Attachment 7

Economic Analysis
Water Supply Costs and Benefits

Integrated Regional Water Management Implementation
Prop 84, Round 1

Santa Ana Watershed Project Authority

Santa Ana One Water One Watershed IRWM
Prop 84, Round 1 Implementation Proposal

Project (a) Groundwater Replenishment System - Flow Equalization

A. Water Supply Benefits:

Narrative description of the project's economic costs:

The initial capital construction costs include direct project administration, planning/design/engineering/environmental documentation, implementation of construction, environmental compliance/mitigation measures program, construction management, survey, materials testing, public outreach program, legal fees, and contingency of construction implementation. The operation and maintenance costs include electricity, replacement parts, labor and chemicals.

Cost details for the entire project using Table 11 and the information in Table 7:

See Table 11.

Estimates of without-project conditions; e.g. current and future water supplies and demand:

The estimates of without-project conditions reflect the current water supply scenario and operation mode of GWRS. The GWRS is currently facing the operational issue of diurnal flow variations of incoming secondary effluent and cannot achieve the optimum and ultimate production capacity. OCWD water production staff must adjust the operational mode of GWRS to accommodate the fluctuating flows throughout the day (in particular, the higher flows in the daytime) and produce as much recycled water as possible.

Estimates of with-project conditions; e.g. improvements in new water supplies made available to meet demand:

The estimates of with-project conditions reflect the creation of new water supplies in the amount of 12,000 acre-feet per year by the flow equalization tanks. These water supplies assist OCWD in the management of Orange County groundwater basin by increasing the recycled water production, assuring water supply reliability, reducing the water demands in the Orange County region, maximizing the annual sustainable yield of the groundwater basin, increasing groundwater recharge, and optimizing water transfer operations.

Description of methods used to estimate without- and with-project conditions:

The method used to estimate the with-project conditions is based on the detailed flow volume and equalization volume requirements throughout the OCSD's wastewater treatment plant and OCWD's GWRS. The calculations of average flow shortfall and surplus of secondary effluent yielded 15 million-gallons-per day, and the flow equalization tanks were developed based on these calculations. The method used to estimate the without-project conditions is based on the non-availability of flow equalization tanks and the continued operation of GWRS at fluctuating flows of incoming secondary effluent (i.e., diurnal flow variations).

Description of the distribution of local, regional, and statewide benefits:

This project creates a locally-controlled, reliable supply of high-quality water that is drought resistant; provides Orange County communities added assurance of sufficient water supplies to support regional economic vitality; protects Orange County's groundwater basin from seawater intrusion; decreases Southern California's dependency on imported water from the Sacramento-San Joaquin River Delta and the Colorado River; diversifies water supplies in Southern California by minimizing potential impacts associated with imported water supply reductions, natural disasters, climate change and droughts; and is consistent with the spirit of the California State Constitution by acknowledging the value of recycled water and the reasonable use of State's limited water supplies.

Identification of beneficiaries:

The water supply benefit in the Orange County groundwater basin from this project will benefit all groundwater producing agencies in north and central Orange County. OCWD's service area covers more than 350 square miles, providing groundwater supplies to more than 20 water agencies and cities in Orange County. Other Southern California agencies also benefit when one Orange County region lessens its dependency on imported water supplies. In summary, the reduced need to import water benefits the entire State of California.

When the benefits will be received:

The California Department of Public Health permit requirements specify that the GWRS water cannot reach drinking water wells for at least six months. Therefore, the water supply benefit will be received by the groundwater producing agencies in Orange County within the first year of operation. The allowable pumping will be set based on new additional water supplied by this project.

Uncertainty of Benefits:

OCWD has had historical success and extensive experience with the reuse of wastewater for nearly four decades. OCWD's first recycled water production facility, Water Factory 21, began operation in 1975. Recently, OCWD replaced Water Factory 21 with the state-of-the-art GWRS which began operation in 2008. Based on OCWD's successful operations of Water Factory 21 and the GWRS, OCWD is confident that it can achieve all the water supply benefits associated with the Flow Equalization Project without difficulty.

Description of any adverse effects:

Based on OCWD's track record and experience of successful water recycling operation for nearly four decades, OCWD is confident that there are no adverse effects of any kind.

Narrative discussion that describes, qualifies, and supports the values entered in the tables:

The construction implementation cost was developed by OCWD's design consultant and was summarized in the opinion of probable construction cost dated October 1, 2010. OCWD has extensive construction experience in water recycling projects and facilities. The costs of direct project administration, planning, engineering, construction management, environmental compliance and mitigation, survey, public outreach and construction contingencies were all based on OCWD's recent experience with six construction contracts associated with the GWRS (from 2002 to 2008). The operation and maintenance costs which included variable and fixed cost items were developed by OCWD's design consultant. The required equalization storage volume of 15 mgd was determined in the Flow Equalization Study with review and comments from OCWD and OCSD. Based on shortfall and surplus flows of secondary effluent, OCWD determined that the construction of two flow equalization tanks is needed to produce 12,000 acre-feet of recycled water per year.

If possible, quantified estimates of physical and economic benefits using Table 12, 13, and 14, as applicable. Table 12 is used to present physical and economic benefits. Table 13 is used for the benefits in an avoided cost of future projects. Table 14 is used if the benefit is estimated in some other way (i.e., not using a unit monetary value or an avoided cost):

[See Table 12]

Documentation to support information presented in the project, including studies, reports, and technical data, which will be used to assess the project's ability to produce the benefits claimed. Applicants may provide requested information for each project to help document the project, including using Table 11 through 14 on a project basis. However, the evaluation score will be determined based on the information provided for the project in its entirety:

OCWD has funded several studies and prepared the following documentations that were used to support the values entered in Tables 11 through 14 and the water supply and water quality benefits claimed for the Flow Equalization Project: OCWD's Groundwater Management Plan 2009 Update; Technical Memorandum Number 6 Flow Equalization Study; Technical Memorandum Number 11 - Secondary Effluent Flow Equalization Facilities; OCWD's Engineer's Report; Calculations of Diurnal and Equalization Volume; and the GWRS 2009 Annual Report.

If the project includes a suite of projects, describe the relationship of each project to the overall project costs and to the overall water supply benefits of the entire project:

See Attachment 3 Work plan for description.

Table 11- Annual Cost of Project
(All costs should be in 2009 Dollars)
Project (a) Groundwater Replenishment System - Flow Equalization (OCWD)

	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	$200,000	$0	$0	$0	$0	$0	$200,000	1.000	$200,000
2010	$357,000	$0	$0	$0	$0	$0	$357,000	0.943	$336,651
2011	$0	$0	$0	$0	$0	$0	$0	0.890	$0
2012	$3,000,000	$0	$0	$0	$0	$0	$3,000,000	0.840	$2,520,000
2013	$12,700,000	$0	$0	$0	$0	$0	$12,700,000	0.792	$10,058,400
2014	$12,690,964	$0	$89,595	$48,850	$8,600	$0	$12,838,009	0.747	$9,589,993
2015		$0	$179,190	$97,700	$17,200	$0	$294,090	0.705	$207,333
2016		$0	$179,190	$97,700	$17,200	$0	$294,090	0.665	$195,570
2017		$0	$179,190	$97,700	$17,200	$0	$294,090	0.627	$184,394
2018		$0	$179,190	$97,700	$17,200	$0	$294,090	0.592	$174,101
2019		$0	$179,190	$97,700	$17,200	$0	$294,090	0.558	$164,102
2020		$0	$179,190	$97,700	$17,200	$0	$294,090	0.527	$154,985
2021		$0	$179,190	$97,700	$17,200	$0	$294,090	0.497	$146,163
2022		$0	$179,190	$97,700	$17,200	$0	$294,090	0.469	$137,928
2023		$0	$179,190	$97,700	$17,200	$0	$294,090	0.442	$129,988
2024		$0	$179,190	$97,700	$17,200	$0	$294,090	0.417	$122,636
2025		$0	$179,190	$97,700	$17,200	$0	$294,090	0.394	$115,871
2026		$0	$179,190	$97,700	$17,200	$0	$294,090	0.371	$109,107
2027		$0	$179,190	$97,700	$17,200	$0	$294,090	0.350	$102,932
2028		$0	$179,190	$97,700	$17,200	$0	$294,090	0.331	$97,344
2029		$0	$179,190	$97,700	$17,200	$0	$294,090	0.312	$91,756
2030		$0	$179,190	$97,700	$17,200	$0	$294,090	0.294	$86,462
2031		$0	$179,190	$97,700	$17,200	$0	$294,090	0.278	$81,757
2032		$0	$179,190	$97,700	$17,200	$0	$294,090	0.262	$77,052
2033		$0	$179,190	$97,700	$17,200	$0	$294,090	0.247	$72,640
Total Present Value of Discounted Costs (Sum of Column (i)) Transfer to Table 20, column (c), Exhibit F: Proposal Costs and Benefits Summaries									$25,157,166

Comments: OCWD pays for the operation and maintenance (O&M) costs of any capital improvement project such as the Groundwater Replenishment System Flow Equalization through the revenue generated by the replenishment assessment (RA) payments from OCWD's member agencies (i.e., groundwater producers/users). Semiannually, OCWD collects RA payments from its member agencies that pump groundwater from OCWD's groundwater basin. Every fiscal year, OCWD budgets the O&M costs of each capital improvement project under the general fund. The O&M costs were developed by OCWD's design consultant based on the configuration of flow equalization tanks and the most suitable location at the treatment plant at 90% design completion. Specifically, two above-grade steel flow equalization tanks will be constructed at the staging area location. Please note that the construction of this project will be fully completed before the end of the first half of 2014. OCWD anticipates that the operation of this project will commence on July 1, 2014 (i.e., the second half of 2014) and the O&M costs for 2014 have been pro-rated to 50% of the annual O&M costs as indicated in this Table. Starting in 2015 and thereafter, this project will inccur 100% of the annual O&M costs as presented in this Table.

(1) The incremental change in O&M costs attributable to the project.

Table 12 - Annual Water Supply Benefits

(All benefits should be in 2009 dollars)

Project (a) Groundwater Replenishment System - Flow Equalization (OCWD)

(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	Recycled Water	acre feet of water per year (afy)			0	$597	$0	1.000	$0
	Groundwater Storage/Conjunctive Management	afy			0	$597	$0	1.000	$0
	Water Transfer & Operational Efficiency	afy			0	$597	$0	1.000	$0
	New Groundwater Recharge	afy			0	$597	$0	1.000	$0
2010	Recycled Water	acre feet of water per year (afy)			0	$680	$0	0.943	$0
	Groundwater Storage/Conjunctive Management	afy			0	$680	$0	0.943	$0
	Water Transfer & Operational Efficiency	afy			0	$680	$0	0.943	$0
	New Groundwater Recharge	afy			0	$680	$0	0.943	$0
2011	Recycled Water	acre feet of water per year (afy)			0	$722	$0	0.890	$0
	Groundwater Storage/Conjunctive Management	afy			0	$722	$0	0.890	$0
	Water Transfer & Operational Efficiency	afy			0	$722	$0	0.890	$0
	New Groundwater Recharge	afy			0	$722	$0	0.890	$0
2012	Recycled Water	acre feet of water per year (afy)			0	$770	$0	0.840	$0
	Groundwater Storage/Conjunctive Management	afy			0	$770	$0	0.840	$0
	Water Transfer & Operational Efficiency	afy			0	$770	$0	0.840	$0
	New Groundwater Recharge	afy			0	$770	$0	0.840	$0
2013	Recycled Water	acre feet of water per year (afy)			0	$808	$0	0.792	$0
	Groundwater Storage/Conjunctive Management	afy			0	$808	$0	0.792	$0
	Water Transfer & Operational Efficiency	afy			0	$808	$0	0.792	$0
	New Groundwater Recharge	afy			0	$808	$0	0.792	$0
2014	Recycled Water	acre feet of water per year (afy)	0	6000	6000	$851	$5,106,000	0.747	$3,814,182
	Groundwater Storage/Conjunctive Management	afy	0	6000	6000	$851	$5,106,000	0.747	$3,814,182
	Water Transfer & Operational Efficiency	afy	0	6000	6000	$851	$5,106,000	0.747	$3,814,182
	New Groundwater Recharge	afy	0	6000	6000	$851	$5,106,000	0.747	$3,814,182
2015	Recycled Water	acre feet of water per year (afy)	0	12000	12000	$892	$10,704,000	0.705	$7,546,320
	Groundwater Storage/Conjunctive Management	afy	0	12000	12000	$892	$10,704,000	0.705	$7,546,320
	Water Transfer & Operational Efficiency	afy	0	12000	12000	$892	$10,704,000	0.705	$7,546,320
	New Groundwater Recharge	afy	0	12000	12000	$892	$10,704,000	0.705	$7,546,320

Table 12 - Annual Water Supply Benefits (All benefits should be in 2009 dollars) Project (a) Groundwater Replenishment System - Flow Equalization (OCWD)									
(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)
2016	Recycled Water	acre feet of water per year (afy)	0	12000	12000	$941	$11,292,000	0.665	$7,509,180
	Groundwater Storage/Conjunctive Management	afy	0	12000	12000	$941	$11,292,000	0.665	$7,509,180
	Water Transfer & Operational Efficiency	afy	0	12000	12000	$941	$11,292,000	0.665	$7,509,180
	New Groundwater Recharge	afy	0	12000	12000	$941	$11,292,000	0.665	$7,509,180
2017	Recycled Water	acre feet of water per year (afy)	0	12000	12000	$992	$11,904,000	0.627	$7,463,808
	Groundwater Storage/Conjunctive Management	afy	0	12000	12000	$992	$11,904,000	0.627	$7,463,808
	Water Transfer & Operational Efficiency	afy	0	12000	12000	$992	$11,904,000	0.627	$7,463,808
	New Groundwater Recharge	afy	0	12000	12000	$992	$11,904,000	0.627	$7,463,808
2018	Recycled Water	acre feet of water per year (afy)	0	12000	12000	$1,047	$12,564,000	0.592	$7,437,888
	Groundwater Storage/Conjunctive Management	afy	0	12000	12000	$1,047	$12,564,000	0.592	$7,437,888
	Water Transfer & Operational Efficiency	afy	0	12000	12000	$1,047	$12,564,000	0.592	$7,437,888
	New Groundwater Recharge	afy	0	12000	12000	$1,047	$12,564,000	0.592	$7,437,888
2019	Recycled Water	acre feet of water per year (afy)	0	12000	12000	$1,112	$13,344,000	0.558	$7,445,952
	Groundwater Storage/Conjunctive Management	afy	0	12000	12000	$1,112	$13,344,000	0.558	$7,445,952
	Water Transfer & Operational Efficiency	afy	0	12000	12000	$1,112	$13,344,000	0.558	$7,445,952
	New Groundwater Recharge	afy	0	12000	12000	$1,112	$13,344,000	0.558	$7,445,952
2020	Recycled Water	acre feet of water per year (afy)	0	12000	12000	$1,178	$14,136,000	0.527	$7,449,672
	Groundwater Storage/Conjunctive Management	afy	0	12000	12000	$1,178	$14,136,000	0.527	$7,449,672
	Water Transfer & Operational Efficiency	afy	0	12000	12000	$1,178	$14,136,000	0.527	$7,449,672
	New Groundwater Recharge	afy	0	12000	12000	$1,178	$14,136,000	0.527	$7,449,672
2021	Recycled Water	acre feet of water per year (afy)	0	12000	12000	$1,248	$14,976,000	0.497	$7,443,072
	Groundwater Storage/Conjunctive Management	afy	0	12000	12000	$1,248	$14,976,000	0.497	$7,443,072
	Water Transfer & Operational Efficiency	afy	0	12000	12000	$1,248	$14,976,000	0.497	$7,443,072
	New Groundwater Recharge	afy	0	12000	12000	$1,248	$14,976,000	0.497	$7,443,072
2022	Recycled Water	acre feet of water per year (afy)	0	12000	12000	$1,323	$15,876,000	0.469	$7,445,844
	Groundwater Storage/Conjunctive Management	afy	0	12000	12000	$1,323	$15,876,000	0.469	$7,445,844
	Water Transfer & Operational Efficiency	afy	0	12000	12000	$1,323	$15,876,000	0.469	$7,445,844
	New Groundwater Recharge	afy	0	12000	12000	$1,323	$15,876,000	0.469	$7,445,844

Table 12 - Annual Water Supply Benefits
(All benefits should be in 2009 dollars)
Project (a) Groundwater Replenishment System - Flow Equalization (OCWD)

(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)
2023	Recycled Water	acre feet of water per year (afy)	0	12000	12000	$1,403	$16,836,000	0.442	$7,441,512
	Groundwater Storage/Conjunctive Management	afy	0	12000	12000	$1,403	$16,836,000	0.442	$7,441,512
	Water Transfer & Operational Efficiency	afy	0	12000	12000	$1,403	$16,836,000	0.442	$7,441,512
	New Groundwater Recharge	afy	0	12000	12000	$1,403	$16,836,000	0.442	$7,441,512
2024	Recycled Water	acre feet of water per year (afy)	0	12000	12000	$1,487	$17,844,000	0.417	$7,440,948
	Groundwater Storage/Conjunctive Management	afy	0	12000	12000	$1,487	$17,844,000	0.417	$7,440,948
	Water Transfer & Operational Efficiency	afy	0	12000	12000	$1,487	$17,844,000	0.417	$7,440,948
	New Groundwater Recharge	afy	0	12000	12000	$1,487	$17,844,000	0.417	$7,440,948
2025	Recycled Water	acre feet of water per year (afy)	0	12000	12000	$1,576	$18,912,000	0.394	$7,451,328
	Groundwater Storage/Conjunctive Management	afy	0	12000	12000	$1,576	$18,912,000	0.394	$7,451,328
	Water Transfer & Operational Efficiency	afy	0	12000	12000	$1,576	$18,912,000	0.394	$7,451,328
	New Groundwater Recharge	afy	0	12000	12000	$1,576	$18,912,000	0.394	$7,451,328
2026	Recycled Water	acre feet of water per year (afy)	0	12000	12000	$1,670	$20,040,000	0.371	$7,434,840
	Groundwater Storage/Conjunctive Management	afy	0	12000	12000	$1,670	$20,040,000	0.371	$7,434,840
	Water Transfer & Operational Efficiency	afy	0	12000	12000	$1,670	$20,040,000	0.371	$7,434,840
	New Groundwater Recharge	afy	0	12000	12000	$1,670	$20,040,000	0.371	$7,434,840
2027	Recycled Water	acre feet of water per year (afy)	0	12000	12000	$1,771	$21,252,000	0.350	$7,438,200
	Groundwater Storage/Conjunctive Management	afy	0	12000	12000	$1,771	$21,252,000	0.350	$7,438,200
	Water Transfer & Operational Efficiency	afy	0	12000	12000	$1,771	$21,252,000	0.350	$7,438,200
	New Groundwater Recharge	afy	0	12000	12000	$1,771	$21,252,000	0.350	$7,438,200
2028	Recycled Water	acre feet of water per year (afy)	0	12000	12000	$1,877	$22,524,000	0.331	$7,455,444
	Groundwater Storage/Conjunctive Management	afy	0	12000	12000	$1,877	$22,524,000	0.331	$7,455,444
	Water Transfer & Operational Efficiency	afy	0	12000	12000	$1,877	$22,524,000	0.331	$7,455,444
	New Groundwater Recharge	afy	0	12000	12000	$1,877	$22,524,000	0.331	$7,455,444
2029	Recycled Water	acre feet of water per year (afy)	0	12000	12000	$1,989	$23,868,000	0.312	$7,446,816
	Groundwater Storage/Conjunctive Management	afy	0	12000	12000	$1,989	$23,868,000	0.312	$7,446,816
	Water Transfer & Operational Efficiency	afy	0	12000	12000	$1,989	$23,868,000	0.312	$7,446,816
	New Groundwater Recharge	afy	0	12000	12000	$1,989	$23,868,000	0.312	$7,446,816

Table 12 - Annual Water Supply Benefits (All benefits should be in 2009 dollars) Project (a) Groundwater Replenishment System - Flow Equalization (OCWD)									
(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)
2030	Recycled Water	acre feet of water per year (afy)	0	12000	12000	$2,109	$25,308,000	0.294	$7,440,552
	Groundwater Storage/Conjunctive Management	afy	0	12000	12000	$2,109	$25,308,000	0.294	$7,440,552
	Water Transfer & Operational Efficiency	afy	0	12000	12000	$2,109	$25,308,000	0.294	$7,440,552
	New Groundwater Recharge	afy	0	12000	12000	$2,109	$25,308,000	0.294	$7,440,552
2031	Recycled Water	acre feet of water per year (afy)	0	12000	12000	$2,235	$26,820,000	0.278	$7,455,960
	Groundwater Storage/Conjunctive Management	afy	0	12000	12000	$2,235	$26,820,000	0.278	$7,455,960
	Water Transfer & Operational Efficiency	afy	0	12000	12000	$2,235	$26,820,000	0.278	$7,455,960
	New Groundwater Recharge	afy	0	12000	12000	$2,235	$26,820,000	0.278	$7,455,960
2032	Recycled Water	acre feet of water per year (afy)	0	12000	12000	$2,370	$28,440,000	0.262	$7,451,280
	Groundwater Storage/Conjunctive Management	afy	0	12000	12000	$2,370	$28,440,000	0.262	$7,451,280
	Water Transfer & Operational Efficiency	afy	0	12000	12000	$2,370	$28,440,000	0.262	$7,451,280
	New Groundwater Recharge	afy	0	12000	12000	$2,370	$28,440,000	0.262	$7,451,280
2033	Recycled Water	acre feet of water per year (afy)	0	12000	12000	$2,512	$30,144,000	0.247	$7,445,568
	Groundwater Storage/Conjunctive Management	afy	0	12000	12000	$2,512	$30,144,000	0.247	$7,445,568
	Water Transfer & Operational Efficiency	afy	0	12000	12000	$2,512	$30,144,000	0.247	$7,445,568
	New Groundwater Recharge	afy	0	12000	12000	$2,512	$30,144,000	0.247	$7,445,568
Total Present Value of Discounted Benefits Based on Unit Value (Sum of the values in Column (j) for all Benefits shown in table)									$581,833,464

Comments: No water supply benefits will occurr during design and construction of this project from 2009 to 2014 (before the end of first half of 2014). Water supply benefits will occurr starting with the first year of project operation which is scheduled to commence on July 1, 2014. The unit value in column (g) represents the Metropolitan Water District of Southern CA (MWD) Tier 1 uninterruptible full-service treated water rate. MWD rates for 2009 and 2010 are actual unit values based on water purchase invoices. Water rates for 2011 to 2020 have been provided by MWD's Chief Financial Officer at the 2010 Update of Long Range Finance Plan on October 4, 2010, and these rates exclude 3% inflation. MWD water rates for 2021 to 2033 are calculated values and include a nominal rate increase but exclude 3% inflation.

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

Table 15. Total Water Supply Benefits

(All benefits should be in 2009 dollars)

Project (a) Groundwater Replenishment System - Flow Equalization (OCWD)

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)
581833464	0	0	581833464

Comments: Detailed explanations and descriptions of water supply benefits are discussed in Attachment 7. The calculations of water supply benefits are summarized in Table 12.

Project (b) Sludge Dewatering, Odor Control, and Primary Sludge Thickening

The economic analysis for OCSD's Sludge Dewatering, Odor Control, and Primary Sludge Thickening Project at Plant No. 1, P1-101 project, encompasses the annual cost of the project, the water supply benefit of production of recycled water, the benefits of the avoided cost that would have constructed a booster pump station, appurtenances and pipeline conveyance system at OCSD's Plant No. 2 and the avoided cost of having to pump additional secondary effluent to the ocean outfall.

The annual cost of P1-101 is based on the capital investment that includes: administration, planning, engineering design, construction and environmental contingency, and operations and maintenance per year cost for the life of the project. The P1-101 project has been designed with a life of 50 years, during this time it is expected that some major equipment may need to be replaced or refurbished. In the year 2030, approximately 15 years after construction it is anticipated that the old Dissolved Air Floatation Thickeners (DAFT) and building M will need to be replaced and some major maintenance for some of the centrifuges and other DAFTs will be included. The approximate life of the equipment is approximately 20 years per the HDR Plant 1 Solids Treatment – Consensus Coordination Meeting Notes dated July 1, 2009, in 2050 it is anticipated that major refurbishing or maintenance of most equipment will be required as well as the potential for piping replacement.

Annual Cost of Project

The P1-101 project annual cost was prepared by HDR (consultant) and has been analyzed by OCSD, the methods and assumptions used are described below.

Full Cost of Construction
In developing the estimated capital costs, HDR attempted to capture the full cost of construction, including construction mark-ups, contingencies and design/construction soft costs. A consistent approach was used to develop the full cost of all system components.

For design/construction soft costs, HDR used a value of 33%, which OCSD has determined to be their average soft cost for construction projects. HDR did not vary this cost factor based on project size. For the P1- 101 facilities, the actual remaining soft cost in OCSD's project budget was used.

Un-inflated Dollars
All capital costs were developed in un-inflated 2009 dollars. Later they were escalated to the projected mid-point of construction as part of the life cycle cost analysis.

Unit Capital Costs
A key objective of the analysis was the development of representative unit capital costs for the various unit processes and facility components. For several of the processes, multiple approaches were used, including those listed below:

- **Cost estimating for historical OCSD projects using quantity take-offs and current unit prices.** This approach was used for the Plant 1 DAFTs, Digesters 11 through 16, and Building M. For these projects, HDR staff performed quantity takeoffs based on the design drawings and developed cost estimates using 2009 unit prices for materials and equipment. The estimates were adjusted to reflect changes in design requirements since the original projects, such as more stringent seismic requirements. They also were adjusted to include soft costs and appropriate contingencies.

- **Escalate actual costs for historical OCSD projects to 2009 dollars**. Costs were escalated using ENR cost indices for the Los Angeles area. They also were adjusted to reflect changes in design requirements since the original projects and to include contingencies and soft costs in the report. The soft costs were not included in the calculation of project cost through the application.
- **Similar reference projects**. HDR the consultant, obtained construction cost data from similar projects for Dissolved Air Floatation Thickeners (DAFT), digesters, Backflow Prevention (BFP) facilities and cake storage/loadout. These estimates were escalated to 2009 dollars and were adjusted to match requirements at the Plant 1 site, such as use of piles.
- **Project P-101 estimate**. The estimate in the P1-101 Preliminary Design Report (PDR) was used to determine capital costs for the centrifuge facility, odor control, tunnels and solids storage modifications.
- **Other OCSD studies and projects**. Cost estimates developed during the Long Range Biosolids Master Plan and Solids Thickening and Processing Upgrades at Plant No. 2 Project P2-89 were used as comparative values for selected for solids handling facilities.

All capital cost estimates were adjusted to include soft costs and appropriate contingencies. Detailed data is identified in appendix Q for the OCSD P1-101 – Plant 1 Solids Hauling Facilities Design Criteria Analysis and Process Configuration Confirmation Final Report, dated August 2010.

Capital Cost Assumptions

Other assumptions used in development of the capital cost estimates are listed below:

- All facilities will be replaced after 50 years of service
  - The older DAFTs and Building M would be replaced in 2030
  - No costs were included to replace the older digesters
- As part of the digester capacity expansion, the Digested Sludge Holding Tanks would be replaced with new, larger digesters
- Replace Building C in the Initial Expansion, if needed
  - Combine the Building C BFP capacity with new facility to house additional BFPs

Rehabilitation and Replacement Costs

Estimated costs are based on performing rehabilitation and replacement of equipment 20 years after the:

- Initial construction project
- Last rehabilitation project

These costs are based on replacing all major equipment and auxiliary systems.

Operation and Maintenance Costs

Labor
Labor costs for existing unit processes are based on OCSD Records for Plant 1 (2003 – 2008). The labor costs were adjusted to include OCSD's Indirect Cost Factor but do not include supervisory labor or allocated costs.

Labor costs for the P1-101 unit processes are based on the staff projections in the P1-101 PDR and the same labor rates used for the existing unit processes.

Energy
Energy demands for existing unit processes are based OCSD Records for Plant 1 (2003–2008).

Energy demands for thickening and dewatering centrifuges were based on Westfalia power draw curves for centrifuges. Energy demands for other P1-101 system components were developed based on the P1-101 Electrical Demand List.

All energy costs were based on a unit cost of $0.10 per kWh; however, a sensitivity analysis was run using $0.12 per kWh.

Materials
For existing unit processes, annual materials costs were estimated based on OCSD Records for Plant 1 (2003 – 2008).

For new unit process and systems, annual material costs were estimated based on 3% of the equipment costs.

Contracts
Specialty operations and maintenance costs for existing unit processes was based on OCSD records for Plant 1 (2003 – 2008).

Costs for digester cleaning were based on OCSD's most recent contracts for this activity, and costs for centrifuge maintenance were based on a survey of other centrifuge facilities with maintenance contracts.

Solids Hauling and Reuse
Figure 7-1 shows that OCSD's cost for biosolids hauling and reuse increased from $43 to $63 per wet ton between 2005 and 2008. A 2009 value of $70/wet ton was used in the analysis.

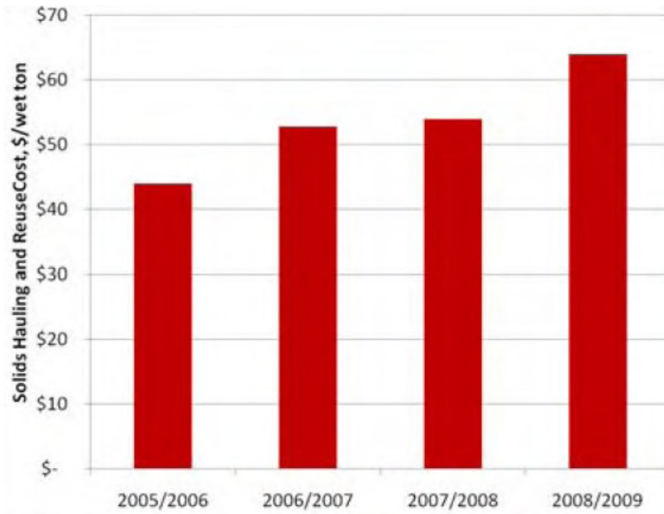


Figure 7-1 Cost of Solids Hauling and Reuse at OCSD

O&M

O&M costs were developed in un-inflated 2009 dollars for the years 2013, 2030 and 2070. A straight-line interpolation was used to determine O&M costs for intermediate years. O&M costs were escalated based on the year of their occurrence as part of the life cycle cost analysis.

The annual cost of the P1-101 project has been estimated at $4,500,000 for operations cost and approximately $1,500,000 for maintenance cost at 2009 dollars, based on the assumptions presented in Section 6.0 of OCSD P1-101 – Plant 1 Solids Hauling Facilities Design Criteria Analysis and Process Configuration Confirmation Final Report, pages 6-2 and 6-3.

