of water quality constituents that affect its suitability as a drinking water source. SWP water contains relatively high levels of bromide and total organic carbon (TOC), two elements that are of particular concern to drinking water agencies. Bromide and TOC combine with chemicals used in the water treatment process to form DBPs such as trihalomethanes (THMs), which are strictly regulated under the federal Safe Drinking Water Act. Currently, there are no standards for bromide or TOC in drinking water. Water treated by CLWA currently meets all federal and state drinking water standards. However, current levels of bromide and TOC are significantly higher than target levels identified by an expert panel hired by the California Urban Water Agencies. These levels are 50 parts per billion (ppb) for bromide and 3 parts per million (ppm) for TOC. Average SWP levels are significantly higher: up to 600% above the target level for bromide and 10% above the target level for TOC (Owen et al., 1998).

Water agencies treat all water to meet stringent state and federal drinking water standards before delivering it to their customers. However, poor-quality source water makes it increasingly expensive and difficult to meet such standards. Increased levels of constituents that aid in the formation of THMs can mean more time spent monitoring finished water in the distribution system. Increased levels of these constituents may also lead to the use of increased proportions of groundwater in the blend of water supplies in order to control THMs. However, reduced imports of SWP water will reduce the need for such preventative measures.

Reduced Stress on the Sacramento-San Joaquin Delta

By reducing the use of imported SWP water, the Southern End Recycled Water Project will augment future in-stream flows in the Sacramento-San Joaquin Delta or will offset other future diversions that may otherwise reduce flows. Reduced future demands on Delta supplies also will help reduce the overall salinity of the Delta and improve Delta habitat.

Improving the Delta's environmental condition is vital to maintaining and improving the viability of the region. The Delta provides drinking water to 25 million people, supports irrigation of 4.5 million acres of agriculture, and serves as home to 750 plant and animal species. The Delta's 1,600 square miles of marshes, islands, and sloughs support at least half of migratory water birds on the Pacific Flyway; 80% of California's commercial fisheries; and recreational uses including boating, fishing, and windsurfing.

Delta resources are in a state of crisis. Fish populations, including salmon and Delta smelt, have declined dramatically in recent years. The levee system is aging, and vulnerability of the Delta to flooding, sea level rise, or a major earthquake has contributed to concerns about possible levee collapse which would result in devastating impacts to both water supply and habitat.

Distribution of Project Benefits and Identification of Beneficiaries

The Southern End Recycled Water Project includes the full range of types of beneficiaries summarized in Table VWC-1.2. At the local level and regional level, agencies (e.g., SVCSD, VWC, CLWA) and their customers will benefit from reduced AWRM costs and improved downstream water quality due to reduced imports of chlorides. VWC customers receiving recycled water will benefit due to avoided fertilizer costs. Statewide benefits include ecological improvements and improved water quality in the Sacramento-San Joaquin Delta.

TABLE VWC-1.2
PROJECT BENEFICIARIES SUMMARY

Local	Regional	Statewide
SCVSD, VWC	CLWA, Ventura County Agriculture	Sacramento-San Joaquin Delta

Project Benefits Timeline Description

Design efforts for the Southern End Recycled Water Project should be completed by June 2012 and construction will begin in January 2013. Construction is expected to take 18 months, with operation starting in July 2014. For this analysis, a 50-year useful project life is assumed. Thus, benefits and costs are calculated through 2063, 50 years after the project comes online. To calculate avoided costs associated with the AWRM, it is assumed that construction would begin in 2012 and would be completed in 2015. Avoided cost benefits are also calculated through 2063.

Potential Adverse Effects from the Project

The project is not expected to result in any significant adverse effects. The project location is within an urban area that is fully developed.

Summary of Findings

The proposed project will provide a range of both water quality and other benefits. The beneficial use of tertiary-treated effluent from the Valencia WRP will reduce AWRM implementation costs by $6,875,545. VWC recycled water customers will avoid $215,557 in present value fertilizer costs. Reduced use of SWP water will avoid the import of 4,369 MT of chlorides and the effluent discharge of 7,613 MT of chlorides over the 50-year life of the project. In addition, reduced use of SWP water imports will prevent the generation of 10,731 MT of CO2 over the 50-year project life. Additional qualitative benefits from the proposed project include reduced DBPs from SWP imported water and reduced stress on the Sacramento-San Joaquin Delta due to reduced SWP demands.

This analysis of costs and benefits is based on available data and some assumptions. As a result, there may be some omissions, uncertainties, and possible biases. These issues are listed in Table VWC-1.3.

TABLE VWC-1.3
OMISSIONS, BIASES, AND UNCERTAINTIES, AND THEIR EFFECT ON THE PROJECT

Benefit or Cost Category	Likely Impact on Net Benefit	Comment
Avoided AWRM costs	++	Costs of the AWRM are calculated through 2063 to match the project life of the Southern End Recycled Water Project. The AWRM would likely have a useful life of less than 50 years and/or would require replacement costs prior to that time. Replacement costs, which have not been included in this analysis, would serve to increase the avoided (reduced) costs of the AWRM as a result of this project.
Avoided AWRM costs	U	The calculation of the present value costs of the AWRM is a function of the timing of capital outlays and a number of other factors and conditions. Changes in these variables will change the estimate of costs. In addition, the percentage of AWRM costs that the project will avoid is based on current information for AWRM implementation. These assumptions could also change over time.
Avoided fertilizer costs	+	Data for the amount of phosphorus in the recycled water are unavailable. For this analysis the concentration of phosphorus in recycled water is assumed to be zero. With information on phosphorous, benefits of avoided fertilizer costs would likely increase.

*Direction and magnitude of effect on net benefits:
+ = Likely to increase net benefits relative to quantified estimates.
++ = Likely to increase net benefits significantly.
– = Likely to decrease net benefits.
– – = Likely to decrease net benefits significantly.
U = Uncertain, could be + or –.

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Electrolysis and Volatilization for Bromide Removal and Disinfectant By-product Reduction Pilot Plant (CLWA-2)

Summary

This project will expand an innovative water treatment technique from a small pilot scale to a demonstration scale that will treat 350,000 gallons per day (gpd) of source water. This new technique, pioneered by the Castaic Lake Water Agency (CLWA), was developed to reduce the level of brominated disinfection by-products (DBPs) in finished drinking water by removing bromide from source waters received from the State Water Project (SWP). Brominated DBPs result from a reaction between naturally occurring bromide anions and disinfectants. CLWA's new treatment technique relies on passing source water through metal anodes where it undergoes both an electrolysis and volatilization process that oxidizes the brominated DBPs into bromine. This reduces the risk of adverse health impacts associated with brominated DBPs. CLWA's pilot project has demonstrated that this treatment technique can successfully reduce levels of brominated DBPs. If the demonstration project is shown to cost-effectively remove brominated DBPs at a greater scale, CLWA will incorporate the existing equipment into a larger project that will treat 7 million gallons per day (MGD), approximately one-half of daily plant wide production.

The benefits of this project can only be properly evaluated based on the full-scale implementation of the innovative technology being demonstrated. Therefore this economic analysis starts by considering the benefits of the larger-scale facility, and then apportions a share of the benefits to the smaller-scale demonstration project. The benefits are apportioned based on the percentage of the full-scale costs represented by this demonstration project.

A summary the benefits and costs of the demonstration project is provided in Table CLWA-2.1. Water quality and other benefits are discussed in the remainder of this attachment.

TABLE CLWA-2.1
BENEFIT-COST ANALYSIS OVERVIEW –DEMONSTRATION-SCALE PROJECT

	Present Value
Costs – Total Capital and O&M	$1,072,533
Monetizable Benefits	
Water Supply Benefits	
Avoided Flushing Due to Nitrification	$147,960
Water Quality Benefits	
Reduction in Chemical Costs	$53,055
Health Benefits From Improved Water Quality	$624,407
Avoided Costs Associated With Switching From Chloramine Treatment to Free Chlorine	$95,173
Total Monetized Benefits	$920,595
Qualitative Benefit or Cost	**Qualitative Indicator***
Water Quality and Other Benefits	

	Present Value
Developing an Innovative New Technique to Reduce Human Exposure to Brominated DBPs	++
More Effective and Flexible Drinking Water Disinfection Treatment	++
Modest Reduction in Influent Levels of Chloride, Ammonia, Brominated DBPs and Nutrients at the Wastewater Treatment Plant	+
Reduced Stress on Sacramento-San Joaquin Delta	+

O&M = operations and maintenance
* Direction and magnitude of effect on net benefits:
+ = Likely to increase net benefits relative to quantified estimates.
++ = Likely to increase net benefits significantly.
– = Likely to decrease net benefits.
– – = Likely to decrease net benefits significantly.
U = Uncertain, could be + or –.

The "Without Project" Baseline

The Santa Clara River Watershed (Watershed) covers an area of 1,634 square miles in Southern California. Approximately 40% of the Watershed is in Los Angeles County and 60% is located in Ventura County. CLWA is located in the upper portion of the Santa Clara River Watershed in Los Angeles County. Principal tributaries within the upper part of the Watershed include Castaic Creek, Bouquet Canyon Creek, San Franciscquito Creek, and the south fork of Santa Clara River. (LARWQCB, 2010)

CLWA relies on a mix of local ground water and supplemental supplies of SWP water from Northern California to supply local purveyors throughout the Santa Clarita Valley. CLWA receives surface water from Lake Oroville near Sacramento. Source water flows through three power plants once it reaches the Oroville dam before traveling down the Feather and Sacramento Rivers to reach the Sacramento-San Joaquin Delta. Source water then moves through the Delta to the Harvey O. Bank pumping plant where it travels 300 miles south via the CA Aqueduct. Finally, source water reaches A.D. Edmonston Pumping plant where it is pumped south through the West Branch of the California Aqueduct to Quail Lake, Pyramid, Lake and Castaic Lake to be processed by CLWA.

SWP water has a number of water quality constituents that affect its suitability as a drinking water source. SWP water contains relatively high levels of bromide and total organic carbon (TOC), two elements that are of particular concern to drinking water agencies. Bromide and TOC combine with chemicals used in the water treatment process to form DBPs such as trihalomethanes (THMs) and holacetic acids (HAA5s), which are strictly regulated under the federal Safe Drinking Water Act. Currently, there are no standards for bromide or TOC in drinking water. Water treated by CLWA currently meets all federal and state drinking water standards. However, CLWA's use of ozone and chlormaines in the treatment process results in the formation of DBPs such as THMs and HAA5s. Importantly, ozone also interacts with bromide, which naturally occurs in source water, to produce bromate (a brominated DBP), a chemical that may increase the statistical risk of cancer in people who drink water with elevated concentrations.

Without the project, CLWA will continue to receive SWP water with elevated bromide levels, and distribute water that meets current federal and state health standards but has elevated brominated DBPs (notably, bromate). CLWA also will need to retain its current reliance on chloramine disinfection in order to manage DBP levels while concurrently providing suitable microbial control. The continued reliance on chloramines is expensive, limits operational flexibility (e.g., allowing better use of existing ozonation disinfection facilities), and periodically leads to nitrification of the treated water (due to the ammonia levels associated with chloramine production). During episodes of elevated nitirifcation, the finished drinking water cannot be served to the public and instead must be flushed from the distribution system, and replaced with other water.

If the demonstration project performs as anticipated, based on the pilot study, CLWA can move forward with larger-scale implementation of the technology. Thus, this demonstration-scale project is a gateway to the wide range of highly valuable benefits for the CLWA and its retail water purveyors. In other words, the benefits of the demonstration-scale project are integrally linked to the anticipated benefits of full-scale implementation. If the demonstration project performs as anticipated, the benefits will be realized as described in these Attachments 7 and 8, and a portion of the full-scale benefits can be attributed to the demonstration-scale project.

If, on the other hand, the project indicates problems with the technology at the demonstration scale, then the Agency will realize benefits by avoiding the cost associated with full-scale implementation of an approach that does not perform as anticipated from the pilot test alone (e.g., a substantial cost savings will be realized by CLWA by avoiding a poor investment). Or, the limitations made evident by the demonstration project can lead to technology and/or operational improvements that might enhance the new approach and increase its net benefits. These scenarios are not included in this assessment, but they indicate in a qualitative manner how the demonstration project can provide benefits even if it does not perform as well as anticipated.

Water Quality and Other Benefits

This section describes the water quality benefits generated by the development of a full-scale treatment process that will remove bromide from source waters and thus reduce levels of brominated DBPs from finished waters served to the public. The water quality and other benefits include a reduction in chemical costs (potential to switch back to free chlorine disinfection from the current use of chloramines), health benefits associated with improved water quality (reduced public exposure to DBPs), operational benefits associated with switching from chloramine treatment to free chlorine (i.e., more effective and flexible drinking water disinfection treatment), and a decrease in nitrification problems and associated losses of treated water (due to reduced ammonia levels, as required to produce chloramines). Reduced flushing due to nitrification will result in less use of imported SWP water (as described in Attachment 7), and thus a small contribution to reduced stress on the Sacramento-San Joaquin Delta. The demonstration-scale project is then assigned benefits according to the ratio of the costs of the demonstration-scale project to the full-scale project.

Reduction in Chemical Costs

This project will help CLWA to reduce its chemical costs because this treatment technique will allow CLWA to use less chemicals to meet established water quality standards for joint microbial and DBP control. The process of electrolysis and volatilization to reduce brominated DBPs will allow CLWA to reduce the amount of ammonia it uses by 100% and the amount of chlorine it uses by 60%. Based on 2009-2010 expenditures on water treatment chemicals, CLWA spent $42,199 on ammonia and $46,641 on chlorine. A 100% reduction and 60% reduction in the amount of ammonia and chlorine used, respectively, will translate to savings of $70,184 per year. These benefits will last throughout the 30-year lifetime of the full-scale project. The total present value of the reduction in chemical costs resulting from the full-scale plant is $588,972. Attributing a share of these cost savings to the demonstration-scale project (based on the demonstration project having 9.3% of the present value costs of the full-scale facility) results in benefits of approximately $53,055 in present value terms.

Health Benefits From Improved Water Quality

Elevated levels of bromate, a problem currently associated with CLWA's water treatment processes, have been shown to have an elevated statistical cancer risk factor. CLWA's new treatment technique will reduce the concentration of brominated DBPs by 60%. Using a baseline concentration of 8 ug/L, the electrolysis and volatilization technique will reduce the concentration of brominated DBPs by 4.8 ug/L (60% of 8.0 ug/L). When combined with the U.S. EPA statistical cancer risk unit factor of 2.010E-5 for each ug/L, this exposure reduction results in the treatment process avoiding the statistical equivalent of 9.6 cases per 100,000 people exposed (4.8 x 2.0E-5).

This benefit will be substantial with the introduction of the full-scale plant. That is because the full-scale plant will treat 7 MGD, thus reducing the amount of brominated DBPs in water for a large number of customers (260,000 people served). In effect, blending the output of the full facility with the average production at the full plant (21 MGD), the statistical cancer risk reduction is reduced by one-third (or, equivalently, the full 4.8 ug/L reduction in bromate is realized by one-third of the service population, approximately 85,800 (0.33 x 260,000) people benefiting from a reduction in statistical cancer risk. In effect, the entire service area obtaining water from this water treatment plant will see reduced concentrations, but the concentration reduction will be lowered through blending with finished water that has not been treated with the new technology. However, because the dose response function is linear, the mathematical result of the risk assessment is identical if we focus instead on a subset of the population receiving the full bromate exposure reduction.

Using the statistical cancer risk unit factor from earlier in the analysis, we can conclude that the full-scale treatment plant will reduce bromate levels to the statistical equivalent of eliminating 8.24 cases per 70-year "lifetime" (the risk of 0.118 statistical cases per year). Using the standard EPA "value of a statistical life" (VSL, per U.S. EPA 2008) of $7,000,000 per case results in an annual health benefit of $826,000. This annual benefit results in a total present value of health benefits over the 30-year assumed lifetime of the full-scale project of $6,931,630. Attributing a share of these cost savings to the demonstration-scale project (based on the demonstration project having 9% of the present value costs of the full-scale facility) results in benefits of $624,407 in present value terms.

Avoided Costs Associated With Switching from Chloramine Treatment to Free Chlorine

This new treatment technique will allow CLWA to discontinue using chloramine and replace it with less expensive free chlorine. Benefits will result from annual cost savings associated with foregoing purchases of the necessary chemicals to make chloramine, including salt ($13,000) and ammonioum hydroxide solution ($31,800). Additionally, there will be annual cost savings associated with using less electricity ($12,000) and labor ($59,300), both of which are required for

making chloramines. Additional annual cost savings come from avoided purchases of sampling reagents ($4,000) and supplemental sodium hypochlorite ($3,700).
Beyond savings directly attributed to switching to free chlorine, there will be savings associated with not re-pumping water that has undergone nitrification. Nitrification in source water results in an inability to maintain adequate disinfectant residual in treated water. This will often reduce water quality by affecting taste and odor. Much of this water needs to be "flushed" because it cannot be distributed to customers. Using free chlorine would reduce the amount of water flushed, saving an estimated $2,100 in pumping costs per year.

The total annual benefit associated with switching from chloramine to free chlorine is $125,900. The present value of this benefit for the full-scale project is $1,056,528. Attributing a share of these cost savings to the demonstration-scale project (based on the demonstration project having 9% of the present value costs of the full-scale facility) results in benefits of approximately $95,173 in present value terms.

Developing an Innovative New Technique to Reduce Human Exposure to Brominated DBPs

This unique treatment technique, developed by the Castaic Lake Water Agency, has the potential for substantial additional benefits experienced throughout the water utility industry. If the demonstration and full-scale projects are shown to be effective in removing brominated DBPs, this technology could be adopted by a number of water utilities that must treat source water with naturally occurring bromide ions. This will allow water utilities to attain similar benefits such as cost savings in chemical use, along with providing end users with water that is healthier, cleaner, and tastes better. Water utilities that adopt this technology following CLWA's successful demonstration project will also forego any costs associated with innovating redundant treatment techniques. The potential for this project to be utilized by a number of other water utilities facing similar treatment challenges is not quantified in this analysis, though this benefit is expected to be substantial.

More Effective and Flexible Water Disinfection Treatment

While not quantified, the success of the demonstration project and subsequent installation of full-scale treatment will provide CLWA with considerably greater flexibility in its management of its disinfection regime (including ozonation) for microbial control, while simultaneously reducing exposures to DBPs. This additional flexibility will likely reduce costs and improve the overall effectiveness of the utility's operations.

Modest Reduction in Influent Levels of Chloride, Ammonia, Brominated DBPs and Nutrients at the Wastewater Treatment Plant

This new technology will result in a reduction in the concentrations of a number of influents in the source water that must be treated at the wastewater treatment plant downstream from the CLWA. Concentrations of chloride, ammonia, and other nutrients are all expected to decline following the implementation of this technology. This decrease in influent level will make treatment easier and more effective, thus resulting in substantial costs savings at the wastewater treatment plant. Additionally, a decrease in the amount of influent that must be treated will resulted in higher quality effluent being discharged to receiving waters. This will help improve and maintain downstream water quality and beneficial uses. This benefit has not been quantified here.

Reduced Stress on the Sacramento-San Joaquin Delta

By reducing flushing due to nitrification, and reducing the use of imported water (as described in Attachment 7), the full-scale bromide treatment project will modestly augment future in-stream flows in the Sacramento-San Joaquin Delta or will offset other future diversions that may otherwise reduce flows. Reduced future demands on Delta supplies also will help reduce the overall salinity of the Delta and improve Delta habitat.

Improving the Delta's environmental condition is vital to maintaining and improving the viability of the region. The Delta provides drinking water to 25 million people, supports irrigation of 4.5 million acres of agriculture, and serves as home to 750 plant and animal species. The Delta's 1,600 square miles of marshes, islands, and sloughs support at least half of migratory water birds on the Pacific Flyway; 80% of California's commercial fisheries; and recreational uses including boating, fishing, and windsurfing.

Delta resources are in a state of crisis. Fish populations, including salmon and Delta smelt, have declined dramatically in recent years. The levee system is aging, and vulnerability of the Delta to flooding, sea level rise, or a major earthquake has contributed to concerns about possible levee collapse which would result in devastating impacts to both water supply and habitat.

Distribution of Project Benefits, and Identification of Beneficiaries

The bromide removal project includes the full range of beneficiaries, as is shown in Table CLWA-2.2. The key benefits associated with this treatment technique will be realized by the water customers served by the CLWA water treatment facility, who will benefit from reduced health risks. Additionally, CLWA will benefit from this technique because it will allow them to discontinue purchases of chemicals associated with producing chloramines. A reduction in chemical costs will reduce the overall costs of water treatment and allow CLWA to operate more cost-effectively. Reduced flushing due to nitrification (as described in Attachment 7) will result in less stress on the Sacramento-San Joaquin Delta ecosystem. And, potential adoption of this innovative technology by other water utilities that must treat source water with naturally occurring bromide ions will provide benefits statewide and beyond.

TABLE CLWA-2.2
PROJECT BENEFICIARIES SUMMARY

Local	Regional	Statewide
CLWA Santa Clarita Water Division, LA County Waterworks District 36, Newhall County Water District, Valencia Water Company.	Castaic Lake Water Agency Santa Clarita Valley Sanitation District	Sacramento-San Joaquin Delta Other Water Utilities That Treat Source Water With Bromide

Project Benefits Timeline Description

This demonstration-scale project will treat 350,000 gpd for three years, beginning in July 2011 and lasting until July 2014. If this technology proves to be effective, it will be scaled up to a full-scale treatment project capable of treating 7 MGD. Construction of the full-scale project would begin January 2017 and end July 2018. Once the full-scale treatment process has been completed, it will provide water treatment benefits for approximately 30 years.