The estimated total cost of the project is approximately $139,155,600 based on engineering fees for planning and design and the engineer's estimate of probable construction cost, as shown on Table 7, Attachment 4. The Original cost of the P1-101 Project is approximately $143,550,000 starting in 2003, to comply with the DWR guidelines and Proposal Solicitation Package instructions costs prior to September 30, 2008 have been removed from the total cost of the project as those costs are not reimbursable, in Table 7 Attachment 4 funding match amounts are eligible cost after September 30, 2008.

The total cost of the P1-101 Project, $139,115,600 was calculated in a yearly cost, then converted to 2009 $ equivalent as shown on Table 7-1. Calculation based on schedule start and end date is available upon request.

Year	Cost Per Year	Yearly Cost as Percent of Total Project Cost	Factor to Convert to 2009 $	2009 Cost Equivalent
2008	$281,000	0.2%	0	*$0
2009	$621,000	0.5%	1	$621,000

2010	$4,130,922	3.0%	0.943	$3,895,460
2011	$4,853,364	3.5%	0.89	$4,319,494
2012	$26,823,120	19.1%	0.84	$22,531,421
2013	$37,114,996	26.7%	0.792	$29,395,077
2014	$38,917,319	28.0%	0.747	$29,071,237
2015	$26,373,879	19.0%	0.705	$18,593,585
	$139,115,600			****$108,427,274**

* Cost incurred during 2008 is sunk cost

**Minor discrepancies due to rounding

Table 7-1 P1-101 Cash Flow Breakdown

The cost of the project is equal to $108,427,274 in 2009 dollars as shown on table 11. The Total Present Value of Discounted Costs of the project has been calculated to be approximately $213,736,067, in 2009 dollars equivalent, for the expected 50 year life.

Water Supply

With Orange County's population projected to keep increasing, Southern California is facing future water supply shortages as current supplies are dwindling. Climatic changes within the region are also resulting in droughts, which is reducing natural water replenishment. P1-101 will provide a reliable local source of water.

Orange County Water District (OCWD) recently updated a Long –Term Facilities Plan (LTFP) in which water supply issues and trends were presented. Total water demands are projected to increase from approximately 480,000 afy to 558,000 afy in 2035 as shown in figure 7-2. The demands are divided up based on the various water supply sources available within the OCSD service area. The OCWD and OCSD boundaries are almost identical and therefore the water needs in the service areas can be considered to be the same. Water needs within the OCWD boundaries are met primarily with a combination of groundwater, imported water, and recycled water. Groundwater pumping or production from the basin has been the major source of supply for areas within the basin. In order to sustain production from the basin, without over drafting the basin and cause adverse impacts, such as increased seawater intrusion or subsidence, water must be recharged back into the basin.

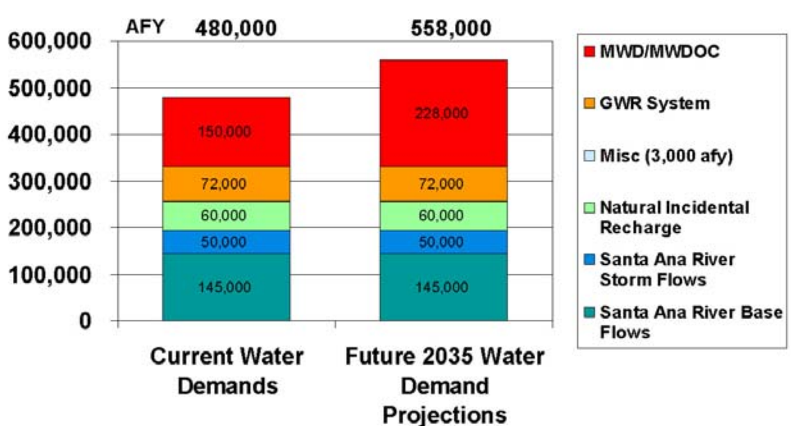


Figure 7-2 Current and Future Demands Within the OCWD/OCSD Service Area

The supply sources listed in Figure 7-2 include Santa Ana River baseflow, Santa Ana River stormflow, imported supplies, natural incidental recharge, GWRS, and a small amount of miscellaneous supplies. Santa Ana River baseflow is primarily comprised of tertiary-treated wastewater discharges from wastewater treatment facilities upstream of Prado Dam. Santa Ana River baseflows are expected to remain about the same in the future. Baseflows could increase in the future due to potential growth in the Santa Ana River watershed. However this is expected to be offset by agencies reusing this source of water as imported supplies become less available and more expensive. The amount of stormflow available for recharge varies significantly from year to year due to the amount of precipitation in the watershed. As Figure 2 indicates, expected increasing water demands will force the OCWD service territory to become more dependent upon imported water supplies which may or may not be available in the future.

Imported supplies are purchased from Metropolitan Water District of Southern California (MWD) and MWDOC. MWD supplies primarily come from the Colorado River and the State Water Project. An almost decade long drought in the Colorado River watershed, along with increases in water demands in the Southwest, has reduced these supplies. Reduced snowpack and precipitation within the state have reduced State Water Project supplies. In addition, environmental restrictions on pumping from the California Bay-Delta system have significantly reduced these supplies. Significant factors which will affect the current OCWD water supply situation include:

- Below normal precipitation in the Santa Ana River Watershed for the last three years;
- The lack of MWD supplemental replenishment water since April 2007;
- MWD may allocate imported water supplies in the next one to two years, which could further increase demands on the basin;
- The anticipated lack of supplemental replenishment water through at least 2011; and
- A potential lag of three to five years before MWD can provide reliable information regarding when supplemental replenishment water is available.

Because of these factors, annual groundwater production and the level of storage in the basin have declined since 2006. Additionally, the potential to refill the basin with supplemental imported replenishment water, as has occurred in the past, is not a reliable option. It is likely that the amount of production from the basin will need to be further reduced in response to the below normal precipitation in the Santa Ana River Watershed and the lack of supplemental replenishment water.

Water supply information is based on the Orange County Water District's "Initial Expansion of the Groundwater Replenishment System Engineer's Report," dated August 2010.

Without the Project
Without this Project, OCSD would be unable to treat the additional solids at their Plant No. 1 facilities. Flows would be diverted to OCSD Plant No. 2 for solids treatment, where the source water or secondary effluent is non-reclaimable and would be discharged to the Pacific Ocean. The secondary effluent can only be reclaimed through OCSD Plant No. 1 facilities, since it has the existing physical facilities to convey the source water by gravity flow next door to the OCWD facilities, unlike, Plant No. 2. Plant No. 2 is not equipped with the physical structures to pump flow from Plant 2 to Plant No. 1.

With the Project

The P1-101 project includes the construction of sludge dewatering facilities to treat the additional sludge produced from new activated sludge wastewater treatment processes and an odor control system. The secondary upgrades will increase the amount of treated wastewater by approximately 38,000 afy that will be available as source water for GWRS to produce approximately 30,000 afy of additional recycled water to be used for reclamation. Ultimately, the implementation of secondary treatment upgrades will improve water quality and maintain the coastal environment within the region.

Methods used to determine without and with project conditions

The current conditions (without a project) and future conditions (with project) of OCSD's service area are studied in order to prepare the strategic plan updates. In order to ascertain the priority of capital improvements at OCSD a variety of studies are conducted for each project such as a feasibility study, conceptual alternatives, cost estimates, and program schedule. The long-term Capital Improvements Program requirements are determined through comprehensive planning efforts undertaken every seven to ten years. The Facilities Master Plan was updated in 2009 to determine the future needs of OCSD through the year 2030.

Distribution of local, regional and statewide benefits

The additional source of water produced by P1-101 that will be treated by GWRS for the production of recycled water will be used to replenish the Orange County Groundwater Basin that serves the north and central portion of Orange County.

The additional local source of water will aid the region by minimizing the amount of imported water to the region. It will also assist in achieving some of the goals established in the One Water, One Watershed (OWOW) 2009 Santa Ana Integrated Watershed Plan, An Integrated Regional Water Management Plan, Section 6.0, Table 6-1, Page 4 of 9 (attached).

- Provide reliable water supply
- Preserve and enhance the environment
- Promote sustainable water solutions
- Ensure high quality water for all users

The state will benefit by the reduction of greenhouse gas emission and help the state achieve the Climate Change Action Plan which has set a goal of reducing emissions levels to 1990 levels by 2020 and 80% below those levels by 2050, Climate Change Proposed Scoping Plan, October 2008 page ES-2.

The CALFED Bay-Delta Program objectives has established the Water Use Efficiency Program with a three-pronged approach through conservation, desalination and recycling was created in 2000 with the signing of the CALFED Record of Decision, as described on the CALFED website http://calwater.ca.gov/calfed/objectives/Water_Supply_Reliability.html. This program seeks to reduce the mismatch between Delta water supplies, and current and projected beneficial uses dependent upon the Bay-Delta system. The P1-101 Project will contribute to the attainment the water supply objectives by increasing recycled water production.

Identification of Beneficiaries
The direct beneficiaries of the benefit from the construction of P1-101 will be the north and central Orange County Residents in the OCSD and OCWD service area.

When the benefits will be received
The project has a completion date of 2015, it is expected that benefits will begin as soon as the project is completed.

Uncertainty of the benefits
The P1-101 project does not have foreseeable uncertainty of benefits. The additional source water to be provided to the GWRS will produce additional recycled water, and since the technology and the water quality parameters are in accord with the Regional Water Quality Control Board (RWQCB) and the GWRS permit, the water quality is known.

OCSD administers a permit program through the Source Control Division to provide a means for protecting the public and environment through the regulation of industrial discharges. The permit program limits the discharge of specific pollutants from industrial facilities and maintains the water quality of the influent at the district. Compliance with the OCSD's NPDES permit as it relates to wastewater discharge involves a number of programs to assure that the effluent discharged to the ocean meets the limits established by the Environmental Protection Agency (EPA). These activities include pretreatment programs that keep industrial and non-industrial sources out of the water stream, frequent monitoring of influent and effluent for conventional, non-conventional, and priority pollutants, and provisions of reports of monitoring results in monthly, quarterly, and annual reports.

Description of adverse effects
The P1-101 project does not have any foreseeable adverse effects, by minimizing the amount of secondary effluent released to the ocean the project will help maintain the coastal environment. The recycled water produced by GWRS can provide better water quality than Metropolitan Water District import to the region from the Colorado River and is treated at the Robert B. Diemer Plant in Yorba Linda, GWRS produces water with a lower TDS levels. The project will generate power which will reduce the current demand on the energy grid and will reduce greenhouse gas emissions.

Annual Water Supply Benefits

As production increases out of the GWRS, it is important to consider where the water will be recharged. It is estimated that the maximum amount the Talbert Injection Barrier can inject is approximately 42 mgd depending on barrier conditions. Current GWRS flow provides sufficient water to satisfy the needs of the Talbert Injection Barrier. Excess flows from the current GWRS are recharged at Kraemer and Miller Basins in Anaheim, after the Talbert Injection Barrier needs are satisfied. The amount the injection barrier can accommodate will vary seasonally, with injection rates generally lower in the winter time when groundwater levels are higher. Table 1 lists estimates on where the GWRS water can be delivered. It is listed in two periods based on current operations and the GWRS Initial Expansion in 2012.

Based on average hydrology, during non-flood season Kraemer and Miller Basins will be able to handle the excess flow generated from the GWRS and its expansion. While Kraemer Basin has typically not been the primary recharge basin to be used to recharge stormflows, there will be periods that stormflows will be available to recharge. In these periods, Kraemer Basin can recharge a mixture of stormflow and GWRS water. Because there is excess capacity within Kraemer Basin even while recharging GWRS water, excess stormflows can be accommodated as well. It is currently being operated in this manner. However, if there is wetter than average year, the GWRS's production can be ramped down so that the basins can capture the additional stormflows. GWRS operational costs would be reduced for the short term as chemical and power consumption would decrease.

GWRS water has extremely low turbidity, essentially no suspended solids, and very low organic carbon concentrations. Due to the high quality, the recharge basins maintain a high percolation rates when recharged only with GWRS water. Although Kraemer and Miller Basins will often have excess capacity that could be used to recharge the GWRS Initial Expansion water, it would be advantageous to recharge the additional flows by other means. It is anticipated that GWRS water can be injected through wells or recharged through horizontal subsurface systems with minimal clogging. Santa Ana River water has a much higher sediment load compared to GWRS water and it is not practical to recharge Santa Ana River water through injection wells or subsurface recharge systems without some type of additional treatment. Surface recharge basins, like Kraemer and Miller, and the Santa Ana River channel bottom are the District's only methods for recharging Santa Ana River water. Since the GWRS water should be ideal for subsurface recharge, and surface recharge basins are the District's primary method of recharging Santa Ana River water, it would be desirable to minimize GWRS flows ultimately send to Kraemer/Miller. (See Attachment 7-D)

As the GWRS is creating new water supplies, it is reducing the amount of MWD Tier II treated water that must be purchased by the Producers. Currently, 10,000 to 30,000 afy of MWD Tier II water is being purchased. This amount will increase with projected increasing water demands and/or with a lower future Basin Production Percentage. Untreated Tier II MWD supplies are estimated to cost $806/af in 2012. Purchasing this water is a viable future option to assist the District in raising the Basin Production Percentage and allowing the Producers to avoid the treatment surcharge portion of the MWD rate structure. The cost of this water is estimated to be very similar to the cost of the GWRS Expansion cost assuming $20 million in grants are received for the project. Both options could be implemented in the future. The GWRS Expansion would be a higher ranked option for the following reasons:

- You are creating more reliable local water supplies;
- The water supply has a lower total dissolved solids concentration to benefit the groundwater basin;
- GWRS supplies are drought proof;
- If imported water supplies are allocated by MWD; OCWD could then be limited to only purchasing up to about 7,000 afy of this water without paying possibly much higher penalty rates.

The P1-101 project will create a local source of water, reducing the dependency on imported water. P1-101 will treat approximately 38,000 afy of wastewater, which will be the source water to the Groundwater Replenishment System (GWRS) to produce approximately 31,000 afy of recycled water that will be used to replenish the Orange County groundwater basin. The 31,000 afy of recycled water produced from local source water will reduce the amount of Treated Tier 1 water purchased from Metropolitan Water District (MWD) of Southern California. The cost of Treated Tier 1 water is presented in Figure 7-3, information obtained from the "Long Range Finance Plan 2010 Updated Rates" presentation to member agencies dated October 4, 2010, page 4 of 5 and found in the Long Range Finance Plan of The MWD website http://www.mwdh2o.com/mwdh2o/pages/finance/finance04.htm.

Long-Term Estimated Rate Increases
(Based On Existing COS Method)

Rates and Charges Effective January 1 ($/AF)	2010*	2011	2012	2013	2014	2015	2016	2017	2017	2019	2020
Untreated Full Service											
Tier 1	$484	$527	$560	$580	$605	$633	$674	$715	$758	$808	$857
Tier 2	$594	$652	$686	$716	$748	$782	$827	$872	$917	$963	$1,009
Untreated Repl.	$366	$409	$442	$462	$487	$515	$556	$597	$640	$690	$739
Untreated Ag.*	$416	$482	$537								
Treated Full Service											
Tier 1	$701	$744	$794	$833	$877	$920	$970	$1,023	$1,079	$1,146	$1,214
Tier 2	$811	$869	$920	$969	$1,020	$1,069	$1,123	$1,180	$1,238	$1,301	$1,366
Treated Repl.	$558	$601	$651	$690	$734	$777	$827	$880	$936	$1,003	$1,071
Treated Ag.**	$615	$687	$765								
Untreated Whlg	$314	$372	$396	$416	$437	$460	$494	$527	$560	$594	$627

* Most rates effective September 1, 2009.
** The Interim Agricultural Water Program will be discontinued after 2012.

CFO Group October 4, 2010 8

Figure 7-3 MWD Long Range Finance Plan Updated Rates

MWD has projected the cost of Treated Tier 1 water to cost approximately $920 per acre-feet in 2015, there is a projected increase in price for the imported of 5 percent through 2017 and an increase to 6 percent starting in 2018 through 2020, since the life of the P1-101 project is approximately 50 years the cost of water from MWD has been projected at a constant increase of 6 percent per year, based on Figure 7-3 Long Range Plan presentation on October 4, 2010. A Consumer Price Index of 3percent per year has been assumed to account for Orange County's cost of living increase. The 3 percent CPI has subtracted from the water price increase for calculations on Table 12. The increase in the cost to purchase water shown on Table 12 is 2 percent from 2015 to 2017, a three percent increase per year was assumed to start in 2018 and last through the life of the project.

Orange County Water District has projected the cost of recycled water produced by GWRS will cost approximately $580 by the year 2015 based on the GWRS Expansion presentation included in the Orange County Water District, Board Agenda dated October 20, 2010, page 168 of 210 pdf file.

The water supply benefit to Orange County Basin within the Santa Ana River Region is the difference in cost of imported water to production cost of the recycled water, which $340 per acre-ft ($920 - $580 = $340). The total yearly savings in 2015 is estimated to be $10.5 million ($10.5 million × 0.705 factor to convert from 2015 to 2009 value = $7.4).

Table 12 shows the savings from the cost of purchasing MWD water vs. the cost of GWRS to produce recycled water to recharge the groundwater for the 50 year life of P1-101 project with a Total Present Value of Discounted Costs Benefits of $139,693,532.

Annual Cost of Avoided Projects

The Santa Ana Watershed Project Authority (SAWPA) owns either capacity rights in, or owns outright approximately 93 miles of 16-inch to 84-inch pipeline referred to as the Santa Ana Regional Interceptor (SARI). SAWPA is conducting a Planning Study for the SARI reaches upstream of the Orange County Sanitation District (OCSD) service area. These upstream segments are referred to as Reaches IV, IV-A, IV-B, IV-D, IV-E, and V, shown in Figure 7-4, from SAWPA's Phase 3 SARI Operations Technical Memorandum, available upon request.

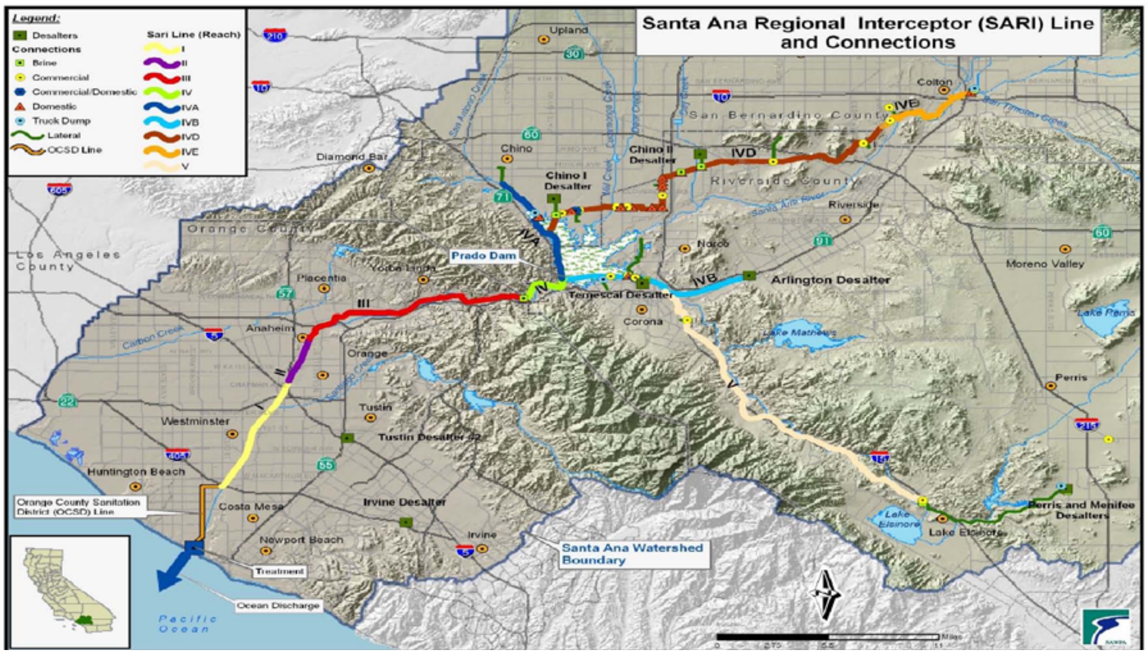


Figure 7-4 SARI Line Map

The Santa Ana River Interceptor (SARI) Line is a regional brine line designed to convey 30 million gallons per day (MGD) of non-reclaimable wastewater from the upper Santa Ana River basin to the ocean for disposal, after treatment. The non-reclaimable wastewater consists of desalter concentrate and industrial wastewater. Domestic wastewater also is received on a temporary basis.

The SARI System is intended to provide a cost-effective, sustainable means of disposal of non-reclaimable wastes for utilities and industry within the Santa Ana Watershed. The highest and best use of the SARI System is the removal of salts from the watershed to keep them from degrading water quality within the watershed, thereby allowing better use of groundwater resources and expanding the ability to reclaim water. The long-term goal of achieving salt balance within the region depends on the ability to remove salts from the watershed via the SARI System. Further use of desalters depends on an economical means of salt disposal and ultimately will depend on an economically viable regional SARI System.

Orange County Sanitation District conducted a preliminary evaluation of the construction of a diversion for the SARI line and a secondary effluent pump station at Plant No. 2 to provide effluent to GWRS, during the Strategic Plan Update in 2002, available upon request. The SARI diversion at Plant No. 2 would be required due to the water quality of the brine in the line it cannot be used for reclamation and must be directed to the ocean outfall and would require a diversion to treat the SARI which would include separate headworks and primary treatment. The effluent from Plant No. 2 that has the adequate water quality to be used for reclamation would be treated and then pumped to GWRS as source water, a separate pipeline to convey the secondary effluent would be required.

The cost of the diversion and booster pump station at Plant No. 2 and pipelines conveyance system was estimated to be approximately $260 million based on the OCSD Strategic Plan Update in 2002, as stated in page 3-31. The cost for the project was updated in 2007, due to increased construction costs, to approximately $380 million with an approximate 7 percent per year escalation cost. The cost used for the calculations in table 13 was based on the average of the options studied for the strategic plan. Option 1 was for a pump stations with 40 mgd capacity and Option 2 was a pump station with 75 mgd capacity, a pump of 55 mgd capacity would be more suitable for comparison. The update value to convert the cost from 2007 to 2009 dollar is 1.04, $380,000,000 × 1.04 = $395,200,000).

The maintenance and operations of this project was estimated to be approximately 2 percent of project cost, which would equal approximately $7.9 million a year. EPA's Standard Operation and Maintenance Cost Factor Breakdown on Table 11-2 of the "Cost of Treatment Technologies," states that cost of maintenance is approximately 4 percent of Total Capital Cost. The capital cost for the avoided project is large, a 2 percent for O&M was considered to be conservative. The cost of maintenance and operations includes maintenance of pipelines, pumps and cost to power the pumps, it also includes maintenance of a separate headwork facility and associated appurtenances for the SARI line. A straight percentage assumption based on an industry standard was used for the avoided cost project.

The replacement costs is based on a project constructed in Miami-Dade County Florida that includes maintenance for pumps of a 50 mgd capacity, was estimated at approximately $15 million dollars after 15 years of operation, (MDWASD Reuse Feasibility Updated, dated April 2007).

Table 13 shows the costs of the avoided SARI diversion and Plant No. 2 Booster Pump Station Project for the 50 year life, with a Total Present Value of Discounted Costs equal to $450,182,503.

Annual Other Water Supply Benefits

The P1-101 project will also avoid sending additional effluent from Plant No. 2 to the ocean outfall. One additional qualitative benefit, not being quantified for this project but worth noting, is that the project will aid to maintain the coastal and beaches environment by avoiding additional effluent disposal to the ocean.

The P1-101 project will avoid additional pumping to the ocean outfall, which would require the consumption of additional energy to operate the pumps transporting effluent to the ocean outfall. Based on the OCSD's power model for fiscal year 2009-2010 the cost to send the effluent to the ocean outfall was approximately $1,764,358 and the amount of effluent discharged to the ocean was an average of approximately 151 mgd, the cost per MG is approximately $32 ($1,764,358 / (151 mgd × 365 days) = $32.01/MG). The cost is approximately $30.19 ($32.01/MG × 0.943 = $30.19/MG) when cost is converted to 2009 dollars.

The cost savings from avoiding the pumping of additional effluent to the ocean outfall is approximately, $372,300 per year ($30/MG × 34 mgd × 365 days = $372,300). It is projected that Total Present Value of Discounted Benefits Based on Unit Value, throughout the life of the project, is approximately $4,426,050, as presented in table 14.

Total Water Supply Benefits

The P1-101 project total water supply benefits are summarized in table 15 with a Total Present Value of Discounted Benefits is equal to $454,608,554 ($450,182,503 + $4,426,050), this total was obtained by adding the Total Discounted Avoided Project Costs and the Other Discounted Water Supply Benefits, please note that there are some minor rounding discrepancies throughout the tables. The Discounted Avoided Project Cost was selected for table 15 because it has the largest impact on OCSD's rate payers and OCSD's ability to minimize fees and sewer rates increases.

Table 11- Annual Cost of Project (All costs should be in 2009 Dollars) Project (b) Sludge Dewatering, Odor Control, and Primary Sludge Thickening (OCSD)									
	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	$621,000						$621,000	1.000	$621,000
2010	$3,895,460						$3,895,460	0.943	$3,674,962
2011	$4,319,494						$4,319,494	0.890	$3,844,334
2012	$22,531,421						$22,531,421	0.840	$18,917,816
2013	$29,395,077						$29,395,077	0.792	$23,283,654
2014	$29,071,237						$29,071,237	0.747	$21,723,719
2015	$18,593,585						$18,593,585	0.705	$13,107,744
2016			$4,500,000	$1,500,000			$6,000,000	0.665	$3,990,343
2017			$4,500,000	$1,500,000			$6,000,000	0.627	$3,764,474
2018			$4,500,000	$1,500,000			$6,000,000	0.592	$3,551,391
2019			$4,500,000	$1,500,000			$6,000,000	0.558	$3,350,369
2020			$4,500,000	$1,500,000			$6,000,000	0.527	$3,160,725
2021			$4,500,000	$1,500,000			$6,000,000	0.497	$2,981,816
2022			$4,500,000	$1,500,000			$6,000,000	0.469	$2,813,034
2023			$4,500,000	$1,500,000			$6,000,000	0.442	$2,653,806
2024			$4,500,000	$1,500,000			$6,000,000	0.417	$2,503,590
2025			$4,500,000	$1,500,000			$6,000,000	0.394	$2,361,878
2026			$4,500,000	$1,500,000			$6,000,000	0.371	$2,228,187
2027			$4,500,000	$1,500,000			$6,000,000	0.350	$2,102,063
2028			$4,500,000	$1,500,000			$6,000,000	0.331	$1,983,078
2029			$4,500,000	$1,500,000			$6,000,000	0.312	$1,870,828
2030			$4,500,000	$1,500,000	$115,000,000		$121,000,000	0.294	$35,592,804
2031			$4,500,000	$1,500,000			$6,000,000	0.278	$1,665,031
2032			$4,500,000	$1,500,000			$6,000,000	0.262	$1,570,784
2033			$4,500,000	$1,500,000			$6,000,000	0.247	$1,481,871
2034			$4,500,000	$1,500,000			$6,000,000	0.233	$1,397,992
2035			$4,500,000	$1,500,000			$6,000,000	0.220	$1,318,860
2036			$4,500,000	$1,500,000			$6,000,000	0.207	$1,244,208
2037			$4,500,000	$1,500,000			$6,000,000	0.196	$1,173,781
2038			$4,500,000	$1,500,000			$6,000,000	0.185	$1,107,340
2039			$4,500,000	$1,500,000			$6,000,000	0.174	$1,044,661
2040			$4,500,000	$1,500,000			$6,000,000	0.164	$985,529
2041			$4,500,000	$1,500,000			$6,000,000	0.155	$929,744
2042			$4,500,000	$1,500,000			$6,000,000	0.146	$877,117
2043			$4,500,000	$1,500,000			$6,000,000	0.138	$827,469
2044			$4,500,000	$1,500,000			$6,000,000	0.130	$780,631
2045			$4,500,000	$1,500,000			$6,000,000	0.123	$736,445
2046			$4,500,000	$1,500,000			$6,000,000	0.116	$694,759
2047			$4,500,000	$1,500,000			$6,000,000	0.109	$655,433
2048			$4,500,000	$1,500,000			$6,000,000	0.103	$618,333
2049			$4,500,000	$1,500,000			$6,000,000	0.097	$583,333
2050			$4,500,000	$1,500,000	$306,000,000		$312,000,000	0.092	$28,616,342
2051			$4,500,000	$1,500,000			$6,000,000	0.087	$519,164
2052			$4,500,000	$1,500,000			$6,000,000	0.082	$489,778
2053			$4,500,000	$1,500,000			$6,000,000	0.077	$462,054
2054			$4,500,000	$1,500,000			$6,000,000	0.073	$435,900
2055			$4,500,000	$1,500,000			$6,000,000	0.069	$411,227
2056			$4,500,000	$1,500,000			$6,000,000	0.065	$387,950
2057			$4,500,000	$1,500,000			$6,000,000	0.061	$365,990
2058			$4,500,000	$1,500,000			$6,000,000	0.058	$345,274
2059			$4,500,000	$1,500,000			$6,000,000	0.054	$325,730
2060			$4,500,000	$1,500,000			$6,000,000	0.051	$307,293
2061			$4,500,000	$1,500,000			$6,000,000	0.048	$289,899
2062			$4,500,000	$1,500,000			$6,000,000	0.046	$273,489
2063			$4,500,000	$1,500,000			$6,000,000	0.043	$258,009
2064			$4,500,000	$1,500,000			$6,000,000	0.041	$243,405
2065			$4,500,000	$1,500,000			$6,000,000	0.038	$229,627
Project Life	$108,427,274		$225,000,000	$75,000,000	$421,000,000	$0	$829,427,274		
Total Present Value of Discounted Costs (Sum of Column (i)) Transfer to Table 20, column (c), Exhibit F: Proposal Costs and Benefits Summaries									$213,736,067

Comments: Total cost of project is $139,115,600 (from Table 7), converted to 2009 equivalent = $108,708,274 - $281,000 of sunk cost for 2008 = $108,427,274
Operational cost of the project is estimated to be $4.5 million annually starting begining in 2015 (2009 dollar equivalent), maintenance cost are estimated at $1.5 million in 2015 (2009 dollar equivalent). It is anticiapted that 15 years after the completion of the project (year 2030) the old DAFTs and building M will need to be replaced). In the year 2050 it is anticipated that refurbishing or major maintenance of daft, centrifuges and potential piping replacement may be required.

(1) The incremental change in O&M costs attributable to the project.

Table 12 - Annual Water Supply Benefits
(All benefits should be in 2009 dollars)
Project (b) Sludge Dewatering, Odor Control, and Primary Sludge Thickening (OCSD)

(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)
2015	Recycled water	Acrefeet Per Yr	0	31000	31000	$240	$7,430,700	0.705	$5,238,644
2016	Recycled water	Acrefeet Per Yr	0	31000	31000	$244	$7,579,314	0.665	$5,040,959
2017	Recycled water	Acrefeet Per Yr	0	31000	31000	$249	$7,730,900	0.627	$4,850,734
2018	Recycled water	Acrefeet Per Yr	0	31000	31000	$257	$7,962,827	0.592	$4,713,449
2019	Recycled water	Acrefeet Per Yr	0	31000	31000	$265	$8,201,712	0.558	$4,580,050
2020	Recycled water	Acrefeet Per Yr	0	31000	31000	$273	$8,447,763	0.527	$4,450,426
2021	Recycled water	Acrefeet Per Yr	0	31000	31000	$281	$8,701,196	0.497	$4,324,470
2022	Recycled water	Acrefeet Per Yr	0	31000	31000	$289	$8,962,232	0.469	$4,202,079
2023	Recycled water	Acrefeet Per Yr	0	31000	31000	$298	$9,231,099	0.442	$4,083,153
2024	Recycled water	Acrefeet Per Yr	0	31000	31000	$307	$9,508,032	0.417	$3,967,592
2025	Recycled water	Acrefeet Per Yr	0	31000	31000	$316	$9,793,273	0.394	$3,855,301
2026	Recycled water	Acrefeet Per Yr	0	31000	31000	$325	$10,087,071	0.371	$3,746,189
2027	Recycled water	Acrefeet Per Yr	0	31000	31000	$335	$10,389,684	0.350	$3,640,165
2028	Recycled water	Acrefeet Per Yr	0	31000	31000	$345	$10,701,374	0.331	$3,537,141
2029	Recycled water	Acrefeet Per Yr	0	31000	31000	$356	$11,022,415	0.312	$3,437,034
2030	Recycled water	Acrefeet Per Yr	0	31000	31000	$366	$11,353,088	0.294	$3,339,759
2031	Recycled water	Acrefeet Per Yr	0	31000	31000	$377	$11,693,680	0.278	$3,245,238
2032	Recycled water	Acrefeet Per Yr	0	31000	31000	$389	$12,044,491	0.262	$3,153,391
2033	Recycled water	Acrefeet Per Yr	0	31000	31000	$400	$12,405,825	0.247	$3,064,144
2034	Recycled water	Acrefeet Per Yr	0	31000	31000	$412	$12,778,000	0.233	$2,977,423
2035	Recycled water	Acrefeet Per Yr	0	31000	31000	$425	$13,161,340	0.220	$2,893,157
2036	Recycled water	Acrefeet Per Yr	0	31000	31000	$437	$13,556,180	0.207	$2,811,275
2037	Recycled water	Acrefeet Per Yr	0	31000	31000	$450	$13,962,866	0.196	$2,731,710
2038	Recycled water	Acrefeet Per Yr	0	31000	31000	$464	$14,381,752	0.185	$2,654,398
2039	Recycled water	Acrefeet Per Yr	0	31000	31000	$478	$14,813,204	0.174	$2,579,273
2040	Recycled water	Acrefeet Per Yr	0	31000	31000	$492	$15,257,601	0.164	$2,506,275
2041	Recycled water	Acrefeet Per Yr	0	31000	31000	$507	$15,715,329	0.155	$2,435,343
2042	Recycled water	Acrefeet Per Yr	0	31000	31000	$522	$16,186,788	0.146	$2,366,418
2043	Recycled water	Acrefeet Per Yr	0	31000	31000	$538	$16,672,392	0.138	$2,299,444
2044	Recycled water	Acrefeet Per Yr	0	31000	31000	$554	$17,172,564	0.130	$2,234,365
2045	Recycled water	Acrefeet Per Yr	0	31000	31000	$571	$17,687,741	0.123	$2,171,128
2046	Recycled water	Acrefeet Per Yr	0	31000	31000	$588	$18,218,373	0.116	$2,109,681
2047	Recycled water	Acrefeet Per Yr	0	31000	31000	$605	$18,764,924	0.109	$2,049,973
2048	Recycled water	Acrefeet Per Yr	0	31000	31000	$623	$19,327,872	0.103	$1,991,955
2049	Recycled water	Acrefeet Per Yr	0	31000	31000	$642	$19,907,708	0.097	$1,935,579
2050	Recycled water	Acrefeet Per Yr	0	31000	31000	$661	$20,504,939	0.092	$1,880,799
2051	Recycled water	Acrefeet Per Yr	0	31000	31000	$681	$21,120,087	0.087	$1,827,569
2052	Recycled water	Acrefeet Per Yr	0	31000	31000	$702	$21,753,690	0.082	$1,775,845
2053	Recycled water	Acrefeet Per Yr	0	31000	31000	$723	$22,406,301	0.077	$1,725,585
2054	Recycled water	Acrefeet Per Yr	0	31000	31000	$744	$23,078,490	0.073	$1,676,748
2055	Recycled water	Acrefeet Per Yr	0	31000	31000	$767	$23,770,844	0.069	$1,629,293
2056	Recycled water	Acrefeet Per Yr	0	31000	31000	$790	$24,483,970	0.065	$1,583,181
2057	Recycled water	Acrefeet Per Yr	0	31000	31000	$813	$25,218,489	0.061	$1,538,374
2058	Recycled water	Acrefeet Per Yr	0	31000	31000	$838	$25,975,044	0.058	$1,494,835
2059	Recycled water	Acrefeet Per Yr	0	31000	31000	$863	$26,754,295	0.054	$1,452,528
2060	Recycled water	Acrefeet Per Yr	0	31000	31000	$889	$27,556,924	0.051	$1,411,419
2061	Recycled water	Acrefeet Per Yr	0	31000	31000	$916	$28,383,631	0.048	$1,371,473
2062	Recycled water	Acrefeet Per Yr	0	31000	31000	$943	$29,235,140	0.046	$1,332,658
2063	Recycled water	Acrefeet Per Yr	0	31000	31000	$971	$30,112,195	0.043	$1,294,941
2064	Recycled water	Acrefeet Per Yr	0	31000	31000	$1,001	$31,015,560	0.041	$1,258,292
2065	Recycled water	Acrefeet Per Yr	0	31000	31000	$1,031	$31,946,027	0.038	$1,222,680
							$854,126,939		
								Total Present Value of Discounted Costs Benefits Based on Unit Value	$139,693,532

Comments: *Recycled water benefit calculated by the following assumptions: the cost of Treated Full Service Tier I water provided by MWD projected to cost $920 per acre-feet in 2015 and the cost of recycled water production by GWRS is projected to cost $580 per acre-feet in 2015. A benefit increase of 2% for years 2015 to 2017 due to 5% MWD water rate increase minus the 3% Orange County CPI. A benefit increase of 3% per year has been included based on MWD water rate increase of 6% each year starting in 2018 minus the Orange County CPI increase of approximately of 3% every year.

Table 13 - Annual Costs of Avoided Projects

(All avoided costs should be in 2009 dollars)

Project (b) Sludge Dewatering, Odor Control, and Primary Sludge Thickening (OCSD)

	Costs				**Discounting Calculations**	
(a)	**(b)**	**(c)**	**(d)**	**(e)**	**(f)**	**(g)**
YEAR	Alternative (Avoided Project Name): SARI Diversion and Plant No. 2 Booster Pump Station				Discount Factor	Discounted Costs (e) x (f)
	Avoided Project Description: SARI diversion through Plant No. 2 and Booster Pump Station for secondary effluent pumping from Plant No. 2 to GWRS					
	Avoided Capital Costs	Avoided Replacement Costs	Avoided Operations and Maintenance Costs	Total Cost Avoided for Individual Alternatives (b) + (c) + (d)		
2009	39520000			39520000	1.000	$39,520,000
2010	59280000			59280000	0.943	$55,901,040
2011	158080000			158080000	0.899	$142,113,920
2012	79040000			79040000	0.839	$66,314,560
2013	39520000			39520000	0.792	$31,280,453
2014	19760000			19760000	0.747	$14,754,931
2015			7900000	7900000	0.704	$5,565,081
2016			7900000	7900000	0.665	$5,250,076
2017			7900000	7900000	0.627	$4,952,902
2018			7900000	7900000	0.591	$4,672,549
2019			7900000	7900000	0.558	$4,408,065
2020			7900000	7900000	0.526	$4,158,552
2021			7900000	7900000	0.497	$3,923,162
2022			7900000	7900000	0.468	$3,701,096
2023			7900000	7900000	0.442	$3,491,600
2024			7900000	7900000	0.417	$3,293,963
2025			7900000	7900000	0.393	$3,107,512
2026			7900000	7900000	0.371	$2,931,615
2027			7900000	7900000	0.350	$2,765,675
2028			7900000	7900000	0.330	$2,609,127
2029			7900000	7900000	0.312	$2,461,441
2030		15000000	7900000	22900000	0.294	$6,731,190
2031			7900000	7900000	0.277	$2,190,673
2032			7900000	7900000	0.262	$2,066,673
2033			7900000	7900000	0.247	$1,949,691
2034			7900000	7900000	0.233	$1,839,332
2035			7900000	7900000	0.220	$1,735,218
2036			7900000	7900000	0.207	$1,636,999
2037			7900000	7900000	0.195	$1,544,338
2038			7900000	7900000	0.184	$1,456,923
2039			7900000	7900000	0.174	$1,374,456
2040			7900000	7900000	0.164	$1,296,656
2041			7900000	7900000	0.155	$1,223,261
2042			7900000	7900000	0.146	$1,154,019
2043			7900000	7900000	0.138	$1,088,698
2044			7900000	7900000	0.130	$1,027,073
2045		15000000	7900000	22900000	0.123	$2,808,691
2046			7900000	7900000	0.116	$914,091
2047			7900000	7900000	0.109	$862,350
2048			7900000	7900000	0.103	$813,538
2049			7900000	7900000	0.097	$767,489
2050			7900000	7900000	0.092	$724,046
2051			7900000	7900000	0.086	$683,062
2052			7900000	7900000	0.082	$644,398
2053			7900000	7900000	0.077	$607,923
2054			7900000	7900000	0.073	$573,512
2055			7900000	7900000	0.068	$541,049
2056			7900000	7900000	0.065	$510,424
2057			7900000	7900000	0.061	$481,532
2058			7900000	7900000	0.058	$454,275
2059			7900000	7900000	0.054	$428,562

Table 13 - Annual Costs of Avoided Projects

(All avoided costs should be in 2009 dollars)

Project (b) Sludge Dewatering, Odor Control, and Primary Sludge Thickening (OCSD)

	Costs				**Discounting Calculations**	
(a)	**(b)**	**(c)**	**(d)**	**(e)**	**(f)**	**(g)**
YEAR	Alternative (Avoided Project Name): SARI Diversion and Plant No. 2 Booster Pump Station				Discount Factor	Discounted Costs (e) x (f)
	Avoided Project Description: SARI diversion through Plant No. 2 and Booster Pump Station for secondary effluent pumping from Plant No. 2 to GWRS					
	Avoided Capital Costs	Avoided Replacement Costs	Avoided Operations and Maintenance Costs	Total Cost Avoided for Individual Alternatives (b) + (c) + (d)		
2060		15000000	7900000	22900000	0.051	$1,171,968
2061			7900000	7900000	0.048	$381,418
2062			7900000	7900000	0.046	$359,829
2063			7900000	7900000	0.043	$339,461
2064			7900000	7900000	0.041	$320,246
2065			7900000	7900000	0.038	$302,119
Project Life	395200000	45000000	402900000	843100000	…	
Total Present Value of Discounted Costs (Sum of Column (g))						$450,182,503
(%) Avoided Cost Claimed by Project						100%
Total Present Value of Discounted Avoided Project Costs Claimed by alternative Project (Total Present Value of Discounted Costs x % Avoided Cost Claimed by Project)						$450,182,503

Comments: The cost of the avoided project total $380 million in 2007 = $395 million 2009 dollars.
The replacement cost is based on a similar magnitude project that was constructed in Miami-Dade County Florida, where pumps with approximate 40 mgd capacity needed major maintenance or replacement every 15 years with estimated cost of $15 million.
The operations and maintenance cost is estimate to be approximately 2% of the total cost of the project, based on 4% recommended by EPA for maintenance cost; due to the large scale of the project 2% was assumed to be conservative for the O&M cost.

Table 14 - Annual Other Water Supply Benefits (All benefits should be in 2009 dollars) Project (b) Sludge Dewatering, Odor Control, and Primary Sludge Thickening (OCSD)					
(a)	(b)	(c)	(d)	(e)	(f)
Year	Type of Benefit	Description of Benefit	Annual Benefits ($) (1)	Discount Factor (1)	Discounted Benefits (d) x (e) (1)
2015	a	Avoided pumping of additional wastewater to the ocean outfall	$372,300	0.705	$262,472
2016	a	Avoided pumping of additional wastewater to the ocean outfall	$372,300	0.665	$247,615
2017	a	Avoided pumping of additional wastewater to the ocean outfall	$372,300	0.627	$233,599
2018	a	Avoided pumping of additional wastewater to the ocean outfall	$372,300	0.592	$220,376
2019	a	Avoided pumping of additional wastewater to the ocean outfall	$372,300	0.558	$207,902
2020	a	Avoided pumping of additional wastewater to the ocean outfall	$372,300	0.527	$196,134
2021	a	Avoided pumping of additional wastewater to the ocean outfall	$372,300	0.497	$185,032
2022	a	Avoided pumping of additional wastewater to the ocean outfall	$372,300	0.469	$174,559
2023	a	Avoided pumping of additional wastewater to the ocean outfall	$372,300	0.442	$164,678
2024	a	Avoided pumping of additional wastewater to the ocean outfall	$372,300	0.417	$155,356
2025	a	Avoided pumping of additional wastewater to the ocean outfall	$372,300	0.394	$146,563
2026	a	Avoided pumping of additional wastewater to the ocean outfall	$372,300	0.371	$138,267
2027	a	Avoided pumping of additional wastewater to the ocean outfall	$372,300	0.350	$130,440
2028	a	Avoided pumping of additional wastewater to the ocean outfall	$372,300	0.331	$123,057
2029	a	Avoided pumping of additional wastewater to the ocean outfall	$372,300	0.312	$116,091
2030	a	Avoided pumping of additional wastewater to the ocean outfall	$372,300	0.294	$109,520
2031	a	Avoided pumping of additional wastewater to the ocean outfall	$372,300	0.278	$103,321
2032	a	Avoided pumping of additional wastewater to the ocean outfall	$372,300	0.262	$97,473
2033	a	Avoided pumping of additional wastewater to the ocean outfall	$372,300	0.247	$91,955
2034	a	Avoided pumping of additional wastewater to the ocean outfall	$372,300	0.233	$86,750
2035	a	Avoided pumping of additional wastewater to the ocean outfall	$372,300	0.220	$81,840
2036	a	Avoided pumping of additional wastewater to the ocean outfall	$372,300	0.207	$77,207
2037	a	Avoided pumping of additional wastewater to the ocean outfall	$372,300	0.196	$72,837
2038	a	Avoided pumping of additional wastewater to the ocean outfall	$372,300	0.185	$68,714
2039	a	Avoided pumping of additional wastewater to the ocean outfall	$372,300	0.174	$64,825
2040	a	Avoided pumping of additional wastewater to the ocean outfall	$372,300	0.164	$61,156
2041	a	Avoided pumping of additional wastewater to the ocean outfall	$372,300	0.155	$57,694
2042	a	Avoided pumping of additional wastewater to the ocean outfall	$372,300	0.146	$54,428
2043	a	Avoided pumping of additional wastewater to the ocean outfall	$372,300	0.138	$51,347
2044	a	Avoided pumping of additional wastewater to the ocean outfall	$372,300	0.130	$48,441
2045	a	Avoided pumping of additional wastewater to the ocean outfall	$372,300	0.123	$45,699
2046	a	Avoided pumping of additional wastewater to the ocean outfall	$372,300	0.116	$43,112
2047	a	Avoided pumping of additional wastewater to the ocean outfall	$372,300	0.109	$40,672
2048	a	Avoided pumping of additional wastewater to the ocean outfall	$372,300	0.103	$38,370
2049	a	Avoided pumping of additional wastewater to the ocean outfall	$372,300	0.097	$36,198
2050	a	Avoided pumping of additional wastewater to the ocean outfall	$372,300	0.092	$34,149
2051	a	Avoided pumping of additional wastewater to the ocean outfall	$372,300	0.087	$32,216
2052	a	Avoided pumping of additional wastewater to the ocean outfall	$372,300	0.082	$30,392
2053	a	Avoided pumping of additional wastewater to the ocean outfall	$372,300	0.077	$28,672
2054	a	Avoided pumping of additional wastewater to the ocean outfall	$372,300	0.073	$27,049
2055	a	Avoided pumping of additional wastewater to the ocean outfall	$372,300	0.069	$25,518
2056	a	Avoided pumping of additional wastewater to the ocean outfall	$372,300	0.065	$24,074
2057	a	Avoided pumping of additional wastewater to the ocean outfall	$372,300	0.061	$22,711
2058	a	Avoided pumping of additional wastewater to the ocean outfall	$372,300	0.058	$21,425
2059	a	Avoided pumping of additional wastewater to the ocean outfall	$372,300	0.054	$20,213
2060	a	Avoided pumping of additional wastewater to the ocean outfall	$372,300	0.051	$19,069
2061	a	Avoided pumping of additional wastewater to the ocean outfall	$372,300	0.048	$17,989
2062	a	Avoided pumping of additional wastewater to the ocean outfall	$372,300	0.065	$24,200
2063	a	Avoided pumping of additional wastewater to the ocean outfall	$372,300	0.061	$22,710
2064	a	Avoided pumping of additional wastewater to the ocean outfall	$372,300	0.058	$21,593
2065	a	Avoided pumping of additional wastewater to the ocean outfall	$372,300	0.055	$20,371
Project Life				…	
Total Present Value of Discounted Benefits Based on Unit Value (Sum of the values in Column (f) for all Benefits shown in table)					$4,426,050
Comments: The pumping costs based on OCSD'S Power Model and meter records for 2009-2010, which makes the cost of pumping approximately $32/MG, discounted to 2009 dollars the pumping cost is approximately $30/MG. The additional wastewater that would be pumped to the ocean is approximately 34 MGD					

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

Table 15. Total Water Supply Benefits (All benefits should be in 2009 dollars)			
Project (b) Sludge Dewatering, Odor Control, and Primary Sludge Thickening (OCSD)			
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)
139693532.3	450182503.5	4426050.486	454608554
Comments: Total Discounted Water Supply Benefits plus Other Discounted Water supply Benefits are being added in column (d)			

P1-101 Cost Breakdown Calculations
Based on Task Start and End Dates

	Cost	2008	2009	2010	2011	2012	2013	2014	2015	
FACTOR FOR 2009 $ equivalent			1	0.943	0.89	0.84	0.792	0.747	0.705	percentage assumed
(a) Direct Project Administration Costs 22296.0 $4,000,000 18-Aug-03 A 19-Jul-16										
3010 Project Management - Development 0.0 $0 18-Aug-03 A 03-Feb-05 A										
3011 Project Management - Development 0.0 $0 18-Aug-03 A 04-Mar-05										
3020 Project Technical Support - Development 0.0 $0 18-Aug-03 A 04-Feb-05 A										
3031 Feasibility Study #1 0.0 $0 08-Sep-03 A 26-May-04 A										
3032 Feasibility Study #2 - Belt Press Test 0.0 $0 21-May-07 A 16-May-08 A										
3110 Project Management - Preliminary Design 687.0 $120,000 01-Mar-04 A 18-Sep-09	$120,000	$36,000	$84,000							
3120 Project Technical Support - Preliminary Design 4285.9 $750,000 22-Apr-05 A 30-Nov-09	$750,000	$225,000	$525,000							
3170 Consultant Selection - Preliminary Design 0.0 $0 01-Mar-04 A 23-Jun-05										
3180 Facility Records & Database Updates - Preliminary Design 12.0 $2,000 01-Mar-04 A 30-Nov-09 A	$2,000		$2,000							
3210 Project Management - Design 4083.5 $714,552 24-Dec-09 A 24-Apr-12	$714,552			$214,366	$285,821	$214,366				30-40-30
3220 Project Technical Support - Design 7314.2 $1,280,000 22-Jan-10 A 24-Apr-12	$1,280,000			$384,000	$512,000	$384,000				30-40-30
3259 District Design Reviews - Design 2499.0 $437,302 08-Jun-10 A 04-Nov-11	$437,302				$218,651	$218,651				50-50
3270 Facility Records & Database Updates - Design 240.0 $30,000 24-Dec-09 A 21-Nov-11	$30,000				$15,000	$15,000				50-50
3273 Construction Bid and Award 0.0 $75,000 22-Nov-11 03-Apr-12	$75,000					$37,500	$37,500			50-50
3310 Project Management - Construction 2887.5 $481,146 24-Apr-12 23-Jun-15	$481,146					$96,229	$144,344	$144,344	$96,229	20-30-30-20
3410 Project Management - Commissioning 0.0 $70,000 21-Feb-14 23-Jun-15	$70,000							$42,000	$70,000	60-40
3510 Project Management - Close-Out 287.0 $40,000 22-Jun-15 19-Jul-16	$40,000								$40,000	
	$4,000,000									
(b) Land Purchase/Easement 0.0 $0 01-Nov-10 01-Nov-10										
. Land Purchases/Easements are not applicable to this project 0.0 $0 01-Nov-10 01-Nov-10			$0	$0	$0	$0	$0	$0	$0	
(c) Planning/Design/Engineering/Environmental Documentation 0.0 $7,565,600 18-Aug-03 A 23-Jun-15										
3000 Project Development 0.0 $0 18-Aug-03 A 12-Jan-05 A										
3100 Preliminary Design 0.0 $0 22-Apr-05 A 13-Sep-05 A										
3141 Engineering Study #1 0.0 $50,000 21-Jun-05 A 20-Nov-08 A	$50,000	$5,000								
3143 New Equipment Studies/Testing 0.0 $25,000 23-Aug-05 A 01-Apr-09 A	$25,000	$15,000	$10,000							60-40
3146 Preliminary Design Report 0.0 $0 30-Aug-07 A 30-Nov-09 A										
3200 Design 0.0 $2,618 24-Dec-09 A 31-Aug-10 A	$2,618			$2,618						
3250 Consultant Services - Design 0.0 $1,589,260 24-Dec-09 A 21-Nov-11	$1,589,260				$953,556	$635,704				60-40
3251 Design Submittal 1 0.0 $1,018,941 24-Dec-09 A 29-Jul-10 A	$1,018,941			$1,018,941						
3252 Design Submittal 2 0.0 $407,497 08-Jul-10 A 25-Feb-11	$407,497			$325,998	$81,499					80-20
3253 Design Submittal 3 0.0 $1,686,837 01-Mar-11 30-Dec-11	$1,686,837				$1,686,837					
3254 Bid Support Services and Solicitation 0.0 $559,920 22-Nov-11 02-Apr-12	$559,920					$559,920				
3258 CEQA/NEPA Environmental Documentation 0.0 $200,000 24-Dec-09 A 24-Apr-12	$200,000			$80,000	$80,000	$40,000				40-40-20
3299 EPA Funding 09/29/09 to 03/31/01 - Project Financing 0.0 $2,025,000 01-Nov-10 01-Nov-10	$2,025,000			$2,025,000						
3300 Construction & Installation 0.0 $527 24-Apr-12 23-Jun-15	$527						$527			
	$7,565,073									
(d) Construction/Implementation 0.0 $102,000,000 07-Dec-10 04-Aug-15										
3360 Contractor Work - Construction 0.0 $100,000,000 24-Apr-12 04-Aug-15	$102,000,000					$20,400,000	$30,600,000	$30,600,000	$20,400,000	20-30-30-20
3460 Contractor Work - Submittals/Test Reports/Warranty/Testing/Commissioning 0.0 $750,000 21-Feb-14 23-Jun-	$750,000							$450,000	$300,000	60-40
3480 Proposition 84 Funding - Project Financing 0.0 $1,000,000 07-Dec-10* 01-Jun-11	$1,000,000				$1,000,000					
3560 Contractor Work - Close-Out 0.0 $250,000 22-Jun-15 21-Jul-15	$250,000								$250,000	
	$104,000,000									
(e) Environmental Compliance/Mitigation/Enhancement 1344.0 $200,000 24-Apr-12 23-Jun-15										
3358 CEQA/NEPA Environmental Compliance/Mitigation/Enhancement 1344.0 $200,000 24-Apr-12 23-Jun-15	$200,000					$40,000	$60,000	$60,000	$40,000	20-30-30-20
(f) Construction Administration 69933.0 $13,000,000 24-Apr-12 18-Jan-16										

P1-101 Cost Breakdown Calculations
Based on Task Start and End Dates

3320 Project Technical Support - Construction 37368.0 $3,431,750 24-Apr-12 23-Jun-15	$3,434,750					$686,950	$1,030,425	$1,030,425	$686,950		20-30-30-20	
3321 PCI Support - Construction 5238.0 $625,000 24-Apr-12 23-Jun-15	$625,000					$125,000	$187,500	$187,500	$125,000		20-30-30-20	
3350 Consultant Services - Construction 0.0 $4,000,000 24-Apr-12 23-Jun-15	$4,000,000					$800,000	$1,200,000	$1,200,000	$800,000		20-30-30-20	
3362 Inspection - Construction 18041.0 $2,175,000 24-Apr-12 23-Jun-15	$2,175,000					$435,000	$652,500	$652,500	$435,000		20-30-30-20	
3363 Testing 0.0 $400,000 24-Apr-12 23-Jun-15	$400,000					$80,000	$120,000	$120,000	$80,000		20-30-30-20	
3370 Facility Record & Database Updates - Construction 200.0 $24,000 24-Apr-12 23-Jun-15	$24,000					$4,800	$7,200	$7,200	$4,800		20-30-30-20	
3420 Project Technical Support - Commissioning 2450.0 $615,000 21-Feb-14 23-Jun-15	$615,000							$369,000	$246,000		60-40	
3421 PCI Support - Commissioning 2000.0 $240,000 21-Feb-14 23-Jun-15	$240,000							$144,000	$96,000		60-40	
3422 O&M Training - Commissioning 800.0 $100,000 21-Feb-14 23-Jun-15	$100,000							$60,000	$40,000		60-40	
3450 Consultant Services - Commissioning 0.0 $992,250 21-Feb-14 23-Jun-15	$992,250							$595,350	$396,900		60-40	
3462 Inspection - Commissioning 2496.0 $300,000 21-Feb-14 23-Jun-15	$300,000							$180,000	$120,000		60-40	
3520 Project Technical Support - Close-Out 1024.0 $60,000 22-Jun-15 18-Jan-16	$60,000								$60,000			
3570 Facility Record & Database Updates - Close-Out 316.0 $37,000 22-Jun-15 18-Jan-16	$37,000								$37,000			
	$13,003,000											
(g) Legal Costs 0.0 $250,000 08-Jul-10 A 23-Jun-15												
3290 Legal Costs Including Permit Acquisitions (Phases 1 2 & 3) 0.0 $100,000 08-Jul-10 A 21-Nov-11	$100,000			$80,000	$20,000						80-20	
3390 Legal Costs (Phases 4 5 & 6) 0.0 $150,000 24-Apr-12 23-Jun-15	$150,000					$30,000	$45,000	$45,000	$30,000		20-30-30-20	
	$250,000											
(h) Construction/Implementation Contingency 0.0 $10,100,000 24-Apr-12 15-Sep-15												
3600 Construction/Implementation Contingency 0.0 $10,100,000 24-Apr-12 15-Sep-15	$10,100,000					$2,020,000	$3,030,000	$3,030,000	$2,020,000		20-30-30-20	
ADJUSTED COST		$281,000	$621,000	$3,895,460	$4,319,494	$22,531,421	$29,395,077	$29,071,237	$18,593,585			$108,708,273
		0.26%	0.57%	3.58%	3.97%	20.73%	27.04%	26.74%	17.10%	100.00%		$108,427,273
		0.25%	0.60%	3.60%	4.00%	20.75%	27.00%	26.80%	17.00%	100.00%		
Back-check		$281,000	$621,000	$4,130,922	$4,853,364	$26,823,120	$37,114,996	$38,917,319	$26,373,879			$139,115,600
		0.20%	0.45%	2.97%	3.49%	19.28%	26.68%	27.97%	18.96%	100.00%		
		0.20%	0.50%	3.00%	3.50%	19.10%	26.70%	28.00%	19.00%	100.00%		

Long Range Finance Plan 2010 Update

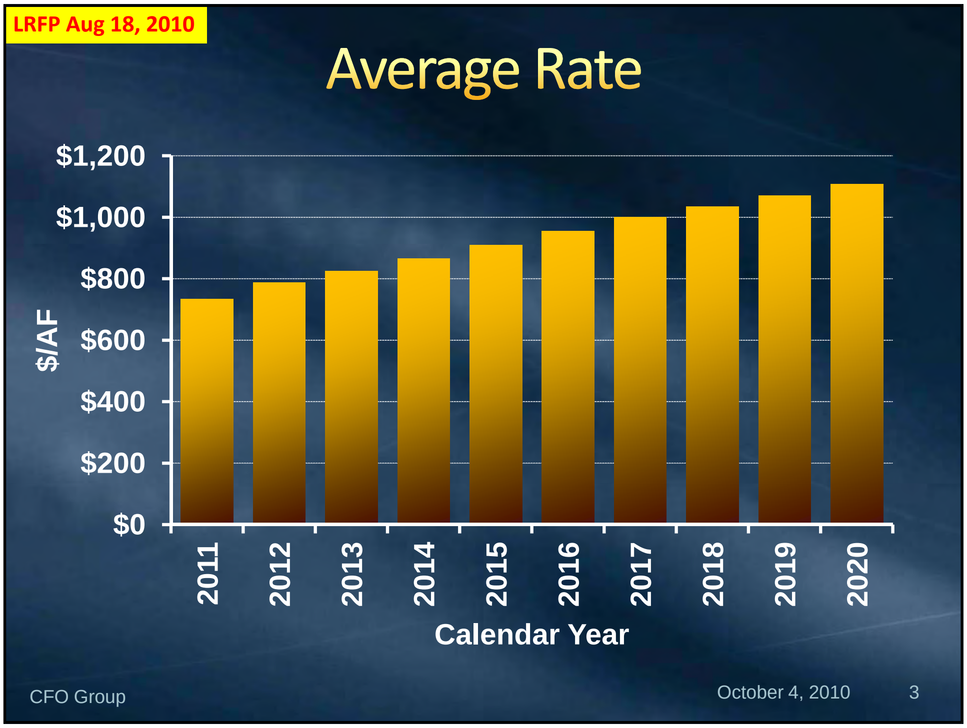
October 4, 2010

LRFP Aug 18, 2010

Average Annual Rate Increases About 5% Over Ten Years

Avg Rate Increase	20%	7.5%	7.5%	5%	5%	5%	5%	5%	4%	4%	4%
PAYGO, $M	37	95	125	125	125	125	125	125	125	125	125
Rev. Bond Cvg	1.6	1.9	2.0	2.0	2.2	2.1	2.0	2.0	2.0	2.1	2.1
Fixed Chg Cvg	1.1	1.3	1.4	1.4	1.4	1.3	1.3	1.2	1.2	1.3	1.3