Potential Adverse Effects from the Project

This technology, which relies on metal anode plates to treat source water, is highly energy intensive. The project will demand greater amounts of energy than the water treatment facility has used in the past. If this energy is not procured from renewable sources, than this project will result in an increase in GHG emissions and the associated carbon footprint of the CLWA. However, reduced GHG emissions from reduced SWP water imports will at least partially offset this effect. Additionally, CLWA is constructing a solar power generation project at the Rio Vista Water Treatment Plant to offset the energy demand of the plant.

Summary of Findings

This project will have a number of water quality related benefits for customers, water purveyors, and the CLWA as shown in Table CLWA-2.3. For the CLWA, this new treatment technique will allow the water utility to reduce its chemical costs. Reductions in the amount of chlorine and ammonia necessary for achieving water treatment standards will result in a present value cost savings of $53,055 over the lifetime of the demonstration project.

In addition to chemical cost savings, this treatment technique will result in monetizable health benefits for customers who drink this water. These health benefits are a result of this project reducing the concentration of brominated DBPs in source water, which have been shown to be a carcinogen when consumed in elevated concentrations. A reduction in the concentration of brominated DBPs will reduce the statistical cancer risk associated with this water. For the demonstration scale project, the present value of health benefits is expected to total $624,407.

Finally, CLWA will also be able to switch treatment chemicals from more expensive chloramines to more affordable free chlorine. Switching from chloramines to free chlorine will result in a present value cost savings of $95,173 over the lifetime of the demonstration project.

Beyond these monetized benefits, there are a number of qualitative benefits associated with this project that are difficult to completely value. Most importantly, this project will also be instrumental in developing an innovative new technique to reducing human exposure to brominated DBPs in source water. If proven to be effective, this technology could be deployed at a large scale in a number of watersheds that have naturally occurring bromate ions. Therefore, the benefits of this project could include the introduction of an innovative treatment technique to a number of water utilities. These benefits also include the increased operational flexibility for CLWA from development of a more effective and flexible drinking water disinfection treatment technique. This project will also result in modest reductions of influent levels of a number of chemicals, including chloride, ammonia, and other nutrients, at wastewater treatment plants. This will result in cost savings for the wastewater treatment plant, in addition to an improvement in the quality of effluent discharged back into receiving waters. Also, reduced flushing due to nitrification (as described in Attachment 7) will result in less stress on the Sacramento-San Joaquin Delta ecosystem.

TABLE CLWA-2.3
QUALITATIVE BENEFITS SUMMARY – WATER QUALITY AND OTHER BENEFITS

Benefit	Qualitative Indicator
Developing an Innovative New Technique to Reduce Human Exposure to Brominated DBPs	++
More Effective and Flexible Drinking Water Disinfection Treatment.	++
Modest Reduction in Influent Levels of Chloride, Ammonia, Brominated DBPs, and Nutrients at the Wastewater Treatment Plant.	+
Reduced Stress on Sacramento-San Joaquin Delta	+

This analysis of costs and benefits is based on available data and some assumptions. As a result, there may be some omissions, uncertainties, and possible biases. In this analysis, the main uncertainties are associated with the attribution of demonstration-scale benefits to full-scale implementation. This issue is discussed in Table CLWA-2.4.

TABLE CLWA-2.4
OMISSIONS, BIASES, AND UNCERTAINTIES, AND THEIR EFFECT ON THE PROJECT

Benefit or Cost Category	Likely Impact on Net Benefits*	Comment
Basing demonstration-scale benefits on a cost-based percentage of the benefits of full-scale implementation of the innovative bromide control technology	U	The benefits of the demonstration-scale project are linked to the anticipated benefits of full-scale implementation. If the demonstration project performs as anticipated, the benefits will be realized as described in Attachments 7 and 8. If the project indicates problems with the technology at the demonstration scale, then the Agency will realize benefits by avoiding full-scale implementation of an approach that does not perform as anticipated from the pilot test alone (e.g., a substantial savings from avoiding a poor investment), or can lead to technology improvements that enhance the new approach and its net benefits.

*Direction and magnitude of effect on net benefits:
+ = Likely to increase net benefits relative to quantified estimates.
++ = Likely to increase net benefits significantly.
– = Likely to decrease net benefits.
– – = Likely to decrease net benefits significantly.
U = Uncertain, could be + or –.

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Santa Clara River, San Francisquito Creek Arundo and Tamarisk Removal Project (SC-1/USFS-1)

Summary

The Santa Clara River Arundo and Tamarisk Removal Plan (SCARP) identifies programs and projects that will most effectively remove arundo, tamarisk, and other invasive plants from the Upper Santa Clara River. Implementation of the SCARP within the Upper Santa Clara River Watershed (Watershed) will be conducted in two phases. Phase 1 of the project will remove arundo and tamarisk in the site specific implementation area (Project Area 1), which includes approximately 297 acres. Phase 2 of the project will continue the removal of arundo and tamarisk outside of Project Area 1, up into City- owned reaches along San Franciscquito and Bouquet Canyon Creeks, and eventually into Angeles National Forest.

The Santa Clara River, San Francisquito Creek Arundo and Tamarisk Removal Project will finish the implementation of the Santa Clarita Site Specific Plan (SSP), and move SCARP into the Santa Clara River Long Term Implementation Plan. The project will implement Phases D through G of the SSP, which includes the removal of arundo and tamarisk within roughly half of the total SSP project area (about 150 of the 297 acres). In total, 20 acres of arundo and tamarisk will be removed from targeted locations throughout the 150-acre project area.

Two types of restoration efforts will be employed to ensure effective eradication of the invasive species. The first effort will include non-native biomass removal and herbicide application. Arundo may be ground in place with mechanical equipment such as a brush grinder (where appropriate), or removed by manual means employing tools such as chainsaws and brush cutters. Herbicide application will ensure after removal. After this initial treatment, a diligent monitoring and maintenance program will be implemented to facilitate re-treatments, and avoid re-infestation of the site.

Native species common to this area such as willows (Salix sp.) and mule fat (Baccharis salicifolia) will reestablish readily through natural recruitment once competition from non-native species is removed. Additionally, native plant restoration will ensure reestablishment in areas that require more rapid enhancement than natural recruitment can provide.

A summary of all benefits and costs of the project are provided in Table SC-1.1. Water quality and other benefits are discussed in the remainder of this attachment.

TABLE SC-1.1
BENEFIT-COST ANALYSIS OVERVIEW

	Present Value
Costs	$648,310
Monetizable Benefits	
Water Supply Benefits	
Avoided Imported Water Costs	$674,560
Total Monetized Benefits	$674,560
Quantified Benefit or Cost	**Project Life Total**
Water Supply Benefits	
Increased Water Supply Reliability	+
Improved Operational Flexibility for CLWA	+
Water Quality Benefits	
Improved Surface Water Quality	++
Reduced Salt Loading	+
Decreased Streambank Erosion	++
Reduced DBP Precursors	++
Reduced Stress on the Sacramento-San Joaquin Delta	++
Restoration of Native Habitat	+
Reduced Fire Hazard	+
Reduced CO2 Emissions	+
Reduced Stress on the Sacramento-San Joaquin Delta	
Increased Educational Opportunities	++
Flood Control Benefits	++
Reduced Flooding Incidence	+

* Direction and magnitude of effect on net benefits:
+ = Likely to increase net benefits relative to quantified estimates.
++ = Likely to increase net benefits significantly.
– = Likely to decrease net benefits.
– – = Likely to decrease net benefits significantly.
U = Uncertain, could be + or –.

The "Without Project" Baseline

The Santa Clara River Arundo and Tamarisk Removal Project will be located near the City of Santa Clarita, within the Upper Santa Clara River Watershed. The project area includes a highly visible 150-acre reach of the Upper Santa Clara River (USCR), and the lower reaches of two major tributaries just above the confluence of San Francisquito Creek and the South Fork of the Santa Clara River.

The Santa Clara River is the largest river system in Southern California that is still in a relatively natural state. The river originates on the northern slope of the San Gabriel Mountains in Los Angeles County, traverses Ventura County, and flows into the Pacific Ocean between the cities of San Buenaventura (Ventura) and Oxnard. Municipalities within the Watershed include Santa Clarita, Newhall, Fillmore, Santa Paula, and Ventura (LAWQCB, 2006).

Extensive patches of high-quality riparian habitat exist along the length of the river and its tributaries. Two endangered fish, the unarmored stickleback and the steelhead trout, are resident in the river (LAWQCB, 2006). One of the Santa Clara River's largest tributaries, Sespe Creek, is designated a Wild Trout Stream by the State of California and a Wild and Scenic River by the U.S. Forest Service. Piru and Santa Paula creeks, tributaries to the Santa Clara River, also support steelhead habitat. In addition, the river serves as an important wildlife corridor. The Santa Clara River drains to the Pacific Ocean through a lagoon that supports a large variety of wildlife.

Since the 1970s, growth in the Santa Clarita Valley has led to chloride and nutrient levels that exceed water quality objectives (WQOs) and impair beneficial uses for agricultural supply, groundwater recharge, and rare and endangered species habitat. As a result of these factors, a total maximum daily load (TMDL) for chlorides has been established for the Watershed. In 2004, the reach of the river affected by this project was also listed for nutrient impairment. Algae problems resulting from excess nutrients have been documented throughout the watershed. Segments of Santa Clara River and its tributaries are also impaired by ammonia, nitrate and nitrite and are included on the California 2002 303(d) list of water quality limited segments. Additionally, one segment of the Santa Clara River is included on the State Monitoring List for organic enrichment/low dissolved oxygen. Two segments of the Santa Clara River are included on the State Enforceable Programs list for ammonia with one of those segments also listed for nitrite as nitrogen (LAWQCB 2003).

Estimates for the broader SSP project area indicate that infestation by arundo, and to a lesser extent tamarisk, is pervasive, extending throughout the site. Arundo infestations are particularly dense in the site's western (downstream) and central reaches, where large areas of the main stem exhibit historic infestation levels of 51 to 75% cover. While arundo historically tends to exhibit lower density infestation levels in the site's upstream areas, large areas are still infested, with significant areas of 26 percent to 50 percent arundo cover. Tamarisk infestations are concentrated in the east (upstream) portions of the SSP project area. These infestations typically range from 1 percent to 50 percent cover. Project Phases D through G (covered under this grant proposal) are located within the western portions of the SSP project area.

Both arundo and tamarisk consume large amounts of water, which negatively affects both instream and groundwater availability. Reduced water availability also adversely affects water-dependent plants and wildlife, and reduces the water available for beneficial municipal and agricultural uses. Although native riparian plants have similar transpiration rates per unit of surface area to arundo and tamarisk, arundo and tamarisk have approximately two or more times greater leaf surface area. Therefore, they transpire more water than native plants (VCRCD 2006 from Kelly 2003). Water consumption by these species is so high that dense infestations can desiccate riparian areas (seeps, springs, rivers) in arid habitats (VCRCD 2006 from Egan and Walker 2000; Dudley 2000).

Without the project, arundo and tamarisk will continue to spread, covering a greater percentage of the watershed. The expansion of these species will have a negative impact on water quality and riparian habitat in the project area and the watershed in general. Increased arundo and tamarisk will result in a reduction in the shading of surface water, thereby resulting in reduction of bank-edge river habitat, high water temperature, lower dissolved-oxygen content, elevated pH, conversion of ammonic to toxic unionized ammonia, and increasing soil salinity from leaf matter. Increased erosion of streambanks, and associated damage to habitats and farmlands, will also continue to increase. These factors will not only result in adverse water quality impacts, but will adversely affect native habitat. In addition, increased arundo in the project area will result in substantially increased danger of wildfire occurrences, intensity, and frequency.

Water Quality and Other Benefits

The project will provide a range of water quality and other benefits. This section provides discussion and details on benefit estimation for benefits including: improved surface water quality, reduced salt loading, decreased stream bank erosion, restoration of native habitat, reduced fire danger, and increased educational opportunities related to arundo and tamarisk removal.

Improved Surface Water Quality

Being a giant grass, Arundo provides little shade along the river compared to native vegetation such as willows, sycamores, and live oaks, which have strong branches that can support wide spreading growth habitat, and/or large leaves that shade streamside habitats in the summer.

Where Arundo is dominant, the lack of shade causes water temperatures in the river to increase compared to areas where native vegetation is dominant, which can ultimately lead to a reduction in dissolved oxygen, making the water unsuitable for aquatic organisms (VCRCD 2006 from Bell 1997). In addition, increased light exposure and temperature may encourage algal blooms, which can increase pH levels and severely reduce available habitat for aquatic organisms (VCRCD 2006 from Adamus et al. 1997). Increased pH also facilitates the conversion of usable ammonia to a toxic byproduct, which degrades water quality. All of these changes can adversely affect beneficial uses of the river, including habitat for rare and sensitive species.

Reduced Salt Loading

Tamarisk deposits concentrated salt from its leaves to the soil. This salt originates from the soil and from deeper aquifers, as its taproot can bring up water from 100 feet deep. When these leaves drop, increased soil salinity and salts are deposited into adjacent creeks due to salt transport during runoff. Native plant species are further impacted because they generally cannot tolerate tamarisk's contribution to soil salinity, while arundo can.

There have been millions of dollars spent to reduce the chloride level in the Santa Clara River below 117 mg/l. Any amount of chloride in the ambient river is not considered "normal". Therefore, any additional chloride salts in the river will need to be offset by additional mechanical removal at the sewage treatment plants. A group of local stakeholders have been working together to develop a program to address WQOs associated with the USCR Chloride TMDL. The cost for that program has recently been estimated at $250 million, including cost to build and operate a reverse osmosis plant to remove chlorides. The community has also spent many millions of dollars removing water softeners that were adding tons of chlorides to the sewage treatment plants' recycled water quality effluent. While the overall chloride content is small from individual trees, adding even small amounts of salt is compounding an already difficult situation.

Decreased Streambank Erosion

Both arundo and tamarisk are known to increase the potential for erosion of adjacent lands along the Santa Clara River. Both plants can alter stream geomorphology by trapping and stabilizing sediment, which narrows stream channels, widens floodplains, and causes increased flooding (VCRCD 2006). Large stands of arundo and tamarisk may also obstruct flows and shunt floodwaters into areas that historically have not experienced water flow. This can exacerbate bank erosion problems and lead to an unnatural increase in the loss of adjacent public and private property that is often valuable farmland (VCRCD 2006).

Reduced Fire Hazards

Both arundo and tamarisk contribute to increased fire hazards. Under natural conditions, riparian areas act as firebreaks, but as they are overcome by invasive species, they not only enable wildfires to spread more rapidly, but they can also become sites where fires may originate. Arundo, in particular, is highly flammable and burns more intensely than native riparian vegetation even when green (VCRCD 2006 from Bell 1997; Dudley 2000).

Several accounts have suggested that infestations of Arundo have increased fuel loads as well as fire frequency and intensity along riparian corridors. Growing from 13 to 26 feet in height, and as fast as 4 inches per day (Coffman et. al. 2010), Arundo produces abundant flammable biomass that accumulates during the summer and fall months (Coffman et. al 2010 from Rundel 2000). Further, several researchers have suggested that fire may increase the ability of Arundo to invade natural riparian systems (studies identified in Coffman et al. 2010), and that it may be part of an invasive plant-fire regime cycle, changing riparian ecosystems from primarily flood-defined to fire-defined systems (Coffman et. al. from Bell 1997).

Coffman et. al. 2010 evaluated the influence of wildfire on Arundo invasion by investigating its relative rate of reestablishment versus native riparian species after the Simi/Verdale wildfire burned 300 ha of riparian woodlands along the Santa Clara River in October 2003. Post-fire Arundo growth rates and productivity were compared to those of native woody riparian species in plots established before and after the fire. The researchers found that Arundo resprouted within days after the fire, and exhibited higher growth rates and productivity compared to native riparian plants. One year post-fire, Arundo density was nearly 20 times higher and productivity was 14–24 times higher than for native woody species.

The study concludes that the greater dominance of Arundo after the wildfire increased the susceptibility of riparian woodlands along the Santa Clara River to subsequent fire, potentially creating an invasive plant-fire regime cycle. Decreased moisture content and increased surface-to-volume ratio of Arundo versus native vegetation may lead to altered or increased fire susceptibility or increased probability of ignition in these systems. Addition of this fuel to the riparian ecosystem has increased vertical continuity (i.e., the structure of fuel allows fire to spread from surface to crowns of shrubs and trees). Due to its tall growth form, infestations of Arundo mixed with native species may spread fire vertically into the canopy of riparian trees.

The October 2003 Simi/Verdale wildfire provides an excellent example of the invasive plant-fire regime cycle that Arundo invasion has created. The wildfire reached the Santa Clara River from the north, crossed the broad riverbed through large stands of Arundo, then burned through thousands of hectares of native shrublands and non-native grasslands before again entering extensive riparian woodlands intermixed with Arundo to the west along the river. Without the presence of arundo, it is believed that the Santa Clara River would have served as a better fire break, and the fire would not have burned as many acres.

Restoration of Native Habitat

Arundo and tamarisk threaten native riparian habitats and the wildlife that depends upon these habitats by excluding native plants from water resources, growing space, and sunlight. Arundo often forms dense monocultures that exclude native vegetation by monopolizing water resources, shading, and altering flood regimes critical to the establishment of native riparian vegetation (Bell 1997 ; Dudley 2000). The salt-laden leaf litter of tamarisk also precludes such native understory from establishing. Both plants do not offer the same amount of shade as native vegetation (Carpenter 1998).

Both arundo and tamarisk reduce habitat quality and food supply for native wildlife, including insects and bird species (Bell 1997 ; Dudley 2000; Herrera 2003). Insects and other grazers are not able to use arundo as a food source due to the noxious chemicals it contains and its defensive cellular structure (Bell 1997). This is particularly important for federal and state listed species, such as least Bell's vireo, southwestern willow flycatcher, and yellow-billed cuckoo, which utilizes insects as a food source. Documented decreases in wildlife usage of riparian areas have occurred due to massive stands of arundo (Dudley 2000).

Based on a review of pertinent literature and of historical sensitive plant species locations identified in the California Natural Diversity Database (CDFG 2002), a total of 19 special status plant species and 21 special status wildlife species have the potential to occur within the broader SCARP project area. Of these 21species, eight are federally listed under the Federal Endangered Species Act (FESA). Specific species of concern associated with this project include the unarmored three-spine stickleback, western pond turtle and red legged frog.

Removal of arundo and tamarisk, and native plant reestablishment through this project will allow restoration of high quality habitat in the project area.

Reduced CO2 Emissions

By offsetting imported water demands with locally produced water, the project will avoid emissions of CO2 (a greenhouse gas) generated by the production of energy required to transport SWP water to the CLWA service area.

CO2 emissions resulting from the production of electricity, measured as tons of CO2 per megawatt-hour (MWh), vary by energy source. Hydroelectric power plants are assumed to generate relatively little CO2 emissions, on the order of 0.005 to 0.02 MT/MWh (van de Vate, 2002). For the Pacific region of the United States, CO2 emissions from coal-fired plants and natural gas-powered plants are estimated to be 0.976 MT CO2/MWh and 0.561 MT CO2/MWh, respectively (U.S. DOE and U.S. EPA, 2000). In California, electricity production relies on a range of energy sources, including those located within California and those located outside of the state. The California Department of Water Resources (DWR) estimates that the CO2 emissions rate for all electricity sources providing electricity to the SWP is 0.325 MT CO2/MWh (Climate Registry, 2010).

The California Energy Commission estimates that the electricity required for the conveyance of 1 AF of SWP water imported to Castaic Lake is 1.17 MWh (CEC, 2010). When energy requirements for treatment are taken into account, the total amount of energy required for every AF of water delivered to CLWA amounts to 1.451 MWh.[13,14]

Using the DWR CO2 emissions rate of 0.325 MT of CO2 emitted per MWh, 0.472 MT of CO2 are produced for every AF of water delivered and treated within the CLWA service area (1.451 MWh/AF multiplied by 0.325 MT/MWh). By eliminating use of 3,100 AF of imported SWP water over the assumed project life, the project will avoid emissions of 1,463 MT of CO2.

Avoided CO2 emissions will be offset to some extent by CO2 emissions from pumping newly available groundwater within the project area. The energy required to pump groundwater is unknown, thus, net avoided emissions cannot be calculated. However, due to the high energy requirements associated with importing water, the project will result in a net avoided emissions of CO2.

Reduced Stress on the Sacramento-San Joaquin Delta

By reducing the use of imported SWP water, the Arundo and Tamarisk Removal Project will augment in-stream flows in the Sacramento-San Joaquin Delta or will offset other diversions that may otherwise reduce flows. Reduced future demands on Delta supplies also will help reduce the overall salinity of the Delta and improve Delta habitat.

Maintaining the Delta's environmental condition is vital to maintaining and improving the viability of the region. The Delta provides drinking water to 25 million people, supports irrigation of 4.5 million acres of agriculture, and serves as home to 750 plant and animal species. The Delta's 1,600 square miles of marshes, islands, and sloughs support at least half of migratory water birds on the Pacific Flyway; 80% of California's commercial fisheries; and recreational uses including boating, fishing, and windsurfing.

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[13]. CLWA estimates energy requirements for treatment to be 0.285 MWh/AF.

[14]. Energy required to transmit treated water from CLWA treatment plants to CLWA retail water purveyors is not included in this analysis due to unavailable data.

Delta resources are in a state of crisis. Fish populations, including salmon and Delta-smelt, have declined dramatically in recent years. The levee system is aging, and vulnerability of the Delta to flooding, sea level rise, or a major earthquake has contributed to concerns about possible levee collapse which would result in devastating impacts to both water supply and habitat.

Increased Educational Opportunities

The project will be located within the City of Santa Clarita in a highly visible area bordered by recreational trails. This will provide the City to demonstrate a natural resource management project to the public, and increase public awareness of problems associated with invasive species.