CFO Group October 4, 2010 2



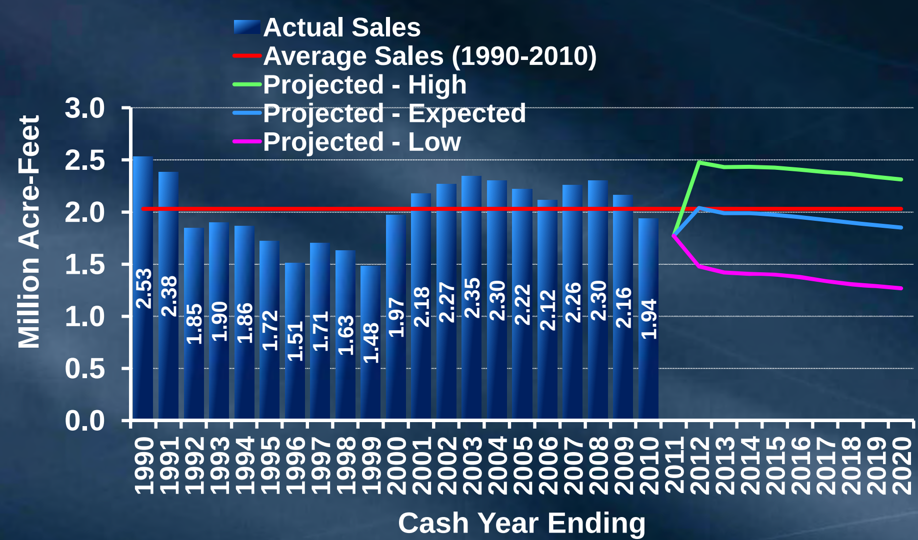
10-Year Rate Forecast

- Align to the IRP
  - Core Resources Strategy plus Water Use Efficiency
    - 20% by 2020 Retail and Regional efficiency
  - Lower water sales over 10-year period
  - Changed water supply, power costs
  - Departmental O&M, SWP capital and OMP&R, and CIP unchanged
  - No enhanced regional programs included
  - Updated 2010/11

CFO Group

October 4, 2010 4

Water Sales and Wheeling



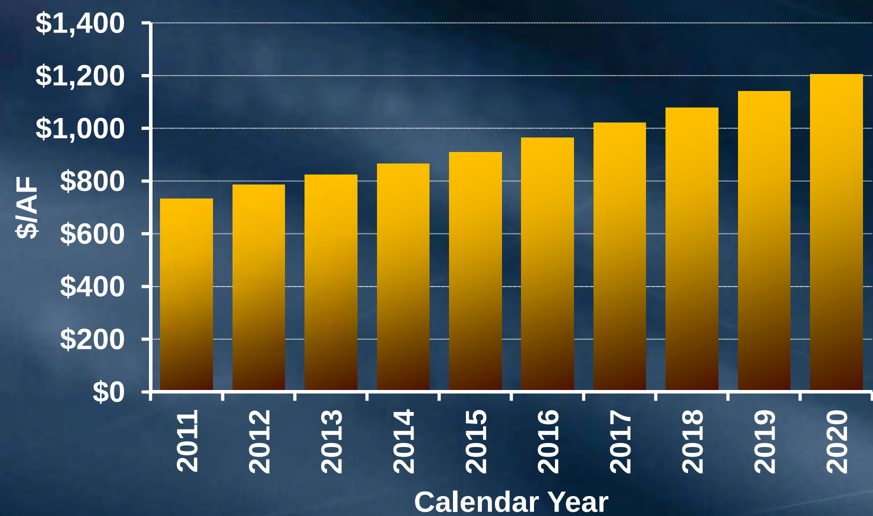
CFO Group October 4, 2010 5

Average Annual Rate Increases About 6% Over Ten Years

Avg Rate Increase	20%	7.5%	7.5%	5%	5%	5%	6%	6%	6%	6%	6%
PAYGO, $M	37	45	125	125	125	125	125	125	125	125	125
Rev. Bond Cvg	1.6	1.5	2.2	2.1	2.1	2.0	2.0	2.0	2.0	2.0	2.1
Fixed Chg Cvg	1.1	1.0	1.5	1.4	1.4	1.3	1.2	1.2	1.2	1.2	1.3

CFO Group 2010/11 Budget for PAYGO is $95M October 4, 2010 6

Average Rate



CFO Group October 4, 2010 7

Long-Term Estimated Rate Increases
(Based On Existing COS Method)

Rates and Charges Effective January 1 ($/AF)											
	2010*	2011	2012	2013	2014	2015	2016	2017	2017	2019	2020
Untreated Full Service											
Tier 1	$484	$527	$560	$580	$605	$633	$674	$715	$758	$808	$857
Tier 2	$594	$652	$686	$716	$748	$782	$827	$872	$917	$963	$1,009
Untreated Repl.	$366	$409	$442	$462	$487	$515	$556	$597	$640	$690	$739
Untreated Ag.*	$416	$482	$537								
Treated Full Service											
Tier 1	$701	$744	$794	$833	$877	$920	$970	$1,023	$1,079	$1,146	$1,214
Tier 2	$811	$869	$920	$969	$1,020	$1,069	$1,123	$1,180	$1,238	$1,301	$1,366
Treated Repl.	$558	$601	$651	$690	$734	$777	$827	$880	$936	$1,003	$1,071
Treated Ag.**	$615	$687	$765								
Untreated Whlg	$314	$372	$396	$416	$437	$460	$494	$527	$560	$594	$627

* Most rates effective September 1, 2009.

** The Interim Agricultural Water Program will be discontinued after 2012.

CFO Group October 4, 2010 8

Long-Term Estimated Rate Increases
(Based On Existing COS Method)

Rates ($/AF) and Charges Effective January 1											
	2010*	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
Tier 1 Supply Rate**	$170	$155	$164	$164	$168	$173	$180	$188	$198	$214	$230
Tier 2 Supply Rate	$280	$280	$290	$300	$311	$322	$333	$345	$357	$369	$382
System Access Rate	$154	$204	$217	$234	$250	$270	$294	$318	$339	$357	$380
Water Stewardship Rate	$41	$41	$43	$46	$51	$54	$55	$58	$58	$58	$58
System Power Rate	$119	$127	$136	$136	$136	$136	$145	$151	$163	$179	$189
Treatment Surcharge	$217	$217	$234	$253	$272	$287	$296	$308	$321	$338	$357
RTS Charge ($M)	$114	$125	$146	$160	$168	$180	$195	$213	$231	$240	$256
Capacity Charge ($/cfs)	$7,200	$7,200	$7,400	$7,400	$7,400	$7,500	$7,800	$8,100	$8,500	$8,900	$9,300

* Most rates effective September 1, 2009.
** Includes Delta Supply Surcharge

Discussion

Orange County Water District

Initial Expansion of the Groundwater Replenishment System

Engineer's Report

Mehul Patel, P.E.

August 2010

Table of Contents

List of Figures

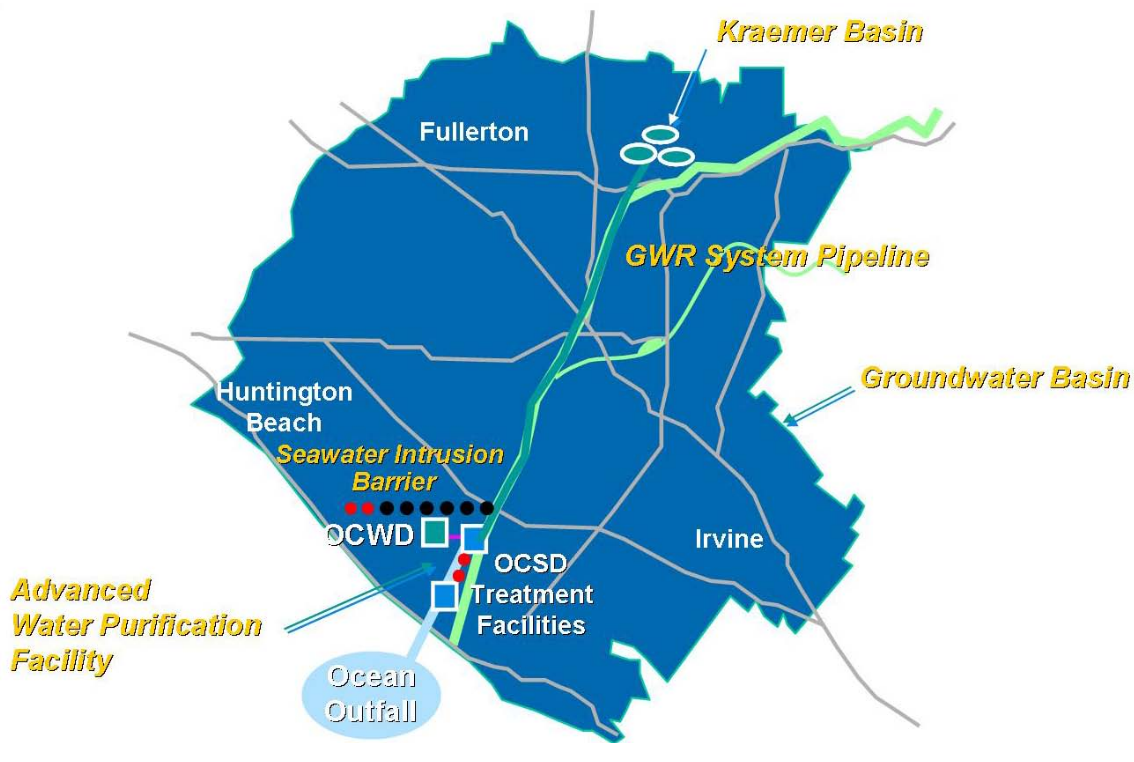
List of Tables

Introduction

The Groundwater Replenishment System (GWRS) is a water supply project constructed by the Orange County Water District (OCWD) and Orange County Sanitation District (OCSD). The GWR System supplements existing water supplies by providing reliable, high-quality source of water to recharge the Orange County Groundwater Basin (the Basin) and protect the Basin from further degradation due to seawater intrusion. By recycling water, it also provides peak wastewater flow disposal relief and indefinitely postponed the need for OCSD to construct a new ocean outfall by diverting treated wastewater flows that would otherwise be discharged to the Pacific Ocean.

Located in central Orange County, the project extends from Huntington Beach, Fountain Valley, and Costa Mesa near the coast to Santa Ana, Orange, and Anaheim generally along the Santa Ana River. The GWRS consists of three major components: (1) Advanced Water Purification Facility (AWPF) and pumping stations; (2) a major pipeline connecting the treatment facilities to existing recharge basins; and (3) expansion of an existing seawater intrusion barrier. The locations of the project components are shown on Figure 1.

FIGURE 1 – GWR SYSTEM MAP



The GWRS AWPF has been operating successfully since January 2008. Since that time, the AWPF has been operating successfully with a current production average of approximately 60 million gallons per day (mgd). The current production of 60 mgd is made possible with the operation of the OCSD Steve Anderson Lift Station (SALS). This pump station diverts additional flows to OCSD Reclamation Plant 1 which are treated by the GWRS. Because the current plant production is limited by OCSD diurnal flow fluctuations, production had been limited to approximately 24 mgd between the hours of 2 a.m. and 9 a.m. and up to 70 mgd between the hours of 9 a.m. to 2 a.m., which averages approximately 50 mgd. While it was never anticipated to operate at fluctuating flow rates throughout the day, the OCWD Water Production staff has proven that they can take advantage of higher flows in the day and increase total daily production.

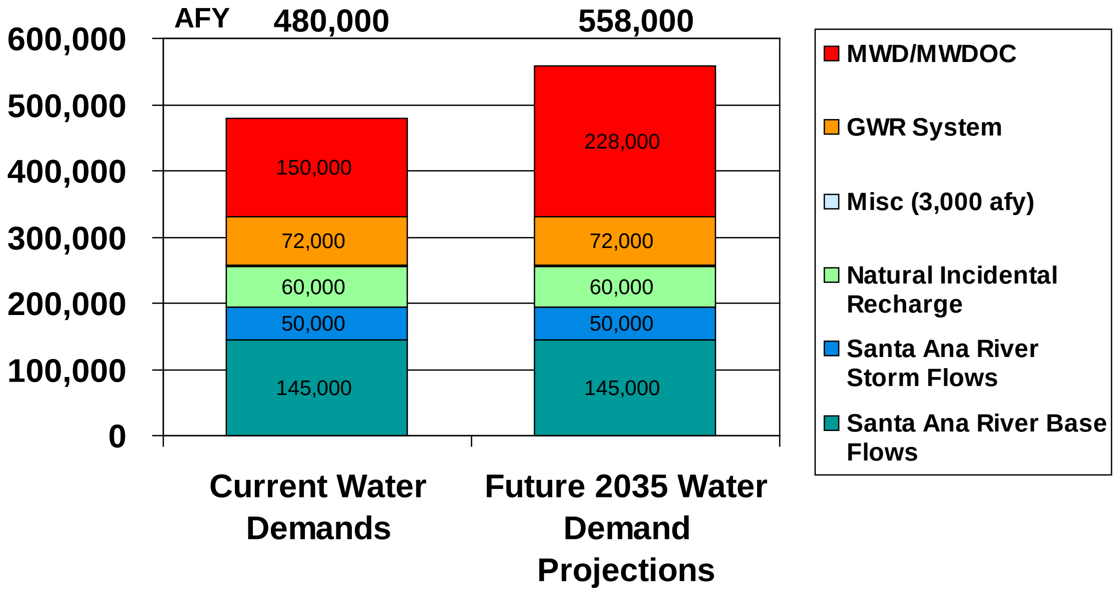
OCSD has indicated that the SALS could be operated 24 hours a day increasing both nighttime and daytime flows available for the GWRS. Knowing the AWPF can operate at various flows, the expansion of the GWRS can include greater capacity to accommodate the higher flows available during the day. In addition, OCSD is currently constructing an expansion to their secondary treatment processes which is expected to be completed in late 2011 and will provide an increased flow of secondary treated water. This Engineer's Report evaluates a 30 mgd expansion which could result in approximately 31,000 additional acre-feet per year (afy) of production from the GWRS. This expansion is a viable option based on the current success of the GWRS and the availability of other recharge sources for OCWD. It would bring the total production of the GWR System up to 103,000 afy which is equivalent to a production flow rate of 100 mgd and a 92 percent on line factor.

The expansion would entail construction of additional treatment and secondary effluent storage facilities at the AWPF site in Fountain Valley. Additional microfiltration, reverse osmosis, ultraviolet light treatment equipment, and storage tanks would be purchased and installed. In addition, pumps, electrical gear, and additional post treatment equipment will be required. A significant portion of the infrastructure has already been constructed to accommodate an expansion. This includes the yard piping, pump stations, and the electrical backbone.

Water Supply Summary

OCWD recently updated a *Long-Term Facilities Plan* (LTFP) in which water supply issues and trends were presented. Total water demands are projected to increase from approximately 480,000 afy to 558,000 afy in 2035 as shown in Figure 2. The demands are divided up based on the various water supply sources available within the OCWD service area. Water needs within OCWD boundaries are met primarily with a combination of groundwater, imported water, and recycled water. Groundwater pumping or production from the basin has been the major source of supply for areas within the basin. In order to sustain production from the basin, without overdrafting the basin and cause adverse impacts, such as increased seawater intrusion or subsidence, water must be recharged back into the basin.

FIGURE 2 – CURRENT AND FUTURE DEMANDS WITHIN THE OCWD SERVICE AREA



The supply sources listed in Figure 2 include Santa Ana River baseflow, Santa Ana River stormflow, imported supplies, natural incidental recharge, GWRS, and a small amount of miscellaneous supplies. Santa Ana River baseflow is primarily comprised of tertiary-treated wastewater discharges from wastewater treatment facilities upstream of Prado Dam. Santa Ana River baseflows are expected to remain about the same in the future. Baseflows could increase in the future due to potential growth in the Santa Ana River watershed. However this is expected to be offset by agencies reusing this source of water as imported supplies become less available and more expensive. The amount of stormflow available for recharge varies significantly from year to year due to the amount of precipitation in the watershed. As Figure 2 indicates, expected increasing water demands will force the OCWD service territory to become more dependent upon imported water supplies which may or may not be available in the future.

Imported supplies are purchased from Metropolitan Water District of Southern California (MWD) and MWDOC. MWD supplies primarily come from the Colorado River and the State Water Project. An almost decade long drought in the Colorado River watershed, along with increases in water demands in the Southwest, has reduced these supplies. Reduced snowpack and precipitation within the state have reduced State Water Project supplies. In addition, environmental restrictions on pumping from the California Bay-Delta system have significantly reduced these supplies. Significant factors which will affect the current OCWD water supply situation include:

- Below normal precipitation in the Santa Ana River Watershed for the last three years;

- The lack of MWD supplemental replenishment water since April 2007;
- MWD may allocate imported water supplies in the next one to two years, which could further increase demands on the basin;
- The anticipated lack of supplemental replenishment water through at least 2011; and
- A potential lag of three to five years before MWD can provide reliable information regarding when supplemental replenishment water is available.

Because of these factors, annual groundwater production and the level of storage in the basin have declined since 2006. Additionally, the potential to refill the basin with supplemental imported replenishment water, as has occurred in the past, is not a reliable option. It is likely that the amount of production from the basin will need to be further reduced in response to the below normal precipitation in the Santa Ana River Watershed and the lack of supplemental replenishment water.

Alternative Sources

OCWD has been developing programs and projects that will maximize the sustainable basin yield of the groundwater basin in a cost effective manner. Sustainable basin yield refers to the annual amount of production that can be maintained on a long term basis (e.g. five to ten years, or more) without overdrafting the basin. This requires matching the production of the basin with the amount recharged on a long-term basis. These projects are summarized in the LTFP. Additional opportunities to develop new water supplies and their feasibility are described below.

Long-Term Facilities Plan

The LTFP is a strategic planning tool for the District which identifies potential projects that could increase the basin's yield and protect groundwater quality. The LTFP presents a preliminary assessment of potential projects' costs and benefits, and prioritizes potential projects for more detailed analysis based upon cost, benefit and feasibility. A wide range of potential projects were identified. The preparation of the LTFP is a planning effort to screen potential projects and identify which ones to carry forward for more detailed analysis and consideration. Many of the projects presented in the LTFP address projects that have been developed to increase storm flow capture. These projects would maximize recharge of water that is normally lost to the ocean during a storm event.

Conservation

OCWD is committed to conservation with their support for MWDOC's conservation program. MWDOC, with financial support from OCWD and its 28 other member agencies, has developed and implemented a water conservation program involving various Best Management Practices (BMP), including:

- Large landscape education
- Multi-family ultra low-flush toilets (ULFT)
- Low-flow showerheads
- Single-Family ULFT
- Residential Evapotranspiration (ET) Smart Controllers
- Residential front-loading clothes washers
- Commercial ULFT
- Home and commercial water surveys
- Distribution system leak repair

MWDOC, Anaheim, Fullerton, and Santa Ana (as the MWD Member Agency within the OCWD service area) tend to be the lead agencies for implementing the conservation programs. Significant demands have been reduced and conservation efforts must remain a high priority. Even with conservation, the OCWD service area will require a substantial amount of imported water supply each year.

Water Transfers

Another option for new water sources are water transfers which will help recharge the groundwater basin. OCWD plans to explore options to acquire available water and how to convey to the Orange County groundwater basin. As Southern California's imported water provider who manages the Colorado River Aqueduct and as the major contractor along the State Water Project, MWD is generally responsible and has experience in making larger water transfers.

There are significant institutional issues to overcome to develop successful transfer programs. OCWD cannot directly compete with MWD in the water market. OCWD will explore opportunities as well as support MWD on any water transfers that are beneficial to the OCWD service area.

Desalination

Poseidon is currently developing plans for a 50 mgd ocean water desalination plant in Huntington Beach. A desalination facility in Huntington Beach could generate a significant amount of water within Orange County. This water is a new supply with an almost unlimited source. While it is a reliable source water, there are numerous permitting and institutional challenges associated with ocean water desalination.

Estimated costs for ocean desalinated water exceed $1,200/af. These high costs are linked to the large amounts of energy required for the reverse osmosis process.

As a groundwater management agency, OCWD may not have a need for this water as desalinated ocean water is generally permitted for the potable system.

Project Description

The Initial Expansion of the GWR System would include adding treatment capacity to the AWPF in Fountain Valley. Additional microfiltration, reverse osmosis, and ultraviolet light treatment equipment would be purchased and installed. In addition flow equalization of secondary effluent would be provided by the construction of two 7.5 million gallon storage tanks. The storage tanks would allow for the excess secondary effluent available in daytime hours to be stored and then fed to the GWRS during low night time flow periods. A significant portion of the infrastructure has already been constructed to accommodate an expansion. This includes the yard piping, pump stations, and the electrical backbone. When the GWRS was designed and constructed, all piping, facilities, electrical systems, and the site were designed for an ultimate capacity of 130 mgd. Because the major processes (microfiltration, reverse osmosis, and ultraviolet light) are modular systems, expansion would be relatively simple. The shaded areas in Figure 3 below identify the areas on the GWRS that would accommodate the 30 mgd expansion.

Major work of the expansion would entail:

- Demolition of the current lab facility
- Microfiltration facility construction (up to a capacity of 42 mgd)
- Reverse osmosis facility (up to a capacity of 30 mgd)
- Ultraviolet light equipment installation (up to a capacity of 30 mgd)
- Additional post-treatment facilities
- Additional reverse osmosis transfer pumps
- Additional product water and barrier pumps
- Construction of two 7.5 million gallon capacity secondary effluent storage tanks

FIGURE 3 – SITE LAYOUT FOR INITIAL EXPANSION OF THE GWRS

Laboratory Demolition

The demolition of the current laboratory is required to provide a construction lay down area for the contractor as well as for future parking for district vehicles and equipment. The demolition was also a requirement of the City of Fountain Valley permit for the new Water Quality Assurance Laboratory being constructed on the north portion of the Fountain Valley Site. This component would be sequenced first in the construction contract to accommodate a construction laydown area.

Microfiltration

The microfiltration treatment capacity would need to be expanded by approximately 42 mgd. The same type of submersible microfiltration system would be employed to maintain consistency. During the design process, a new membrane material may be evaluated and incorporated into the design. This would involve increase the existing capacity as well as constructing new basins. Because they are losses throughout the membrane processes and extra capacity will supplement Green Acres Plant supplies, 42 mgd of microfiltration capacity needs to be installed to produce 30 mgd from the reverse osmosis. Currently, there are 26 microfiltration cells which produce a total of 86 mgd. In each one of these cells, 76 additional membrane modules can be added increasing the capacity of each cell to 3.7 mgd. This brings the existing plant to a capacity of approximately 96 mgd. Two empty cells, constructed in the original GWR System contract, and one additional train (consisting of eight cells) would be installed to bring the plant capacity up to 128 mgd of microfiltration capacity. In order to convey this increased flow to the reverse osmosis, additional pumps will need to be installed in the Reverse Osmosis Transfer Pump Station.

The microfiltration equipment will be pre-selected and assigned to the contractor. Price and terms will be negotiated initially and be incorporated into the design documents. This process is similar to the approach take on the original GWR System design.

Reverse Osmosis

The expansion of the reverse osmosis entails an additional 30 mgd of treatment capacity as well as construction of a new building. The current 70 mgd of reverse osmosis treatment is within an enclosed building. Space is available to the west for an additional 60 mgd expansion. It is proposed that the entire building be constructed but only 30 mgd of reverse osmosis capacity be installed. Maintaining the same 5 mgd unit design would be desirable to reduce impacts on the operations staff. Additional cartridge filters and chemical feed systems upstream of the reverse osmosis would also be required.

Currently, the area serves as a parking lot for OCWD vehicles and equipment. Following construction of the reverse osmosis expansion, this parking area would be moved to the site of the old lab.

Ultraviolet light with Hydrogen Peroxide

The expansion of the advanced oxidation system involves installation of additional ultraviolet equipment. Each train is capable of treating 8.75 mgd of reverse osmosis product. Currently, there are three partial trains that can be built out to add 17.5 mgd of treatment capacity. Two additional trains would need to be installed to treat the 30 mgd of additional flow. The peroxide system would not need to be modified significantly.

Post-treatment

Post-treatment facilities include decarbonators and lime stabilization. Five decarbonators currently degasify the product water to reduce carbon dioxide and help restore pH. An analysis will need to be performed to determine how many additional decarbonators will be required to handle the increased flow. The same will need to be performed to evaluate whether an additional lime saturator will be required. The lime addition is required to stabilize the water before being recharged into the groundwater basin. Finally, additional barrier and product water pumps will be required to convey the water to the injection barrier or to the recharge basins in Anaheim.

Flow Equalization Storage Tanks

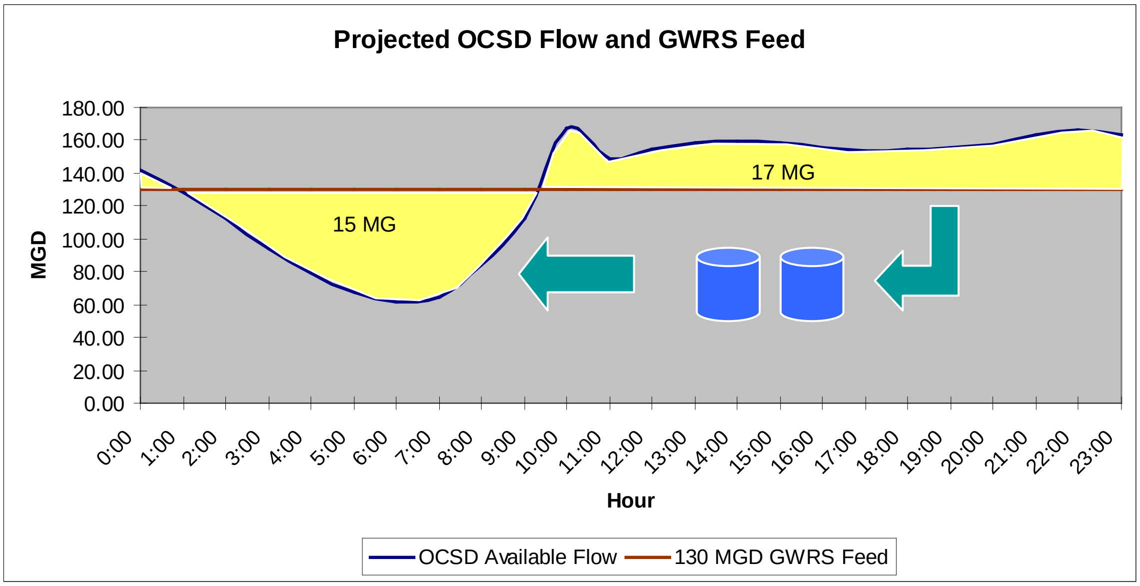
Flow equalization will be included in the GWRS Expansion Project. Flow equalization will involve the construction of two 7.5 million gallon capacity above ground steel storage tanks. The tanks would contain enough storage volume to ensure that the expansion would provide an additional 31,000 afy of production from the GWRS. The tanks will be 216 feet in diameter and 35 feet tall. The tanks will include solar powered mixers. A pump station consisting of five 75 horsepower vertical turbine pumps is included as part of the flow equalization portion of the expansion project. The pumps are used to fill the equalization tanks with excess secondary effluent. The contents are then discharged from the tanks by gravity to the GWRS screening facility. A common pipeline will be used for both filling and draining of the equalizaition tanks.

OCSD Secondary Treated Flow Availability

OCSD has provided expected flow availability information for Plant 1 when the SALS is operational. Based on these expected figures, it can be anticipated to have enough flow to produce an additional 31,000 afy from the GWRS. In order to do this, additional capacity would need to be constructed so that the GWRS AWPF could be ramped up during the day. OCSD has indicated that with the new secondary treatment available in 2012 and the 24 hour operation of the SALS, flow would be available. OCWD and OCSD have revised the existing Operations Agreement to ensure that this would be a mode of operation amenable to OCSD.

The following graph (Figure 4) identifies the current estimate of OCSD water that will be available with the SALS in operation and secondary treatment expanded in 2012. It also shows that the 15 million gallons of equalization storage make up for the short fall in available night time flows to ensure a continuous 100 mgd flow rate from the GWRS.

FIGURE 4 – EXPECTED AVAILABLE FLOW FROM OCSD PLANT 1 AFTER 2012



Based on the available flow and an annual production of 131,000 afy can be achieved. Water Production staff at OCWD has proven that they can operate the GWRS AWPF to match the diurnal curve of flow availability from OCSD. There is a difference in the flow available from OCSD and amount GWRS can produce due to the losses across the membrane processes. The GWRS needs a feed flow rate of 134 mgd in order to product 100 mgd of product water to account for losses through the membrane processes. The expansion would account for an increase of 31,000 afy to the existing GWRS.

Groundwater Recharge and Injection

As production increases out of the GWRS, it is important to consider where the water will be recharged. It is estimated that the maximum amount the Talbert Injection Barrier can inject is approximately 42 mgd depending on barrier conditions. Current GWRS flow provides sufficient water to satisfy the needs of the Talbert Injection Barrier. Excess flows from the current GWRS are recharged at Kraemer and Miller Basins in Anaheim, after the Talbert Injection Barrier needs are satisfied. The amount the injection barrier can accommodate will vary seasonally, with injection rates generally lower in the winter time when groundwater levels are higher. Table 1 lists estimates on where the GWRS water can be delivered. It is listed in two periods based on current operations and the GWRS Initial Expansion in 2012.

TABLE 1 - EXPANDED GWR SYSTEM FLOW DELIVERIES

	TOTAL (MGD)	BARRIER (MGD)	KRAEMER/MILLER (MGD)
Current	60	42	18
Beyond 2012	100	35-42	58-65

Based on average hydrology, during non-flood season Kraemer and Miller Basins will be able to handle the excess flow generated from the GWRS and its expansion. While Kraemer Basin has typically not been the primary recharge basin to be used to recharge stormflows, there will be periods that stormflows will be available to recharge. In these periods, Kraemer Basin can recharge a mixture of stormflow and GWRS water. Because there is excess capacity within Kraemer Basin even while recharging GWRS water, excess stormflows can be accommodated as well. It is currently being operated in this manner. However, if there is wetter than average year, the GWRS's production can be ramped down so that the basins can capture the additional stormflows. GWRS operational costs would be reduced for the short term as chemical and power consumption would decrease.

GWRS water has extremely low turbidity, essentially no suspended solids, and very low organic carbon concentrations. Due to the high quality, the recharge basins maintain a high percolation rates when recharged only with GWRS water. Although Kraemer and Miller Basins will often have excess capacity that could be used to recharge the GWRS Initial Expansion water, it would be advantageous to recharge the additional flows by other means. It is anticipated that GWRS water can be injected through wells or recharged through horizontal subsurface systems with minimal clogging. Santa Ana River water has a much higher sediment load compared to GWRS water and it is not practical to recharge Santa Ana River water through injection wells or subsurface recharge systems without some type of additional treatment. Surface recharge basins, like Kraemer and Miller, and the Santa Ana River channel bottom are the District's only methods for recharging Santa Ana River water. Since the GWRS water should be ideal for subsurface recharge, and surface recharge basins are the District's primary method of recharging Santa Ana River water, it would be desirable to minimize GWRS flows ultimately sent to Kraemer/Miller.

OCWD staff is currently evaluating injection near the GWRS pipeline along the Santa Ana River to recharge recycled water in the "mid-basin. Modeling has shown that recharging GWRS water through mid-basin injection wells would provide the benefit of increasing groundwater levels in a portion of the basin where groundwater levels are low during some time periods due to pumping. OCWD staff is also testing the performance of a shallow horizontal subsurface recharge system with GWRS water. This test is being conducted adjacent to Burris Basin in Anaheim.

Organizational Impact

It is anticipated that additional staff would be required to support the increased treatment capacity of the GWRS. It is currently estimated that six additional staff would be required to support the increased production. This increase includes three new operators, two maintenance technicians, and one instrumentation and electrical technician. As part of the design, a more detailed staffing plan would be generated to determine the actual need. It is not anticipated that this would increase the amount of samples analyzed by the Water Quality Assurance Laboratory so there is no increase in staffing required there.

Cost

A preliminary unit cost of $543/af has been estimated. This is based on numerous assumptions including:

- All costs escalated to the midpoint of construction in 2011
- Entire reverse osmosis building is constructed to accommodate additional expansions up to 130 mgd
- A contingency on capital improvement included
- Capital cost component financed at five percent over 30 years
- No grants or subsidies
- 92 percent online efficiency
- Annual four percent increase in all operating costs
- Six additional staff

A summary of the costs is provided below in Table 2.

TABLE 2 - PRELIMINARY COST ESTIMATE FOR PHASE 2 TREATMENT FACILITIES

CATEGORY	ESTIMATED COST
Plant wide Facilities	$12,273,792
Microfiltration/Pretreatment	$23,651,087
Reverse Osmosis	$33,564,002
Ultraviolet light (UV)/Post-Treatment	$15,407,817
Flow Equalization Tanks	$24,993,000
Contingency (5%)	$5,165,161
Other (tax, start up, etc)	$18,405,810
Subtotal construction cost	*$133,461,389*
Engineering, Legal, Administrative	$23,930,323
Grand Total	$157,391,712

The estimated cost for construction of the new facilities is $157,391,7120. A detailed cost break down is provided in the appendix. To calculate the unit cost of the water, it was assumed that the capital cost would be funded with a five percent loan repaid over 30 years. With these assumptions, the unit cost of the water is $543/af (assuming additional production of 31,000 afy). This estimate is based on an annual amortization cost of $9,522,199 and operation and maintenance costs of $6,603,000. The estimate does not account for any grant funding or subsidies. The calculation of the unit cost is shown in Table 3.

TABLE 3 - ESTIMATED UNIT COST OF PHASE 2 WATER

CATEGORY	COST
Total Capital Cost	$157,391,712
Amortized Capital Cost (5% loan over 30 years)	$9,522,199
Total Operations and Maintenance Cost	$6,603,000
Total Annual Cost	$16,125,199
Total Unit Cost	$543 per acre-foot

Note: does not include any grants or subsidies

Several grant and subsidy opportunities are available to reduce the local cost of the potential expansion. Upcoming grant opportunities include Proposition 84 and other grant funds available from the State of California. Additional capital and operational funding opportunities are available from the federal government and MWD. Grant funding opportunities from the state have expenditure deadlines which require the grant funds be utilized prior to specific deadlines. If the project was to receive $20 million in grants the unit cost would reduce to $501/af.

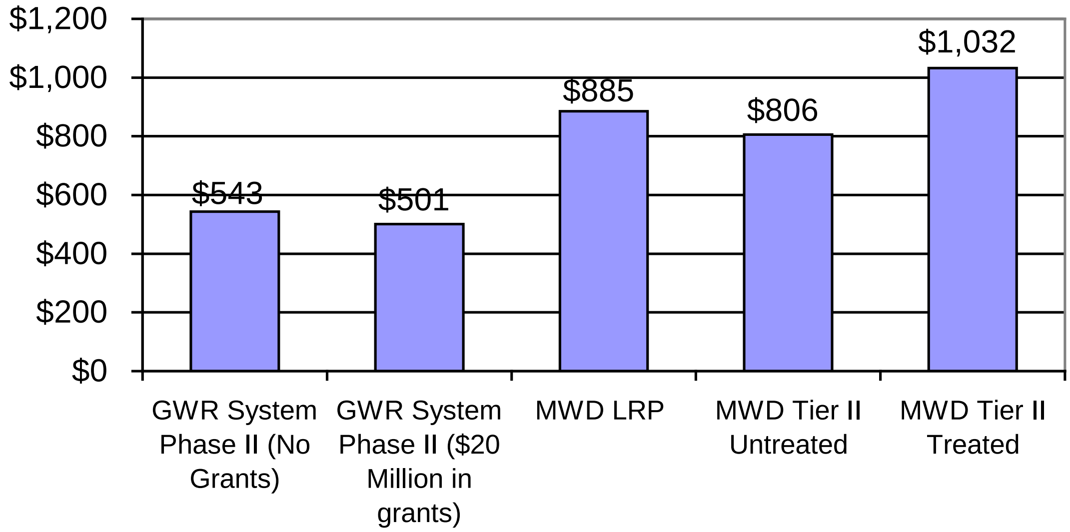
Figure 5 below displays the estimated unit costs of Phase 2 GWRS water and available MWD supplies in the year 2012. MWD rates were assumed to increase 20 percent in 2010, 12 percent in 2011, and 10 percent in 2012, as was provided in a January 13, 2009 budget and rates report to the MWD Board. The projected Tier II MWD rates include estimated equivalent $/af amounts for the MWD readiness-to-serve and capacity charges.

The MWD Local Resources Program (LRP) unit cost shown in Figure 5 is used to calculate LRP subsidy eligibility. MWD uses the difference between the two unit costs of water to calculate what the MWD LRP subsidy should be. In this case, the GWRS Initial Expansion unit cost is lower than the MWD LRP rate so no subsidy would be received. Opportunities still may exist to qualify if the unit cost of the GWRS Expansion would be higher than anticipated due to reduced production due to a wet scenario or other unknown increase. The District could enter into a MWD LRP agreement to ensure the Unit 2 water cost never exceeded the MWD LRP rate which is estimated at $885/af in 2012.

As the GWRS is creating new water supplies, it is reducing the amount of MWD Tier II treated water that must be purchased by the Producers. Currently, 10,000 to 30,000 afy of MWD Tier II water is being purchased. This amount will increase with projected increasing water demands and/or with a lower future Basin Production Percentage. Untreated Tier II MWD supplies are estimated to cost $806/af in 2012. Purchasing this water is a viable future option to assist the District in raising the Basin Production Percentage and allowing the Producers to avoid the treatment surcharge portion of the MWD rate structure. The cost of this water is estimated to be very similar to the cost of the GWRS Expansion cost assuming $20 million in grants are received for the project. Both options could be implemented in the future. The GWRS Expansion would be a higher ranked option for the following reasons:

- You are creating more reliable local water supplies;
- The water supply has a lower total dissolved solids concentration to benefit the groundwater basin;
- GWRS supplies are drought proof;
- If imported water supplies are allocated by MWD; OCWD could then be limited to only purchasing up to about 7,000 afy of this water without paying possibly much higher penalty rates.

FIGURE 5 – ESTIMATED 2012 GWR SYSTEM PHASE 2 UNIT COSTS AND MWD UNIT COSTS ($/AF)



Schedule

The schedule for next steps in implementing Initial Expansion of the GWRS, subject to Board approval, is described in Table 4 below. Throughout this process, staff will seek additional funding opportunities which include grants, operational subsidies, and loans. If at the completion of design, it is not economically beneficial to proceed, the design can be "shelved" and constructed at a later time if and when additional funds are available. The GWRS expansion would be completed after the OCSD secondary treatment expansion so that treated flow is available. This schedule matches well with OCSD's estimated completion of their secondary expansion. Currently, they are estimated to complete in late 2011.

TABLE 4 - SCHEDULE OF THE INITIAL EXPANSION OF THE GWR SYSTEM

TASK	SCHEDULE
Board Consideration to Approve Engineer's Report	February 2009
Issue Design RFP	February 2009
Award Design Contract	April 2009
Amend OCSD/OCWD Operating Agreement	May 2010
Complete Design	October 2010
Construction	January 2011 – January 2015

CEQA

The Environmental Impact Report (EIR) for the GWRS, which included Phases 1, 2, and 3, was certified in March 1999. It is anticipated that there are no additional environmental analysis required. The District would need to receive an amended permit or a new permit from the Regional Water Quality Control Board (RWQCB). The California Department of Health (DPH) is involved in this process and the conditions required by DPH are included in the permit issued by the Regional Board.

Recommendation

The Initial Expansion of the GWRS is a viable project and is feasible and necessary and of general benefit to the lands in the Orange County Water District. With droughts and environmental challenges affecting imported supplies, the new water produced through the Initial Expansion of GWRS is a cost effective water supply that exceed the water quality of any other source of water.

Appendix

Capital Cost for GWRS Expansion and Flow Equalization Project (30 mgd, 31,000 AFY)

Sub Area	Description		Amount
100	Plant Wide Facilities		$ 620,841
140	Screening Facility		$ 464,774
150	Main Laboratory		$ 585,928
160	Maintenance Building		$ 101,540
210	MF Facility		$ 20,651,252
214	MF Compressors/ Vacuum Pumps		$ 10,649
216	MF Process Air		$ 12,126
218	MF Backwash Supply Pumps		$ 48,588
220	MF CIP System		$ 4,202
230	MF BackwashWaste Pump Station		$ 126,362
235	MF Chemicals		$ 9,744
240	MF Electrical Room		$ 1,530,345
255	MF RO Transfer Pump Station		$ 1,258,539
400	Bulk Chemical Storage Facility		$ 70,058
410	Sodium Hypochlorite Bulk Storage		$ 283,543
420	Sulfuric Acid Bulk Storage		$ 272,648
430	Threshold Inhibitor Bulk Storage Area		$ 189,284
450	Cartridge Filters		$ 435,727
510	RO Building		$ 33,087,908
520	RO CIP System		$ 225,624
540	RO Electrical Building		$ 250,470
600	Site		$ 8,964
610	UV Facility		$ 9,003,153
640	UV Electrical Building		$ 63,611
710	Decarbonation		$ 1,820,709
720	MF CIP/ RO Flush Pump Station		$ 84,372
730	Lime Post Treatment Building		$ 4,234,117
750	Post Treatment Chemical Storage		$ 192,891
815	Product Water and Barrier Pump Station		$ 1,764,749
910	Switchgear Building		$ 248,137
911	GAP Facility		$ 42,563
912	Building 1		$ 130,000
999	Other (General Conditions, I&C Integration)		$ 7,064,000
	Tax at 9.25%		$ 3,812,930
	Start Up/Commissioning (1.5%)		$ 1,273,461
	Overhead & Profit (15%)		$ 7,869,944
	Escalation to Mid-Point of Construction (5.569%)		$ 5,449,475
	Subtotal		$ 103,303,228
	Design Costs		$ 6,500,000
	Design Engineer services during construction		$ 2,000,000
	Construction Management (10%)		$ 10,330,323
	Materials Testing		$ 1,600,000
	Administration (4 persons for 4 years)		$ 1,600,000

	Outreach		$ 1,200,000
	Legal Services		$ 200,000
	Outside Consultants		$ 400,000
	Surveying Services		$ 100,000
	Contingency (5%)		$ 5,165,161
	Treatment Plant Expansion Total Cost		**$ 132,398,712**
142	**Flow Equalization (Secondary Effluent Storage)**		
	Sitework		$ 1,699,000
	Equalization Tanks (2)		$ 13,625,000
	Pump Station		$ 2,547,000
	Metering Vault		$ 558,000
	Power Feed		$ 426,000
	Misc (General Requirements, Sales Tax, etc)		$ 2,400,000
	Contingency (15%)		$ 3,188,000
	Escalation to Mid-Point of Construction (3% for 0.75 years)		$ 550,000
	Flow Equalization Total Cost		**$ 24,993,000**

Total Project Capital Cost: Expansion and Flow Equalization	**$ 157,391,712**

O&M Costs		$/Acre Foot
Electricity		56
Chemicals		32
Labor		59
Plant Maintenance		30
R&R Fund Contribution		36
Total O&M Costs		**$ 213 per AF**

Total Project Unit Cost (Capital plus O&M) (Amortization over 30 years at 5%)	**$ 543**

Chapter 6 Regional Goals & Objectives

In order to guide the development of the OWOW Plan, the Steering Committee and the Pillar Leader group convened to establish the goals and objectives for the Watershed that would allow a holistic approach to resource management.

A two-day eco-charrette was hosted by Stantec Consulting on July 16, 2007 and on July 17, 2007. This event provided an interactive and thought-provoking forum to discuss ideas and priorities in the pursuit of sustainable water resources and to discuss and take a first step toward developing goals and objectives for the Watershed. Stantec staff conducted a thoughtful and meaningful discussion regarding the values and principles that would be used as guiding principles for the Pillars to follow in the development the OWOW IRWMP. The eco-charette format is based on developing consensus of the OWOW leadership values, challenges, and strategies via group input and voting mechanisms to refine and enhance the overall vision of the group.

Through extensive discussion and collaboration among the OWOW Steering Committee and Pillar Leaders on issues pertaining to values, challenges, and strategies, they were able to prioritize each issue. Listed below is a summary of the issues obtaining the most "votes" at the eco-charrettes.

Values

- Sustainability
- Comprehensive Water Strategy
- Smart Growth/Urban Centers Communities
- Maintain Quality of Life

Challenges

- Benchmark Data
- High Impact Development/Heavy Footprint
- Economics/Cost of Change

Strategies

- Improved Social Marketing
- Advocacy for a Sustainable Watershed
- Increase Recycled Water Usage
- Massive Reduction of Urban Runoff by 2030
- Maximize Utilization of Stormwater for Supply
- Green Building/LID
- Reduction of Turf and Water Guzzling Plants

In addition, using the Pillar Leaders' input from the July 16, 2007 eco-charrette, the Steering Committee developed three statements to help each Pillar prepare their respective group's report. These three statements are:

- Balance Environment and Economics
- Plan for Severe Reduction of Imported Water Scenario
- Consider Climate Change

The Steering Committee conveyed a sense of urgency that moderately aggressive to aggressive planning was needed. Furthermore, they were effective in conveying direction to produce a plan that is more aggressive in taking steps to plan for major changes in how developing, protecting, and conserving water is approached. At the end of the eco-charrette, the general direction was as follows:

- There was a shared understanding that all water within the Santa Ana River Watershed is a precious resource. Climate change, continuing Colorado River drought, questions about the San Joaquin Bay Delta's vulnerability and its ability to deliver water to southern California, and changes to the hydrologic cycle as the result of our very own successful growth and development will stress our ability to provide sufficient water to supply to our Watershed for economic and environmental sustainability.
- There was an expressed commitment to invest time and resources for high quality planning, both long-range and short-range, to ensure the best possible outcome and to achieve the stated mission of making the Santa Ana River Watershed drought-proofed, salt-balanced, and to continue its economic and environmental vitality.
- While major paradigm changes are being considered, the quality of life of the residents must be protected and the economic impact of a recommended change must be understood before implementation.
- The group indicated through voting that, in order to meet these challenges, the leadership in the watershed would need to consider significant review of current practices and expectations. The best solutions would likely engender new ways of thinking about water use and the value of water.
- There was acknowledgment that while many advances would need to be made in conservation and water use efficiency, the planning process should consider if agricultural water conservation measures could free up water for urban use or if water could be purchased from agriculture for urban use.
- There was a commitment to employ emerging technologies to further urban water efficiencies and to develop new water supplies.

Generally, the consensus was that the OWOW effort would need to be bold and innovative to meet the watershed's vision.

There also was interest in matching the quality of water delivered to the water quality needed for a specific purpose. For example, highly treated drinking water is not needed for agriculture or landscaping use. Steering Committee members discussed the impacts of land use decisions on water quality and the quantity of water available. There was a desire for better communication and coordination between the water industry and those charged with land use planning. Furthermore, Steering Committee members also discussed how much public open space is dedicated to grass and how much of residential personal outdoor space can be maintained in grass verses other plantings that would be less water dependent. They acknowledged the need for grass play areas while seeing opportunities for water savings by replacing grass with drought tolerant plantings in other areas. The Steering Committee suggested that the price paid for water by the consumer versus the actual cost of water, including environmental, wheeling, and infrastructure replacement costs be reconciled.

In addition to the two-day eco-charette, the Steering Committee, as well as the Pillar leaders, met on several occasions to review and enhance these goals and objectives. Draft goals and objectives were developed based on the eco-charrette exercises. A draft set of Goals and Objectives was presented to the Steering Committee for comment. The Pillar Leaders then prepared a draft final set of goals and objectives. These were presented for comment at a public meeting held at the California Citrus State Historic Park on October 31, 2007. Email notices allowed public on the mailing list to participate electronically in the comment process. Stantec Consultants collected the comments and provided them to the Pillar leaders for consideration. After final revision, the goals and objectives were adopted by the Steering Committee. The final product of their efforts is shown below in **Table 6-1**, which summarizes the objectives and sub-objectives developed in consensus by the group.

Table 6-1 Objectives Adopted by the Steering Committee

Objectives	Sub-objectives
Provide reliable water supply	Reduce dependency on imported water Meet current and future water demands during all hydrologic conditions Meet water demands during emergency or catastrophic conditions Maximize water use efficiency (conservation) Increase use of recycled water
Preserve and enhance the environment	Protect and enhance the ecological function of open-space Protect and enhance water-related habits Reduce or eliminate invasive riparian and aquatic species Protect sensitive marine and estuarine environments Consider ecological functionality in new development
Promote sustainable water solutions	Promote strategies that link land and water use Reduce greenhouse gas emissions Reduce energy consumption and promote urban greening projects Develop partnerships for planning and implementation of economically, environmentally, and socially sustainable watershed projects
Ensure high quality water for all users	Attain water quality standards in fresh and marine environments Match water quality with intended uses Protect and improve source water Manage salinity
Provide economically effective solutions	Leverage existing financial and infrastructure assets Minimize capital, O&M, and life-cycle cost Promote aggressive pursuit of grants and loans Pursue innovative, non-traditional revenue-generating concepts
Improve regional integration and coordination	Engage stakeholders in planning and implementation of watershed projects Increase communication and coordination Search for projects that meet multiple goals across geographic and water resource services
Manage rainfall as a resource	Provide appropriate flood control capacity and other benefits to the community Maximize beneficial use of rain water
Preserve open-space and recreational opportunities	Increase opportunities for recreation and open-space Provide useable open-space for all residents of the watershed
Maintain quality of life	Balance quality of life, and social, environmental and economic impacts when implementing projects Consider the needs of disadvantaged communities

The objectives established by the Steering Committee address the overarching goals established by DWR Proposition 84 Guidelines, including requirements of CWC§10540(C), as summarized in **Table 6-2**.

Table 6-2 Objectives and Goals set by the Steering Committee

CWC§10540(C) Objectives	Corresponding OWOW Plan Objective
Protection and improvement of water supply reliability, including identification of feasible agricultural and urban water use efficiency strategies	Provide reliable water supply Promote sustainable water solutions Provide economically effectives solutions Improve regional integration and coordination Manage rainfall as a resource
Identification and consideration of the drinking water quality of communities within the area of the Plan	Ensure high quality water for all users
Protection and improvement of water quality within the area of the Plan consistent with relevant basin plan	Ensure high quality water for all users
Identification of any significant threats to groundwater resources from overdrafting	Provide reliable water supply Promote sustainable water solutions Manage rainfall as a resource
Protection, restoration, and improvement of stewardship of aquatic, riparian, and watershed resources within the region	Preserve and enhance the environment Promote sustainable water solutions Improve regional integration and coordination Preserve open-space and recreational opportunities
Protection of groundwater resources from contamination	Ensure high quality water for all users Promote sustainable water solutions
Identification and consideration of water-related needs of disadvantaged communities in the area within boundaries of the Plan	Provide reliable water supply Provide economically effectives solutions Improve regional integration and coordination Maintain quality of life

During subsequent meetings and workshops, the Steering Committee and the Pillar Groups identified Strategies to meet the objectives, and targets to measure the extent to which the objectives are being met. As shown in **Table 6-3** below, there is a strong correlation between objectives, strategies, and targets.

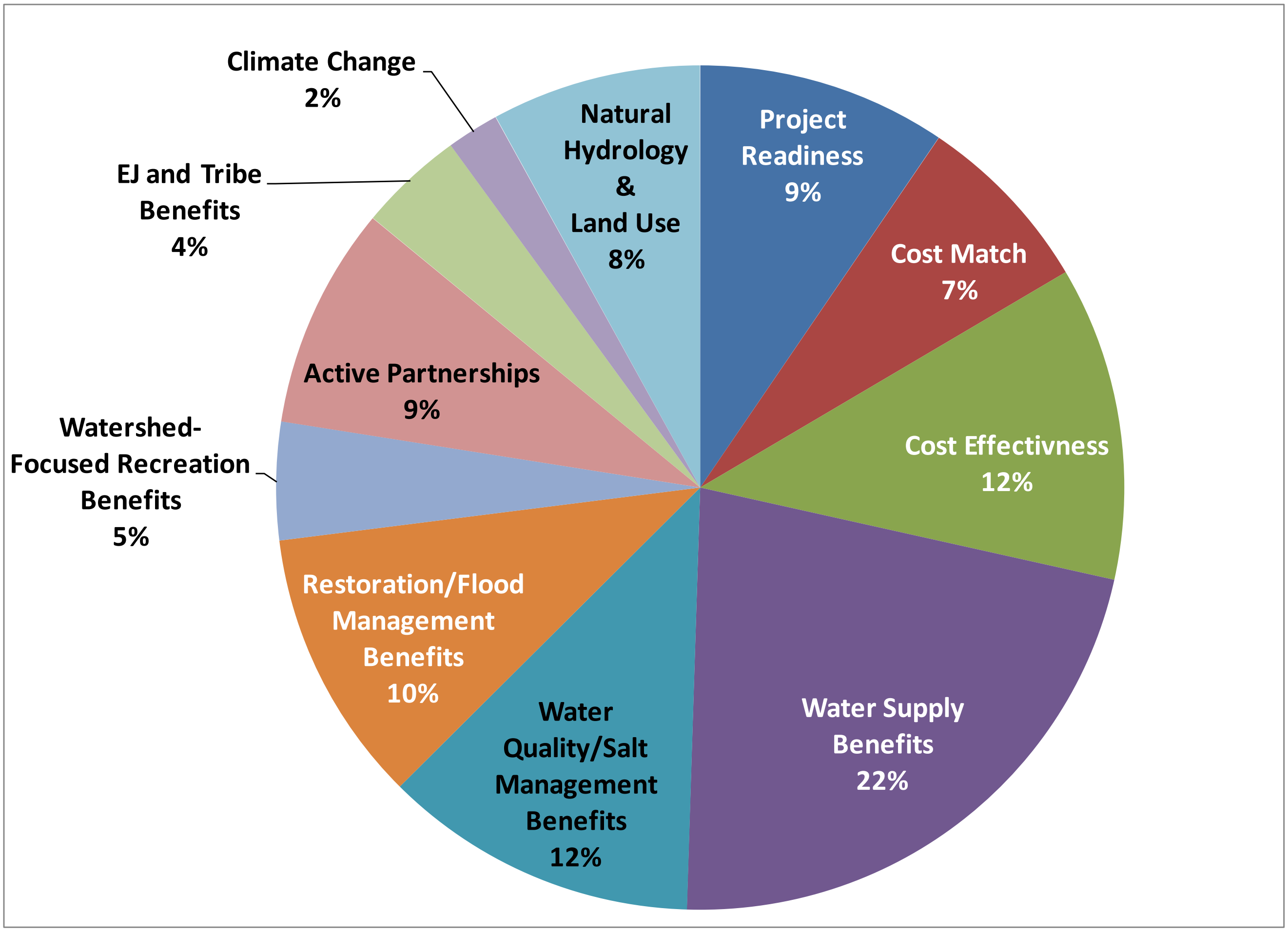
Table 6-3 Objectives, Strategies, and Targets Identified

Goals & objectives	Strategies	Targets
Provide reliable water supply Promote sustainable water solutions Use rainfall as a resource	Increase storage Reduce demand Desalinate groundwater Recycle water Consider stormwater as water supply Value water differently	Recycle and reuse 100% of wastewater Store water to account for half of watershed demand for 3 years Reuse all of Santa Ana River flow at least once Reduce potable water use by 20% Capture and recharge 80% of rainfall
Preserve and enhance the environment	Maximize preservation and use of native plants	Fill gaps in riparian corridors to provide wetlands and linkages between open space and natural habitat Meet California Flood SAFE goals & construct soft bottom flood systems
Ensure high quality water	Develop risk-based WQ improvements	Meet WQ standards Remove salt from watershed to improve salt balance
Provide recreational opportunities		Complete the SAR Trail and connect all tributary corridors to
		Assure adequate water supply and safe wastewater treatment and disposal
		Reduce GHG emissions from water mgmt activities
	Incorporate integrated water planning in General Plans Manage public property for more than one use	Increase resource efficient land use
Provide economically effective solutions		
Improve regional integration & coordination		
	Create watershed governance Implement watershed-wide education programs	

Finally, in order to prioritize projects based on the degree to which they meet the Plan goals and objectives, SAWPA staff and consultants developed Evaluation Criteria. Evaluation criteria are considered more implementable and quantifiable than the overarching goals and objectives of the Plan, and thus are useful for the ranking of projects and to monitor the performance of projects upon implementation (the project ranking process is explained in more detail in Chapter 7).

The Steering Committee assigned a weight of importance to each criterion by using a dot-voting exercise. The exercise consisted in giving each Steering Committee member a set number of votes (dots) to be allocated among the 11 criteria based on its importance as perceived by the individual Steering Committee member. The final weight or relative importance of each criterion was established based on the total number of votes allocated to it by the Steering Committee. **Figure 6-1** summarizes the results of the weighting exercise.

Figure 6-1 Relative Importance of Objectives



A Performance measure was created for each criterion and sub-criterion to quantitatively determine the degree to which the latter are being met by each project. In some cases, more than one performance measure was established for a criterion to increase the specificity of the measurements (See **Table 6-4** below).

Table 6-4 Evaluation Criteria

Project evaluation criteria	Performance measures
1. Provide water supply benefits	a. Reduction in imported water (in acre-feet per year) from conservation, recycling, desalination, storage, transfers, groundwater recharge/storage/conjunctive management, and/or other sources of new water b. Percent of project area implementing water use efficiency
2. Provide restoration and flood management benefits	Number of acres of new or restored habitat or flood plain protected
3. Provide water quality and salt management benefits	a. Volume of water treated (acre-feet/year or mgd) b. mass of salt or contaminants removed (tons/year).
4. Provide recreational benefits	Acres of open space/parks created
5. Provide benefits and avoid adverse impacts to disadvantaged communities and Native American tribes	a. Benefits to disadvantaged communities (Yes/No)b. Benefits to Native American tribes (Yes/No)
6. Reduce greenhouse gas emissions from water management activities	GHG Score: 0 = no information 3 = narrative description only 4 = numeric estimate without specific actions 5 = numeric estimate with specific actions
7. Increase resource-efficient land use and reduce impact on natural hydrology	a. Uses LID or other resource-efficient land use (Yes/No) b. Adversely impacts or changes natural hydrology (Negative impacts/No impacts/Positive impacts)
8. Cost match	Percent of project cost funded and secured from other sources
9. Cost effectiveness	A standardized per unit cost indicator (e.g., $/AF or $/acres of habitat)
10. Project readiness	Project readiness score: 1 = Planning studies completed 2 = Conceptual design (15%) completed 3 = Preliminary design (30%) completed 4 = Final design (100%) completed 5 = Project ready for construction bids (permits secured)
11. Increase active participation	Partnership Score: 1 = No or limited partnership 3 = Coordination with others 5 = Cost-share or in-kind funding partner

The graph below illustrates the relationship between goals and objectives, strategies, targets and evaluation criteria.

Chapter 7 further describes the project ranking method based on objectives achievement as indicated by the performance measures described above.