Distribution of Project Benefits, and Identification of Beneficiaries

The Santa Clara River, San Francisquito Creek Arundo and Tamarisk Removal Project includes the full range of types of beneficiaries, as shown in Table SC-1.2. At the local level, farmers and other property owners along the river will benefit from reduced streambank erosion and reduced fire danger. Local residents will also benefit from increased knowledge and education regarding invasive species. At the regional level, residents of the Santa Clara River Watershed will benefit from improved water quality, restoration of native habitat, and reduced CO2 emissions. Residents will benefit from reduced fire hazard, as fires in California can put a strain the State's financial resources. At the state level, residents will also benefit through the restoration of habitat for species of statewide significance and reduced stress on the Sacramento- San Joaquin Delta.

TABLE SC-1.2
PROJECT BENEFICIARIES SUMMARY

Local	Regional	Statewide
Santa Clara River property owners and nearby residents, Local Water Retailers	Santa Clara River Watershed residents (improved water quality, restoration of native habitat, reduced CO2 emissions, reduced fire hazard)	Sacramento-San Joaquin Delta

Project Benefits Timeline Description

Project implementation will be completed in December of 2012, with some administration and monitoring activities taking place through 2015. A 50-year useful project life is assumed for this analysis. Thus, benefits are calculated through 2062 (50-years after the project begins providing benefits in 2013).

Potential Adverse Effects from the Project

The Santa Clara River, San Francisquito Creek Arundo and Tamarisk Removal Project may have short-term negative impacts during removal work, but steps will be taken to avoid long-term disturbance to habitat and native species living in the area. A CEQA document is being prepared and will address any potential adverse impacts.

Summary of Findings

The proposed project will provide a range of both water quality and other benefits. Although none of these benefits are quantifiable, they serve to significantly increase the value of the proposed project. These benefits include improved surface water quality, reduced salt loading, decreased stream bank erosion, restoration of native habitat, reduced fire hazard, and increased educational opportunities related to arundo and tamarisk removal.

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ATTACHMENT 9- ECONOMIC ANALYSIS — FLOOD CONTROL BENEFITS

Santa Clara River, San Francisquito Creek Arundo and Tamarisk Removal Project (SC-1/USFS-1)

Summary

The Santa Clara River Arundo and Tamarisk Removal Plan (SCARP) identifies programs and projects that will most effectively remove arundo, tamarisk, and other invasive plants from the Upper Santa Clara River. Implementation of the SCARP within the Upper Santa Clara River Watershed (Watershed) will be conducted in two phases. Phase 1 of the project will remove arundo and tamarisk in the site specific implementation area (Project Area 1), which includes approximately 297 acres. Phase 2 of the project will continue the removal of arundo and tamarisk outside of Project Area 1, up into City- owned reaches along San Franciscquito and Bouquet Canyon Creeks, and eventually into Angeles National Forest.

The Santa Clara River, San Francisquito Creek Arundo and Tamarisk Removal Project will finish the implementation of the Santa Clarita Site Specific Plan (SSP), and move SCARP into the Santa Clara River Long Term Implementation Plan. The project will implement Phases D through G of the SSP, which includes the removal of arundo and tamarisk within roughly half of the total SSP project area (about 150 of the 297 acres). In total, 20 acres of arundo and tamarisk will be removed from targeted locations throughout the 150-acre project area.

Two types of restoration efforts will be employed to ensure effective eradication of the invasive species. The first effort will include non-native biomass removal and herbicide application. Arundo may be ground in place with mechanical equipment such as a brush grinder (where appropriate), or removed by manual means employing tools such as chainsaws and brush cutters. Herbicide application will ensure after removal. After this initial treatment, a diligent monitoring and maintenance program will be implemented to facilitate re-treatments, and avoid re-infestation of the site.

Native species common to this area such as willows (Salix sp.) and mule fat (Baccharis salicifolia) will reestablish readily through natural recruitment once competition from non-native species is removed. Additionally, native plant restoration will ensure reestablishment in areas that require more rapid enhancement than natural recruitment can provide.

A summary of all benefits and costs of the project are provided in Table 1. Flood control benefits are discussed in the remainder of this attachment.

TABLE 1
BENEFIT-COST ANALYSIS OVERVIEW

	Present Value
Costs	$648,310
Monetized Benefits	
Water Supply Benefits	
Avoided Imported Water Costs	$674,560
Total Monetized Benefits	$674,560
Qualitative Benefit or Cost	**Qualitative Indicator***
Water Supply Benefits	
Increased Water Supply Reliability	+
Improved Operational Flexibility for CLWA	+
Water Quality Benefits	
Improved Surface Water Quality	++
Reduced Salt Loading	+
Decreased Streambank Erosion	++
Restoration of Native Habitat	++
Reduced Fire Hazard	++
Reduced CO2 Emissions	+
Reduced Stress on the Sacramento-San Joaquin Delta	+
Increased Educational Opportunities	+
Flood Control Benefits	
Reduced Flooding Impact	++

O&M = operations and maintenance

* Direction and magnitude of effect on net benefits:
+ = Likely to increase net benefits relative to quantified estimates.
++ = Likely to increase net benefits significantly.
– = Likely to decrease net benefits.
– – = Likely to decrease net benefits significantly.
U = Uncertain, could be + or –.

The "Without Project" Baseline

The Santa Clara River Arundo and Tamarisk Removal Project will be located near the City of Santa Clarita, within the Upper Santa Clara River Watershed (Watershed). The project area includes a highly visible 150-acre reach of the Santa Clara River, and the lower reaches of two major tributaries just above the confluence of San Francisquito Creek and the South Fork of the Santa Clara River.

The Santa Clara River is subject to frequent flooding especially from winter storms. This poses flooding risks for all areas along its bank, including the City of Santa Clarita, and other Upper Santa Clara River (USCR) floodplain communities and farming properties. Eighteen major flood events have been documented in Los Angeles County since 1965, all of which have been given State disaster designations and most of which were given Federal disaster designations (City of Santa Clarita, 2010). A most recent example is the severe storms in January and February of 2005. Total public damages were approximately $1.8 million, while private damages were estimated to total $4 million. The winter storms resulted in the loss of one mobile home on the Santa Clara River, and significant damage and flooding occurred to a mobile home park causing 150 residents to evacuate for several days. The flooding also resulted in the loss of recreational trails and paths along the Santa Clara River and several tributaries. Efforts to recover from the storm required public investment for measures including debris removal, bride repair, bank stabilization and repair of public trails (Chong et al., 2010; City of Santa Clarita, 2010).

Arundo and tamarisk are both known to increase flood hazards. Both plants can alter stream geomorphology by trapping and stabilizing sediment, which narrows stream channels, widens floodplains, and causes increased flooding (Carpenter 1998; Lovich 2000). By obstructing flows, large stands of arundo and tamarisk may force floodwaters into areas that historically have not experienced water flow. This can worsen bank erosion problems and lead to an increase in the loss of adjacent public and private property. Arundo's dense but shallow root masses are more easily undercut than deep-rooted native riparian vegetation and therefore provide less protection for steambanks from erosion. Arundo and tamarisk debris may also accumulate downstream of the infestations, trapping sediments, and impeding natural water flow. Arundo debris can create new establishments downstream. In many cases, costly clean up efforts or repairs are required after arundo debris has been spread by flooding (Ventura County Resource Conservation District, 2006).

Without the project, arundo and tamarisk will continue to spread, covering a greater percentage of the Watershed. The expansion of these species will exacerbate the already negative impact of the species on flooding by obstructing flood flows and causing associated damage to public facilities, including bridges and trails, and to private property. Continued spread of arundo and tamarisk will result in more areas facing flooding issues, more frequent flooding problems for flood events with shorter return intervals, and increased debris-related impacts on flooding.

Flood Control Benefits

Removal of arundo and tamarisk in the project area will decrease flooding impacts. Because of the difficulty in quantifying the effect of vegetation on flooding events, this Attachment 9 does not attempt to monetize damages. Instead, the benefit is described qualitatively below.

Reduced Flooding Impact

Within the City of Santa Clarita alone, 360 commercial properties, 323 industrial properties, 2,213 residential properties, and 37 special purpose properties are located in a high-risk flood zone (City of Santa Clarita, 2010). The 150 acres targeted in the first phase of the project include the confluence of San Fancisquito Creek and the Santa Clara River. This highly visible area bordered by recreational trails and owned by the City is surrounded by developed commercial, industrial, and residential properties. This project will eliminate approximately 20 acres of arundo and tamarisk from the project site through mechanical grinding, biomass removal, and herbicide application. According to the City of Santa Clarita Hazard Mitigation Plan, there is a “desire to maintain the river’s natural character, yet provide adequate safety through the use of appropriate non-structural flood/erosion control measures” (City of Santa Clarita 2010). This project provides such a non-structural flood reduction strategy within the City of Santa Clarita.

The effect of arundo removal on reduced flood incidence is uncertain, thus, the benefits are not quantitatively estimated. Nevertheless, removal of this invasive species will restore normal stream geomorphology by preventing the trapping and stabilization of sediment, allowing stream channels to widen, and reducing the incidence of debris build up in the floodway. Removal of arundo in the stream channel will reduce the likelihood that floodwaters will be forced outward beyond the stream channel capacity due to obstruction of flows. Furthermore, this project not only makes flooding improvements relative to today’s status-quo, but those benefits are even more pronounced compared to the without project baseline of increasing arundo infestation and associated increased flooding risk.

Reduced costs associated with arundo and tamarisk debris removal also could be significant. As noted in Attachment 8, Arundo and tamarisk increase streambank erosion, which damages riparian habitat and farmland due to channel obstruction. Arundo, in particular, increases erosion due to its shallow root system, which reduces bank stability. A Santa Ana Watershed Project Authority (SAWPA) document cites a report stating that cleanup of arundo debris washed downstream costs the public millions each year (Zembal and Hoffman, 2000). The SAWPA report also describes arundo-related damages to bridges in the area ranging from $260,000 for repairs to $8 million for new construction (close to $324,000 for repairs and $9,967,000 when updated to 2009 dollars). This benefit is included as a qualitative benefit due to the difficulty in applying these values to the Santa Clara River Watershed. However, it is useful in understanding the potential magnitude of arundo-related infrastructure impacts.

Distribution of Project Benefits, and Identification of Beneficiaries

The Santa Clara River and San Francisquito Creek Arundo and Tamarisk Removal Project provides flooding-related benefits to a variety of stakeholders. First, property owners located in flood prone areas immediately adjacent to the project site will experience reduced impact during flood events. Second, downstream riverside property owners along the Santa Clara River will experience reduced flooding and associated debris clean-up.

TABLE 2
PROJECT BENEFICIARIES SUMMARY

Local	Regional	Statewide
Property owners in flood prone areas immediately adjacent to and downstream from the project site	Downstream riverside property owners along the Santa Clara River who will face less debris related flooding	--

Project Benefits Timeline Description

Project implementation will be completed in December of 2012, with some administration and monitoring activities taking place through 2015. A 50-year useful project life is assumed for this analysis. Thus, benefits are calculated through 2062 (50 years after the project begins providing benefits in 2013).

Potential Adverse Effects from the Project

The Santa Clara River, San Francisquito Creek Arundo and Tamarisk Removal Project may have short-term negative impacts during removal work, but steps will be taken to avoid long-term disturbance to habitat and native species living in the area. A CEQA document is being prepared and will address any potential adverse impacts.

Summary of Findings

Arundo increases flood hazards by trapping and stabilizing sediment, narrowing the stream channel, and widening the floodplains. This project will eliminate about 20 acres of arundo and tamarisk from the project site through mechanical grinding, biomass removal, and herbicide application. Removal of this invasive species will restore the natural stream geomorphology by preventing the trapping and stabilization of sediment, allowing stream channels to widen, and reducing the incidence of debris build up in the floodway. Commercial, industrial, and residential property owners in flood prone areas immediately adjacent to, and downstream from, the project site will experience reduced flooding incidence as a result of the project. Downstream riverside property owners along the Santa Clara River will face less debris related to flooding. Monetized values were not claimed for reduced flooding incidence, although existing data from past flooding events suggest potentially large benefits. Consequently, this benefit is assessed qualitatively as summarized in Table 3.

TABLE 3
QUALITATIVE BENEFITS SUMMARY – FLOOD CONTROL BENEFITS

Benefit	Qualitative Indicator
Reduced Flooding Impact	++

This analysis benefits is based on available data and some assumptions. As a result, there may be some omissions, uncertainties, and possible biases. In this analysis, there are no quantitative or monetized benefits calculated. As a consequence, there are no identifiable biases or uncertainties in flooding benefits of this project.

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ATTACHMENT 10– COST AND BENEFITS SUMMARY

This attachment provides a summary of the overall costs and benefits of the projects that make up this Proposal. Table 1 below provides the present value of the costs for each project and the present value of any monetized benefits for each project. A brief description of these benefits, as detailed in Attachments 7, 8, and 9, is provided.

Monetized Benefits

Water supply – Avoided imported water costs as a result of local use of recycled water, water conservation, a new method of bromide treatment that avoids flushing of unusable water due to nitrification, invasive species removal, and repair of an exposed sewer trunk line in the Santa Clara River bed.

Water quality and other – partial avoidance of Alternative Water Resources Management (AWRM) project costs, health benefits from innovative water treatment technique, reduction in water treatment chemical costs, avoided wastewater treatment costs, avoided sewer line repair and replacement costs, avoided sewer spill clean-up costs, avoided fertilizer costs.

Flood damage avoidance – none (only qualitative)

Qualitatively Assessed Benefits (including Quantified)

Water supply – increased water supply reliability, increased operational flexibility for CLWA.

Water quality and other – reduced chloride loading to help meet TMDL for the Watershed, development of an innovative bromide treatment technique potentially benefiting other utilities, restoration of native habitat, decreased streambank erosion, reduced fire hazard, reduced stress on Sacramento-San Joaquin Delta, reduced pollution from dry-weather runoff, reduced CO_2 emissions.

Flood damage avoidance – reduced impact of flooding due to invasive species removal.

TABLE 1
PROPOSAL COSTS BENEFITS SUMMARY

Proposal: Upper Santa Clara River IRWM Plan Round 1 Proposition 84 Implementation Grant							
Agency: CLWA, NCWD, VWC, City of Santa Clarita							
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)	(h)
						(d) + (e) + (f)	(g) / (c)
SCV Water Use Programs (CLWA-4)	Castaic Lake Water Agency (CLWA)	$1,645,699	$3,405,010	$0	$187,881	$3,592,891	2.2
SCR-Sewer Trunk Line (NCWD-3)	Newhall County Water District (NCWD)	$202,718	$44,117	$0	$33,394	$77,511	**0.4**
SCV Southern End Recycled Water (VWC-1)	Valencia Water Company (VWC)	$10,974,099	$9,061,140	$0	$7,091,102	$16,152,242	**1.5**
Bromide Removal Project (CLWA-2)	CLWA	$1,072,533	$147,960	$0	$772,635	$920,595	**0.9**
SCR Arundo & Tamarisk Removal (SC-1/USFS-1)	City of Santa Clarita	$648,310	$674,560	$0	$0	$674,560	**1.0**
TOTAL		**$14,543,359**	**$13,332,787**	**$0**	**$8,085,012**	**$21,417,800**	**1.5**

ATTACHMENT 11 – PROGRAM PREFERENCES

The objectives of the Upper Santa Clara River IRWMP strongly correlate to Program Preferences and Statewide Priorities. Because projects were developed in response to the objectives of the IRWMP, this Proposal also has a significant connection to Program Preferences and Statewide Priorities. The following five projects meet 14 of 14 of the Proposition 84 Program Preferences and Statewide Priorities as summarized in the matrix below:

A) Santa Clarita Valley Water Use Efficiency Plan Programs (CLWA–4, SCV WUE Programs)

B) Santa Clara River-Sewer Trunk Line Relocation (NCWD–3, Sewer Trunk Line Relocation)

C) Santa Clarita Valley Southern End Recycled Water Project (VWC-1, SCV Southern End Recycled Water)

D) Electrolysis and Volatilization for Bromide Removal and DBP Reduction (CLWA–2, Bromide Removal)

E) Santa Clara River, San Francisquito Creek Arundo and Tamarisk Removal (SC–1/USFS–1, SCR Arundo Removal)

Program Preferences	SCV WUE Programs	Sewer Trunk Line Relocation	SCV Southern End Recycled Water	Bromide Removal	SCR Arundo Removal
INCLUDE REGIONAL PROJECTS/PROGRAMS	●	●	●	●	●
INTEGRATE WATER MANAGEMENT WITHIN HYDROLOGIC REGION	●		●	●	●
EFFECTIVELY RESOLVE SIGNIFICANT WATER-RELATED CONFLICTS	●		●	●	●
CONTRIBUTE TO ATTAINMENT OR ONE OR MORE OBJECTIVES OF CALFED	●		●		
ADDRESS CRITICAL WATER SUPPLY/QUALITY NEEDS OF A DAC	●	●	●	●	●
INTEGRATE WATER MANAGEMENT WITH LAND USE PLANNING	●	●	●		●
FOR FLOOD MANAGEMENT PROJECTS THAT PROVIDE MULTIPLE BENEFITS	**Not Applicable**				
ADDRESS STATEWIDE PRIORITIES OF:					
A. DROUGHT PREPAREDNESS	●		●		●
B. USE AND REUSE WATER MORE EFFICIENTLY	●	●	●		●
C. CLIMATE CHANGE RESPONSE ACTIONS	●		●		●
D. EXPAND ENVIRONMENTAL STEWARDSHIP		●			●
E. PRACTICE INTEGRATED FLOOD MANAGEMENT		●			●
F. PROTECT SURFACE WATER AND GROUNDWATER QUALITY	●	●	●	●	●
G. IMPROVE TRIBAL WATER AND NATURAL RESOURCES	●	●	●	●	●
H. ENSURE EQUITABLE DISTRIBUTION OF BENEFITS	●	●	●	●	●

INCLUDE REGIONAL PROJECTS OR PROGRAMS

Relevant Projects: SCV WUE Programs, Sewer Trunk Line Relocation, SCV Southern End Recycled Water, Bromide Removal, and SCR Arundo Removal

The development of the IRWM Plan provided an ongoing forum in which the Stakeholders could collaborate and develop regional partnerships and programs. The intent is to use IRWMP implementation projects to further these regional partnerships leading to regional solutions. The five projects in this Proposal not only address regional issues, but benefit the Region as a whole. The SCV WUE Program project was developed out of a collaborative process of all the public water systems in the SCV (CLWA, Valencia Water Company, Santa Clarita Water Division, Newhall County Water District, and Los Angeles County Waterworks District 36). The SCV WUE Program project will affect the entire CLWA service area, including the service areas of the four retailers. The SCV WUE Program project will affect the demand for all but a small amount of the water delivered in the entire SCV. The purpose of the Sewer Trunk Line Relocation project is to protect all the beneficial uses of the Santa Clara River (SCR), including those of the SCV, the underlying groundwater basin, and the 84 miles of the lower SCR. The Sewer Trunk Line Relocation project has not only regional but inter-regional benefits. As part of the SCV Southern End Recycled Water Project, wastewater from the region will be put to beneficial use and will make it feasible to deliver recycled water to more agencies in the future. Most importantly, use of recycled water will reduce demand on the shared imported water supply. Likewise, the Bromide Removal project will protect the shared SWP supply. Further, this project and the resulting technology would benefit any water system dealing with high bromide source water. The SCR Arundo Removal project will utilize the resources and expertise of a local agency, the City of Santa Clarita as well as the US Forest Service to protect the most significant regional resource, the SCR. Due to the nature of Arundo and Tamarisk, it is necessary to undertake removal and restoration in the upper reaches of a watershed to prevent "re-seeding" of the noxious weed in lower river reaches. Therefore removal in the upper SCR not only benefits habitat and ecological processes in the upper watershed, it enhances and preserves Arundo and Tamarisk removal in the lower watershed.

Certainty of Achieving Program Preferences, Breadth and Magnitude of Program Preference Achieved

Review of the projects selected demonstrates that this Proposal includes regional projects and programs. The projects selected for this proposal are regional in many respects. The projects address regional issues. The projects affect a large geographic area and benefit downstream users. The projects address a range of issues (water demand, water quality, water supply reliability, and environmental habitat quality). Project benefits apply to the SCV, the Upper SCR Region, the Lower SCR Region (within the Watersheds Coalition Ventura County Region), as well as statewide.

INTEGRATE WATER MANAGEMENT PROGRAMS AND PROJECTS

Relevant Projects: SCV WUE Programs, Sewer Trunk Line Relocation, SCV Southern End Recycled Water, Bromide Removal, and SCR Arundo Removal

The five projects in this Proposal, while separate and distinct from each other, together create a multifaceted approach to the fundamental issue in the SCV, water supply reliability. The projects address water supply reliability in the following ways:

- SCV WUE Program - reduces demands on the regional water supply
- Sewer Trunk Line Relocation project - protects quality and availability of surface and groundwater supplies

- SCV Southern End Recycled Water project - enhances local water supplies without requiring additional imported water supplies
- Bromide Removal project - protects the quality and ability to effectively utilize imported water supply
- SCR Arundo Removal - decreases loss of local water supply to noxious non-native weeds

Conversely, because of the differing natures of the projects they represent a complete and whole approach to water supply management in the SCV and Upper SCR. The suite of projects address the need to reduce water demand, increase water supply, improve and protect water quality, and promote resource stewardship.

Certainty of Achieving Program Preferences, Breadth and Magnitude of Program Preference Achieved

This proposal takes separate projects that as a group represent a complete set of water management practices that all work toward improved water supply reliability.