Guiding principles

1. View our actions as part of a watershed systems
2. Avoid transferring our problems to others or the environment
3. Work collaboratively

Goals and objectives (SteerCo)

1. Reliable water supply
2. Preserve/enhance the environment
3. Promote sustainable water solutions
4. Ensure high quality water
5. Provide economically effective solutions
6. Improve regional integration & coordination
7. Use rainfall as a resource
8. Provide recreational opportunities
9. Maintain quality of life

Strategies (SteerCo)

1. Increase storage
2. Reduce demand
3. Desalinate groundwater
4. Recycle water
5. Maximize preservation and use of native plants
6. Develop risk-based WQ improvements
7. Consider stormwater as water supply
8. Value water differently
9. Incorporate integrated water planning in General Plans
10. Manage public property for more than one use
11. Create watershed governance
12. Implement watershed-wide education programs

Targets (Pillars)

1. Recycle and reuse 100% of wastewater
2. Store water to account for ½ of demand
3. Reuse all Santa Ana River flow at least once
4. Remove all salt necessary for reuse
5. Reduce potable water use by 20%
6. Fill gaps in riparian corridors to provide wetlands and linkages
7. Meet California FloodSAFE goals & construct soft bottom flood
8. Meet WQ standards
9. Capture and recharge 80% of rainfall
10. Connect all tributary corridors to the SAR Trail
11. Assure adequate water supply and safe wastewater treatmentt
12. Reduce GHG emissions
13. Increase resource efficient land use

Evaluation criteria (Staff)

1. Provide water supply benefits
2. Provide restoration and flood management benefits
3. Provide water quality and salt management benefits
4. Provide recreational benefits
5. Provide benefits and avoid adverse impacts to disadvantaged communities and Native American tribes
6. Reduce greenhouse gas emissions from water management activities
7. Increase resource-efficient land use and reduce impact on natural hydrology
8. Cost match
9. Cost effectiveness
10. Project readiness
11. Increase active participation

Project (c) East Garden Grove Wintersburg Channel Urban Runoff Diversion

<u>A. Water Supply Benefits:</u>

<u>Narrative description of the project's economic costs:</u>

Project economic costs include the (1) capital costs, and (2) operational / maintenance costs. The capital costs include the construction of the pump station, mechanical equipment, diversion facility, and force main pipeline. The operation and maintenance costs include the monitoring of the diversion system and flows to the treatment system, maintenance and inspection of the different equipment, water quality monitoring, maintenance of the diversion and pump station facility, power costs to operate the pump systems, and the replacement costs of the different equipment based on the service life. Capital and Implementation Costs = $2,758,795 and the Operation / Maintenance Costs (annual) = $92,272 however if the present value over the 50-year service life O&M Costs (50-years PV) = $4,042,750

<u>Cost details for the entire project using Table 11 and the information in Table 7:</u>

Construction Costs - Detailed breakdown for the diversion system is based on the construction drawings and the detailed quantity estimate. The detailed engineers estimate breakdown is provided as technical documentation to support the costs. The construction estimate was broken down into the major elements which included (1) offsite power source, (2) channel demolition and replacement, (3) rubber dam, (4) channel inlet diversion structure, (5) stilling well, (6) silt basin and wet well, (7) pump station, (8) electrical, and (9) force main. The service life for the project is estimated to be 50-years based on the life expectancy of the rubber dam, however, this can be replaced and a replacement cost used instead. The service life can be extended to 100-years which would be similar to the life of the flood control; however, the 50-year life was conservatively used for the economic analysis. The additional Implementation Costs were analyzed in a detailed breakdown of the additional labor costs for the different items and well as the costs previously expended. Specific costs in the "implementation" of the project are known because these have been expended in order to complete the engineering design and CEQA documentation, as well as the project administration by the City for the project. The constructions drawings have been completed as well as the CEQA documentation and environmental regulatory permitting for the project so it is a "shovel-ready" project with these costs previously expended as noted in the breakdown of project costs. A detailed estimate and breakdown of the Operation and Maintenance costs were prepared based on an evaluation of the different O&M tasks for the different items associated with the diversion facility. The amount of labor and frequency was quantified to estimate both the operation requirements and maintenance. The additional operational costs include the annual power costs to operate the diversion pumps. The power consumption was based on the year round operation of the pumps and the pump characteristics. The replacement costs for the different mechanical and operational items were estimated based on the service different services life's of the equipment.

See Table 11.

Estimates of without-project conditions; e.g. current and future water supplies and demand:

The "without-project" represents the current water sources and the need to pay whole sale prices for water delivery. The City is fully urbanized so there should not be increase in the water supply requirements. The project represents the ability to tap into an unused water supply and free up existing water supplies for other uses. The project provides the ability to reduce the current demand from the existing source water and reduce the overall costs of buying water which is a cost savings.

Estimates of with-project conditions; e.g. improvements in new water supplies made available to meet demand:

Project conditions were determined based on the amount of water diverted or reclaimed which because a new water source that can be used to replace existing water supplies currently used or costs to buy that water. The water supply benefit was estimated through the amount of water reclaimed as a new unused water source and estimated as a cost savings based on a similar cost to buy non-potable water. The unit value for the water was estimate as 90% of the City's domestic water rate, currently our domestic rate is $1.79/ unit (748 gallons). The actual amount of water diverted was conservatively estimated for two different periods during the year which was the 6 rainfall season and then the non-rain season. In addition, it was assumed that the diversion system will not operate during large storm periods in order not to interfere with the flood control channel function and was assumed to be 15-days in the year. The rainy season was diversion utilized the high end of the measured average daily flows at 1.5 MGD because of the additional response from the watershed and the dry season used the lower average daily discharge estimate in the channel at 1.0 MGD. The total estimated average annual water that could be diverted from the channel was evaluated at the low-end for the economic analysis since up to 3MGD can be pumped from the channel. The total average annual volume reclaimed was estimated for economic purposes at 1,330 acre-feet based on these assumptions. This represents a new source of water and was compared to the current costs of similar source of water based on the prices that the City is currently incurring as the pre-project conditions.

Description of methods used to estimate without- and with-project conditions:

The procedure used to quantify the amount of additional water supply benefits relied on actual field monitoring of the channel flows during the dry season when the flows would be the lowest. The data provided a reliable forecast including other data sources to estimate the amount of water in the channel that could be captured, treated , and reclaimed. This is currently a waste stream that goes directly to the ocean so the baseline conditions just represented the current water usage in the City. Reclaiming this water would free up the existing water supplies and reduce the overall costs paid by the City for similar non-potable water sources.

Description of the distribution of local, regional, and statewide benefits:

Local Benefits would include (1) City benefits reduced costs for water through reclaiming the currently unused water source, (2) ability to free additional water supply sources currently utilized by the City. Regional Benefits include the (1) reduction in the demands on the regional water supplies, (2) regional benefits to improving the overdraft on the aquifer through additional recharge and supplementing the saltwater intrusion barrier. Statewide Benefits include more reliance on unused local water supply and less dependence on the state water projects as commercial water source.

Identification of beneficiaries:

The beneficiaries would include: (1) OCMWD and OCWD through the reduction of the amount of water withdrawal from the aquifer through existing production water wells within the City, and reducing the stress on the aquifer, (2) reducing demands on regional water supplies.

When the benefits will be received:

Benefits would be received immediately on completion of the project construction since water can be diverted from the channel and reclaimed for non-potable uses or for recharge into the upper aquifer to assist in replenishing groundwater and the saltwater intrusion barrier.

Uncertainty of Benefits:

The only uncertainty in the amount of the water supply benefit is associated with the amount of urban nuisance dry-weather flows generated in the future from the upstream 22 square mile urbanized watershed. The NPDES regulatory requirements related to municipalities controlling the amount of dry weather or non-storm flows released to receiving water will continue to be enforced in greater amounts. These requirements can potentially reduce the amount of urban dry-weather flow released to the channel that would be available for reclamation, as well as future water conservation efforts.

Description of any adverse effects:

There have not been any adverse impacts associated or identified with the project as part of the design/environmental process and approved CEQA documentation which has been prepared to evaluate the level of insignificant impacts from the project did not require any mitigation for the diversion portion of the project. The project illustrated that there were primarily positive impacts from the project since this eliminated a manmade disturbance to the downstream receiving waters and habitat.

Narrative discussion that describes, qualifies, and supports the values entered in the tables:

The values used in the tables to support the water supply (1) costs, and the (2) quantified water supply benefits are based on reliable documentation and field data. Costs have included both the capital and implementation costs that have been documented in detail based on the associated level of design from the corresponding improvement plans. The improvement plan and construction documents are ready for construction so a reliable engineer’s estimate of the construction costs has been developed. In addition, a corresponding detailed evaluation has been performed to indentify and quantify the different tasks as well as the frequency associated with the maintenance and operation of the system based on other similar pump stations facilities. The monetary value of the benefits can be documented with a high level of confidence since this represents a "new water supply" which was previously just an unused waste stream. Reclaiming this water source then provides a "value" to the water at similar costs which the City is being currently charging for selling similar non-potable water. The costs for this water has been documented through the City Water Department and is based the value which the Water Department could actually sell this water at 90% of the domestic rate, currently the City domestic rate charge is $1.79/ unit (748 gallons).

If possible, quantified estimates of physical and economic benefits using Table 12, 13, and 14, as applicable. Table 12 is used to present physical and economic benefits. Table 13 is used for the benefits in an avoided cost of future projects. Table 14 is used if the benefit is estimated in some other way (i.e., not using a unit monetary value or an avoided cost):

The "water supply" economic benefits are based on the monetary value of the reclaiming the unused waste stream of urban runoff as a new non-potable water source. The annual value of an estimated average 1,330 acre-feet of reclaimed water at $700/acre-foot for non-potable water is approximately $931,000. The estimated present worth value of this reclaimed water over a minimum 50-year service life, assuming the average annual reclaimed volume, is approximately $ 13,748,077 based on the results of the Table 12. Additional "benefits" for "avoided future project costs" were not utilized as part of the economic analysis (i.e. Tables 13 and 14).

Documentation to support information presented in the project, including studies, reports, and technical data, which will be used to assess the project's ability to produce the benefits claimed. Applicants may provide requested information for each project to help document the project, including using Table 11 through 14 on a project basis. However, the evaluation score will be determined based on the information provided for the project in its entirety:

The key design data related to the water supply benefit that can be achieved with this project is the amount of urban dry-weather flows available in the channel that can be captured. Actual physically measured field data was utilized to determine the average daily volume of water in the existing flood control channel that could be reclaimed from the urban dry-weather/nuisance flows and all the technical information / detailed engineering data to support the design of the diversion system is provided in the "Preliminary Design Report". Significant additional field studies have been conducted by other agencies, such as the County of Orange, related to monitoring the amount of flow during non-storm periods because of the critical nature of the downstream receiving waters and concerns related to water quality impacts. There is considerable amount of historical data as well as field verification monitoring that has been performed as part of the design for this project to verify the flows within the channel in order to ensure the minimum benefits anticipated with this project.

If the project includes a suite of projects, describe the relationship of each project to the overall project costs and to the overall water supply benefits of the entire project:

See Attachment 3 Work plan for description.

Table 11- Annual Cost of Project
(All costs should be in 2009 Dollars)
Project (c) East Garden Grove Wintersburg Channel Urban Runoff Diversion (C. Huntington Beach)

	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	$1,379,398						$1,379,398	1.000	$1,379,398
2010	$1,379,397						$1,379,397	0.943	$1,300,771
2011		$19,200	$34,982	$31,740	$6,350		$92,272	0.890	$82,122
2012		$19,200	$34,982	$31,740	$6,350		$92,272	0.840	$77,508
2013		$19,200	$34,982	$31,740	$6,350		$92,272	0.792	$73,079
2014		$19,200	$34,982	$31,740	$6,350		$92,272	0.747	$68,927
2015		$19,200	$34,982	$31,740	$6,350		$92,272	0.705	$65,052
2016		$19,200	$34,982	$31,740	$6,350		$92,272	0.665	$61,361
2017		$19,200	$34,982	$31,740	$6,350		$92,272	0.627	$57,855
2018		$19,200	$34,982	$31,740	$6,350		$92,272	0.592	$54,625
2019		$19,200	$34,982	$31,740	$6,350		$92,272	0.558	$51,488
2020		$19,200	$34,982	$31,740	$6,350		$92,272	0.527	$48,627
2021		$19,200	$34,982	$31,740	$6,350		$92,272	0.497	$45,859
2022		$19,200	$34,982	$31,740	$6,350		$92,272	0.469	$43,276
2023		$19,200	$34,982	$31,740	$6,350		$92,272	0.442	$40,784
2024		$19,200	$34,982	$31,740	$6,350		$92,272	0.417	$38,477
2025		$19,200	$34,982	$31,740	$6,350		$92,272	0.394	$36,355
2026		$19,200	$34,982	$31,740	$6,350		$92,272	0.371	$34,233
2027		$19,200	$34,982	$31,740	$6,350		$92,272	0.350	$32,295
2028		$19,200	$34,982	$31,740	$6,350		$92,272	0.331	$30,542
2029		$19,200	$34,982	$31,740	$6,350		$92,272	0.312	$28,789
2030		$19,200	$34,982	$31,740	$6,350		$92,272	0.294	$27,128
2031		$19,200	$34,982	$31,740	$6,350		$92,272	0.278	$25,652
2032		$19,200	$34,982	$31,740	$6,350		$92,272	0.262	$24,175
2033		$19,200	$34,982	$31,740	$6,350		$92,272	0.247	$22,791
2034		$19,200	$34,982	$31,740	$6,350		$92,272	0.233	$21,499
2035		$19,200	$34,982	$31,740	$6,350		$92,272	0.220	$20,300
2036		$19,200	$34,982	$31,740	$6,350		$92,272	0.207	$19,100
2037		$19,200	$34,982	$31,740	$6,350		$92,272	0.196	$18,085
2038		$19,200	$34,982	$31,740	$6,350		$92,272	0.185	$17,070

Table 11- Annual Cost of Project
(All costs should be in 2009 Dollars)
Project (c) East Garden Grove Wintersburg Channel Urban Runoff Diversion (C. Huntington Beach)

	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)
2039		$19,200	$34,982	$31,740	$6,350		$92,272	0.174	$16,055
2040		$19,200	$34,982	$31,740	$6,350		$92,272	0.164	$15,133
2041		$19,200	$34,982	$31,740	$6,350		$92,272	0.155	$14,302
2042		$19,200	$34,982	$31,740	$6,350		$92,272	0.146	$13,472
2043		$19,200	$34,982	$31,740	$6,350		$92,272	0.138	$12,734
2044		$19,200	$34,982	$31,740	$6,350		$92,272	0.130	$11,995
2045		$19,200	$34,982	$31,740	$6,350		$92,272	0.123	$11,349
2046		$19,200	$34,982	$31,740	$6,350		$92,272	0.116	$10,704
2047		$19,200	$34,982	$31,740	$6,350		$92,272	0.109	$10,058
2048		$19,200	$34,982	$31,740	$6,350		$92,272	0.103	$9,504
2049		$19,200	$34,982	$31,740	$6,350		$92,272	0.097	$8,950
2050		$19,200	$34,982	$31,740	$6,350		$92,272	0.092	$8,489
2051		$19,200	$34,982	$31,740	$6,350		$92,272	0.087	$8,028
2052		$19,200	$34,982	$31,740	$6,350		$92,272	0.082	$7,566
2053		$19,200	$34,982	$31,740	$6,350		$92,272	0.077	$7,105
2054		$19,200	$34,982	$31,740	$6,350		$92,272	0.073	$6,736
2055		$19,200	$34,982	$31,740	$6,350		$92,272	0.069	$6,367
2056		$19,200	$34,982	$31,740	$6,350		$92,272	0.065	$5,998
2057		$19,200	$34,982	$31,740	$6,350		$92,272	0.061	$5,629
2058		$19,200	$34,982	$31,740	$6,350		$92,272	0.058	$5,352
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									$4,042,750

Comments: The detail analysis of the breakdown for the operation and maintenance task items are include in the next work sheet which includes (1) the breakdown in labor and indivudal tasks for the operation, (2) details of the maintenance items including frequency and estimated hours, (3) operation costs for power to operate the mechanical equipment, (4) replacement costs of the different mechanical items based on the different typical services life of the different equipment..

(1) The incremental change in O&M costs attributable to the project.

EGGWC DIVERSION O&M LABOR ESTIMATE

Design Component	O&M Task Description	Frequency	Time to Peform Task, hours	Number of Personnel	Total Labor Hours / year	Specialist or Qualified Personnel	Labor Cost / hour	Annual Labor Cost
General Pump Station Operation	Montior pump rates / daily useage/	Daily	0.5	1	130	Yes	$60	$7,800
	Pump Station Inspection	Daily	0.5	1	130	Yes	$60	$7,800
Management / Administrative Reporting	Monthly Monitoring Report	Monthly	8	1	96	Yes	$60	$5,760
	Annual Operation Report	Annual	16	1	16	Yes	$60	$960
	Overall Management	Weekly	2	1	104	Yes	$120	$12,480
Rubber Dam	Inspect for proper operation	Weekly	1	1	52	No	$30	$1,560
	Debris & Trash Removal	Monthly	8	4	384	No	$30	$11,520
	Water Quality Sampling	Monthly	1	1	12	Yes	$60	$720
	Inspect Dam Body & Anchoring System	Yearly	6	2	12	No	$30	$360
Air Compressor for Rubber Dam	Inspect for proper operation	Weekly	0.5	1	26	No	$30	$780
	Replace air filters	3 months	2	2	16	No	$30	$480
	Rebuild air compressor	Yearly	8	1	8	Yes	$60	$480
Air Compressor for Aeration System	Inspect for proper operation	Weekly	0.5	1	26	No	$30	$780
	Replace air filters	3 months	2	2	16	No	$30	$480
	Rebuild air compressor	Yearly	8	1	8	Yes	$60	$480
Aeration System Valves	Inspect Valves	Weekly	1	1	52	No	$30	$1,560
	Maintain ball valves & tighten hose connections	Monthly	2	2	48	No	$30	$1,440
Aeration Tubing/Piping	Inspect tubing/piping for cracks or leaks	Weekly	1	1	52	No	$30	$1,560
	Visually verify the presence of bubbles	Weekly	1	1	52	No	$30	$1,560
Forebay (CDS Unit or Similar)	Inspect for proper operation	Monthly	1	1	12	No	$30	$360
	Debris & Trash Removal	4 months	2	2	12	No	$30	$360
Pumps	Check Running Volts and Amps	Monthly	2	2	48	No	$30	$1,440
	Grease Motor Bearings	Yearly	5	2	10	No	$30	$300
Electrical	Inspect Contactors	Monthly	0.5	2	12	No	$30	$360
	Inspect Breakers	Yearly	1	2	2	No	$30	$60
	Inspect Main Control Panel	Weekly	0.5	2	52	No	$30	$1,560
	Inspect Motor Control Center (MCC)	2 years	2	2	2	No	$30	$60
	Service for Electrical components (estimate only)	Yearly	20	1	20	Yes	$60	$1,200
Valves	Inspect valves	Weekly	1	1	52	No	$30	$1,560
	Inspect Plumbing in & around pumps for leaks	Monthly	1	2	24	No	$30	$720
LABOR COST TOTAL					***1010***			***$66,540***

EGGWC DIVERSION POWER COST ESTIMATE

Design Component	Type of Equipment	HP	Days of 24 Hr. Operation / Year	Hours / Year	No. of Units	Kilowatt Hour / Year	Cost / KW-Hr	Annual Cost
Air Compressor for Rubber Dam	Thomas 3 HP Air Compressor	3	10	240	1	540	$0.14	$76
Air Compressor for Aeration	Thomas 1/3 HP Oil-less Air Compressor	0.33	365	8,760	3	6,504	$0.14	$911
Pumps	VFD Pump - 1200 gpm @ 30'	10	365	8,760	2	131,400	$0.14	$18,396
POWER COST TOTAL								***$19,382***

EGGWC DIVERSION MATERIAL AND EQUIPMENT REPLACEMENT COST ESTIMATE

Material or Equipment	Cost / Unit	No. of Units	Total Cost	Useful Life (years)	Annual Replacement Cost
Thomas 3 HP Air Compressor	$600	1	$600	10	$60
Thomas 1/3 HP Oil-less Air Compressor	$500	3	$1,500	10	$150
VFD Pump - 1200 gpm @ 30'	$17,500	2	$35,000	20	$1,750
Pump Materials (gaskets, bearings, etc.)	$100	2	$200	5	$40
Electrical Controls	$15,000	1	$15,000	20	$750
Water Quality Laboratory Testing	$300	1 / month	$3,600	N/A	$3,600
REPLACEMENT COST TOTAL					***$6,350***

EGGWC Diversion O&M Summary

Labor Cost =	$66,540
Power Cost =	$19,382
Material & Equipment Cost =	$6,350
TOTAL:	***$92,272***

PACE

Table 12 - Annual Water Supply Benefits
(All benefits should be in 2009 dollars)
Project (c) East Garden Grove Wintersburg Channel Urban Runoff Diversion (C. Huntington Beach)

(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	Addiontal Non-potable Water	acre-feet	0	0	0	$700	$0	1.000	$0
2010	Addiontal Non-potable Water	acre-feet	0	0	0	$700	$0	0.943	$0
2011	Addiontal Non-potable Water	acre-feet	0	1,330	1,330	$700	$931,000	0.890	$828,590
2012	Addiontal Non-potable Water	acre-feet	0	1,330	1,330	$700	$931,000	0.840	$782,040
2013	Addiontal Non-potable Water	acre-feet	0	1,330	1,330	$700	$931,000	0.792	$737,352
2014	Addiontal Non-potable Water	acre-feet	0	1,330	1,330	$700	$931,000	0.747	$695,457
2015	Addiontal Non-potable Water	acre-feet	0	1,330	1,330	$700	$931,000	0.705	$656,355
2016	Addiontal Non-potable Water	acre-feet	0	1,330	1,330	$700	$931,000	0.665	$619,115
2017	Addiontal Non-potable Water	acre-feet	0	1,330	1,330	$700	$931,000	0.627	$583,737
2018	Addiontal Non-potable Water	acre-feet	0	1,330	1,330	$700	$931,000	0.592	$551,152
2019	Addiontal Non-potable Water	acre-feet	0	1,330	1,330	$700	$931,000	0.558	$519,498

Table 12 - Annual Water Supply Benefits
(All benefits should be in 2009 dollars)
Project (c) East Garden Grove Wintersburg Channel Urban Runoff Diversion (C. Huntington Beach)

(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)
2020	Addiontal Non-potable Water	acre-feet	0	1,330	1,330	$700	$931,000	0.527	$490,637
2021	Addiontal Non-potable Water	acre-feet	0	1,330	1,330	$700	$931,000	0.497	$462,707
2022	Addiontal Non-potable Water	acre-feet	0	1,330	1,330	$700	$931,000	0.469	$436,639
2023	Addiontal Non-potable Water	acre-feet	0	1,330	1,330	$700	$931,000	0.442	$411,502
2024	Addiontal Non-potable Water	acre-feet	0	1,330	1,330	$700	$931,000	0.417	$388,227
2025	Addiontal Non-potable Water	acre-feet	0	1,330	1,330	$700	$931,000	0.394	$366,814
2026	Addiontal Non-potable Water	acre-feet	0	1,330	1,330	$700	$931,000	0.371	$345,401
2027	Addiontal Non-potable Water	acre-feet	0	1,330	1,330	$700	$931,000	0.350	$325,850
2028	Addiontal Non-potable Water	acre-feet	0	1,330	1,330	$700	$931,000	0.331	$308,161
2029	Addiontal Non-potable Water	acre-feet	0	1,330	1,330	$700	$931,000	0.312	$290,472
2030	Addiontal Non-potable Water	acre-feet	0	1,330	1,330	$700	$931,000	0.294	$273,714

Table 12 - Annual Water Supply Benefits
(All benefits should be in 2009 dollars)
Project (c) East Garden Grove Wintersburg Channel Urban Runoff Diversion (C. Huntington Beach)

(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)
2031	Addiontal Non-potable Water	acre-feet	0	1,330	1,330	$700	$931,000	0.278	$258,818
2032	Addiontal Non-potable Water	acre-feet	0	1,330	1,330	$700	$931,000	0.262	$243,922
2033	Addiontal Non-potable Water	acre-feet	0	1,330	1,330	$700	$931,000	0.247	$229,957
2034	Addiontal Non-potable Water	acre-feet	0	1,330	1,330	$700	$931,000	0.233	$216,923
2035	Addiontal Non-potable Water	acre-feet	0	1,330	1,330	$700	$931,000	0.220	$204,820
2036	Addiontal Non-potable Water	acre-feet	0	1,330	1,330	$700	$931,000	0.207	$192,717
2037	Addiontal Non-potable Water	acre-feet	0	1,330	1,330	$700	$931,000	0.196	$182,476
2038	Addiontal Non-potable Water	acre-feet	0	1,330	1,330	$700	$931,000	0.185	$172,235
2039	Addiontal Non-potable Water	acre-feet	0	1,330	1,330	$700	$931,000	0.174	$161,994
2040	Addiontal Non-potable Water	acre-feet	0	1,330	1,330	$700	$931,000	0.164	$152,684
2041	Addiontal Non-potable Water	acre-feet	0	1,330	1,330	$700	$931,000	0.155	$144,305

Table 12 - Annual Water Supply Benefits
(All benefits should be in 2009 dollars)
Project (c) East Garden Grove Wintersburg Channel Urban Runoff Diversion (C. Huntington Beach)

(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)
2042	Addiontal Non-potable Water	acre-feet	0	1,330	1,330	$700	$931,000	0.146	$135,926
2043	Addiontal Non-potable Water	acre-feet	0	1,330	1,330	$700	$931,000	0.138	$128,478
2044	Addiontal Non-potable Water	acre-feet	0	1,330	1,330	$700	$931,000	0.130	$121,030
2045	Addiontal Non-potable Water	acre-feet	0	1,330	1,330	$700	$931,000	0.123	$114,513
2046	Addiontal Non-potable Water	acre-feet	0	1,330	1,330	$700	$931,000	0.116	$107,996
2047	Addiontal Non-potable Water	acre-feet	0	1,330	1,330	$700	$931,000	0.109	$101,479
2048	Addiontal Non-potable Water	acre-feet	0	1,330	1,330	$700	$931,000	0.103	$95,893
2049	Addiontal Non-potable Water	acre-feet	0	1,330	1,330	$700	$931,000	0.097	$90,307
2050	Addiontal Non-potable Water	acre-feet	0	1,330	1,330	$700	$931,000	0.092	$85,652
2051	Addiontal Non-potable Water	acre-feet	0	1,330	1,330	$700	$931,000	0.087	$80,997
2052	Addiontal Non-potable Water	acre-feet	0	1,330	1,330	$700	$931,000	0.082	$76,342

Table 12 - Annual Water Supply Benefits (All benefits should be in 2009 dollars) Project (c) East Garden Grove Wintersburg Channel Urban Runoff Diversion (C. Huntington Beach)									
(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)
2053	Addiontal Non-potable Water	acre-feet	0	1,330	1,330	$700	$931,000	0.077	$71,687
2054	Addiontal Non-potable Water	acre-feet	0	1,330	1,330	$700	$931,000	0.073	$67,963
2055	Addiontal Non-potable Water	acre-feet	0	1,330	1,330	$700	$931,000	0.069	$64,239
2056	Addiontal Non-potable Water	acre-feet	0	1,330	1,330	$700	$931,000	0.065	$60,515
2057	Addiontal Non-potable Water	acre-feet	0	1,330	1,330	$700	$931,000	0.061	$56,791
2058	Addiontal Non-potable Water	acre-feet	0	1,330	1,330	$700	$931,000	0.058	$53,998
…									
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)									$13,748,077
Comments: The amount of diverted or reclaimed water from the flood control channel used 350 days per year diversion assuming 15 days per year non-operation because of flood periods in the channel. Diversion amount during the 6 month flood season is 1.5 MGD and during the dry season the average diversion is 1.0 MGD. Total Volume = 167*1.5 MGD + 183*1.0 MGD = 1,330 acre-feet. Unit cost of the nonpotable water is 90% of the current domestice rate or $780/AF so 90% of that rate is $700/AF									

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

Table 15. Total Water Supply Benefits (All benefits should be in 2009 dollars)			
Project (c) East Garden Grove Wintersburg Channel Urban Runoff Diversion (C. Huntington Beach)			
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)
$13,748,077	$0	$0	$13,748,077
Comments:			

8391E - EGGWC Diversion Cost Estimate
Based on Contruction Plans

ITEM	UNITS	QTY	UNIT PRICE ($)	COST ($)
Power Souce				
3" Electrical Conduit (3 @ 1200 LF)	LF	1200	$20	$24,000
			Power Source Subtotal:	*$24,000*
Channel Demolition & Replacement				
Concrete Invert Demo	CY	120	$150	$18,000
Concrete Wall Demo	LF	17	$300	$5,100
Access Road excavation	CY	1360	$8	$10,880
Below channel excavation	CY	40	$8	$320
Hauling	CY	1500	$10	$15,000
Channel Invert Replacement - structural concrete	CY	115	$675	$77,625
Aggregate Base	CY	77	$30	$2,310
Non-woven Geotextile (AMOCO 2016)	SY	233	$2	$350
Channel Wall Replacement - structural concrete	CY	17	$675	$11,475
Steel Railing - Remove & Replace	LF	25	$16	$400
Water control dam/diversion pump/piping	LS	1	$10,000	$10,000
Dewatering and water diversion operation	LS	1	$15,000	$15,000
CMB Access Road Replacement	SY	150	$10	$1,500
			Channel Demo & Replacement Subtotal:	*$167,960*
Rubber Dam*				
Rubber Dam - 3/8" Thick (about 1125 SF)	LS	1	$600,000	$600,000
Rubber Dam - storage & installation	LS	1	$45,000	$45,000
3" diameter S.S. inlet/outlet air Pipe	LF	54	$40	$2,160
Anchor Clamping Plate (3.5" (W) 316 S.S.)	LF	95	N/A	N/A
Anchor Embedded Plate (3/8" (W) 304 S.S.)	LF	95	N/A	N/A
Anchor Bolt - 8" depth (3/4" 316 S.S.) w/ hardware	EA	190	$20	$3,800
			Rubber Dam Subtotal:	*$650,960*
Inlet Structure				
11'x8'x4' Precast Concrete Inlet Box	LS	1	$25,000	$25,000
Steel Grates & Frame (HDG 12 sections: 1'-5 3/8" x 3'-4")	SF	63	$500	$31,500
24" Diameter C905 PVC Inlet Pipe	LF	35	$200	$7,000
			Inlet Structure Subtotal:	*$63,500*
Stilling Well				
Bubbler System Panel	EA	2	$5,000	$10,000
30" PVC Schedule 80 (2 @ 15 LF)	LF	30	$90	$2,700
8" PVC Schedule 80 (2 @ 35 LF)	LF	70	$32	$2,240
2" PVC Schedule 80 (2 @ 33 LF)	LF	66	$20	$1,320
3/4" PVC Schedule 80 (2 @ 20 LF)	LF	40	$8	$320
Reinforced Concrete Collar/Slab	CY	4	$500	$2,000
30" Manhole & Frame	EA	2	$500	$1,000
			Stilling Well Subtotal:	*$19,580*
Silt Basin				
16'x10.5'x24' Precast reinforced concrete vault	LS	1	$59,000	$59,000
Reinforced Concrete Baffle Walls	CY	3	$500	$1,500
24" Manhole & Frame	EA	2	$500	$1,000

8391E - EGGWC Diversion Cost Estimate
Based on Contruction Plans

ITEM	UNITS	QTY	UNIT PRICE ($)	COST ($)
Access Hatch (3'x3' single leaf, H-20 rated)	EA	1	$1,000	$1,000
Excavation and shoring	LS	1	$20,000	$20,000
Aluminum Ladder	VLF	24	$100	$2,400
			Silt Basin Subtotal:	*$84,900*
Pump Station				
16'x10.5'x24' Precast reinforced concrete vault	LS	1	$59,000	$59,000
Submersible Pump (20 HP, VFD)	EA	2	$29,000	$58,000
Valves, fittings, sensors, misc equipment	LS	1	$34,000	$34,000
Sump pump (1/3 HP)	EA	1	$10,000	$10,000
Air Compressor	EA	1	$3,000	$3,000
Air Compressor valves, sensors, equipment	LS	1	$2,000	$2,000
Exhaust Fan, intake vent, exhaust vent	LS	1	$5,000	$5,000
Access Hatch (3'x3' single leaf, H-20 rated)	EA	2	$1,000	$2,000
Excavation and shoring	LS	1	$20,000	$20,000
Metal Ship Ladder with Platform	LS	1	$5,000	$5,000
			Pump Station Subtotal:	*$198,000*
Electrical**				
Control Panel & Programming	LS	1	$35,000	$35,000
SES/MCC	LS	1	$50,000	$50,000
Level Instruments	LS	1	$8,000	$8,000
Service Electrical Wire	LS	1	$40,000	$40,000
Control, Lighting, and Recep. Wire	LS	1	$15,000	$15,000
			Electrical Subtotal:	*$148,000*
Force Main				
12" DIP Forcemain	LF	35	$130	$4,550
12" C900 PVC Forcemain	LF	1550	$140	$217,000
11.25 degree bend	EA	2	$500	$1,000
22.5 degree bend	EA	2	$500	$1,000
45 degree bend	EA	6	$500	$3,000
90 degree bend	EA	5	$500	$2,500
Traffic Control	LS	1	$15,000	$15,000
Pavement Replacement	LS	1	$10,000	$10,000
Concrete Pipe Penetration	LS	1	$5,000	$5,000
			Force Main Subtotal:	*$259,050*
			EGGWC Diversion Total Cost Estimate:	**$1,615,950**

* Cost based on OCFCD Rubber Dam installations adjusted to 2009 (ENR cost index)

** Estimates based on preliminary cost estimate 01-06-09

Project (d) Romoland Line A Flood System

A. Water Supply Benefits:

Narrative description of the project's economic costs:

The land that makes up the Briggs Road and Juniper Flats basins consists of six assessor's parcels totaling 73.6 acres. In addition there is 11,800 lineal feet of open channel comprising about 16.3 acres. Land values have decreased significantly since these parcels were acquired and dedicated, so the estimated purchase price contained in Attachment 4 is not comparable to the current fair market value. The total assessed value of the underlying land is $698,925. This represents a fair estimate for the fair market value.

Cost details for the entire project using Table 11 and the information in Table 7:

Budget categories (a), (d), (f), (g) and (h) are included in the cost details as described in Table 7. Budget category (b) (Land Purchase/Easement) is included at the fair market value, as described in the above paragraph. Budget category (c) contains the $90,000 described in Table 7 as remaining costs, with the remainder considered to be sunk costs. The cost of Budget category (e) going forward is expected to be equal to 15% of the total estimate, or $15,000.

See Table 11.

Estimates of without-project conditions; e.g. current and future water supplies and demand:

In the current condition rainfall moves rapidly off the eastern mountains within this watershed and hits a alluvial fan spreading out over a large area. The I-215 freeway serves as a dam with the constraint being the undersized bridge in Caltrans right-of-way. The soils in this portion of the watershed are mainly impervious. The flood water collects along a wide front of the I-215 freeway and eventually discharges through the small bridge and sheet flows to the San Jacinto River.

Estimates of with-project conditions; e.g. improvements in new water supplies made available to meet demand:

This project includes two large detention basins and 11,800 linear feet of interconnecting open channel designed for the Q100 storm event. The basins will contain 80% of the upstream runoff, dramatically reducing the downstream flooding. The two drainage basins are located in the upper end of the alluvial plain and contain coarser, more permeable soils. The drainage basin groundwater will be replenished at a rate at least 20-30% more than is currently achieved without the project.

Description of methods used to estimate without- and with-project conditions:

Based on the information on the output from the basins, inflow and outflow HEC1 studies prepared by Webb.

Description of the distribution of local, regional, and statewide benefits:

All benefits are local.

Identification of beneficiaries:

Eastern Municipal Water District (they have prepared a groundwater master plan) and their users.

When the benefits will be received:

At the completion of the Project.

Uncertainty of Benefits:

The benefits were calculated based on a hundred year storm. The benefits will be proportional to the level of storms that occur. Storms tend to follow the predictable path, but there will be variation.

Description of any adverse effects:

The basins are below ground so they don't provide any danger to the public.

Narrative discussion that describes, qualifies, and supports the values entered in the tables:

Projected in-flows and out-flows for 2, 5, 10, and 100-year events were calculated by the project engineer. It was also estimated that of the 4,800 acres that are currently within FEMA Flood Zone A, 1600 acres would remain within the Flood Zone after Project completion. The number of flooded acres for a 100-year event was then applied to lesser flood events proportional to the reduction in flows.

A table was produced (see Exhibit D) that lists each flood event, the probability of occurrence and the amount of groundwater percolation expected during each event. It was assumed that flood waters would be approximately 1 foot deep and that 20% of standing water would percolate into the groundwater. Water held in the basins was assumed to percolate completely into the ground.

Estimated administration, operations, maintenance and replacement costs for the Project were provided by the City of Menifee.

If possible, quantified estimates of physical and economic benefits using Table 12, 13, and 14, as applicable. Table 12 is used to present physical and economic benefits. Table 13 is used for the benefits in an avoided cost of future projects. Table 14 is used if the benefit is estimated in some other way (i.e., not using a unit monetary value or an avoided cost):

[See Table 12]

Documentation to support information presented in the project, including studies, reports, and technical data, which will be used to assess the project's ability to produce the benefits claimed. Applicants may provide requested information for each project to help document the project, including using Table 11 through 14 on a project basis. However, the evaluation score will be determined based on the information provided for the project in its entirety:

See Exhibit Floodplain Removal Diagram (Exhibit A), Calculation of Storm Flows (Exhibit B), and EMWD groundwater management plan (Exhibit C).

If the project includes a suite of projects, describe the relationship of each project to the overall project costs and to the overall water supply benefits of the entire project:

See Attachment 3 Work plan for description.

Table 11- Annual Cost of Project
(All costs should be in 2009 Dollars)
Project (d) Romoland Line A Flood System (C. Menifee)

	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	$698,925	$0	$0	$0	$0	$0	$698,925	0.943	$659,363
2011	$886,405	$0	$0	$0	$0	$0	$886,405	0.890	$788,897
2012	$4,168,055	$0	$0	$0	$0	$0	$4,168,055	0.840	$3,499,579
2013	$1,174,569	$10,000	$8,000	$25,000	$20,000	$0	$1,237,569	0.792	$980,271
2014	$0	$10,000	$8,000	$25,000	$20,000	$0	$63,000	0.747	$47,077
2015	$0	$10,000	$8,000	$25,000	$20,000	$0	$63,000	0.705	$44,413
2016	$0	$10,000	$8,000	$25,000	$20,000	$0	$63,000	0.665	$41,899
2017	$0	$10,000	$8,000	$25,000	$20,000	$0	$63,000	0.627	$39,527
2018	$0	$10,000	$8,000	$25,000	$20,000	$0	$63,000	0.592	$37,290
2019	$0	$10,000	$8,000	$25,000	$20,000	$0	$63,000	0.558	$35,179
2020	$0	$10,000	$8,000	$25,000	$20,000	$0	$63,000	0.527	$33,188
2021	$0	$10,000	$8,000	$25,000	$20,000	$0	$63,000	0.497	$31,309
2022	$0	$10,000	$8,000	$25,000	$20,000	$0	$63,000	0.469	$29,537
2023	$0	$10,000	$8,000	$25,000	$20,000	$0	$63,000	0.442	$27,865
2024	$0	$10,000	$8,000	$25,000	$20,000	$0	$63,000	0.417	$26,288
2025	$0	$10,000	$8,000	$25,000	$20,000	$0	$63,000	0.394	$24,800
2026	$0	$10,000	$8,000	$25,000	$20,000	$0	$63,000	0.371	$23,396
2027	$0	$10,000	$8,000	$25,000	$20,000	$0	$63,000	0.350	$22,072
2028	$0	$10,000	$8,000	$25,000	$20,000	$0	$63,000	0.331	$20,822
2029	$0	$10,000	$8,000	$25,000	$20,000	$0	$63,000	0.312	$19,644
2030	$0	$10,000	$8,000	$25,000	$20,000	$0	$63,000	0.294	$18,532
2031	$0	$10,000	$8,000	$25,000	$20,000	$0	$63,000	0.278	$17,483
2032	$0	$10,000	$8,000	$25,000	$20,000	$0	$63,000	0.262	$16,493
2033	$0	$10,000	$8,000	$25,000	$20,000	$0	$63,000	0.247	$15,560
2034	$0	$10,000	$8,000	$25,000	$20,000	$0	$63,000	0.233	$14,679
2035	$0	$10,000	$8,000	$25,000	$20,000	$0	$63,000	0.220	$13,848

Table 11- Annual Cost of Project (All costs should be in 2009 Dollars) Project (d) Romoland Line A Flood System (C. Menifee)									
	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)
2036	$0	$10,000	$8,000	$25,000	$20,000	$0	$63,000	0.207	$13,064
2037	$0	$10,000	$8,000	$25,000	$20,000	$0	$63,000	0.196	$12,325
2038	$0	$10,000	$8,000	$25,000	$20,000	$0	$63,000	0.185	$11,627
Total Present Value of Discounted Costs (Sum of Column (i)) Transfer to Table 20, column (c), Exhibit F: Proposal Costs and Benefits Summaries									$6,566,024
Comments:									

(1) The incremental change in O&M costs attributable to the project.

Groundwater Recharge Analysis Project (d) Romoland Line A Flood System (C. Menifee)						
Hydrologic Event	Event Probability	Event Percolation		Average Annual Percolation		Groundwater Recharge Benefit
		Without Project	With Project	Without Project	With Project	
(a)	(b)	(d)	(e)	(f)	(g)	(h)
				(c) x (d)	(c) x (e)	(g) – (f)
2-Year	0.50	219	731	109.50	365.50	256.00
5-Year	0.20	352	767	70.40	153.40	83.00
10-Year	0.10	468	801	46.80	80.10	33.30
100-Year	0.01	840	960	8.40	9.60	1.20
				235.10	**608.60**	**373.50**

Table 12 - Annual Water Supply Benefits (All benefits should be in 2009 dollars) Project (d) Romoland Line A Flood System (C. Menifee)									
(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	Groundwater Recharge	Acre-Feet	0	0	0	$409	$0	1.000	$0
2010	Groundwater Recharge	Acre-Feet	0	0	0	$409	$0	0.943	$0
2011	Groundwater Recharge	Acre-Feet	0	0	0	$409	$0	0.890	$0
2012	Groundwater Recharge	Acre-Feet	110	609	499	$409	$204,132	0.840	$171,393
2013	Groundwater Recharge	Acre-Feet	110	609	499	$409	$204,132	0.792	$161,692
2014	Groundwater Recharge	Acre-Feet	110	609	499	$409	$204,132	0.747	$152,539
2015	Groundwater Recharge	Acre-Feet	110	609	499	$409	$204,132	0.705	$143,905
2016	Groundwater Recharge	Acre-Feet	110	609	499	$409	$204,132	0.665	$135,759
2017	Groundwater Recharge	Acre-Feet	110	609	499	$409	$204,132	0.627	$128,075
2018	Groundwater Recharge	Acre-Feet	110	609	499	$409	$204,132	0.592	$120,825
2019	Groundwater Recharge	Acre-Feet	110	609	499	$409	$204,132	0.558	$113,986
2020	Groundwater Recharge	Acre-Feet	110	609	499	$409	$204,132	0.527	$107,534
2021	Groundwater Recharge	Acre-Feet	110	609	499	$409	$204,132	0.497	$101,447
2022	Groundwater Recharge	Acre-Feet	110	609	499	$409	$204,132	0.469	$95,705
2023	Groundwater Recharge	Acre-Feet	110	609	499	$409	$204,132	0.442	$90,288
2024	Groundwater Recharge	Acre-Feet	110	609	499	$409	$204,132	0.417	$85,177
2025	Groundwater Recharge	Acre-Feet	110	609	499	$409	$204,132	0.394	$80,356
2026	Groundwater Recharge	Acre-Feet	110	609	499	$409	$204,132	0.371	$75,807
2027	Groundwater Recharge	Acre-Feet	110	609	499	$409	$204,132	0.350	$71,516
2028	Groundwater Recharge	Acre-Feet	110	609	499	$409	$204,132	0.331	$67,468
2029	Groundwater Recharge	Acre-Feet	110	609	499	$409	$204,132	0.312	$63,649
2030	Groundwater Recharge	Acre-Feet	110	609	499	$409	$204,132	0.294	$60,047
2031	Groundwater Recharge	Acre-Feet	110	609	499	$409	$204,132	0.278	$56,648
2032	Groundwater Recharge	Acre-Feet	110	609	499	$409	$204,132	0.262	$53,441

Table 12 - Annual Water Supply Benefits (All benefits should be in 2009 dollars) Project (d) Romoland Line A Flood System (C. Menifee)									
(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)
2033	Groundwater Recharge	Acre-Feet	110	609	499	$409	$204,132	0.247	$50,416
2034	Groundwater Recharge	Acre-Feet	110	609	499	$409	$204,132	0.233	$47,562
2035	Groundwater Recharge	Acre-Feet	110	609	499	$409	$204,132	0.220	$44,870
2036	Groundwater Recharge	Acre-Feet	110	609	499	$409	$204,132	0.207	$42,330
2037	Groundwater Recharge	Acre-Feet	110	609	499	$409	$204,132	0.196	$39,934
2038	Groundwater Recharge	Acre-Feet	110	609	499	$409	$204,132	0.185	$37,674
Total Present Value of Discounted Benefits Based on Unit Value (Sum of the values in Column (j) for all Benefits shown in table)									$2,400,046
Comments:									

Table 15. Total Water Supply Benefits (All benefits should be in 2009 dollars)			
Project (d) Romoland Line A Flood System (C. Menifee)			
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)
$2,400,046	NA	$0	$2,400,046
Comments:			

Project (e) Santa Ana Watershed Vireo Monitoring

SAWA's biological monitoring of endangered, native and invasive birds in the watershed directly supports SAWA's efforts to remove and maintain control over (to date) approximately 4,000 acres of land in the Santa Ana Watershed that was formerly covered in Arundo donax or Giant Reed, and expects to remove another 100 acres per year over the next three years.

Annual water use by Arundo has been estimated by various studies to be from 3.8 acre-feet (Jackson, Katagi, and Loper 2002) and 5.5 acre-feet (Iverson, 1993) per acre of Arundo. Giant Reed also has been shown to use three times as much water (Iverson, 1993) as native plants.

Our calculation of the value of water saved annually by our removal and control efforts, which are supported by our biological activities, are based on the 4,000 acres of Arundo that SAWA has removed and continues to maintain virtually Arundo-free annually in the watershed.

We took the mean of the estimates of annual Arundo water use in the available literature (4.65 acre-feet) and subtracted one-third to account for the water that native vegetation would use if it occupied the same area. This equals 3.1 acre-feet of water savings. We multiplied 4,000 acres by 3.1 for a total of 12,400 acre feet of water. This is a conservative estimate because some of the area formerly covered by Arundo is not covered in native plants.

We then multiplied the 12,400 acre-feet by the Metropolitan Water District's current import rate of $450 per acre-foot for Tier 1 water. The total annual water savings of SAWA's removal and maintenance effort to date is estimated at $5,580,000. By the end of the first year of the we estimate we will have removed approximately 4,100 acres, by the second year 4,200 acres and by the third year 4,300 acres, a savings of 12,710, 13020 and 13,330 acre-feet annually, respectively. The estimate annual water savings for the three years of the project in current dollars are as follows:

2011	2012	2013
$5,719,500	$5,859,000	$5,998,500

The Santa Ana Watershed Vireo Monitoring and Breeding Bird Surveys Project is integral to the accomplishment of SAWA's invasive plant removal and ongoing maintenance activities.

References

Jackson, N.E., Katagi W., Loper C. 2002. “Southern California Integrated Watershed Program Arundo Removal Protocol.” Santa Ana Watershed Project Authority.

Iverson M.E. 1994. “The Impact of Arundo donax on Water Resources.” November 1993. Arundo donax Workshop Proceedings, pp. 19-25. Ontario, CA.

Table 11- Annual Cost of Project (All costs should be in 2009 Dollars) Project (e) Santa Ana Watershed Vireo Monitoring (SAWA)									
	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	1.000	$0
2010		$0	$0				$0	0.943	$0
2011		$6,767	$276,937				$283,704	0.890	$252,497
2012		$6,970	$280,779				$287,749	0.840	$241,709
2013		$7,180	$289,778				$296,958	0.792	$235,191
								…	
Project Life	$868,413	$20,918	$847,494					…	
Total Present Value of Discounted Costs (Sum of Column (i)) Transfer to Table 20, column (c), Exhibit F: Proposal Costs and Benefits Summaries									$729,396
Comments:									

(1) The incremental change in O&M costs attributable to the project.

Table 14 - Annual Other Water Supply Benefits

(All benefits should be in 2009 dollars)

Project (e) Santa Ana Watershed Vireo Monitoring (SAWA)

(a) Year	(b) Type of Benefit	(c) Description of Benefit	(d) Annual Benefits ($) (1)	(e) Discount Factor (1)	(f) Discounted Benefits (d) x (e) (1)
2009				1.000	$0
	..				
2010				0.943	
	..				
2011	Water saved	The vireo monitoring and cowbird trapping operations will support the retention of a 4,100-acre area once covered in Arundo. Studies show that for each acre of Arundo removed and maintained Arundo-free, approximately 3.1 acre-feet of water is saved each year. These efforts support programs that result the retention of 12,710 acre-feet of water per year (see attached Rationale, WaterSupplyBenefits.doc).	$5,719,500	0.890	$5,090,355
	..				
2012	Water saved	In the second year of the project SAWA intends to add another 100 acres of removal to the project area, bringing the estimated acre-feet of water retained in the watershed to 13,020 acre-feet.	$5,859,000	0.850	$4,980,150
	..				
2013	Water saved	In the third year of the project SAWA intends to add another 100 acres of removal to the project area, bringing the estimated acre-feet of water retained in the watershed to 13,330 acre-feet.	$5,998,500	0.792	$4,750,812
...				…	
Project Life			$17,577,000	…	
Total Present Value of Discounted Benefits Based on Unit Value (Sum of the values in Column (f) for all Benefits shown in table)					$14,821,317

Comments:

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

Table 15. Total Water Supply Benefits (All benefits should be in 2009 dollars)			
Project (e) Santa Ana Watershed Vireo Monitoring (SAWA)			
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)
$14,821,317			$14,821,317
Comments:			

Project (f) Mill Creek Wetlands

The Project provides water quality treatment and transient storage of low and potentially high flows within the Prado Basin, providing a benefit to downstream water supply and water users such as Orange County Water District (OCWD). The OCWD utilizes stored Prado Basin water as a groundwater replenishment source and transient storage facility. By providing water quality treatment (i.e., pollutant removal), the Project offsets a portion of the total pollutant removal that is required by downstream water users; freeing up some water treatment capacity of downstream water quality systems. By providing storage of low flows without utilizing low-flow pools in the Prado Basin (i.e., by diverting the low flows and storing them in the wetlands and ponds), the Project provides increased operational storage that can be utilized by downstream water agencies for groundwater recharge. While these contributions may not singly mitigate the need for downstream capital projects, Project elements provide quantifiable water supply benefits to 100,000 Orange County and downstream users.

Project (g) Cactus Basins

A. Water Supply Benefits:

Not Applicable

Project (h) Inland Empire Brine Line Rehabilitation and Enhancement

A. Water Supply Benefits:

Narrative description of the project's economic costs:

The estimated capital cost to increase the capacity of the Lower Reach IVB is $11.2 million, which will be incurred between 2013. Incremental operation and maintenance costs are estimated to be approximately $238,000 per year, starting in 2012. The present value costs of The Brine Line Reach IVB Rehabilitation and Capacity Improvement Project (the "Project"), assuming a useful life of 50 years, is $10.7 million. The present value of the costs of the project, assuming a useful life of 50 years, is $10.7 million. Furthermore, the net present value of the water supply benefits and the water quality benefits over the same useful life is $609.5 million. Therefore, the cost benefit ratio of the project is 56.8.

Introduction:

The Project consists of improvements to a portion of the 93 mile Santa Ana Regional Interceptor Line ("SARI Line") that will increase capacity in the line by 4 million gallons per day ("mgd"). The SARI Line is owned by Santa Ana Watershed Project Authority ("SAWPA") and by SAWPA member agencies that all own capacity in the line, and serves to remove salt from the watershed including brine from brackish groundwater desalters, and to collect and transport non-reclaimable industrial brine that could not be accepted at local treatment facilities due to high total dissolved salts ("TDS") concentration. Approximately 45% of the current flow in the SARI Line can be attributed to desalting facilities operating in the Inland Empire.

This Project is integrated with Eastern Municipal Water District's ("EMWD") Brackish Water Well Project and Western Municipal Water District's ("WMWD") Chino Creek Well Field Project, all three projects being a part of SAWPA's suite of 13 projects. The additional capacity in the SARI Line will allow EMWD and WMWD to discharge additional brine waste from their respective desalter projects. This additional waste is the concentrated residual brine resulting from treatment of pumped groundwater to potable standards, thereby developing new, local water supplies. Therefore, increasing the capacity of the SARI line will provide the benefit of creating new water supplies.

Because the EMWD and WMWD projects cannot exist on a long term basis without the additional capacity in the SARI Line, the water supply benefits calculated for the EMWD and WMWD accrue to SAWPA's project also. However, to avoid double counting of benefits, water supply benefits calculated for EMWD and WMWD will be identified as "primary" benefits in their respective sections of this application, while those same benefits will be identified as "secondary" benefits to the SAWPA Project. In Section B "Water Quality Benefits", benefits related to reduced groundwater salinity derived from the EMWD and WMWD projects will accrue to the SAWPA Project as "primary" benefits.

Cost details for the entire project using Table 11 and the information in Table 7:

See Table 11.

Estimates of without-project conditions; e.g. current and future water supplies and demand:

The Brine Line Reach IVB receives brine discharge from EMWD's and WMWD's service areas. The Urban Water Management Plans ("UWMP") for EMWD and WMWD estimate the service area populations at 420,000 and 61,000 respectively. Based on Southern California Association of Governments ("SCAG"), the service areas' populations are expected to grow to approximately 890,000 and 139,000 by 2030. Under the current capacity limits, SAWPA anticipates that the SARI Line Reach IVB will be operating at full capacity before 2020.

Without the Project, future desalting projects may not occur because of the lack of a cost effective alternative to discharge brine. As a result, EMWD and WMWD will increase reliance on imported water in order to meet the demands of future growth which will result in a greater salt imbalance. Both agencies purchase imported water from Metropolitan Water District ("MWD") and the cost of Full Service Treated water from MWD, effective January 2011, will be $869 per acre-foot ("AF"). Based on projection to 2020 provided by MWD, the cost of imported water is expected to increase by an average of 5% annually. However, with various factors affecting the supply of imported water – such as competition for new supply, concerns for endangered species at water sources, and drought conditions – both EMWD and WMWD service areas will continue to face water reliability challenges, especially as new development takes place.

Estimates of with-project conditions; e.g. improvements in new water supplies made available to meet demand:

The proposed Project will create an additional capacity for 4 mgd of brine water discharge in the SARI Line Reach IVB. This additional capacity will facilitate groundwater treatment projects that will generate approximately 23,295 acre-feet per year ("AFY") of potable water, assuming all the additional discharge capacity is utilized for that purpose. The new water sources would reduce the regional reliance on imported water. Based on cost estimates provided by EMWD and WMWD, desalting facilities are expected to produce treated water at cost between $558 and 568 per AF. For purposes of this analysis the cost was assumed to be an average of $563 per AF.

The annual rates for MWD water were determined using the methodology described in the "without- and with-project" section. The resulting cost-savings benefit is estimated to be $285 per AF in 2012 and is expected to increase annually to $1,722 per AF by 2062. The net present value of the benefit over the 50 year life of the Project is quantified in Table 12, and amounts to approximately **$94.3 million.**

Description of methods used to estimate without- and with-project conditions:

In calculating the "with and without Project" conditions, the cost to EMWD and WMWD of importing potable water from MWD is compared to the average cost of desalting water locally. The Project is expected to facilitate the production of 23,295 AFY of new potable water shown in column (e), from 27,779 AFY of pumped groundwater. Effective 1/2011, the cost of imported water is $869 per AF. For purposes of calculating benefit, the MWD water rates were discounted by 3% to account for the inflation factor included in the annual cost increases. Specifically, the MWD rate effective 1/2011 of $869 per AF was discounted by 3% annually over 2 years (to $819 per AF) to account for the inflation factor built into the rate since 2009. Similarly, all projected MWD rates were also discounted by 3% to reflect expected real increases over time. As projections were only available through 2020, it was assumed that the MWD rates would continue to increase annually by 2% which is the average growth rate of projected MWD rates (approximately 5%), less 3% for inflation.

Moreover, based on cost estimates provided by EMWD and WMWD, desalting facilities are expected to produce treated water at between $558 and 568 per AF. However, for purposes of this analysis the cost was assumed to be $563 per AF. Therefore, the resulting annual cost savings in 2012 was estimated to be $285 per AF and is found in column (g) of Table 12. Because the real annual costs of desalting are expected to remain flat over time, the cost-savings benefit per AF is expected increase annually, also shown in Table 12.

Description of the distribution of local, regional, and statewide benefits:

Benefit	**Measure**	**Value**	**Beneficiaries**
Increased Capacity To Accommodate New Waste Discharge which Enables New Water Production	Quantitative	$285 per AF (2012)	Local/Regional
Greater Water Reliability	Qualitative	++	Local/Regional
Reduced Salt Imbalance	Qualitative	++	Local/Regional

+ Likely to have minor impacts
++ Likely to have significant impacts
+++ Likely to have very significant impacts

Local/Regional:

1. The Project will increase the discharge capacity which will provide for the implementation of future desalting projects in the region.
2. The Project will improve water reliability indirectly, by reducing the need for imported water in the region.

Statewide:

1. The Project will indirectly reduce the need for imported water.

Identification of beneficiaries:

1. EMWD and WMWD will benefit from increased discharge capacity which will provide for the implementation of future desalting projects in the region.
2. EMWD and WMWD will benefit from greater water reliability by decreasing the need to import water.
3. The watershed will benefit by reducing the salt imbalance.
4. The State will benefit from reduced reliance on imported water.

When the benefits will be received:

The Project is expected to be completed by November 2012. The additional capacity created by the Project will be available for use after this date, although SAWPA anticipates that EMWD and WMWD will require this additional capacity between 2015 and 2020.

Uncertainty of Benefits:

Although the Project is creating additional capacity for discharge resulting primarily from treatment of groundwater, the actual creation of new potable water will be dependent on future desalting projects that will utilize the additional capacity for brine discharge.

The uncertainty of the quantified benefits for the project in essence is the uncertainty of the various factors in the economic analysis related to the EMWD and WMWD projects, such a swell depth, ground material encountered in the drilling process, water quality of the groundwater pumped, energy costs, water demands, etc.

Description of any adverse effects:

Adverse Effects	**Measure**	**Impact**
Short Term Construction Impacts to Air Quality	Qualitative	+
Impacts to Biological Resources Habitat Conservation Plans	Qualitative	+

+ Likely to have minor impacts
++ Likely to have significant impacts
+++ Likely to have very significant impacts

Narrative discussion that describes, qualifies, and supports the values entered in the tables:

The amount of future water production given a 4 mgd discharge capacity was determined to be 23,295 AFY, based on an average efficiency of 84% for desalters in EMWD and WMWD service areas. The estimation further assumes that the entire 4 mgd discharge capacity will be utilized by desalting projects.

If possible, quantified estimates of physical and economic benefits using Table 12, 13, and 14, as applicable. Table 12 is used to present physical and economic benefits. Table 13 is used for the benefits in an avoided cost of future projects. Table 14 is used if the benefit is estimated in some other way (i.e., not using a unit monetary value or an avoided cost):

[See Table 12]

Documentation to support information presented in the project, including studies, reports, and technical data, which will be used to assess the project's ability to produce the benefits claimed. Applicants may provide requested information for each project to help document the project, including using Table 11 through 14 on a project basis. However, the evaluation score will be determined based on the information provided for the project in its entirety:

MWD Water Rates:
Metropolitan Water District Water Rates and Charges,
http://www.mwdh2o.com/mwdh2o/pages/finance/finance_03.html

Desalting Costs:
EMWD Operating Budget, FY 2010-11
Chino Desalter Phase 3 – Comprehensive Predesign Report, June 2010

Impacts of High Salinity:
Pitzer, Water Education Foundation, Salinity in the Central Valley: A Critical Problem
Poland, Groundwater in California, AIME TRANSACTIONS, FEB 1950, VOL 187, pg. 280

If the project includes a suite of projects, describe the relationship of each project to the overall project costs and to the overall water supply benefits of the entire project:

The Project works in concert with Western Municipal Water District ("WMWD") Phase I Chino Creek Well Fields project, and Eastern Municipal Water District ("EMWD") Brackish Water Well project. Brine discharge from EMWD's desalter and WMWD's desalter will be conveyed to SAWPA's Santa Ana Regional Interceptor ("SARI") Line. Expansion of the SARI Line will provide needed capacity to accept brine discharge from the desalter facilities that accept, treat and deliver new potable water suppliers. These three projects work together and represent three of the thirteen projects that make up SAWPA's "suite of projects".

The economic costs and benefits for this project as well as the costs and benefits for the WMWD project and the EMWD benefits, as calculated in the respective Table 12 and 16, are also entered in Table 20, which summarizes the total costs and benefits for the entire suite of 13 projects.