RESOLVE SIGNIFICANT WATER-RELATED CONFLICTS

Relevant Projects: SCV WUE Programs, SCV Southern End Recycled Water, Bromide Removal, and SCR Arundo Removal

The intent of the Upper SCR IRWMP is to create an ongoing framework and a collaborative process whereby conflict between different water uses can be avoided or reduced. In the past, development wasn't always done with due regard for habitat preservation or restoration. However increasing priority is being given to changing the process of water resource development and human use to conduct these activities in ways which will not damage natural resources and to restoring damaged natural habitats so that they not only survive but thrive. In the Region local jurisdictions are working in conjunction with habitat preservation advocacy groups, in an attempt to restore balance and improve water quality of one of the last large, natural riparian ecosystems in Southern California. The SCV WUE Programs project, SCV Southern End Recycled Water project, and SCR Arundo Removal project have been promulgated from this desire to balance the different water uses in the Region. Both the SCV WUE Program and SCV Southern End Recycled Water projects will reduce human demand on the various regional water sources. The SCR Arundo Removal project will improve the local natural riparian ecosystem of the SCR.

Another significant water related conflict in the Region is how and in what quantities, should the chloride and nutrient (such as ammonia) levels in the SCR be managed. The Upper SCR gains chlorides and nutrients through the use of imported water, wastewater treatment, and the use of self-regenerating softeners. Downstream crops may be negatively impacted by high chloride levels. As part of the upcoming IRWMP Update, a Salt and Nutrient Management Plan will be developed. Projects included in this proposal will enhance the activities of the Salt and Nutrient Management Plan. For example, the Bromide Removal project will decrease the amount of ammonia added during the water treatment process. The SCV Southern End Recycled Water and SCV WUE Program projects will serve as data sources for the Salt and Nutrient Management Plan and reduce chloride and nutrient loading. Water use information developed as part of the audits and landscape programs of the SCV WUE Program will allow more informed management of salts and nutrients through reduced use of water, reduced irrigation runoff to local channels and a greater accounting of where salts and nutrients are applied.

Certainty of Achieving Program Preferences, Breadth and Magnitude of Program Preference Achieved

The commitment to reducing water related conflicts in the Region is demonstrated by: (a) the ongoing participation of a broad range of stakeholders in the IRWMP, and (b) the selection of a suite of projects that, when implemented, reduce water related conflicts in the Region.

The magnitude by which project implementation will reduce water conflicts in the region cannot be quantified. However, these projects represent an early and important step. Overtime the success of these projects will lead to similar actions and the projects in turn could have a large cumulative positive benefit.

CONTRIBUTE TO ATTAINMENT OF CALFED BAY-DELTA PROGRAM

Relevant Projects: SCV WUE Programs and SCV Southern End Recycled Water

The Upper SCR Region receives SWP delivered through the Sacramento-San Joaquin Delta; actions to reduce water demand and to enhance local water supply would contribute to the success of the CALFED Bay-Delta Program. The SCV WUE Programs would annually save 613 acre-feet of water beginning in 2014. Savings from the SCV WUE Program would continue through 2020. Over the life of the project, total water savings will amount to 6,580 AF.

Certainty of Achieving Program Preferences, Breadth and Magnitude of Program Preference Achieved

The certainty of achieving this program preference is high, assuming funding is made available for implementation. The estimates of water demand reduction are based on past experience with similar water use efficiency programs implemented in the Upper SCR Region as analyzed in the SCV Water Use Efficiency Strategic Plan. Likewise, the offset of potable demand resulting from the SCV Southern End Recycled Water project has been studied and confirmed in multiple technical studies.

As described earlier, implementation of this Proposal could reduce future dependence on water imported from the Sacramento-San Joaquin Delta region by nearly 3,000 AF a year.

ADDRESS WATER SUPPLY AND WATER QUALITY NEEDS OF DISADVANTAGED COMMUNITIES

Relevant Projects: SCV WUE Programs, Sewer Trunk Line Relocation, SCV Southern End Recycled Water, Bromide Removal, and SCR Arundo Removal

During development of the 2008 Plan, no communities that met the strict State definition of a Disadvantaged Community (DAC) were identified. However, in the spirit of providing "a safe, clean, affordable, and sufficient water supply to meet the needs of California residents, farms, and businesses", an outreach effort directed at DAC members was developed and a DAC Outreach Subcommittee was formed. The DAC Outreach subcommittee contacted DAC members through opinion surveys in areas where economically disadvantaged people were likely to seek services. These surveys did not identify any water quality or supply issues unique to DACs. The upcoming IRWMP Update will take advantage of 2010 Census information to re-examine DAC issues.

Certainty of Achieving Program Preferences, Breadth and Magnitude of Program Preference Achieved

The five projects of this Proposal have broad benefits for all persons in the Region, including DACs.

EFFECTIVELY INTEGRATE WATER MANAGEMENT WITH LAND USE PLANNING

Relevant Projects: SCV WUE Programs, Sewer Trunk Line Relocation, SCV Southern End Recycled Water, and SCR Arundo Removal

The IRWMP has the benefit of participation from all land use planning entities within the Upper Santa Clara watershed: the City of Santa Clarita, the County of Los Angeles, and the Angeles National Forest.

Coordination with the land use entities has lead to the determination that accommodating a growing population depends on improving water use efficiency and enhancing local supplies. The SCV WUE Program and SCV Southern End Recycled Water projects are a direct response to the need to accommodate anticipated population growth. The four WUE programs within the SCV WUE Program project are designed to help CLWA and the water retailers meet their 20 by 2020 requirements under SBx7-7. SCV Large Landscape Audit & Incentive Program will target the City of Santa Clarita Landscape Maintenance Districts, Los Angeles County Parks and Homeowner's Associations. SCV CII Audit & Customized Incentive Program will target major non-residential users including amusements parks, colleges and universities, hotels, hospitals and other customers identified by the retail water agencies. Residential SCV Landscape Contractor Certification and Weather-Based Irrigation Controller (WBIC) Program would target all landscape contractors and maintenance companies in the SCV. Recycled water from the SCV Southern End Recycled Water project will be used for landscapes associated with parks, schools, as well as private development. Installation of WBICs complements the recycled water program to reduce potable demand of landscapes.

An important consideration for land use entities is providing a mix of land uses, including open space and recreational opportunities. The SCR has been designated a "Significant Ecological Area" (SEA) within the joint City of Santa Clarita and Los Angeles County land use plan, "One Valley, One Vision" (also called the Santa Clarita Area Plan). SEAs are defined as ecologically important land and water systems that are valuable as plant or animal communities, often important to the preservation of threatened or endangered species, and conservation of biological diversity. The SCR is also defined in One Valley, One Vision as a significant scenic resource for the Region. Water management can be done in a manner to enhance, rather than detract from, land use plans to protect regional resources. Both the Sewer Trunk Line Relocation and SCR Arundo Removal are projects that will contribute to the protection and enhancement of the Santa Clara River. The SCR Arundo Removal project will eliminate invasive species from within a 150-acre parcel of land along the SCR. Removal will promote the reestablishment of native habitat and native species, and improve the view shed by removing this invasive weed. In addition, removal will result in increased river flows, as Arundo consumes almost three times the amount of water used by native species. Removal of the thick stands of Arundo will reduce river erosion while protecting adjacent land uses from flooding. Likewise, Sewer Trunk Line Relocation will protect both the water quality of the river and the habitat of the river, and eliminates the existing land use conflict between the sewer line and the floodplain.

Certainty of Achieving Program Preferences, Breadth and Magnitude of Program Preference Achieved

The certainty of achieving this program preference is high, assuming funding is made available for implementation. All projects in the Proposal are consistent with local land use plans and projects enhance land use protections contained in local land use plans.

As described earlier, implementation of this proposal could reduce future dependence on water imported from the Sacramento-San Joaquin Delta region by nearly 3,000 AF a year.

FOR FLOOD MANAGEMENT - PROJECTS THAT PROVIDE MULTIPLE BENEFITS

This application is not seeking Proposition 1E funding and therefore this Program Preference is not applicable.

STATEWIDE PRIORITIES

DROUGHT PREPAREDNESS

Relevant Projects: SCV WUE Programs, SCV Southern End Recycled Water, and SCR Arundo Removal

The IRWMP focuses on drought preparedness. Three of the five objectives selected by the Stakeholder group related to drought preparedness:

- Reduce Water Demand - Implement technological, legislative and behavioral changes that will reduce use demands for water
- Improve Operational Efficiency - Maximize water system operational flexibility and efficiency, including energy efficiency.
- Increase Water Supply - Understand future regional demands and obtain necessary water supply sources.

One way to lessen the severity of a drought's effect on SCV is to prepare in advance by: (a) diversifying the various sources of supply, (b) developing a "drought-proof" supply, (c) identifying the types of water uses in the Region, and (d) reducing demand from non-essential uses.

The SCV Southern End Recycled Water project adds another supply source to the Santa Clarita supply portfolio. Significantly, this supply is considered "drought-proof" due to it being largely unaffected by local hydrology. Data gathered as part of the SCV WUE Program will provide a picture of various water uses in the SCV. This data will help target water demand reductions under all conditions, but could be vital in reducing non-essential uses in the event of a drought. Removal of Arundo and Tamarisk, both voracious water users, preserves river flow and will improve groundwater recharge from the river that water agencies must rely on during droughts. . These programs will allow for better management of the local water resources.

As described earlier, since preparation of the 2008 Plan, SBx7-7 has been enacted, mandating that urban water suppliers reduce statewide water use (in gallons per capita per day) by 20 percent by 2020. Methods of complying with SBx7-7 include enhanced water conservation, water use efficiency, and recycled water. The majority of the projects proposed increase the efficiency of the local and imported supply through conservation and recycling. The WUE programs implemented as part of the SCV WUE Program project would save approximately 6,580 acre-feet of water over the lifetime of the project.

Because the implementation of the SCV Southern End Recycled Water project will result in the use of recycled water with a potable water savings of 910 AFY, it also addresses SBx7-7. In order to use recycled water in a manner protective of water quality, the Region must have a Salt and Nutrient Management Plan. A Salt and Nutrient Management Plan will be a requirement for using recycled water after year 2014. A Salt and Nutrient Management Plan will be undertaken as part of, and incorporated into, the IRWMP Update. The Salt and Nutrient Management Plan allows the region to most effectively use recycled water without degrading the local groundwater supply. The plan will facilitate further expansion of recycled water projects in the future so that the most efficient use of water can occur while minimizing the impacts of salt and nutrient accumulation.

In addition these projects compliment the Climate Change Study being undertaken as part of the IRWMP Update. The Climate Change Study will not only evaluate the Region's vulnerability to climate change, but will develop adaptive strategies. These strategies will be incorporated to ensure the reliability of the local supply and reduce the dependence on imported waters. Also supporting climate change responses is the increased use of local water supplies which will reduce greenhouse gases. The use of recycled water will not only facilitate sustainable local water supplies, but will also result in a reduction of greenhouse gas generation.

Certainty of Achieving Program Preferences, Breadth and Magnitude of Program Preference Achieved

The certainty of achieving this program preference is high, assuming funding is made available for implementation. As described earlier, three of five objectives selected by stakeholders relate to drought preparedness, demonstrating the high level of commitment by water agencies, local land use agencies, and environmental groups to drought preparedness. The Region has already undertaken water use efficiency programs and recycled water projects and this proposal will build upon these past successes.

The SCV WUE Programs would save approximately 1,972 AF of water. The SCV Southern End Recycled Water project would displace an additional 910 AF of potable water demand beginning in 2012. Finally, Arundo and Tamarisk Removal are anticipated to save over 7,770 AFY.

USE AND REUSE WATER MORE EFFICIENTLY

Relevant Projects: SCV WUE Programs, Sewer Trunk Line Relocation, SCV Southern End Recycled Water, and SCR Arundo Removal Project

As demonstrated above, this Proposal will implement water use efficiency, water conservation, and water recycling. By reducing demands and adding another local source to the water supply portfolio, this proposal is an early step towards climate change adaption. In addition, the SCR Arundo Removal project works toward re-establishment of native species, natural habitat, and natural hydrologic processes in the upper watershed, another recognized climate adaptation strategy. Recognizing the potential for increased stormflow and flooding due to climate change, Sewer Trunk Line Relocation will relocate a vulnerable pipeline out of the SCR.

Certainty of Achieving Program Preferences, Breadth and Magnitude of Program Preference Achieved

The certainty of achieving this program preference is high, assuming funding is made available for implementation. The Stakeholders of the Upper SCR IRWMP are committed to using and reusing water more efficiently. This is verified by the nature of the projects selected and by the Salt and Nutrient Management Plan which is being undertaken as part of the IRWMP update. The Salt and Nutrient Management Plan will allow the Region to most effectively use recycled water without degrading the local groundwater supply. The plan will facilitate further expansion of recycled water projects in the future so that the most efficient use of water can occur while minimizing the impacts of salt and nutrient accumulation.

The SCV WUE Programs will reduce demand by 1,972 AF of water. Arundo and Tamarisk Removal are anticipated to save over 7,770 AFY. The SCV Southern End Recycled Water project would create a new local supply of 910 AFY.

CLIMATE CHANGE RESPONSE ACTIONS

Relevant Projects: SCV WUE Programs, SCV Southern End Recycled Water, and SCR Arundo Removal

As described above, this proposal includes projects that address adaptation to climate change. Implementation of this proposal would diversify the supply sources available in the Region, promote water use efficiency, and result in increased water recycling. Importantly, the new recycled water supply source will require less energy and result in fewer greenhouse gas emissions than a like amount of imported water (see Attachment 8 for the full analysis). Energy savings (and greenhouse gas emission reductions) are enhanced by the reduced water demands. The SCV CII

Audit and Incentive Program and the High Efficiency Toilet Rebate Program, both proposed as part of the SCV WUE Programs, will reduce not only water demand, but wastewater loads as well.

Certainty of Achieving Program Preferences, Breadth and Magnitude of Program Preference Achieved

Review of the projects selected demonstrates that this Proposal will benefit climate change response. These projects are an early step in climate change response that will be enhanced by the Climate Change Study which is being prepared as part of the IRWMP. The Climate Change Study will identify vulnerability of the Region to climate change, evaluate potential climate change impacts, identify and evaluate potential adaption strategies, and will make recommendations as to how to collect and utilize greenhouse gas emissions data within the IRMWP framework.

EXPAND ENVIRONMENTAL STEWARDSHIP

Relevant Projects: Sewer Trunk Line Relocation and SCR Arundo Removal

One of the major threats to the SCR is the potential rupture of the NCWD Sewer Trunk line due to severe weather or earthquake. Relocation of the pipeline out of the floodplain will prevent contamination of the river and underlying groundwater and protect surrounding ecosystems.

Another ecological threat addressed by this Proposal is the presence of Arundo and Tamarisk in the SCR. In a study commissioned by the Ventura County Resource Conservation District the impacts of Arundo and Tamarisk include high water consumption, reduced biodiversity, bank erosion, and channel alteration.

Certainty of Achieving Program Preferences, Breadth and Magnitude of Program Preference Achieved

This proposal contains projects that practice, promote, improve, and expand environmental stewardship, therefore certainty of achieving this Statewide Priority is high. The magnitude of benefits is great. Spill of sewage into the SCR would affect not only the local area, but the entire river downstream to the Pacific Ocean. The spill would negatively impact all the various groundwater recharge operations in both the upper and lower Santa Clara watershed. Benefits of the SCR Arundo Removal project are also widespread as it is necessary to undertake removal in the upper watershed to enable eradication efforts throughout the river system.

PRACTICE INTEGRATED FLOOD MANAGEMENT

Relevant Projects: Sewer Trunk Line Relocation and SCR Arundo Removal

This proposal contains two projects that augment the productivity of the SCR floodplain while providing protective measures against losses resulting from flooding.

Sewer Trunk Line Relocation is a structural approach to flood management. Relocating the sewer trunkline protects not only the sewer infrastructure, but also the water supply, water quality, and ecological values of the SCR floodplain.

As described by the California Water Plan, Arundo displaces native vegetation along waterways, impedes flow during floods, and is a heavy water user. Further, Arundo that clogs floodways eventually ends up downstream, resulting in expensive beach clean-ups. Removal serves to improve habitat for the native species, reduce flood risk, and reduce water losses. Therefore, Arundo removal itself is a non-structural flood management strategy that has multiple benefits.

Certainty of Achieving Program Preferences, Breadth and Magnitude of Program Preference Achieved

Integrated flood management is a multi-strategy approach that employs both structural and non-structural measures to maximize the benefits of floodplains while minimizing potential for loss of life and property damage from flooding. The projects in this proposal are near-term approaches to addressing integrated flood management. However, the commitment to integrated flood management is also long-term. The IRWMP is undertaking a Climate Change Study that will greatly inform the description of future flood vulnerabilities and identify adaptation strategies. The Climate Change Study will provide a means to consider uncertainty and risk not only for water management but specifically for flood management.

PROTECT SURFACE WATER AND GROUNDWATER QUALITY

Relevant Projects: SCV WUE Programs, Sewer Trunk Line Relocation, SCV Southern End Recycled Water, Bromide Removal, and SCR Arundo Removal

All projects associated with this proposal protect surface and groundwater quality.

The SCV WUE Programs targets outdoor water application, including large landscape audits, installation of WBICs, and specialized training for landscape contractors and maintenance companies. These programs will limit application of excessive water and, therefore, undesirable salts and nutrients to the landscape. These programs will reduce runoff and improve the quality of any receiving waters. In addition, water use information from the audits and landscape programs will allow the Region to more better manage the salts and nutrients through reductions of imported water, and greater accounting of where salts and nutrients are applied in the watershed.

The Relocation of the Sewer Trunk Line from Santa Clara Riverbed would prevent the accidental discharge of untreated sewerage to the SCR and the underlying alluvial aquifer from which groundwater is extracted.

The SCV Southern End Recycled Water project both secures water supplies for beneficial uses while guarding groundwater quality. The project will be implemented in concert with the Salt and Nutrient Management Plan. The Salt and Nutrient Management Plan allows the region to most effectively use recycled water without degrading the local groundwater supply.

The Upper SCR Watershed is not only interested in salt and nutrients that may degrade the current water quality but the naturally occurring bromide. Bromide is a non-volatile anion found in all natural waters. However, in the Upper SCR Watershed the levels result in elevated levels of brominated disinfection byproducts, including ammonia from the treatment of drinking water. These disinfection by-products have public health concerns and could limit the beneficial use of the imported water supply. Removing bromide using existing technologies is cost prohibitive for large scale water treatment. The Proposal would result in full-scale application of a new, more cost-effective technology for bromide removal.

Arundo and Tamarisk are major threats to the beneficial uses of the SCR. These weeds are pervasive and provide no redeeming wildlife value. These weeds clog flood channels, pose an increased wildfire risk and result in heavy stream erosion. Unlike native vegetation, Arundo and Tamarisk do not shade the riparian area. Lack of shade alters pH and oxygen levels and increases toxicity of undesirable nutrients such as ammonia.

Certainty of Achieving Program Preferences, Breadth and Magnitude of Program Preference Achieved

The certainty of achieving this program preference is high, assuming funding is made available for implementation. The outcomes from the SCV Water Use Efficiency Program are well understood given past experience with similar water use efficiency programs implemented in the Upper SCR Region. The sewer trunk line and invasive species are well defined dangers to surface and groundwater quality. The public health threat from brominated disinfection by-products are recognized by stringent drinking water regulations. Implementation of this proposal will decrease polluted runoff, decrease the risk to the SCR and underlying aquifer from an untreated sewage spill, and balance use of recycled water with salt and nutrient management. Besides preventing degradation the Proposal will enhance water quality through reestablishment of native vegetation leading to improved pH, improved oxygen levels and less sedimentation.

IMPROVE TRIBAL WATER AND NATURAL RESOURCES

Relevant Projects: SCV WUE Programs, Sewer Trunk Line Relocation, SCV Southern End Recycled Water, Bromide Removal, and SCR Arundo Removal

The SCV is within the historic range of the Tataviam Band of Mission Indians, though there are no tribal lands within the watershed. The IRWMP has solicited the input and participation from a broad Stakeholder group, including a specific solicitation to the Tataviam. Unfortunately, no tribal representatives have participated to date. The IRWMP Stakeholders will continue to solicit tribal participation.

Certainty of Achieving Program Preferences, Breadth and Magnitude of Program Preference Achieved

The five projects of this proposal have broad benefits for all persons in the Region.

ENSURE EQUITABLE DISTRIBUTION OF BENEFITS

Relevant Projects: SCV WUE Programs, Sewer Trunk Line Relocation, SCV Southern End Recycled Water, Bromide Removal, and SCR Arundo Removal

As described earlier, the IRWMP has not identified communities that met the State definition for a DAC. Additional outreach directed at economically disadvantaged areas and populations did not find any water quality or supply issues unique to DACs. Likewise, outreach to California Native American Tribes did not identify any critical water supply or water quality needs. However, this proposal contains regional project and programs that benefit a large geographic area. The projects and programs of this proposal do not adversely affect one particular group but rather equitably distribute benefits to a broad geographic area and all residents and water users of that area.

Certainty of Achieving Program Preferences, Breadth and Magnitude of Program Preference Achieved

The IRWMP process included considerable effort to include disadvantaged communities as well as California Native American Tribes. Extensive outreach did not point to any safe drinking water, wastewater, or other unique water-related needs of these populations.

ATTACHMENT 12 – DISADVANTAGED COMMUNITY ASSISTANCE

This Proposal provides for the implementation of a suite of projects that will enhance the reliability of existing supplies by reducing water demand, and increasing water supply and improving water quality, for the benefit of every person within the Santa Clarita Valley.

The proposal does not include a project that specifically addresses a critical, exclusive water supply or water quality need of a DAC, since no communities were identified that met the definition of a DAC, as defined in the Water Code, during development of the 2008 Upper Santa Clara River IRWM Plan.

Therefore, this Attachment is not applicable to this Proposal.

ATTACHMENT 13 – URBAN WATER SUPPLIER ELIGIBILITY

****NOTE** Compliance Forms have been submitted early at the request of DWR; forms were submitted to the Department on December 31, 2010.**

Castaic Lake Water Agency (CLWA or Agency) is the applicant and an Urban Water Supplier that will be receiving funding from this Implementation Grant should the Proposal be awarded funding. The Agency submitted to DWR its self certification forms for documenting compliance with Assembly Bill (AB) 1420 for Best Management Practice and California Water Code (CWC) §525 for Water Meter Installation with the Upper Santa Clara River IRWM Plan Proposition 84 Round 1 Planning Grant Application on September 28, 2010. The attached documentation provided as Att13_IG1_UrbanSupplier_2of2 is DWR's compliance letter, dated November 9, 2010, which provides DWR's review and acceptance of the Agency's conformance with AB 1420.

Newhall County Water District (NCWD) is also an Urban Water Supplier that will be receiving funding from this Implementation Grant should the Proposal be awarded funding. NCWD is the project sponsor for the Santa Clara River-Sewer Trunk Line Relocation Project. As such, self certification forms for documenting compliance with CWC §525 for Water Meter Installation and AB 1420 for Best Management Practice implementation are provided as Att13_IG1_UrbanSupplier_2of2.

Valencia Water Company (VWC) is also an Urban Water Supplier that will be receiving funding from this Implementation Grant should the Proposal be awarded funding. VWC is the project sponsor for the Santa Clarita Valley Southern End Recycled Water Project. As such, self certification forms for documenting compliance with CWC §525 for Water Meter Installation and AB 1420 for Best Management Practice implementation are provided as Att13_IG1_UrbanSupplier_2of2.

STATE OF CALIFORNIA – CALIFORNIA NATURAL RESOURCES AGENCY

ARNOLD SCHWARZENEGGER, Governor

DEPARTMENT OF WATER RESOURCES
1416 NINTH STREET, P.O. BOX 942836
SACRAMENTO, CA 94236-0001
(916) 653-5791

RECEIVED
NOV 22 2010
By__________

November 9, 2010

Mr. Dirk Marks, Water Resources Manager
Castaic Lake Water Agency
27234 Bouquet Canyon Road
Santa Clarita, California 91350-2173

Dear Mr. Marks:

The Department of Water Resources (DWR) has reviewed the Castaic Lake Water Agency's (CLWA) Self-Certification Statement – Table 1 dated October 26, 2010, regarding implementation of the Urban Best Management Practices (BMPs).

The purpose of DWR's review is to determine eligibility of CLWA to receive water management grant or loan funds. DWR has followed the *Draft AB 1420 Compliance Requirements* dated June 1, 2009. For detailed information, please visit http://www.water.ca.gov/wateruseefficiency/finance/.

Based on DWR's review of the information in Table 1, CLWA has and is currently implementing the BMPs consistent with AB 1420 and, therefore, is eligible to receive water management grant or loan funds.

DWR reserves the right to request additional information and documentation, including reports from CLWA to substantiate the accuracy of the information provided in Table 1. DWR may reverse or modify its eligibility determination and notify you and the funding agency if inaccuracies are found in the supporting documentation or in Table 1.

If you have any questions, please contact me at (916) 651-7025 or Jodi Evans at (916) 651-7026.

Sincerely,

Fethi BenJemaa
Ag Water Use Efficiency Section Chief

California State Water Resources Control Board
California Department of Water Resources
California Department of Public Health

CERTIFICATION FOR COMPLIANCE WITH WATER METERING REQUIREMENTS FOR FUNDING APPLICATIONS

Funding Agency name: CALIFORNIA DEPARTMENT OF WATER RESOURCES

Funding Program name: PROPOSITION 84 IRWM

Applicant (Agency name): NEWHALL COUNTY WATER DISTRICT

Project Title (as shown on application form): SANTA CLARA RIVER SEWER TRUNK LINE RELOCATION "PHASE 1"

Please check one of the boxes below and sign and date this form.

☐ As the authorized representative for the applicant agency, I certify under penalty of perjury under the laws of the State of California, that the agency is not an urban water supplier, as that term is understood pursuant to the provisions of section 529.5 of the Water Code.

☒ As the authorized representative for the applicant agency, I certify under penalty of perjury under the laws of the State of California, that the applicant agency has fully complied with the provisions of Division 1, Chapter 8, Article 3.5 of the California Water Code (sections 525 through 529.7 inclusive) and that ordinances, rules, or regulations have been duly adopted and are in effect as of this date.

I understand that the Funding Agency will rely on this signed certification in order to approve funding and that false and/or inaccurate representations in this Certification Statement may result in loss of all funds awarded to the applicant for its project. Additionally, for the aforementioned reasons, the Funding Agency may withhold disbursement of project funds, and/or pursue any other applicable legal remedy.

STEVE COLE
Name of Authorized Representative (Please print)

[signature]
Signature

G.M.
Title

11.24.10
Date

AB 1420 Self- Certification Statement Table 1

Note: Table 1 documents Status of Past and Current BMP implementation.

Self-Certification Statement: The Urban Water Supplier and its authorized representative certifies, under penalty of perjury, that all information and claims, stated in this table, regarding compliance and implementation of the BMPs, including alternative conservation approaches, are true and accurate. This signed AB 1420 Self-Certification Statement Table 1, and Table 2 are the basis for granting funds by the Funding Agency. Falsification and/or inaccuracies in AB 1420 Self Certification Statement Table 1, and Table 2 and in any supporting documents substantiating such claims may, at the discretion of the funding agency, result in loss of all State funds to the applicant. Additionally, the Funding Agency, in its sole discretion, may halt disbursement of grant or loan funds, not pay pending invoices, and/or pursue any other applicable legal remedy and refer the matter to the Attorney General's Office.

Name of Signatory Stephen L Cole Title of Signatory General Manager Signature of signatory [signature] Date 11/23/10

Application Date: 11/23/2010

Proposal Identification Number: CUWCC Member? Yes/No: Yes

Has Urban Water Supplier submitted a 2005 Urban Water Management Plan? Yes/No: Yes

Is the UWM Plan Deemed Complete by DWR? Yes/No: Submitting 2010

Applicant Name: Newhall County Water District

Project Title: Santa Clara River Sewer Trunk Line Relocation "Phase 1"

Applicant's Contact Information: Name: Michael Alvord Phone: 661-259-3610 E-mail: malvord@ncwd.org

Participants:

Retailer (List Below)	*Wholesaler (List Below)*
Newhall County Water District	*Castaic Lake Water Agency*

C1

C2	C3	C4	C5	*C6	C7	**C8	**C9	**C10	C11	C12	C13	C14	C15	C16	C17	C18
			BMP Implemented by Retailers and/or Wholesalers / BMP			Compliance Options/Alternative Conservation Approaches (1)			BMP Is Exempt (2)			BMP Implementation Requirements Met				
BMPs required for Wholesale Supplier	BMPs required for Retail Supplier	BMPs	Retailer *Yes/No*	Wholesaler *Yes/No*	Regional *Yes/No*	BMP Checklist	Flex Track	Gallons Per Capita Per Day GPCD	Not Cost Effective	Lack of Funding	Lack of Legal Authority	CUWCC MOU Requirement Met: Retailer *Yes/No*	CUWCC MOU Requirement Met: Wholesaler *Yes/No*	Date of BMP Report Submitted to CUWCC for (2007-2008) (MOU Signatories)	Date BMP Implementation Data Submitted to DWR in CUWCC Format (Non MOU Signatories) (3)	All Supporting Documents have been Submitted Yes/No
	✓	BMP 1 Water Survey for Single/Multi-Family Residential Customers	✓				✓					No		12/30/2008		Yes
	✓	BMP 2 Residential Plumbing Retrofit	✓				✓					No		12/30/2008		Yes
✓	✓	BMP 3 System Water Audits, Leak Detection	✓	✓		✓						Yes	Yes	12/30/2008		Yes
✓	✓	BMP 3 Leak Repairs	✓	✓		✓						Yes	Yes	12/30/2008		Yes
	✓	BMP 4 Metering with Commodity Rates for All New connections	✓			✓						Yes		12/30/2008		Yes
	✓	BMP 4 Retrofit of Existing Connections	✓			✓						Yes		12/30/2008		Yes

C1	C2	C3	C4	C5	*C6	C7	**C8	**C9	**C10	C11	C12	C13	C14	C15	C16	C17	C18
				BMP Implemented by Retailers and/or Wholesalers / *BMP*			Compliance Options/Alternative Conservation Approaches (1)			BMP Is Exempt (2)			BMP Implementation Requirements Met				
	BMPs required for Wholesale Supplier	BMPs required for Retail Supplier	BMPs	Retailer *Yes/No*	Wholesaler *Yes/No*	Regional *Yes/No*	BMP Checklist	Flex Track	Gallons Per Capita Per Day GPCD	Not Cost Effective	Lack of Funding	Lack of Legal Authority	CUWCC MOU Requirement Met: Retailer *Yes/No*	CUWCC MOU Requirement Met: Wholesaler *Yes/No*	Date of BMP Report Submitted to CUWCC for (2007-2008) (MOU Signatories)	Date BMP Implementation Data Submitted to DWR in CUWCC Format (Non MOU Signatories) (3)	All Supporting Documents have been Submitted Yes/No
		✓	BMP 5 Large Landscape Conservation Programs and Incentives	✓	✓		✓						Yes		12/30/2008		Yes
		✓	BMP 6 High-Efficiency Washing Machine Rebate Programs	✓				✓					No		12/30/2008		Yes
	✓	✓	BMP 7 Public Information	✓	✓		✓						Yes	Yes	12/30/2008		Yes
	✓	✓	BMP 8 School Education	✓	✓		✓						Yes	Yes	12/30/2008		Yes
		✓	BMP 9 Conservation programs for Commercial, Industrial, and Institutional (CII) Accounts	✓	✓		✓						Yes		12/30/2008		Yes
	✓		BMP 10 Wholesale Agency Assistance Programs		✓		✓							Yes	12/30/2008		Yes
		✓	BMP 11 Conservation Pricing	✓									Yes		12/30/2008		Yes
	✓	✓	BMP 12 Conservation Coordinator	✓	✓		✓						Yes	Yes	12/30/2008		Yes
		✓	BMP 13 Water Waste Prohibitions	✓			✓						Yes		12/30/2008		Yes
		✓	BMP 14 Residential ULFT Replacement Programs	✓	✓		✓						Yes		12/30/2008		Yes

***C6:** Wholesaler may also be a retailer (supplying water to end water users)
****C8, **C9, **, and C10:** Agencies choosing an alternative conservation approach are responsible for achieving water savings equal or greater than that which they would have achieved using only BMP list.

(1) For details, please see: http://www.cuwcc.org/mou/exhibit-1-bmp-definitions-schedules-requirements.aspx.
(2) BMP is exempt based on cost-effectiveness, lack of funding, and lack of legal authority criteria as detailed in the CUWCC MOU
(3) Non MOU signatories must submit to DWR reports and supporting documents in the same format as CUWCC.

AB 1420 Self- Certification Statement Table 2

Provide Schedule, Budget, and Finance Plan to Demonstrate Commitment to Implement All BMP's to Become in Compliance with BMP Implementation - Commencing Within 1st Year of Agreement for Which Applicant Receives Funds.

Self-Certification Statement: The Urban Water Supplier and its authorized representative certifies, under penalty of perjury, that all information and claims, stated in this table, regarding compliance and implementation of the BMPs, including alternative conservation approaches, are true and accurate. This signed AB 1420 Self-Certification Statement Table 1 and Table 2 are the basis for granting funds by the Funding Agency. Falsification and/or inaccuracies in AB 1420 Self Certification Statement Table 1 and Table 2, and in any supporting documents substantiating such claims may, at the discretion of the funding agency, result in loss of all State funds to the applicant. Additionally, the Funding Agency, in its sole discretion, may halt disbursement of grant or loan funds, not pay pending invoices, and/or pursue any other applicable legal remedy and refer the matter to the Attorney General's Office.

Name of Signatory Stephen L Cole Title of Signatory General Manager Signature of signatory ____ Date 11/23/10

Application Date: 11/23/2010

Proposal Identification Number: ____ **CUWCC Member?** Yes/No: Yes

Applicant Name: Newhall County Water District **Is the UWM Plan Deemed Complete by DWR?** Yes/No: Submitting 2010

Project Title: Santa Clara River Sewer Trunk Line Relocation "Phase 1"

Applicant's Contact Information: Name: Michael Alvord

	Retailer (List Below)		
Participants:	Newhall County Water District		

C1	C2	C3	C4	C5	*C6	C7	C8	**C9	**C10	**C11	C12			C13	C14	C15	C16	C17	C18	C19
				BMP Implemented by Retailers and/or Wholesalers				Compliance Options / Alternative Conservation Approaches (1)			BMP is Exempt (2)			Implementation Scheduled to Commence within 1st Year of Agreement						
CUWCC 2010 Flex Track BMPs	BMPs required for Wholesale Supplier	BMPs required for Retail Supplier	BMPs	Retailer Yes/No	Wholesaler Yes/No	Regional Yes/No	Alternative Conservation Approaches Yes/No	BMP Checklist	Flex Track	Gallons Per Capita Per Day GPCD	Not Cost Effective	Lack of Funding	Lack of Legal Authority	Start Date (MM/YR)	Completion Level (%)	BMP Completion Date (MM/YR)	Budget (Dollars)	Funding Source & Finance Plan to Implement BMPs	Meets CUWCC Coverage Yes/No	Funds Requested, if Available. (See AB 1420 Compliance Table 3) Yes/No
1. Utility Operations Programs																				
1.11			BMP 12 Conservation Coordinator																	
1.12			BMP 13 Water Waste Prohibitions																	
1.13			BMP 10 Wholesale Agency Assistance Programs																	
1.20			BMP 3 System Water Audits, Leak Detection/**Repair**																	
1.30			BMP 4 Metering with Commodity Rates for All New/**Retrofit of Existing** connections																	
1.40			BMP 11 Conservation Pricing																	
2. Educational Programs																				
2.10			BMP 7 Public Information																	
2.20			BMP 8 School Education																	
3. Residential																				
3.11		✓	BMP 1 **Indoor** Water Survey for Single/Multi-Family Residential Customers	Yes	No		Yes		✓					Jul-11	90%	Jun-13	$2,500.00	Water Rates	Yes	
3.12		✓	BMP 1 **Outdoor** Water Survey for Single/Multi-Family Residential Customers	Yes	No		Yes		✓					Jul-11	90%	Jun-13	$2,500.00	Water Rates	Yes	
3.20		✓	BMP 2 Residential Plumbing Retrofit	Yes	No		Yes		✓					Jul-11	50%	Jun-15	$6,000.00	Water Rates	Yes	

				BMP Implemented by Retailers and/or Wholesalers				Compliance Options / Alternative Conservation Approaches (1)			BMP is Exempt (2)			Implementation Scheduled to Commence within 1st Year of Agreement						
CUWCC 2010 Flex Track BMPs	BMPs required for Wholesale Supplier	BMPs required for Retail Supplier	BMPs	Retailer Yes/No	Wholesaler Yes/No	Regional Yes/No	Alternative Conservation Approaches Yes/No	BMP Checklist	Flex Track	Gallons Per Capita Per Day GPCD	Not Cost Effective	Lack of Funding	Lack of Legal Authority	Start Date (MM/YR)	Completion Level (%)	BMP Completion Date (MM/YR)	Budget (Dollars)	Funding Source & Finance Plan to Implement BMPs	Meets CUWCC Coverage Yes/No	Funds Requested, if Available. (See AB 1420 Compliance Table 3) Yes/No
3.30		✓	BMP 6 High-Efficiency Washing Machine Rebate Programs	Yes	No		Yes		✓					Jul-11	0%	Jun-17	$18,000.00	Water Rates	Yes	
3.40			BMP 14 Residential ULFT Replacement Programs																	
4. Commercial, Industrial, Institutional																				
4.00			BMP 9 Conservation programs for Commercial, Industrial, and Institutional (CII) Accounts																	
5. Landscape																				
5.00			BMP 5 Large Landscape Conservation Programs and Incentives																	

*C6: Wholesaler may also be a retailer (supplying water to end water users)
**C9, ** C10, and **C11: Agencies choosing an alternative conservation approach are responsible for achieving water savings equal or greater than that which they would have achieved using only BMP list.
(1) For details, please see http://www.cuwcc.org/mou/exhibit-1-bmp-definitions-schedules-requirements.aspx.
(2) BMP is exempt based on cost-effectiveness, lack of funding, or lack of legal authority, as detailed in the CUWCC MOU.

California State Water Resources Control Board
California Department of Water Resources
California Department of Public Health

CERTIFICATION FOR
COMPLIANCE WITH WATER METERING REQUIREMENTS
FOR FUNDING APPLICATIONS

Funding Agency name: DEPARTMENT OF WATER RESOURCES (DWR)

Funding Program name: IRWM GRANTS

Applicant (Agency name): VALENCIA WATER COMPANY (VWC)

Project Title (as shown on application form): SOUTH END RECYCLED WATER PROJECT

Please check one of the boxes below and sign and date this form.

☐ As the authorized representative for the applicant agency, I certify under penalty of perjury under the laws of the State of California, that the agency is not an urban water supplier, as that term is understood pursuant to the provisions of section 529.5 of the Water Code.

☒ As the authorized representative for the applicant agency, I certify under penalty of perjury under the laws of the State of California, that the applicant agency has fully complied with the provisions of Division 1, Chapter 8, Article 3.5 of the California Water Code (sections 525 through 529.7 inclusive) and that ordinances, rules, or regulations have been duly adopted and are in effect as of this date.

I understand that the Funding Agency will rely on this signed certification in order to approve funding and that false and/or inaccurate representations in this Certification Statement may result in loss of all funds awarded to the applicant for its project. Additionally, for the aforementioned reasons, the Funding Agency may withhold disbursement of project funds, and/or pursue any other applicable legal remedy.

KEITH ABERCROMBIE — Keith Abercrombie

Name of Authorized Representative (Please print) — Signature

GENERAL MANAGER — 12/17/10

Title — Date

Recycled Paper

AB 1420 Self- Certification Statement Table 1

Note: Table 1 documents Status of Past and Current BMP implementation.

Self-Certification Statement: The Urban Water Supplier and its authorized representative certifies, under penalty of perjury, that all information and claims, stated in this table, regarding compliance and implementation of the BMPs, including alternative conservation approaches, are true and accurate. This signed AB 1420 Self-Certification Statement Table 1, and Table 2 are the basis for granting funds by the Funding Agency. Falsification and/or inaccuracies in AB 1420 Self Certification Statement Table 1, and Table 2 and in any supporting documents substantiating such claims may, at the discretion of the funding agency, result in loss of all State funds to the applicant. Additionally, the Funding Agency, in its sole discretion, may halt disbursement of grant or loan funds, not pay pending invoices, and/or pursue any other applicable legal remedy and refer the matter to the Attorney General's Office.

Name of Signatory_Matthew S. Dickens_______**Title of Signatory** Resource Conservation Manager_ **Signature of signatory** [signature] **Date** 12/21/2010

Application Date:

Proposal Identification Number: [ ] **CUWCC Member? Yes/No** Yes

Has Urban Water Supplier submitted a 2005 Urban Water Management Plan? Yes/No Yes **Is the UWM Plan Deemed Complete by DWR? Yes/No** Yes

Applicant Name: Castaic Lake Water Agency

Project Title:

Applicant's Contact Information: **Name:** Matthew S. Dickens **Phone:** 661-295-6543 **E-mail:** mdickens@valenciawater.com

Participants:

Retailer (List Below)	*Wholesaler (List Below)*
Valencia Water Company	*Castaic Lake Water Agency*

C1

C2	C3	C4	C5	*C6	C7	**C8	**C9	**C10	C11	C12	C13	C14	C15	C16	C17	C18
			BMP Implemented by Retailers and/or Wholesalers / BMP			Compliance Options/Alternative Conservation Approaches (1)			BMP Is Exempt (2)			BMP Implementation Requirements Met				
BMPs required for Wholesale Supplier	BMPs required for Retail Supplier	BMPs	Retailer *Yes/No*	Wholesaler *Yes/No*	Regional *Yes/No*	BMP Checklist	Flex Track	Gallons Per Capita Per Day GPCD	Not Cost Effective	Lack of Funding	Lack of Legal Authority	CUWCC MOU Requirement Met: Retailer *Yes/No*	CUWCC MOU Requirement Met: Wholesaler *Yes/No*	Date of BMP Report Submitted to CUWCC for (2007-2008) (MOU Signatories)	Date BMP Implementation Data Submitted to DWR in CUWCC Format (Non MOU Signatories) (3)	All Supporting Documents have been Submitted Yes/No
	✓	BMP 1 Water Survey for Single/Multi-Family Residential Customers	Yes			X						Yes		3/30/2009		Yes
	✓	BMP 2 Residential Plumbing Retrofit	Yes			X						Yes		3/30/2009		Yes
✓	✓	BMP 3 System Water Audits, Leak Detection	Yes			X						Yes		3/30/2009		Yes
✓	✓	BMP 3 Leak Repairs	Yes			X						Yes		3/30/2009		Yes
	✓	BMP 4 Metering with Commodity Rates for All New connections	Yes			X						Yes		3/30/2009		Yes
	✓	BMP 4 Retrofit of Existing Connections	Yes			X						Yes		3/30/2009		Yes

C1

C2	C3	C4	C5	*C6	C7	**C8	**C9	**C10	C11	C12	C13	C14	C15	C16	C17	C18
			BMP Implemented by Retailers and/or Wholesalers / *BMP*			Compliance Options/Alternative Conservation Approaches (1)			BMP Is Exempt (2)			BMP Implementation Requirements Met				
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	✓	BMP 5 Large Landscape Conservation Programs and Incentives	Yes			X						Yes		3/30/2009		Yes
	✓	BMP 6 High-Efficiency Washing Machine Rebate Programs	Yes			X						No		3/30/2009		Yes
✓	✓	BMP 7 Public Information	Yes			X						Yes		3/30/2009		Yes
✓	✓	BMP 8 School Education	Yes			X						Yes		3/30/2009		Yes
	✓	BMP 9 Conservation programs for Commercial, Industrial, and Institutional (CII) Accounts	Yes			X						Yes		3/30/2009		Yes
✓		BMP 10 Wholesale Agency Assistance Programs	NA			NA						NA		NA		NA
	✓	BMP 11 Conservation Pricing	Yes			X						Yes		3/30/2009		Yes
✓	✓	BMP 12 Conservation Coordinator	Yes			X						Yes		3/30/2009		Yes
	✓	BMP 13 Water Waste Prohibitions	Yes			X						Yes		3/30/2009		Yes
	✓	BMP 14 Residential ULFT Replacement Programs	Yes			X						Yes		3/30/2009		Yes

***C6:** Wholesaler may also be a retailer (supplying water to end water users)
****C8, **C9, **, and C10:** Agencies choosing an alternative conservation approach are responsible for achieving water savings equal or greater than that which they would have achieved using only BMP list.

(1) For details, please see: http://www.cuwcc.org/mou/exhibit-1-bmp-definitions-schedules-requirements.aspx.
(2) BMP is exempt based on cost-effectiveness, lack of funding, and lack of legal authority criteria as detailed in the CUWCC MOU
(3) Non MOU signatories must submit to DWR reports and supporting documents in the same format as CUWCC.

Valencia Water Company - CUWCC Cost Effectiveness Documentation

B/C Analysis - CUWCC Method								
Year	Units/Yr.	Retrofits Needed	Annual Water Savings (AFY)	Annual Costs ($)	Annual Costs ($, PV)	Cum.Costs ($, PV)	Annual Costs of Saved Water ($)	Costs of Saved Water ($, PV)
2011	262	262	8	$49,114	$49,114	$49,114	$1,545	$1,545
2012	0	241	8	$ -	$0	$49,114	$1,421	$1,381
2013	0	222	7	$ -	$0	$49,114	$1,307	$1,235
2014	0	204	6	$ -	$0	$49,114	$1,203	$1,104
2015	0	188	6	$ -	$0	$49,114	$1,107	$987
2016	0	173	5	$ -	$0	$49,114	$1,018	$882
2017	0	159	5	$ -	$0	$49,114	$937	$789
2018	0	146	5	$ -	$0	$49,114	$862	$705
2019	0	134	4	$ -	$0	$49,114	$793	$631
2020	0	124	4	$ -	$0	$49,114	$729	$564
2021	0	114	4	$ -	$0	$49,114	$671	$504
2022	0	105	3	$ -	$0	$49,114	$617	$451
2023	0	96	3	$ -	$0	$49,114	$568	$403
2024	0	89	3	$ -	$0	$49,114	$522	$360
2025	0	82	3	$ -	$0	$49,114	$481	$322
2026	0	75	2	$ -	$0	$49,114	$442	$288
2027	0	69	2	$ -	$0	$49,114	$407	$258
2028	0	63	2	$ -	$0	$49,114	$374	$230
2029	0	58	2	$ -	$0	$49,114	$344	$206
2030	0	54	2	$ -	$0	$49,114	$317	$184
2031	0	49	2	$ -	$0	$49,114	$291	$165
2032	0	45	1	$ -	$0	$49,114	$268	$147
2033	0	42	1	$ -	$0	$49,114	$247	$132
2034	0	38	1	$ -	$0	$49,114	$227	$118
2035	0	35	1	$ -	$0	$49,114	$209	$105
Total	**262**		**90**		**$49,114**			**$13,694**

Notes:

Benefits/C	0.3
$/AF	$546

DWR DMM Review Table	
Cost Effectiveness Summary	
Total Costs	$49,114
Total Benefits	$13,694
Benefit/Cost	0.28
Discount Rate	2.90%
Time Horizon	25 years
Cost of Water	$546
(AFY)	90

AB 1420 Self- Certification Statement Table 2

Provide Schedule, Budget, and Finance Plan to Demonstrate Commitment to Implement All BMP's to Become in Compliance with BMP Implementation - Commencing Within 1st Year of Agreement for Which Applicant Receives Funds.

Self-Certification Statement: The Urban Water Supplier and its authorized representative certifies, under penalty of perjury, that all information and claims, stated in this table, regarding compliance and implementation of the BMPs, including alternative conservation approaches, are true and accurate. This signed AB 1420 Self-Certification Statement Table 1 and Table 2 are the basis for granting funds by the Funding Agency. Falsification and/or inaccuracies in AB 1420 Self Certification Statement Table 1 and Table 2, and in any supporting documents substantiating such claims may, at the discretion of the funding agency, result in loss of all State funds to the applicant. Additionally, the Funding Agency, in its sole discretion, may halt disbursement of grant or loan funds, not pay pending invoices, and/or pursue any other applicable legal remedy and refer the matter to the Attorney General's Office.

Name of Signatory Matthew S. Dickens________Title of Signatory Resource Conservation Manager Signature of signatory [signature] Date 12/22/2010

Application Date:

Proposal Identification Number: [ ] **CUWCC Member?** Yes/No Yes

Applicant Name: Castaic Water Agency **Is the UWM Plan Deemed Complete by DWR?** Yes/No Yes

Project Title:

Applicant's Contact Information: Name Matthew S. Dickens

	Retailer (List Below)		
Participants:	Valencia Water Company		

C1	C2	C3	C4	C5	*C6	C7	C8	**C9	**C10	**C11	C12			C13	C14	C15	C16	C17	C18	C19
				BMP Implemented by Retailers and/or Wholesalers				Compliance Options / Alternative Conservation Approaches (1)			BMP is Exempt (2)			Implementation Scheduled to Commence within 1st Year of Agreement						
CUWCC 2010 Flex Track BMPs	BMPs required for Wholesale Supplier	BMPs required for Retail Supplier	BMPs	Retailer Yes/No	Wholesaler Yes/No	Regional Yes/No	Alternative Conservation Approaches Yes/No	BMP Checklist	Flex Track	Gallons Per Capita Per Day GPCD	Not Cost Effective	Lack of Funding	Lack of Legal Authority	Start Date (MM/YR)	Completion Level (%)	BMP Completion Date (MM/YR)	Budget (Dollars)	Funding Source & Finance Plan to Implement BMPs	Meets CUWCC Coverage Yes/No	Funds Requested, if Available. (See AB 1420 Compliance Table 3) Yes/No
1. Utility Operations Programs																				
1.11	✓	✓	BMP 12 Conservation Coordinator	Yes				X												
1.12		✓	BMP 13 Water Waste Prohibitions	Yes				X												
1.13	✓		BMP 10 Wholesale Agency Assistance Programs																	
1.20	✓	✓	BMP 3 System Water Audits, Leak Detection/Repair	Yes				X												
1.30		✓	BMP 4 Metering with Commodity Rates for All New/Retrofit of Existing connections	Yes				X												
1.40		✓	BMP 11 Conservation Pricing	Yes				X												
2. Educational Programs																				
2.10	✓	✓	BMP 7 Public Information	Yes				X												
2.20	✓	✓	BMP 8 School Education	Yes				X												
3. Residential																				
3.11		✓	BMP 1 Indoor Water Survey for Single/Multi-Family Residential Customers	Yes				X												
3.12		✓	BMP 1 Outdoor Water Survey for Single/Multi-Family Residential Customers	Yes				X												
3.20		✓	BMP 2 Residential Plumbing Retrofit	Yes				X												

				BMP Implemented by Retailers and/or Wholesalers				Compliance Options / Alternative Conservation Approaches (1)			BMP is Exempt (2)			Implementation Scheduled to Commence within 1st Year of Agreement						
CUWCC 2010 Flex Track BMPs	BMPs required for Wholesale Supplier	BMPs required for Retail Supplier	BMPs	Retailer Yes/No	Wholesaler Yes/No	Regional Yes/No	Alternative Conservation Approaches Yes/No	BMP Checklist	Flex Track	Gallons Per Capita Per Day GPCD	Not Cost Effective	Lack of Funding	Lack of Legal Authority	Start Date (MM/YR)	Completion Level (%)	BMP Completion Date (MM/YR)	Budget (Dollars)	Funding Source & Finance Plan to Implement BMPs	Meets CUWCC Coverage Yes/No	Funds Requested, if Available. (See AB 1420 Compliance Table 3) Yes/No
3.30		✓	BMP 6 High-Efficiency Washing Machine Rebate Programs	Yes				X			X									
3.40		✓	BMP 14 Residential ULFT Replacement Programs	Yes				X												
	4. Commercial, Industrial, Institutional																			
4.00		✓	BMP 9 Conservation programs for Commercial, Industrial, and Institutional (CII) Accounts	Yes				X												
	5. Landscape																			
5.00		✓	BMP 5 Large Landscape Conservation Programs and Incentives	Yes				X												

*C6: Wholesaler may also be a retailer (supplying water to end water users)

**C9, ** C10, and **C11: Agencies choosing an alternative conservation approach are responsible for achieving water savings equal or greater than that which they would have achieved using only BMP list.

(1) For details, please see http://www.cuwcc.org/mou/exhibit-1-bmp-definitions-schedules-requirements.aspx.

(2) BMP is exempt based on cost-effectiveness, lack of funding, or lack of legal authority, as detailed in the CUWCC MOU.

Consent Form
IRWM Plan Update

Applicant: Castaic Lake Water Agency

IRWM Region: Upper Santa Clara River

RWMG: Upper Santa Clara River

Date of Adoption: July 9, 2008

As the authorized representative of the above-referenced RWMG, I acknowledge and affirm that the RWMG is utilizing an IRWM Plan that was adopted on or before September 30, 2008, to meet part of the grant Eligibility Criteria for the Round 1, Proposition 84 IRWM Grant Program, Implementation Grant solicitation.

I also acknowledge that the RWMG understands that it must enter into a binding agreement with DWR to update, within two years of the execution date of the agreement, the IRWM Plan to meet the IRWM Plan standards contained in the Guidelines; and to undertake all reasonable and feasible efforts to take into account water-related needs of disadvantaged communities in the area within the IRWM region.

I further acknowledge that the RWMG understands that failure to meet the condition listed above may result in termination of the grant agreement by DWR and that DWR may demand the immediate repayment to State of an amount equal to the amount of grant funds disbursed to Grantee prior to such termination.

Dan Masnada
Name of Authorized Representative

[signature]
Signature

General Manager
Title of Authorized Representative

November 8, 2010
Date

ATTACHMENT 15 – DELTA

Introduction/Summary

The Upper Santa Clara River (USCR) IRWMP Region receives State Water Project (SWP) water delivered through the Delta; actions within the Region contribute to the success of CALFED Bay-Delta Program objectives.

In the USCR IRWMP, the Stakeholders made "reduction in water demand" one of the regional objectives. In the IRWMP, Stakeholders sought a "ten percent overall reduction in projected urban water demand throughout the Region by 2030 through implementation of water conservation measures" (IRWMP, pg. 3-3). A reduction in water demand would reduce dependence on imported SWP water and contribute to the attainment of CALFED objectives, benefiting the Delta.

Since the IRWMP was adopted, Senate Bill 7 of Extended Session 7 (SB7x-7) has been enacted, mandating that urban water suppliers reduce statewide water demand (in gallons per capita per day) by 20 percent by 2020. The Department of Water Resources (DWR) is recommending that the Region receive the planning grant funds requested during Planning Grant Round 1, which will allow an opportunity for the region as a whole to tackle enhanced water use efficiency in the IRWMP Update. Additionally, the Proposal Projects CLWA-4 (Santa Clarita Valley Water Use Efficiency Strategic Plan Programs) and VWC-1 (Santa Clarita Valley Southern End Recycled Water Project), specifically address water supply management practices to reduce potable water demand within the Region.

The Upper Santa Clara River IRWMP Region, Imported Water, and Water Supply Reliability

Nearly 50 percent of the Region's water supply is imported water from the SWP. The imported water is delivered to Castaic Lake through SWP facilities, treated at one of CLWA's two treatment plants, and then delivered to the domestic water purveyors through transmission lines owned and operated by CLWA. CLWA, as the Region's water wholesaler, has been has been contracting with the State of California through DWR to acquire and distribute SWP water since 1980. CLWA's Water Supply Contract with DWR is for 95,200 acre-feet per year (AFY) of SWP Table A Amount (IRWMP pg. 2-49). The four local retail water purveyors; 1) CLWA Santa Clarita Water Division (SCWD) (a RMWG member), 2) Los Angeles County Waterworks District No. 36 (LACWWD36), 3) Newhall County Water District (NCWD) (a RMWG member), and 4) Valencia Water Company (VWC) (a RMWG member), deliver these water supplies to municipal and industrial (M&I) users within the Valley. Agricultural uses are serviced by local groundwater supplies. Together, the Purveyors provide water to about 68,000 service connections (2009 Santa Clarita Valley Water Report).

Consistent with other urban SWP contractors, SWP deliveries to CLWA have increased as its requests for SWP water have increased (IRWMP pg. 2-50). Table 15-1, adapted from the USCR IRWMP presents historical total SWP deliveries to CLWA's service area.

TABLE 15-1
HISTORICAL TOTAL SWP DELIVERIES TO PURVEYORS

Year	Deliveries (AF)	Year	Deliveries (AF)
1980	1,125	1999	27,282
1985	11,823	2000	32,579
1990	21,647	2001	35,369
1991	7,968	2002	41,768
1992	13,991	2003	44,419
1993	13,393	2004	47,205
1994	14,389	2005	38,034
1995	16,996	2006	40,646
1996	18,093	2007[(a)]	45,332
1997	22,148	2008	41,705
1998	20,254	2009	38,546

Source: Santa Clarita Valley Water Report, 2009
Notes: a) Historically these supplies were comprised of only SWP Table A Amount. Since 2007, CLWA's imported supplies now consist of a combination of SWP water and water acquired from the Buena Vista Water Storage District in Kern County.

In late 2007 a federal court decision required that DWR curtail pumping from the Delta to protect the endangered Delta Smelt. A similar court decision was rendered in 2009 involving endangered salmon. The results of these impacts on environmental resources in the Delta, when combined with recent socio-economic conditions and hydrology changes have already reduced imported SWP utilization in the Region from a high in 2004 of 47,205 acre-feet (AF) to approximately 38,546 AF in 2009 (see Table 15-1). Recently (December 14, 2010) the court overturned these rulings and has required new analysis of Delta pumping requirements; while the results are unknown at this time it is expected that some level of SWP pumping restrictions will continue into the future.

The SWP supply itself is highly variable and depends on hydrologic conditions in northern California, the amount of water in SWP storage reservoirs at the beginning of the year, regulatory and operational constraints, the total amount of water requested by the contractors, and climate change. Currently, the reliability of the Region's overall water supply is dependent upon the reliability of its groundwater, imported water, and recycled water supplies. Since SWP water deliveries are subject to reductions when dry conditions occur in Northern California, and/or are affected by environmental decisions, the IRWMP, as well as the 2010 UWMP, include water management strategies for enhancing local water supply reliability during such occurrences.

Natural catastrophes can also impact water supplies. If an earthquake were to occur, pipelines, canals, or pump stations conveying water across the Tehachapi Mountains might become inoperable, making SWP deliveries to CLWA and the other downstream contractors dependent on the supplies then available in the terminal reservoirs. Although pipelines that traverse fault lines are reinforced, damage can still occur depending on the magnitude of the earthquake. Therefore, water banking opportunities south of the Tehachapi Mountains have a high value to CLWA, and thus are given high value as water management strategies within the USCR IRWMP.

In addition to earthquakes, the SWP could experience other emergency outage scenarios. Past examples include slippage of aqueduct side panels into the California Aqueduct near Patterson in the mid-1990s, the Arroyo Pasajero flood event in 1995, and various subsidence repairs needed along the East Branch of the Aqueduct since the 1980s. Such events could impact some or all SWP contractors south of the Delta. Impacts to the delivery of SWP water to CLWA would require the purveyors to rely on local supplies, increased groundwater pumping, recycled water, conservation, and water available to CLWA from Pyramid and Castaic

Lakes during the time period the SWP was unavailable. *Thus combinations of water management strategies that reduce dependence on imported water and that maximize the reliability of other local resources are strongly sought within the IRWM framework.*

The following section identifies how the USCR IRWMP will continue to integrate multiple water management strategies in order to maximize the flexibility of Region's water resources.

USCR IRWMP Objectives

During development of the USCR IRWMP, stakeholder issues and concerns culminated into significant key themes.

Key Issue #1: ***Increasing water demand while imported water supplies become less reliable.***

Since reduction in water demand is a critical objective within USCR IRWMP Region, and prioritizing projects is predicated on the objectives within the IRWM Plan, all of the projects within the IRWMP, and this Grant Proposal have been selected to directly meet the IRWMP objectives below (IRWMP pg.3-1).

USCR IRWMP OBJECTIVES

IRWMP OBJECTIVE	MULTIPLE BENEFIT
Reduce Water Demand: Implement technological, legislative and behavioral changes that will reduce user demands for water.	These projects result in more efficient water use, ***less dependence on imported water supplies***, less energy usage for treatment and delivery of water, and reduced demand for new or expanded water supply infrastructure. Proposal Project CLWA-4 and VWC-1 are examples.
Improve Operational Efficiency*:* Maximize water system operational flexibility and efficiency, including energy efficiency.	These projects have benefits related to reduced maintenance costs and decreased system water loss. Proposal Project NCWD-1 is an example.
Increase Water Supply*:* Understand future regional demands and obtain necessary water supply sources.	These projects ***provide for increased use of local supplies rather than imported water.*** They can decrease peak flood flows and can provide opportunities for habitat improvement and restoration.
Improve Water Quality: Supply drinking water with appropriate quality; improve groundwater quality; and attain water quality standards.	These projects reduce the potential for human exposure to potentially harmful substances and improve the efficiency of both water and wastewater treatment processes. They also benefit agricultural water users and wildlife habitat. Proposal Project CLWA-2 and VWC-1 are examples.
Promote Resource Stewardship*:* Preserve and improve ecosystem health; improve flood management; and preserve and enhance water-dependent recreation.	These projects improve overall habitat quality, reduce flooding and prevent erosion. Arundo removal also increases water supply as this plant utilizes large quantities of surface and groundwater. Proposal Project SC-1/USFS-1 is an example.

While all of the objectives are meant to work in together in order to maximize their benefits; two of the objectives are more directly focused on water supply as a resource and demand as a management tool that impacts that supply: ***Reduce Water Demand*** and ***Increase Water Supply***.

The USCR IRWMP objective ***Reduce Water Demand*** will be implemented by technological, legislative and behavioral changes that will reduce user demands for water. This is important to the USCR IRWMP for a few key reasons:

1. Adequate planning for, and the procurement of reliable water supplies is a critical component of CLWA's mission. Planning for an adequate water supply to meet demands requires consideration of the reliability of SWP supplies, because history and statistical analysis indicate that the full contractual Table A Amount will not be available for delivery to the SWP Contractors in all years (IRWMP pg. 2-51). Therefore, SWP Contractors like CLWA are compelled to initiate local projects given that maximum Table A Amounts are not projected for delivery in the future.

2. Local water agencies like CLWA and the four purveyors understand that local water supplies will provide them with more control and will also expand their water portfolios and encourage efficient water allocation and use).

3. The retail purveyors and CLWA have undertaken the production of a Valley-wide Water Use Efficiency Strategic Plan for their service areas in the Valley, which will provide recommendations for a variety of water conservation measures that can be incorporated into future versions of the IRWMP through time (IRWMP pg. 3-4).

The USCR IRWMP objective ***Increase Water Supply*** will be implemented by understanding regional water demands and obtaining the necessary water supply sources. This is important to the USCR IRWMP for a few key reasons:

1. The CLWA service area portion of the Region's anticipated demand in a normal year is projected to be about 130,000 AF in 2030 (with conservation), but this could increase in a multi-year dry situation to an estimated 138,000 AF in 2030 (IRWMP pg. 3-5). Concurrently in a multi-year drought scenario, supplies will decline. For this reason the water agencies in the CLWA service area have planned for other sources to increase water supply and water supply reliability, including programs to restore groundwater production, to utilize recycled water, and to conserve water. Further, storm water capture and subsequent groundwater recharge provides for increased use of local supplies rather than imported water. These projects assist in maintaining the long-term sustainability of the groundwater supply.

2. Implementing and expanding the recycled water system within the Region provides a reliable source of water year round that can help offset reliance on imported water and local groundwater. Use and delivery of up to 17,400 AFY of reclaimed water was considered in CLWA's Recycled Water Master Plan Final Program Environmental Impact Report (IRWMP pg. 3-6). By utilizing the effluent from the Region's two wastewater treatment plants, the Saugus Water Reclamation Plant and the Valencia Water Reclamation Plant, CLWA and the purveyors can more efficiently allocate its potable water and increase the reliability of the local water supplies in the Santa Clarita Valley (IRWMP pg. 2-53).

3. CLWA and the purveyors currently meet the balance of their demands with local groundwater and a small amount of recycled water. However, CLWA has evaluated the long-term water needs (water demand) within its service area based on applicable county and city land use plans and has compared these needs against existing and potential water supplies. Results indicate that CLWA's water requirements should utilize increased proportions of supply from conjunctive use, water transfers and water banking as means to improve the reliability of SWP supplies, and that the Region's long-term water supply strategy should also include water conservation, storm water capture, groundwater recharge and recycled water (IRWMP pg. 2-60, 2-90, 3-4, 3-6, 4-13, 4-36, 5-10).

4. Since preparation of the 2008 IRWMP, SBx7-7 has been enacted, mandating that urban water suppliers reduce statewide water use (in gallons per capita per day) by 20 percent by 2020. Methods of complying with SBx7-7 include enhanced water conservation, water use efficiency, and recycled water. In addition, storm water capture and groundwater recharge projects provide for increased

use of local supplies rather than imported water. These projects assist in maintaining the long-term sustainability of the groundwater supply. CLWA and the purveyors are together preparing a 2010 Urban Water Management Plan which will provide the calculations necessary to obtain a regional understanding of the water demands within the Valley in order to set SBx7-7 baseline and targets suited to the Region.

Additionally, to help gain a better understanding the Region's dependence on the Delta water supplies from a hydrologic perspective, the Region will be implementing a focused region-specific Climate Change Technical Study that will be prepared during the IRWMP Update. The Climate Change Technical Study will identify vulnerability of the Region to climate change, evaluate potential climate change impacts, and identify and evaluate potential adaption strategies to better understand this altered hydrologic reliability.

USCR Water Management Strategies and Projects to Reduce Dependence on Imported Water

Nearly 40 separate projects were submitted for consideration as Candidate Projects during the "call for projects" (IRWMP pg. 5-1). Full implementation of the IRWMP will provide for the following specific benefits:

Demand Management Projects
Candidate Projects include preparation of a Valley-wide conservation strategic plan and technical support to improve water use efficiency in large landscape areas. More efficient water use will result in less demand on imported water supplies, less energy usage for treatment and delivery of water, and reduced demand for new or expanded water supply infrastructure. In addition, improved outdoor irrigation reduces the flows of poor quality urban run-off. (IRWMP pg. 5-9).

Water Supply Projects
The majority of Candidate Projects submitted by Stakeholders relate to water supply, particularly storm water capture, groundwater recharge, and development of recycled water supplies. Storm water capture and subsequent groundwater recharge provides for increased use of local supplies rather than imported water. These projects assist in maintaining the long-term sustainability of the groundwater supply. Depending on project specifics, these projects can also serve to decrease peak flood flows and provide opportunities for habitat improvement and restoration. Recycled water supplies, likewise, decrease demand for imported water. Recycled water can offset potable water demand, recharge groundwater, and be used to create and restore wetland areas. (IRWMP pg. 5-9).

Reducing Dependence into the Future

For the following reasons the USCR IRWMP *will continue to help reduce dependence on the Delta for water supply:*

- Adopted objectives of the USCR IRWMP are to ***Reduce Water Demand*** and ***Increase Water Supply***
- Adequate planning for, and the procurement of, a reliable water supply is a fundamental function of CLWA, the Region's SWP wholesaler and active RWMG member; and
- The RWMG is committed to, and the IRWMP governance structure supports, implementing and updating the IRWMP into the future.

Extracted from the IRWMP is the list of Candidate and Pending Projects (Att15_IG1_Delta_2of2); *projects that when implemented would continue to help reduce the Region's dependence on the Delta, through either a reduction in demand or an enhancement in supply* have been highlighted.

Appendix to Attachment 15

UPPER SANTA CLARA RIVER IRWMP LIST OF CANDIDATE AND PENDING PROJECTS W/ HIGHLIGHTS

Upper Santa Clara River IRWMP: Candidate and Pending Projects

PROJECTS READY FOR PRIORITIZATION PROCESS

	Project Name	Partners	Related Projects	Description	Location	Benefits and Costs
Castaic Lake Water Agency (CLWA) Sponsored Projects						
CLWA-1	Recycled Water Program, Phase II	None listed	CLWA-5	Part of CLWA's Recycled Water Master Plan. Includes the planning, design and construction of CLWA's next phase of recycled water improvements, including a new storage tank and various recycled water pipelines. The recycled water pipelines will transport recycled water from the existing Valencia Water Reclamation Plant to a new recycled water storage tank and recycled water customers.	Valencia Water Reclamation Plant and various local streets in Valencia, CA	Reduce Water Demand: Yes, not quantified Improve Operational Efficiency: NA Enhance Water Supply: ~1600 AFY Improve Water Quality: NA Promote Resource Stewardship: Yes, not quantified Capital Cost: $19M O&M Cost: $20K/yr Consistent with Plan Docs: Yes
CLWA-2	Electrolysis and Volatilization for Bromide Removal & DBP Reduction	Carollo Engineers; Metropolitan Water District of Southern California	CLWA-3	Bromide is a non-volatile anion found in all natural waters. Removing bromide using existing technologies is cost prohibitive for large scale water treatment. CLWA has developed a technology that can remove bromide from source waters. Water is passed between dimensionally stable anodes (DSAs) and the bromide is oxidized to bromine. Water is also oxidized to oxygen gas and hydrogen ions. This produces a very low pH near the surface of the DSAs and large volumes of very fine gases, resulting in the volatilization of bromine. CLWA has published several papers on the topic and received research funds from the American Water Works Association Research Foundation for this project. The process has already been shown to be effective at both removing bromide and reducing the concentrations of brominated disinfection byproducts which bromide causes.	CLWA Rio Vista Treatment Plant, Santa Clarita, CA	Reduce Water Demand: NA Improve Operational Efficiency: NA Enhance Water Supply: ~20,000 gpd treated Improve Water Quality: Yes, not quantified Promote Resource Stewardship: NA Capital Cost: $40-60K O&M Cost: $100K/yr Consistent with Plan Docs: unknown

PROJECTS READY FOR PRIORITIZATION PROCESS

	Project Name	Partners	Related Projects	Description	Location	Benefits and Costs
Castaic Lake Water Agency (CLWA) Sponsored Projects						
CLWA-3	Feasibility of Using Electrolysis and Volatilization for Chloride Removal	Los Angeles County Sanitation Districts; Carollo Engineers	CLWA-2	Chloride is a non-volatile anion found in all natural waters. Removing chloride using existing technologies is cost prohibitive for large scale water treatment. CLWA has developed a technology that can remove bromide from source waters. Water is passed between dimensionally stable anodes and the bromide is oxidized to bromine. Water is also oxidized to oxygen gas and hydrogen ions. This produces large volumes of very fine gases resulting in the volatilization of bromine. CLWA has published several papers on the topic and received research funds from the American Water Works Association Research Foundation for this project. Since chloride and bromide (and bromine and chlorine) have fairly similar chemistries, the same process may work for the oxidation and volatilization of chloride as well. The proposed project is to operate a pilot-scale treatment plant and conduct studies to determine if the process that removes bromide can also remove chloride from local waters. If effective, the process could be applied to Castaic Lake water and the waters of the Santa Clara River watershed.	CLWA Rio Vista Treatment Plant, Santa Clarita, CA	Reduce Water Demand: NA Improve Operational Efficiency: NA Enhance Water Supply: ~20,000 gpd treated Improve Water Quality: Yes, not quantified Promote Resource Stewardship: NA Capital Cost: $60-80K O&M Cost: $125K/yr Consistent with Plan Docs: unknown
CLWA-4	Large Landscape Efficiency Improvement Program	SCWD, NCWD		This project will start with an education component so the on- site maintenance staff will have an understanding of the issues that lead to increased water demand and the tools to recognize and correct those issues. The site will get an ET controller with a rain shut off device and some high distribution uniformity heads with a low application rate of the correct size installed to demonstrate the maximum achievable results for the unique area. Sites will be chosen on a projected cost versus benefit basis.	Large Landscapes in the Santa Clarita Valley including Landscape Maintenance districts, HOA common areas and regional and local parks.	Reduce Water Demand: Yes by 2 percent Improve Operational Efficiency: Demand reduced by 800 AFY treated water Enhance Water Supply: Yes, not quantified Improve Water Quality: Yes, not quantified Promote Resource Stewardship: NA Capital Cost: $450-$675K O&M Cost: $500-$1,000/yr Consistent with Plan Docs: unknown

PROJECTS READY FOR PRIORITIZATION PROCESS

	Project Name	Partners	Related Projects	Description	Location	Benefits and Costs
Castaic Lake Water Agency (CLWA) Sponsored Projects						
CLWA-5	Customer Recycled Water Incentive Program	NCWD, LACWWD NO.36, SCWD, VWC, SCVSD	CLWA-1	CLWA is planning to expand its existing recycled water system as noted in project CLWA-1. This project would fund hook-up costs to the system providing an incentive for the end-user to use recycled water. Project would consist of providing financing to customers to pay for a licensed plumber/contractor to connect to the recycled water system or to pay for the meter or other equipment connect to the system. Financing would be very favorable terms that could be repaid by paying potable rates for recycled water and using the difference to pay for the hook-up costs.	CLWA service area	Reduce Water Demand: Yes, not quantified Improve Operational Efficiency: NA Enhance Water Supply: Increase recycled water use by 1,600 AFY Improve Water Quality: NA Promote Resource Stewardship: Yes, not quantified Capital Cost: $1M-$10M O&M Cost: $100K/yr Consistent with Plan Docs: Yes

CLWA is listed as a partner for the following projects:

SCVSD-1: East Santa Clara River Wetlands and Recycled Water Project

SVCSD-2: Valencia and Saugus Water Reclamation Plants - Ultraviolet Disinfection System Facilities

SCVSD-3: SCVSD Self-Regenerating Water Softeners (SRWS) Public Outreach and Rebate Program

VWC-2: Implementation of Santa Clarita Valley Water Conservation Strategic Plan

City of Santa Clarita Sponsored Projects						
Santa Clarita-1	Upper Santa Clara River Arundo/Tamarisk Removal Program (SCARP) Implementation	VCRCD, LACDPW, Angeles National Forest	Former separate projects LACDPW-12 and USFS-1 have been combined with Santa Clarita-1.	The VCRCD is implementing an environmentally beneficial project in the Upper Santa Clara River watershed including its tributaries (approximately 16,300 acres) – the Upper Santa Clara River Arundo/Tamarisk Removal Plan (SCARP). Restoration of riparian habitat, increase of water quantity, improvement of water quality, and reduction of flood/wildfire hazard will be accomplished through the removal of invasive plant species, some of which have colonized in large extents of the Upper Santa Clara River watershed. The primary species of concern are arundo (*Arundo donax*) and tamarisk (*Tamarix spp.*). The current estimate is approximately 1,500 acres. However, since the SCARP implementation is a long-term project with extensive costs and logistical issues, the VCRCD is requesting funding to cover a 10-year implementation period.	Approximately 16,300 acres within 500-year floodplain of river and tributaries, Angeles Forest Highway west to the Los Angeles County line.	Reduce Water Demand: Yes, not quantified Improve Operational Efficiency: NA Enhance Water Supply: 7,773 AF will be recharged to the groundwater basin Improve Water Quality: Yes, not quantified Promote Resource Stewardship: Yes, not quantified Capital Cost: $4M-$12M O&M Cost: $1.5M-$4M Consistent with Plan Docs: Yes

PROJECTS READY FOR PRIORITIZATION PROCESS

	Project Name	Partners	Related Projects	Description	Location	Benefits and Costs
City of Santa Clarita Sponsored Projects						
Santa Clarita-3	Discovery River Park and Conservation Area	None listed	Santa Clarita-1, Santa Clarita-2	This project will capture 100 percent of urban runoff and allow groundwater, now diverted or pumped off-site, to return to the river. Water will flow through planted filtration and bioswales and drain into retention basins and a restored spring-fed pond consistent with historic flow patterns. No unfiltered or untreated urban water will flow into the river or off site. An overflow system will allow rainfall greater than a 50-year storm to gradually enter the river. The interpretive center will be the first of its kind, located in a suburban area, dedicated to storm water management, water conservation, and the Santa Clara River's preservation. The center and its demonstration garden represent a tool for learning about how restoration and conservation has relevance in a suburban community and will provide guidance, direction, and advocacy of sustainable water use. The ecosystem restoration plan includes integrating native planting with adapted, non-invasive species relevant to the Southern California suburban environment.	The project is located along the west side of Canyon View Drive, in the community of Canyon Country within the City of Santa Clarita. It is partially located within the Santa Clara River, a Significant Ecological Area (SEA) as identified in the City's General Plan.	Reduce Water Demand: Yes, not quantified Improve Operational Efficiency: NA Enhance Water Supply: Yes, not quantified Improve Water Quality: Yes, not quantified Promote Resource Stewardship: Yes, not quantified Capital Cost: $1.6M-$1.85M O&M Cost: $25k/yr Consistent with Plan Docs: Yes

The City of Santa Clarita has been listed as partner for the following projects:

SCVSD-1: East Santa Clara River Wetlands and Recycled Water Project

SCVSD-3: SCVSD Self-Regenerating Water Softeners (SRWS) Public Outreach and Rebate Program

	Project Name	Partners	Related Projects	Description	Location	Benefits and Costs
Los Angeles County Department of Public Works (LACDPW) Sponsored Projects						
LACDPW-1	Lower San Francisquito Spreading Grounds	LACFCD	LACDPW-11, LACDPW-15, LACDPW-16	This project consists of building a recharge facility and diversion. Flows will be redirected to the west bank and to the property adjacent to the river where basins for recharge will be excavated. An earthen diversion will wash out during major storms and it will later need to be rebuilt. There may be opportunities for habitat restoration and passive recreation in the surrounding areas. Trash that washes into the river will be collected in the basins and removed regularly.	Upstream of Decoro Drive, north bank, Santa Clarita, CA	Reduce Water Demand: NA Improve Operational Efficiency: NA Enhance Water Supply: 100-1,000 AFY Improve Water Quality: Yes, not quantified Promote Resource Stewardship: 47 acres in the floodplain Capital Cost: $3M-$6M O&M Cost: $25k/yr Consistent with Plan Docs: unknown

PROJECTS READY FOR PRIORITIZATION PROCESS

	Project Name	Partners	Related Projects	Description	Location	Benefits and Costs
Los Angeles County Department of Public Works (LACDPW) Sponsored Projects						
LACDPW-2	Newhall Creek In-River Spreading Grounds	LACFCD		The Newhall Creek In-River Spreading Grounds Project would consist of excavating a portion of the river and widening the river to provide in-stream recharge basins. Habitat could be restored along the river. The berms would be washed out during high flows and would need to be reestablished. Trash would be detained in and then removed from the outer basins.	Near confluence of Newhall Creek and Santa Clara River South Fork, Santa Clarita, CA	Reduce Water Demand: NA Improve Operational Efficiency: NA Enhance Water Supply: 1-100 AFY Improve Water Quality: Yes, not quantified Promote Resource Stewardship: 5 acres in floodplain Capital Cost: $2M-$5M O&M Cost: $25k/yr Consistent with Plan Docs: unknown
LACDPW-3	Placerita Creek Off-River Spreading Grounds	LACFCD		The Placerita Creek Off-River Spreading Grounds Project would consist of building a recharge facility and a diversion structure. Storm flows from the creek and from the South Fork of the Santa Clara River would be diverted into a spreading basin using an earthen berm. Trash would wash into the spreading grounds and be removed post-storm. The spreading grounds could incorporate habitat restoration and/or passive recreation.	Near confluence of Placerita Creek and Santa Clara River South Fork, Santa Clarita, CA	Reduce Water Demand: NA Improve Operational Efficiency: NA Enhance Water Supply: 100-1,000 AFY Improve Water Quality: Yes, not quantified Promote Resource Stewardship: 17 acres of floodplain Capital Cost: $3M-$7M O&M Cost: $25k/yr Consistent with Plan Docs: unknown
LACDPW-4	Santa Clara In-River Spreading Ground No. 1	LACFCD		The recharge basins would be constructed on the outer edges of the river and earthen levees would be constructed to direct flows to the basins from the center of the river. Storm flows would meander through the river section allowing more time for percolation. Higher flows would wash out the diversion, and it would be reconstructed post storm. The project consists of 61 acres providing 183 AF of storage and water conservation benefit of 550 AF. There are opportunities for habitat restoration in the surrounding areas. Trash would typically be detained in the outer basins and removed post storm.	Between Cocklebur Lane and Soledad Street upstream and downstream of Conveyer Belt, Santa Clarita, CA	Reduce Water Demand: NA Improve Operational Efficiency: NA Enhance Water Supply: 100-1,000 AFY Improve Water Quality: Yes, not quantified Promote Resource Stewardship: 61 acres in floodplain Capital Cost: $4M-$7M O&M Cost: $25k/yr Consistent with Plan Docs: unknown

PROJECTS READY FOR PRIORITIZATION PROCESS

	Project Name	Partners	Related Projects	Description	Location	Benefits and Costs
Los Angeles County Department of Public Works (LACDPW) Sponsored Projects						
LACDPW-5	Santa Clara In-River Spreading Ground No. 2	LACFCD		The spreading grounds would utilize earthen levees to redirect flows to the outside banks of the river. Small recharge basins and finger levees along the outer banks would slow flows and increase recharge in this stretch of the river. Trash would typically be detained in the outer basins and removed from the river post-storm. High flows would wash out the low levees, and they would be rebuilt after larger storms. Adjacent areas may provide opportunities for habitat restoration and possible invasive species removal.	Upstream of Lang Station Road, Santa Clarita, CA	Reduce Water Demand: NA Improve Operational Efficiency: NA Enhance Water Supply: 100-1,000 AFY Improve Water Quality: Yes, not quantified Promote Resource Stewardship: 18 acres in floodplain Capital Cost: $2M-$5M O&M Cost: $25k/yr Consistent with Plan Docs: unknown
LACDPW-6	Santa Clara Off-River Spreading Ground	LACFCD		The project would install a diversion in the Santa Clara River that would convey water to the adjacent property where recharge basins would be constructed. Trash would be collected in the spreading grounds. The stream flow gages would be placed to determine the amount of water that is being directed to the spreading grounds. The spreading grounds would have a total area of 53 acres and a storage capacity of 223 AF. Passive recreation and habitat restoration could be incorporated into the design of the facility.	Upstream of Whites Canyon Road, crossing on Santa Clara, Santa Clarita, CA	Reduce Water Demand: NA Improve Operational Efficiency: NA Enhance Water Supply: 100-1,000 AFY Improve Water Quality: Yes, not quantified Promote Resource Stewardship: 53 acres in floodplain Capital Cost: $4M-$7M O&M Cost: $25k/yr Consistent with Plan Docs: unknown
LACDPW-7	Santa Clara River Rubber Dam No. 1	LACFCD		An air inflatable rubber dam will be constructed at the proposed location. During storm flows, the rubber dam will inflate, and the water will pond and percolate behind the rubber dam. During nonstorm weather, the rubber dam will stay deflated to allow lower flows in the river to pass without obstruction. Habitat will be restored along the river. Trash that collects behind the rubber dam will be removed.	Santa Clara River, Bouquet Canyon Road Bridge, Santa Clarita, CA	Reduce Water Demand: NA Improve Operational Efficiency: NA Enhance Water Supply: 100-1,000 AFY Improve Water Quality: Yes, not quantified Promote Resource Stewardship: Yes, not quantified Capital Cost: $5M-$7M O&M Cost: $25k/yr Consistent with Plan Docs: unknown

PROJECTS READY FOR PRIORITIZATION PROCESS

	Project Name	Partners	Related Projects	Description	Location	Benefits and Costs
Los Angeles County Department of Public Works (LACDPW) Sponsored Projects						
LACDPW-8	Santa Clara River Spreading Ground	LACFCD		This project would construct earthen levees in the river to slow down and spread flows across the river. Another levee would direct flows to an adjacent property along the south bank. The diversion levee would wash-out during higher flows to minimize damage to the proposed levees. The off-river portion of this proposal could be designed to incorporate habitat and passive recreation. Trash would be diverted and detained at the basins for post-storm removal.	Santa Clara River between Highway 14 and Sand Canyon Road, Santa Clarita, CA	Reduce Water Demand: NA Improve Operational Efficiency: NA Enhance Water Supply: 100-2,000 AFY Improve Water Quality: Yes, not quantified Promote Resource Stewardship: Yes, not quantified Capital Cost: \$7M-\$10M O&M Cost: \$25k/yr Consistent with Plan Docs: unknown
LACDPW-9	South Fork Santa Clara River Rubber Dam No. 1 and Spreading Ground	LACFCD		An air-inflatable rubber dam will be installed utilizing the location of an existing drop structure. During storm flows the rubber dam will inflate, and water will pond and percolate behind the rubber dam. The rubber dam will also divert the water to the proposed spreading basins which will then also percolate into the aquifers. After the water percolates, the rubber dam will slowly deflate and lay flat across the drop structure allowing lower flows in the river to pass without obstruction.	Under the pedestrian bridge at Newhall Avenue, adjacent to Santa Clara River South Fork, Santa Clarita, CA	Reduce Water Demand: NA Improve Operational Efficiency: NA Enhance Water Supply: 100-1,000 AFY Improve Water Quality: Yes, not quantified Promote Resource Stewardship: Yes, not quantified Capital Cost: \$5M-\$9M O&M Cost: \$50k/yr Consistent with Plan Docs: unknown
LACDPW-10	South Fork Santa Clara River Rubber Dam No. 2	LACFCD		This project will involve the installation of an inflatable-rubber dam to aid in conserving storm water within the river. Since the rubber dam will be installed on an existing drop structure, the native ground surface will not be disturbed. During storm flows, the rubber dam will inflate, and water will pond and percolate behind the dam. After the water percolates, the rubber dam will slowly deflate and lay flat across the drop structure and allow lower flows in the river to pass without obstruction. Habitat could be restored along the banks of the river. Trash that washes into the river will be collected at the rubber dam and it will be removed.	Santa Clara River South Fork, near Covala Drive, Santa Clarita, CA	Reduce Water Demand: NA Improve Operational Efficiency: NA Enhance Water Supply: 100-1,000 AFY Improve Water Quality: Yes, not quantified Promote Resource Stewardship: Yes, not quantified Capital Cost: \$5M-\$7M O&M Cost: \$25k/yr Consistent with Plan Docs: unknown

PROJECTS READY FOR PRIORITIZATION PROCESS

	Project Name	Partners	Related Projects	Description	Location	Benefits and Costs
Los Angeles County Department of Public Works (LACDPW) Sponsored Projects						
LACDPW-11	South Fork Santa Clara River Rubber Dam No. 3	LACFCD	LACDPW 1, LACDPW-15, LACDPW-16	This project will install an air-inflatable rubber dam, utilizing the location of an existing drop structure. During storm flows the rubber dam will inflate, and water will pond and percolate behind the rubber dam. After the water percolates, the rubber dam will slowly deflate and lay flat across the drop structure. This will allow the lower flows in the river to pass without obstruction. Habitat will be restored along the banks of the river. Trash that washes into the river and collects behind the rubber dam will be removed.	Santa Clara River South Fork, near the continuation of Pueblo Drive, Santa Clarita, CA	Reduce Water Demand: NA Improve Operational Efficiency: NA Enhance Water Supply: 100-1,000 AFY Improve Water Quality: Yes, not quantified Promote Resource Stewardship: Yes, not quantified Capital Cost: \$5M-\$7M O&M Cost: \$25k/yr Consistent with Plan Docs: unknown
LACDPW-13	Acquisition of Land in the Flood Plain of the Upper Santa Clara River	None listed	RMC-1, SCOPE-1	This project entails the acquisition of land in the Upper Santa Clara River flood plain by willing sellers in order to restrict their future development and restore lands to their natural condition.	Throughout the Upper Santa Clara River, Los Angeles County, CA	Reduce Water Demand: NA Improve Operational Efficiency: NA Enhance Water Supply: Yes, not quantified Improve Water Quality: Yes, not quantified Promote Resource Stewardship: Yes, not quantified Capital Cost: unknown O&M Cost: unknown Consistent with Plan Docs: unknown
LACDPW-14	Acton Master Drainage Plan	None listed		Phased development of flood control facilities to mitigate flooding in the Acton community. Proposed improvements include four debris basins, five multi-use retention facilities, and low impact water quality enhancement flood control facilities.	Throughout the Upper Santa Clara River, Los Angeles County, CA	Reduce Water Demand: NA Improve Operational Efficiency: Yes, not quantified Enhance Water Supply: NA Improve Water Quality: NA Promote Resource Stewardship: Yes, not quantified Capital Cost: \$10M-50M O&M Cost: unknown Consistent with Plan Docs: unknown

PROJECTS READY FOR PRIORITIZATION PROCESS

	Project Name	Partners	Related Projects	Description	Location	Benefits and Costs
Los Angeles County Department of Public Works (LACDPW) Sponsored Projects						
LACDPW-15	South Fork Santa Clara River Rubber Dam No. 4	LACFCD	LACDPW-1, LACDPW-11, LACDPW-16	Utilizing the location of an existing drop structure, this project will install an air-inflatable rubber dam. During storm flows the rubber dam will inflate, and water will pond and percolate behind the rubber dam. After the water percolates, the rubber dam will slowly deflate and lay flat across the drop structure and allow lower flows in the river to pass without obstruction. Habitat will be restored along the banks of the river. The adjacent power line easement provides opportunities for habitat restoration and possible recreation. Trash will be removed at the rubber dam after storms.	Santa Clara River South Fork, Valencia Boulevard Bridge, Santa Clarita, CA	Reduce Water Demand: NA Improve Operational Efficiency: NA Enhance Water Supply: 100-1,000 AFY Improve Water Quality: Yes, not quantified Promote Resource Stewardship: Yes, not quantified Capital Cost: $5M-$7M O&M Cost: $25k/yr Consistent with Plan Docs: unknown
LACDPW-16	Upper San Francisquito Spreading Grounds	LACFCD	LACDPW 1, LACDPW-11, LACDPW-15	This project will construct earthen levees that will divert water to the outside limits of the creek where recharge basins will be constructed. During higher flows, the earthen levee would wash out and regular maintenance to restore the levees will be necessary. There may be opportunities for habitat restoration and passive recreation in the surrounding areas. Trash that washes into the creek will be detained at the recharge basins and will be removed.	Upstream of Copper Hill Drive, Santa Clarita, CA	Reduce Water Demand: NA Improve Operational Efficiency: NA Enhance Water Supply: 100-2,000 AFY Improve Water Quality: Yes, not quantified Promote Resource Stewardship: Yes, 54 acres within floodplain Capital Cost: $3M-$6M O&M Cost: $25k/yr Consistent with Plan Docs: unknown

LACDPW is listed as partner for the following project:

Santa Clarita-1: Upper Santa Clara River Arundo/Tamarisk Removal Program (SCARP) Implementation

	Project Name	Partners	Related Projects	Description	Location	Benefits and Costs
Newhall County Water District (NCWD) Sponsored Projects						
NCWD-1	Wellhead Treatment for NC 10	None listed	SCWD-1, VWC-1, SCVSD-2	The project would provide treatment to remove naturally occurring manganese and iron from the groundwater. Treatment would bring the manganese and iron levels below the secondary MCL of 50 ppb and 300 ppb respectively. In February of 2005 an iron and manganese removal feasibility study was completed for Newhall Well No. 10. The study found that there were treatment options that could bring iron levels below 100 ppb and manganese levels below 20 ppb.	The proposed treatment plant site is adequate for a typical treatment train (about 250 feet by 200 feet) and is located on San Fernando Road. The site is located within a mixed industrial/residential use area. Santa Clarita, CA	Reduce Water Demand: NA Improve Operational Efficiency: Reduces demand by 870 AFY Enhance Water Supply: 870 AFY would be made available to NCWD (Newhall) Improve Water Quality: Manganese levels below secondary MCL of 50 ppb; iron levels below secondary MCL of 300 ppb. Promote Resource Stewardship: NA Capital Cost: $826K-$1M O&M Cost: $32.50/AF Consistent with Plan Docs: Yes

PROJECTS READY FOR PRIORITIZATION PROCESS

	Project Name	Partners	Related Projects	Description	Location	Benefits and Costs
Newhall County Water District (NCWD) Sponsored Projects						
NCWD-3	Removal of the Sewer Trunk Line from the Santa Clara Riverbed	LACDPW, City of Santa Clarita		The main objective of this sewer realignment project is to relocate the remaining portion of the 2-S Trunk Sewer out of the Santa Clara River by routing sewage across the Santa Clara River underneath the Sand Canyon Bridge into a Los Angeles County sewer, and relocating a portion of the existing trunk sewer into the paved section of the Lost Canyon Road. The proposed sewer abandonment includes 4,881 linear feet of 15-, 18-, 21-, and 24-inch sewer pipe. The relocation of the sewer would prevent the discharge of untreated sewerage directly into the Santa Clara River as a result of storm damage.	Parts of the Pinetree sewer trunk line are located in the Santa Clara River bed. The project will remove the sewer from the stream bed and relocate it into the public right-of-way and out of the flow of the stream bed. Santa Clarita, CA	Reduce Water Demand: NA Improve Operational Efficiency: NA Enhance Water Supply: NA Improve Water Quality: Yes, not quantified Promote Resource Stewardship: Yes, not quantified Capital Cost: ~\$1.74M-\$2.5M O&M Cost: \$20K/yr Consistent with Plan Docs: unknown

NCWD is listed as partner for the following projects:

- CLWA-5: Customer Recycled Water Incentive Program
- SCWD-2: Consolidation of Water Mutuals
- VWC-2: Implementation of Santa Clarita Valley Water Conservation Strategic Plan

Rivers and Mountains Conservancy (RMC) Sponsored Projects						
RMC-1	Acquisition of River Channel and Major Tributaries for Watershed Protection	Santa Monica Mountains Conservancy, The Nature Conservancy	SCOPE-1, LACDPW-13	The purpose of this project is to preserve the natural floodplain of the upper reaches of the river for water conservation and habitat protection. In addition, the project would address preservation of recharge capacity, preservation of habitat values, protection from flooding, and protection from pollution and water based recreation. By acquiring the riparian and flood plain parcels, they can remain undeveloped and therefore continue to provide watershed benefits in perpetuity.	Upper reaches of the Santa Clara River and its major tributaries	Reduce Water Demand: NA Improve Operational Efficiency: NA Enhance Water Supply: Yes, not quantified Improve Water Quality: Yes, not quantified Promote Resource Stewardship: Yes, not quantified Capital Cost: \$5k-\$10k/acre O&M Cost: TBD Consistent with Plan Docs: Yes

PROJECTS READY FOR PRIORITIZATION PROCESS

	Project Name	Partners	Related Projects	Description	Location	Benefits and Costs
Santa Clarita Valley Sanitation District (SCVSD) Sponsored Projects						
SCVSD-1	East Santa Clara River Wetlands and Recycled Water Project	City of Santa Clarita, NCWD, SCWD	NCWD-2 and SCWD 3 have been combined with SCVSD-1	The East Santa Clara River Wetlands and Recycled Water Project is a multi-phase project. Phase I is a feasibility study to investigate potential impacts that the discharge of recycled water in the eastern Santa Clara River would have on surface water and groundwater quality, as well as the creation/development of wetland and riparian habitat. The feasibility study would also identify potential recreational opportunities. A set of recommended project(s) would be developed for Phase II implementation. Phase II of the project would involve: (1) design and construction of a line to convey recycled water to the NCWD and SCWD service areas and to discharge recycled water to eastern Santa Clara River; and (2) construction of wetlands using recycled water which will also provide recreational opportunities (e.g., regional walking trails, cycling paths and green belts). Phase II of the project would be implemented after completion of the Phase I studies, assuming that a recommended set of project(s) are identified as feasibile.	Reach 7 portion of the Santa Clara River (bound by Lang gauging station and Bouquet Canyon Bridge), Santa Clarita, CA	Reduce Water Demand: Yes, not quantified Improve Operational Efficiency: NA Enhance Water Supply: Yes, not quantified Improve Water Quality: Yes, not quantified Promote Resource Stewardship: Yes, not quantified Capital Cost Phase I: $300k-$600k; Capital Cost Phase II: $10M-$20M O&M Cost: TBD Consistent with Plan Docs: Yes
SCVSD-2	Valencia and Saugus Water Reclamation Plants - Ultraviolet Disinfection System Facilities	CLWA	SCVSD-3, VWC-1, NCWD-1	The Saugus and Valencia Water Reclamation Plant UV Disinfection Facilities will reduce chloride loading from chloramination, preserve and expand the use of recycled water in the Upper Santa Clara River IRWMP Region, which is an important component of the Valley's water resources, and improve recycled water quality by reducing chloride levels and reducing the potential to generate disinfection byproducts, such as trihalomethanes and NDMA. The project will demonstrate the sequential use of free chlorine/UV disinfection as an alternative disinfection method to the current disinfection method utilizing chloramination.	Valencia Water Reclamation Plant and Saugus Water Reclamation Plant, Santa Clarita, CA	Reduce Water Demand: Yes, not quantified Improve Operational Efficiency: NA Enhance Water Supply: Up to 17,000 AFY Improve Water Quality: Yes, not quantified Promote Resource Stewardship: Yes, not quantified Capital Cost: $11.5M-$13.2M O&M Cost: $500k/yr Consistent with Plan Docs: unknown

SCVSD is listed as partner for the following projects:

CLWA-5: Customer Recycled Water Incentive Program

VWC-1: Water Quality Improvement Program

PROJECTS READY FOR PRIORITIZATION PROCESS

	Project Name	Partners	Related Projects	Description	Location	Benefits and Costs
Santa Clarita Valley Sanitation District (SCVSD) Sponsored Projects						
SCVSD-3	SCVSD Self-Regenerating Water Softeners (SRWS) Public Outreach and Rebate Program	City of Santa Clarita, CLWA	SCVSD-2, VWC-1, NCWD-1, Santa Clarita-2	Since 2003, the District has aggressively targeted voluntary removal of residential SRWS with a multi-pronged public education campaign and rebate program. However, it is unlikely that this program alone will accomplish the goal of removal of SRWS predating 2003 within the necessary time period. The District's goal is to reduce chloride in an environmentally-friendly, cost-effective and timely manner. The upgraded rebate program (the project) will offer homeowners reasonable value for SRWS units, as well as assistance with removal and disposal of the units, consistent with provisions of SB 475, which took effect January 1, 2007. The intent is to provide incentive to remove SRWS units expeditiously on a voluntary basis. Reasonable value for SRWS units will be based on the average retail value of units assuming a 12-year service life and straight-line depreciation. Following the effective date of an ordinance banning all existing water softener that implements the provisions of SB 475, assuming it passes in a referendum as required under SB 475, rebate amounts will be redu	SCVSD's service area	Reduce Water Demand: Yes, not quantified Improve Operational Efficiency: NA Enhance Water Supply: Up to 17,000 AFY Improve Water Quality: Yes, not quantified Promote Resource Stewardship: Yes, not quantified Capital Cost: $4.7M O&M Cost: NA Consistent with Plan Docs: unknown
Santa Clarita Water Division (SCWD) Sponsored Projects						
SCWD-2	Consolidation of Water Mutuals	California Department of Public Health (DPH)		This project would involve designing more efficient distribution systems within ten water mutuals and replacing existing distribution lines with new, current standard approved piping. Also, the master meter would be removed and every residence would be metered individually. This would ensure good water quality throughout these areas with routine water sampling and testing and system flushing. System pressure would be more consistently maintained throughout these areas so risk of contaminating backflow events would be reduced.	Ten separate locations east of Bouquet Canyon Road to just east of Sand Canyon Road on both north and south sides of Reach 7 of the Santa Clara River. Santa Clarita, CA	Reduce Water Demand: NA Improve Operational Efficiency: Yes, not quantified Enhance Water Supply: NA Improve Water Quality: Yes, not quantified Promote Resource Stewardship: NA Capital Cost: $1M-$5M O&M Cost: Unknown Consistent with Plan Docs: unknown

SCWD has been listed as a partner for the following projects:

CLWA-5: Customer Recycled Water Incentive Program

VWC-2: Provide Funding to Implement Innovative and Cost-Effective Water Conservation Programs

PROJECTS READY FOR PRIORITIZATION PROCESS

	Project Name	Partners	Related Projects	Description	Location	Benefits and Costs
Valencia Water Company (VWC) Sponsored Projects						
VWC-1	Water Quality Improvement Program	SCVSD, City of Santa Clarita	SCVSD-2, SCVSD-3, NCWD-1, SCWD-1	The proposed Water Quality Improvement Program is a demonstration project that employs pellet softening technology to reduce the concentration of calcium in water produced from an existing water supply well. The softened water will be delivered to approximately 430 existing homes. The objectives of the project are to confirm consumer acceptance of a centralized water softening system, measure region-wide environmental protections, evaluate economic benefits to customers and the community, and optimize the pellet softening treatment process. Pellet softening is the process of mineral extraction through precipitation. The system utilizes a cylindrical column with a sand bed. Hard water enters the bottom of the column and the pH is elevated using sodium hydroxide. The sand bed becomes fluidized and the calcium crystallizes around grains of sand - creating white spherical pellets of calcium carbonate. As the water passes through the column the pH is then reduced using carbon dioxide. As the pellets grow they are removed and can be reused in various industries such as steel, textile, and agriculture.	VWC Well No. 9, 25001 Decoro Drive Valencia, CA	Reduce Water Demand: Yes, not quantified Improve Operational Efficiency: Yes, not quantified Enhance Water Supply: Yes, not quantified Improve Water Quality: Yes, not quantified Promote Resource Stewardship: Yes, not quantified Capital Cost: \$1.3M-\$1.7M O&M Cost: \$170k/yr Consistent with Plan Docs: Yes
VWC-2	Implementation of Santa Clarita Valley Water Conservation Strategic Plan	NCWD, SCWD, LACWWD NO. 36, CLWA		Reducing the amount of imported water needed to meet the long term water supply needs of the Santa Clarita Valley is an important goal of the local water purveyors and offers important state-wide benefits. Although water conservation efforts have been on-going, the local water agencies recognize that more needs to be done to eliminate wasteful water use. Implementing conservation programs will require a sustained effort over many years. In order to efficiently organize a comprehensive plan, the water agencies have retained a consultant to prepare a Water Conservation Strategic Plan for the Santa Clarita Valley. The following elements are included in the plan: 1) Specify the conservation planning goals, 2) Develop a customer profile, 3) Develop means of measuring savings, 4) Identify water conservation measures, 5) Analyze costs and benefits, 6) Selection of conservation measures, and 7) Development of an implementation plan. Those programs and measures deemed to be cost-effective will be selected for implementation by the purveyors. The Plan is expected to be completed in early 2008.	Within CLWA service area, Santa Clarita & Unincorporated Los Angeles County, CA	Reduce Water Demand: Up to 13,000 AFY Improve Operational Efficiency: Yes, not quantified Enhance Water Supply: Up to 13,000 AFY Improve Water Quality: NA Promote Resource Stewardship: Yes, not quantified Capital Cost: \$1M-\$5M O&M Cost: TBD Consistent with Plan Docs: Yes

VWC has been listed as a partner for the following projects:

CLWA-5: Customer Recycled Water Incentive Program

PENDING PROJECTS

	Project Name	Partners	Related Projects	Description	Location	Benefits and Costs
City of Santa Clarita Sponsored Projects						
Santa Clarita-2	Water Quality Education Program	None listed	SCVSD-3, CHC-1	Provide coordinated, consistent and clear messages to the general public, youth, and other groups on protecting water quality in the River. Topics include chloride, nutrients, littering, dumping in the storm drain, integrated pest management, best management practices, Enviroscape, demonstration sites and other methods.	Santa Clarita Valley and watershed area	
Community Hiking Club Stewardship Committee (CHC) Sponsored Projects						
CHC-1	Trash Removal and Non-Native Removal in Tributaries to the Santa Clara River	Placerita Nature Center, Friends of the River, Friends of the Inyo, Mountains Recreation Conservation Authority (MRCA)	Santa Clarita-2	The first priority would be to map all invasives and accumulated trash. Although we currently have access to tools, new and updated tools would be desirable. The project will be organized by the Community Hiking Club under the direction of Dianne Erskine-Hellrigel who has organized all past stewardship events. The CHC Stewardship Director, Sylvia Altamirano will assist. Much of the labor force is volunteer, pooled from our membership of 1,200 community members. The organization of each project would be a full time occupation, with the actual clean up and eradication events occurring on the weekends when volunteers are available.	Project would include Placerita Canyon, Elsmere Canyon, Whitney Canyon, East/Rice Canyon, Towsley/Wiley Canyon, Pico Canyon	
Los Angeles County Department of Public Works (LACDPW) Sponsored Projects						
LACDPW-17	Hasley Canyon Road Watermain, Turnout Connection, and Pump Station	None listed		This project would construct a new turnout, pump station, and 6,900 feet of 16 inch transmission main. The proposed transmission main would run south along The Old Road for 1,100 feet, then run southwest along Hasley Canyon Road for 3,120 feet before branching off into two sections. One section will head in a northwest direction on Hasley Canyon Road for 2,120 ft. The other section will continue south for 530 feet to Industry Drive where the new transmission main will tie into an existing 12-inch water main. Also proposed is the construction of a new pump station along Hasley Canyon Road to boost pressure to District 1598 pressure zone.	LACWWD NO. 36, Val Verde. Along The Old Road, Hasley Canyon Road, and Industry Drive	
LACDPW-18	Replacement of 8-inch Water Main Along Del Valle Road	None listed		The proposed project is to replace 6,900 linear feet of aging 8 inch water main along Del Valle Road from Hasley Canyon Road to Chiquito Canyon Road with a 12 inch pipeline.	LACWWD NO. 36, Val Verde. Along Del Valle Road from Hasley Canyon Road to Chiquito Canyon Road	

PENDING PROJECTS

	Project Name	Partners	Related Projects	Description	Location	Benefits and Costs
Los Angeles County Department of Public Works (LACDPW) Sponsored Projects						
LACDPW-19	Crown Valley Water Main Replacement	None listed		This project proposes to install approximately 7000 linear feet of 16 inch steel water main to run parallel to the existing water main. The proposed new line would begin with approximately 300 feet along Corey Avenue, connected from Soledad Canyon Road to Crown Valley Road. The main would extend approximately 6700 feet northward along Crown Valley Road and Connect to the 33025 N. Crown Valley Pump Station.	LACWWD NO. 37, Acton. From 33025 N. Crown Valley to intersection with Soledad Canyon	
LACDPW-20	North Tank Pump Station	None listed		This project consists of constructing a new pump station near the intersection of Aliso Canyon and Soledad Canyon to reduce demand on the Crown Valley pump station. The main inlet into the Crown Valley pump station is undersized for the current flow. In addition to a new pump station, a segment of pipe would have to be constructed from the pump station along Soledad Canyon Road to the intersection with the 3483 pressure zone to direct the flow to the North Tank.	LACWWD NO. 37, Acton. Intersection of Soledad Canyon Road and Aliso Canyon Road	
Santa Clarita Organization for Planning and the Environment (SCOPE) Sponsored Projects						
SCOPE-1	Santa Clara River Floodplain Acquisition	Potential partners: LACFCD and or/ The Nature Conservancy	LACDPW-13, RMC-1	Provide flood control by leaving the flood plain in its natural state so that flood waters can spread. Project area would accommodate a recreational area and provide for natural bioremediation to clean urban runoff before it reaches the river. Potential to enhance groundwater recharge.	Any available floodplain lots of the Santa Clara River Eastern reaches from Bouquet Canyon Road to Aqua Dulce identified as acquisition habitat by The Nature Conservancy	
Unsponsored Projects Submitted						
SCOPE-2*	Upper Santa Clara River Recycled Water Sanitation Plant Expansion	Potential partners: SCVSD, LACFCD, Santa Monica Mountains Conservancy (SMMC), Water Agencies	CLWA-1, CLWA-5, SCVSD-2, NCWD-2	Build a small tertiary treatment sanitation facility in the Sand Canyon, Upper Santa Clara River watershed area to treat local residential effluent and then use the recycled water to recharge the upper watershed.	Santa Clara River floodplain north of Sand Canyon	

* This project was submitted by SCOPE, however there is currently no agency willing to sponsor at this time.