Table 11- Annual Cost of Project (All costs should be in 2009 Dollars) Project (h) Inland Empire Brine Line Rehabilitation and Enhancement (SAWPA)									
	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							$0	0.890	$0
2012							$0	0.840	$0
2013	$11,216,831						$11,216,831	0.792	$8,884,781
2014			$238,000				$238,000	0.747	$177,847
2015			$238,000				$238,000	0.705	$167,781
2016			$238,000				$238,000	0.665	$158,284
2017			$238,000				$238,000	0.627	$149,324
2018			$238,000				$238,000	0.592	$140,872
2019			$238,000				$238,000	0.558	$132,898
2020			$238,000				$238,000	0.527	$125,375
2021			$238,000				$238,000	0.497	$118,279
2022			$238,000				$238,000	0.469	$111,584
2023			$238,000				$238,000	0.442	$105,268
2024			$238,000				$238,000	0.417	$99,309
2025			$238,000				$238,000	0.394	$93,688
2026			$238,000				$238,000	0.371	$88,385
2027			$238,000				$238,000	0.350	$83,382
2028			$238,000				$238,000	0.331	$78,662
2029			$238,000				$238,000	0.312	$74,210
2030			$238,000				$238,000	0.294	$70,009
2031			$238,000				$238,000	0.278	$66,046
2032			$238,000				$238,000	0.262	$62,308
2033			$238,000				$238,000	0.247	$58,781
2034			$238,000				$238,000	0.233	$55,454
2035			$238,000				$238,000	0.220	$52,315
2036			$238,000				$238,000	0.207	$49,354
2037			$238,000				$238,000	0.196	$46,560
2038			$238,000				$238,000	0.185	$43,925
2039			$238,000				$238,000	0.174	$41,438
2040			$238,000				$238,000	0.164	$39,093
2041			$238,000				$238,000	0.155	$36,880
2042			$238,000				$238,000	0.146	$34,792
2043			$238,000				$238,000	0.138	$32,823
2044			$238,000				$238,000	0.130	$30,965
2045			$238,000				$238,000	0.123	$29,212
2046			$238,000				$238,000	0.116	$27,559
2047			$238,000				$238,000	0.109	$25,999
2048			$238,000				$238,000	0.103	$24,527
2049			$238,000				$238,000	0.097	$23,139
2050			$238,000				$238,000	0.092	$21,829
2051			$238,000				$238,000	0.087	$20,594
2052			$238,000				$238,000	0.082	$19,428
2053			$238,000				$238,000	0.077	$18,328
2054			$238,000				$238,000	0.073	$17,291
2055			$238,000				$238,000	0.069	$16,312
2056			$238,000				$238,000	0.065	$15,389
2057			$238,000				$238,000	0.061	$14,518
2058			$238,000				$238,000	0.058	$13,696
2059			$238,000				$238,000	0.054	$12,921
2060			$238,000				$238,000	0.051	$12,189
2061			$238,000				$238,000	0.048	$11,499
2062			$238,000				$238,000	0.046	$10,848
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									$11,845,945
Comments:									

(1) The incremental change in O&M costs attributable to the project.

Table 12 - Annual Water Supply Benefits

(All benefits should be in 2009 dollars)

Project (h) Inland Empire Brine Line Rehabilitation and Enhancement (SAWPA)

(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	Additional Water Desalting Capacity (Assuming 4 MGD discharge)	Acre-Feet	0	0	0		$0	1.000	$0
2010	Additional Water Desalting Capacity (Assuming 4 MGD discharge)	Acre-Feet	0	0	0		$0	0.943	$0
2011	Additional Water Desalting Capacity (Assuming 4 MGD discharge)	Acre-Feet	0	0	0		$0	0.890	$0
2012	Additional Water Desalting Capacity (Assuming 4 MGD discharge)	Acre-Feet	0	0	0	$285	$0	0.840	$0
2013	Additional Water Desalting Capacity (Assuming 4 MGD discharge)	Acre-Feet	0	23295	23295	$304	$7,086,682	0.792	$5,613,316
2014	Additional Water Desalting Capacity (Assuming 4 MGD discharge)	Acre-Feet	0	23295	23295	$324	$7,541,244	0.747	$5,635,256
2015	Additional Water Desalting Capacity (Assuming 4 MGD discharge)	Acre-Feet	0	23295	23295	$340	$7,911,766	0.705	$5,577,483
2016	Additional Water Desalting Capacity (Assuming 4 MGD discharge)	Acre-Feet	0	23295	23295	$358	$8,340,732	0.665	$5,547,063
2017	Additional Water Desalting Capacity (Assuming 4 MGD discharge)	Acre-Feet	0	23295	23295	$377	$8,783,671	0.627	$5,510,984
2018	Additional Water Desalting Capacity (Assuming 4 MGD discharge)	Acre-Feet	0	23295	23295	$395	$9,200,857	0.592	$5,445,973
2019	Additional Water Desalting Capacity (Assuming 4 MGD discharge)	Acre-Feet	0	23295	23295	$415	$9,664,571	0.558	$5,396,646
2020	Additional Water Desalting Capacity (Assuming 4 MGD discharge)	Acre-Feet	0	23295	23295	$434	$10,116,964	0.527	$5,329,490
2021	Additional Water Desalting Capacity (Assuming 4 MGD discharge)	Acre-Feet	0	23295	23295	$454	$10,579,275	0.497	$5,257,576
2022	Additional Water Desalting Capacity (Assuming 4 MGD discharge)	Acre-Feet	0	23295	23295	$474	$11,050,833	0.469	$5,181,062
2023	Additional Water Desalting Capacity (Assuming 4 MGD discharge)	Acre-Feet	0	23295	23295	$495	$11,531,822	0.442	$5,100,536
2024	Additional Water Desalting Capacity (Assuming 4 MGD discharge)	Acre-Feet	0	23295	23295	$516	$12,022,431	0.417	$5,016,540
2025	Additional Water Desalting Capacity (Assuming 4 MGD discharge)	Acre-Feet	0	23295	23295	$538	$12,522,851	0.394	$4,929,574
2026	Additional Water Desalting Capacity (Assuming 4 MGD discharge)	Acre-Feet	0	23295	23295	$559	$13,033,281	0.371	$4,840,097
2027	Additional Water Desalting Capacity (Assuming 4 MGD discharge)	Acre-Feet	0	23295	23295	$582	$13,553,918	0.350	$4,748,531
2028	Additional Water Desalting Capacity (Assuming 4 MGD discharge)	Acre-Feet	0	23295	23295	$605	$14,084,969	0.331	$4,655,266
2029	Additional Water Desalting Capacity (Assuming 4 MGD discharge)	Acre-Feet	0	23295	23295	$628	$14,626,641	0.312	$4,560,656
2030	Additional Water Desalting Capacity (Assuming 4 MGD discharge)	Acre-Feet	0	23295	23295	$652	$15,179,146	0.294	$4,465,028
2031	Additional Water Desalting Capacity (Assuming 4 MGD discharge)	Acre-Feet	0	23295	23295	$676	$15,742,701	0.278	$4,368,680
2032	Additional Water Desalting Capacity (Assuming 4 MGD discharge)	Acre-Feet	0	23295	23295	$700	$16,317,527	0.262	$4,271,884
2033	Additional Water Desalting Capacity (Assuming 4 MGD discharge)	Acre-Feet	0	23295	23295	$726	$16,903,850	0.247	$4,174,888
2034	Additional Water Desalting Capacity (Assuming 4 MGD discharge)	Acre-Feet	0	23295	23295	$751	$17,501,899	0.233	$4,077,918
2035	Additional Water Desalting Capacity (Assuming 4 MGD discharge)	Acre-Feet	0	23295	23295	$778	$18,111,909	0.220	$3,981,179
2036	Additional Water Desalting Capacity (Assuming 4 MGD discharge)	Acre-Feet	0	23295	23295	$804	$18,734,119	0.207	$3,884,856
2037	Additional Water Desalting Capacity (Assuming 4 MGD discharge)	Acre-Feet	0	23295	23295	$831	$19,368,774	0.196	$3,789,116
2038	Additional Water Desalting Capacity (Assuming 4 MGD discharge)	Acre-Feet	0	23295	23295	$859	$20,016,122	0.185	$3,694,110
2039	Additional Water Desalting Capacity (Assuming 4 MGD discharge)	Acre-Feet	0	23295	23295	$888	$20,676,416	0.174	$3,599,974
2040	Additional Water Desalting Capacity (Assuming 4 MGD discharge)	Acre-Feet	0	23295	23295	$917	$21,349,917	0.164	$3,506,827
2041	Additional Water Desalting Capacity (Assuming 4 MGD discharge)	Acre-Feet	0	23295	23295	$946	$22,036,887	0.155	$3,414,779
2042	Additional Water Desalting Capacity (Assuming 4 MGD discharge)	Acre-Feet	0	23295	23295	$976	$22,737,597	0.146	$3,323,923
2043	Additional Water Desalting Capacity (Assuming 4 MGD discharge)	Acre-Feet	0	23295	23295	$1,007	$23,452,321	0.138	$3,234,346
2044	Additional Water Desalting Capacity (Assuming 4 MGD discharge)	Acre-Feet	0	23295	23295	$1,038	$24,181,340	0.130	$3,146,119
2045	Additional Water Desalting Capacity (Assuming 4 MGD discharge)	Acre-Feet	0	23295	23295	$1,070	$24,924,939	0.123	$3,059,306
2046	Additional Water Desalting Capacity (Assuming 4 MGD discharge)	Acre-Feet	0	23295	23295	$1,103	$25,683,410	0.116	$2,973,964
2047	Additional Water Desalting Capacity (Assuming 4 MGD discharge)	Acre-Feet	0	23295	23295	$1,136	$26,457,051	0.109	$2,890,138
2048	Additional Water Desalting Capacity (Assuming 4 MGD discharge)	Acre-Feet	0	23295	23295	$1,170	$27,246,164	0.103	$2,807,868
2049	Additional Water Desalting Capacity (Assuming 4 MGD discharge)	Acre-Feet	0	23295	23295	$1,204	$28,051,059	0.097	$2,727,185
2050	Additional Water Desalting Capacity (Assuming 4 MGD discharge)	Acre-Feet	0	23295	23295	$1,239	$28,872,053	0.092	$2,648,117
2051	Additional Water Desalting Capacity (Assuming 4 MGD discharge)	Acre-Feet	0	23295	23295	$1,275	$29,709,466	0.087	$2,570,683
2052	Additional Water Desalting Capacity (Assuming 4 MGD discharge)	Acre-Feet	0	23295	23295	$1,312	$30,563,627	0.082	$2,494,897
2053	Additional Water Desalting Capacity (Assuming 4 MGD discharge)	Acre-Feet	0	23295	23295	$1,349	$31,434,872	0.077	$2,420,771
2054	Additional Water Desalting Capacity (Assuming 4 MGD discharge)	Acre-Feet	0	23295	23295	$1,388	$32,323,542	0.073	$2,348,308
2055	Additional Water Desalting Capacity (Assuming 4 MGD discharge)	Acre-Feet	0	23295	23295	$1,426	$33,229,985	0.069	$2,277,510
2056	Additional Water Desalting Capacity (Assuming 4 MGD discharge)	Acre-Feet	0	23295	23295	$1,466	$34,154,557	0.065	$2,208,376
2057	Additional Water Desalting Capacity (Assuming 4 MGD discharge)	Acre-Feet	0	23295	23295	$1,507	$35,097,620	0.061	$2,140,899

Table 12 - Annual Water Supply Benefits

(All benefits should be in 2009 dollars)

Project (h) Inland Empire Brine Line Rehabilitation and Enhancement (SAWPA)

(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)]
2058	Additional Water Desalting Capacity (Assuming 4 MGD discharge)	Acre-Feet	0	23295	23295	$1,548	$36,059,545	0.058	$2,075,070
2059	Additional Water Desalting Capacity (Assuming 4 MGD discharge)	Acre-Feet	0	23295	23295	$1,590	$37,040,708	0.054	$2,010,879
2060	Additional Water Desalting Capacity (Assuming 4 MGD discharge)	Acre-Feet	0	23295	23295	$1,633	$38,041,494	0.051	$1,948,312
2061	Additional Water Desalting Capacity (Assuming 4 MGD discharge)	Acre-Feet	0	23295	23295	$1,677	$39,062,296	0.048	$1,887,351
2062	Additional Water Desalting Capacity (Assuming 4 MGD discharge)	Acre-Feet	0	23295	23295	$1,722	$40,103,514	0.046	$1,827,981
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)									$188,597,289

Comments:

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

Table 15. Total Water Supply Benefits (All benefits should be in 2009 dollars)			
Project (h) Inland Empire Brine Line Rehabilitation and Enhancement (SAWPA)			
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)
188597289.4	NA	0	188597289.4
Comments:			

Project (i) Arlington Desalter Interconnection Project

A. Water Supply Benefits:

Using Table 11, Annual Cost of Project, the present value project cost is $869,150. Using Table 13, Annual Costs of Avoided Projects, the total present value of project benefits is $31.3 million. The resulting benefit cost ratio is 36.1 (reference Table 20).

The Arlington Desalter Interconnection allows Corona DWP to avoid the additional project of expanding the Temescal Desalter plant. The Corona DWP currently provides water to its residents with a Total Dissolved Solids (TDS) of about 700 milligrams per liter (mg/l). The TDS within the Corona water supply is near the maximum allowed by the State. Corona DWP plans on mixing its current water with water provided by this project to reduce the overall TDS of the system.

Admittedly, there is no water supply benefit to Corona DWP to implement this project because its water wholesaler is Western Municipal Water District and this intertie only strengthens the redundancy within the system. However, when taking into account the avoided project because of the water mixing and TDS reduction, the project becomes beneficial over the life of the project.

The benefit cost analysis utilizes the following assumptions. Initial construction of the Temescal Desalter cost approximately $30 million. It is estimated that the Temescal facility would need to be expanded by 50% in order to achieve the same TDS reduction offered by the Promenade Avenue connection. This expansion is estimated somewhere between $5 million and $20 million depending on the needed capacity. To be conservative, the grant application is using the average cost between the two estimates ($12.5 million). Corona DWP estimates that the expansion project would not be required until approximately 2012 and Table 13 reflects this implementation date.

To estimate the potential operation and maintenance cost, Corona DWP is assuming that a project expansion of 50% to the Temescal Desalter would also have a proportional increase on operations and maintenance costs. Currently the City of Corona spends approximately $2.9 million and $205,000 annually on operations and maintenance, respectively. The avoided expansion would increase operations and maintenance cost by $1.45 million (operations) and $102,500 (maintenance), for a total increase in O&M of approximately $1.6 million. For the BCA, only the additional cost is used.

No other benefits can be identified that can be described in monetary terms.

Table 11- Annual Cost of Project (All costs should be in 2009 Dollars) Project (i) Arlington Desalter Interconnection Project (C. Corona)									
	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	$901,908	$0	$2,000	$2,500	$0	$0	$906,408	0.890	$806,703
2012		$0	$2,000	$2,500	$0	$0	$4,500	0.840	$3,780
2013		$0	$2,000	$2,500	$0	$0	$4,500	0.792	$3,564
2014		$0	$2,000	$2,500	$0	$0	$4,500	0.747	$3,362
2015		$0	$2,000	$2,500	$0	$0	$4,500	0.705	$3,173
2016		$0	$2,000	$2,500	$0	$0	$4,500	0.665	$2,993
2017		$0	$2,000	$2,500	$0	$0	$4,500	0.627	$2,822
2018		$0	$2,000	$2,500	$0	$0	$4,500	0.592	$2,664
2019		$0	$2,000	$2,500	$0	$0	$4,500	0.558	$2,511
2020		$0	$2,000	$2,500	$0	$0	$4,500	0.527	$2,372
2021		$0	$2,000	$2,500	$0	$0	$4,500	0.497	$2,237
2022		$0	$2,000	$2,500	$0	$0	$4,500	0.469	$2,111
2023		$0	$2,000	$2,500	$0	$0	$4,500	0.442	$1,989
2024		$0	$2,000	$2,500	$0	$0	$4,500	0.417	$1,877
2025		$0	$2,000	$2,500	$0	$0	$4,500	0.394	$1,773
2026		$0	$2,000	$2,500	$0	$0	$4,500	0.371	$1,670
2027		$0	$2,000	$2,500	$0	$0	$4,500	0.350	$1,575
2028		$0	$2,000	$2,500	$0	$0	$4,500	0.331	$1,490
2029		$0	$2,000	$2,500	$0	$0	$4,500	0.312	$1,404
2030		$0	$2,000	$2,500	$0	$0	$4,500	0.294	$1,323
2031		$0	$2,000	$2,500	$0	$0	$4,500	0.278	$1,251
2032		$0	$2,000	$2,500	$0	$0	$4,500	0.262	$1,179
2033		$0	$2,000	$2,500	$0	$0	$4,500	0.247	$1,112
2034		$0	$2,000	$2,500	$0	$0	$4,500	0.233	$1,049
2035		$0	$2,000	$2,500	$0	$0	$4,500	0.220	$990
2036		$0	$2,000	$2,500	$0	$0	$4,500	0.207	$932
2037		$0	$2,000	$2,500	$0	$0	$4,500	0.196	$882
2038		$0	$2,000	$2,500	$0	$0	$4,500	0.185	$833
2039		$0	$2,000	$2,500	$0	$0	$4,500	0.174	$783
2040		$0	$2,000	$2,500	$0	$0	$4,500	0.164	$738
2041		$0	$2,000	$2,500	$0	$0	$4,500	0.155	$698
2042		$0	$2,000	$2,500	$0	$0	$4,500	0.146	$657
2043		$0	$2,000	$2,500	$0	$0	$4,500	0.138	$621
2044		$0	$2,000	$2,500	$0	$0	$4,500	0.130	$585
2045		$0	$2,000	$2,500	$0	$0	$4,500	0.123	$554
2046		$0	$2,000	$2,500	$0	$0	$4,500	0.116	$522
2047		$0	$2,000	$2,500	$0	$0	$4,500	0.109	$491
2048		$0	$2,000	$2,500	$0	$0	$4,500	0.103	$464
2049		$0	$2,000	$2,500	$0	$0	$4,500	0.097	$437
2050		$0	$2,000	$2,500	$0	$0	$4,500	0.092	$414
2051		$0	$2,000	$2,500	$0	$0	$4,500	0.087	$392
2052		$0	$2,000	$2,500	$0	$0	$4,500	0.082	$369
2053		$0	$2,000	$2,500	$0	$0	$4,500	0.077	$347
2054		$0	$2,000	$2,500	$0	$0	$4,500	0.073	$329
2055		$0	$2,000	$2,500	$0	$0	$4,500	0.069	$311
2056		$0	$2,000	$2,500	$0	$0	$4,500	0.065	$293
2057		$0	$2,000	$2,500	$0	$0	$4,500	0.061	$275
2058		$0	$2,000	$2,500	$0	$0	$4,500	0.058	$261
...								…	
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									$869,150
Comments:									

(1) The incremental change in O&M costs attributable to the project.

Table 13 - Annual Costs of Avoided Projects **(All avoided costs should be in 2009 dollars)** **Project (i) Arlington Desalter Interconnection Project (C. Corona)**						
	Costs				**Discounting Calculations**	
(a)	**(b)**	**(c)**	**(d)**	**(e)**	**(f)**	**(g)**
YEAR	Alternative (Avoided Project Name): Desalter Expansion *Avoided Project Description: Current desalter expansion to increase capacity by 50%*				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				0	1.000	$0
2010				0	0.943	$0
2011				0	0.890	$0
2012	12500000	0	0	12500000	0.840	$10,500,000
2013			1600000	1600000	0.792	$1,267,200
2014			1600000	1600000	0.747	$1,195,200
2015			1600000	1600000	0.705	$1,128,000
2016			1600000	1600000	0.665	$1,064,000
2017			1600000	1600000	0.627	$1,003,200
2018			1600000	1600000	0.592	$947,200
2019			1600000	1600000	0.558	$892,800
2020			1600000	1600000	0.527	$843,200
2021			1600000	1600000	0.497	$795,200
2022			1600000	1600000	0.469	$750,400
2023			1600000	1600000	0.442	$707,200
2024			1600000	1600000	0.417	$667,200
2025			1600000	1600000	0.394	$630,400
2026			1600000	1600000	0.371	$593,600
2027			1600000	1600000	0.350	$560,000
2028			1600000	1600000	0.331	$529,600
2029			1600000	1600000	0.312	$499,200
2030			1600000	1600000	0.294	$470,400
2031			1600000	1600000	0.278	$444,800
2032			1600000	1600000	0.262	$419,200
2033			1600000	1600000	0.247	$395,200
2034			1600000	1600000	0.233	$372,800
2035			1600000	1600000	0.220	$352,000
2036			1600000	1600000	0.207	$331,200
2036			1600000	1600000	0.196	$313,600
2038			1600000	1600000	0.185	$296,000
2039			1600000	1600000	0.174	$278,400
2040			1600000	1600000	0.164	$262,400
2041			1600000	1600000	0.155	$248,000
2042			1600000	1600000	0.146	$233,600
2043			1600000	1600000	0.138	$220,800
2044			1600000	1600000	0.130	$208,000
2045			1600000	1600000	0.123	$196,800
2046			1600000	1600000	0.116	$185,600
2047			1600000	1600000	0.109	$174,400
2048			1600000	1600000	0.103	$164,800
2049			1600000	1600000	0.097	$155,200
2050			1600000	1600000	0.092	$147,200

Table 13 - Annual Costs of Avoided Projects

(All avoided costs should be in 2009 dollars)

Project (i) Arlington Desalter Interconnection Project (C. Corona)

	Costs				**Discounting Calculations**	
(a)	**(b)**	**(c)**	**(d)**	**(e)**	**(f)**	**(g)**
YEAR	Alternative (Avoided Project Name): Desalter Expansion *Avoided Project Description: Current desalter expansion to increase capacity by 50%*				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)		
2051			1600000	1600000	0.087	$139,200
2052			1600000	1600000	0.082	$131,200
2053			1600000	1600000	0.077	$123,200
2054			1600000	1600000	0.073	$116,800
2055			1600000	1600000	0.069	$110,400
2056			1600000	1600000	0.065	$104,000
2057			1600000	1600000	0.061	$97,600
2058			1600000	1600000	0.058	$92,800
...					…	
Project Life	12500000	0	73600000	86100000	…	
Total Present Value of Discounted Costs (Sum of Column (g))						$31,359,200
(%) Avoided Cost Claimed by Project						100%
Total Present Value of Discounted Avoided Project Costs Claimed by alternative Project (Total Present Value of Discounted Costs x % Avoided Cost Claimed by Project)						$31,359,200

Comments:

Table 15. Total Water Supply Benefits (All benefits should be in 2009 dollars)			
Project (i) Arlington Desalter Interconnection Project (C. Corona)			
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)
	31359200		31359200
Comments:			

Project (j) Perris II Desalination Facility

A. Water Supply Benefits:

Narrative description of the project's economic costs:

The Brackish Water Well 93 Project (the "Project") consists of the construction of a new, fully-developed and equipped brackish water well. The Project is an element of the Eastern Municipal Water District ("EMWD") South Perris Desalination Program which consists of 12 existing brackish water wells, up to seven proposed brackish water wells, two existing desalters, a third proposed desalter, and a brine line to the Santa Ana Regional Interceptor ("SARI") Line.

The estimated capital cost to construct and equip the brackish water well is $2.3 million. Some of the project costs have already been incurred consistent with Proposal Solicitation Package ("PSP"). On Table 11, these costs will be shown as incurred in 2011. Future costs are projected to be incurred between 2011 and 2013. Operation and maintenance costs are estimated to be approximately $85,000 per year, starting in 2014. The present value of the costs of the project, assuming a useful life of 30 years, is $2.8 million. Furthermore, the net present value of the water supply benefits and the water quality benefits over the same useful life is $26.5 million. Therefore, the cost benefit ratio of the project is 9.3.

Cost details for the entire project using Table 11 and the information in Table 7:

See Table 11.

Estimates of without-project conditions; e.g. current and future water supplies and demand:

The Project is located in a rapidly growing area served by EMWD, consisting of six (6) cities (Hemet, Moreno Valley, portion of Murrieta, Perris, San Jacinto and Temecula) and some unincorporated areas of Riverside County. The 2009 population in the EMWD service area is approximately 660,000, and according to the Southern California Association of Government ("SCAG") projections, the population is expected to reach approximately 890,000 by 2030.

EMWD is dependent on three (3) main water sources: Metropolitan Water District ("MWD"), local groundwater, and recycled water. The Urban Water Management Plan ("UWMP") from 2005 identifies that approximately 80% of EMWD's potable water is imported and supplied by MWD.

Without the proposed Project, EMWD will need to import approximately 700 acre-feet per year ("AFY") of potable water to meet the demands for future growth. The cost of imported water is expected to be $882 per acre-foot ("AF") in 2013. This rate is expected to continue rising (excluding inflation) through 2025. With various factors affecting the supply of imported water - such as competition for new supply, concerns for endangered species at water sources, and drought conditions – EMWD's service area will continue to face water reliability challenges, especially as new development takes place.

Estimates of with-project conditions; e.g. improvements in new water supplies made available to meet demand:

The Project will create approximately 700 AFY of potable water for the service area and reduce reliance on imported water. The existing Perris I Desalter can produce potable water at a cost of $568 per AF. As mentioned in the previous section, the rates for imported water are expected to increase annually. Therefore, the cost-savings benefit of $314 per AF in 2013 is expected to increase annually to $1,562 per AF by 2043. The net present value of the benefit over the 30 year life of the Project is quantified in Table 12, and amounts to approximately $5.5 million.

The Project will further benefit the EMWD service area by replacing imported water with more reliable local groundwater. The reliability of water supply refers to the ability to meet water demands on a consistent basis, even in times of drought or other constraints on the availability of source water. While it is difficult to quantify the reliability benefit, a number of studies have been prepared on this subject attempting to achieve this. Although these methodologies have limitations that need to be acknowledged and considered, they generally conclude that residential and non-residential users tend to value water reliability highly.

Description of methods used to estimate without- and with-project conditions:

The brackish water well is part of EMWD's South Perris Desalination Program which consists of 12 existing brackish water wells, up to seven proposed brackish water wells, two existing desalters (the Menifee and Perris I Desalters), a third proposed desalter (the Perris II Desalter), and a brine line brine line for exporting salts from the local area to the Pacific Ocean. While the Perris II Desalter is not anticipated to be constructed and operational until 2013, the Project will be used in the interim to supply the existing Menifee and Perris I Desalters with raw, brackish groundwater and thus help to increase the system’s operational capacity (in parallel with construction of the iron and manganese pre-treatment facilities at the Menifee and Perris I Desalters).

Quantified water supply benefits are summarized in Table 12 “Annual Water Supply Benefits”. The metric used to estimate the benefits of the Project, is the annual cost-savings resulting from additional local water supplies. The Project is expected to produce 700 AFY shown in column (e), from 1,000 AFY of raw water. When the Project is operational in 2013, the cost of imported water is estimated to be $882 per AF and is projected to increase on an annual basis until 2043. Moreover, the cost of desalting was estimated at $568 per AF based on historical costs at the Menifee and Perris I Desalters. The resulting annual cost savings is $314 per AF in 2013, shown in column (g) of Table 12. Because the annual costs of desalting are expected to remain flat over time, the cost-savings benefit per AF in 2013 is expected increase annually.

Description of the distribution of local, regional, and statewide benefits:

Benefit	Measure	Value	Beneficiaries
Creation of new local water supply	Quantitative	$314 per AF (2013)	Local/Regional
Greater Water Reliability	Qualitative	++	Local/Regional/Statewide

\+ Likely to have minor impacts
++ Likely to have significant impacts
+++ Likely to have very significant impacts

Local/Regional Benefits:

1. The Project will provide for the production of 700 AFY of potable water that will be utilized in EMWD's growing service area.
2. The Project will improve water reliability by decreasing reliance on imported water, which may be affected by drought or environmental regulations.
3. The Project will stabilize the water supply cost to EMWD customers by producing water locally rather than importing supplies.
4. The Project will improve efficacy of groundwater basin management of the Perris South, Lakeview/Hemet North, Menifee, and Perris North Groundwater Management Zones and will comply with the salinity management plan for the San Jacinto River Watershed.

Statewide Benefits:

1. The Project will reduce EMWD's demand for imported water and thus, evaporative losses during transport, thereby reducing annual and seasonal peak demands on the Sacramento Bay Delta, and increasing the SWP yield through conjunctive use and storage.

Identification of beneficiaries:

1. EMWD customers will receive benefits of increased water supply and greater water reliability as a result of the Project. EMWD customers will also benefit from the stabilizing effect resulting from a reduction in imported water purchases.
2. The State will benefit from reduced demands by EMWD on the Sacramento Bay Delta.

When the benefits will be received:

The benefits of the Project will be received starting in 2013, when the Project well begins to supply the Desalters with brackish groundwater.

Uncertainty of Benefits:

Project will construct a brackish water well that is expected to produce approximately 1,000 AFY in brackish water. This estimate is based on the production levels of adjacent wells, but may be an over- or under-estimation depending on the geology of the site and the final depth achieved. The cost estimates assume that the well will be approximately 350 feet deep. However, if the maximum depth of 520 feet was reached, the cost of the Project will increase. In order to avoid construction delays from increasing costs, EMWD will bid out the Project assuming the maximum depth of 520 feet. Once the well is complete, the unused budget will be accounted for as a cost savings.

Description of any adverse effects:

The Project will have one-time construction impacts, although mitigation provisions have been included in the specifications for the well construction and for the well equipping.

Narrative discussion that describes, qualifies, and supports the values entered in the tables:

The Project well is expected to produce approximately 1,000 AFY in brackish water. Based on Menifee and Perris I Desalter's historical efficiency of approximately 70%, it was assumed that the operation of the well would result in approximately 700 AFY in product water.

If possible, quantified estimates of physical and economic benefits using Table 12, 13, and 14, as applicable. Table 12 is used to present physical and economic benefits. Table 13 is used for the benefits in an avoided cost of future projects. Table 14 is used if the benefit is estimated in some other way (i.e., not using a unit monetary value or an avoided cost):

[See Table 12]

Documentation to support information presented in the project, including studies, reports, and technical data, which will be used to assess the project's ability to produce the benefits claimed. Applicants may provide requested information for each project to help document the project, including using Table 11 through 14 on a project basis. However, the evaluation score will be determined based on the information provided for the project in its entirety:

MWD Water Rates:
Effective Rates, Source: EMWD.

Desalting Costs:
EMWD Operating Budget, FY 2010-11

If the project includes a suite of projects, describe the relationship of each project to the overall project costs and to the overall water supply benefits of the entire project:

The Project works in concert with Western Municipal Water District ("WMWD") Phase I Chino Creek Well Fields project, and SAWPA's Brine Line Reach IVB project. Brine discharge from EMWD's desalter and WMWD's desalter will be conveyed to SAWPA's Santa Ana Regional Interceptor ("SARI") Line. Expansion of the SARI Line will provide needed capacity to accept brine discharge from the desalter facilities that accept, treat and deliver new potable water suppliers. These three projects work together and represent three of the thirteen projects that make up SAWPA's "suite of projects".

The economic costs and benefits for this project as well as the costs and benefits for the WMWD project and the SAWPA benefits, as calculated in the respective Table 12 and 16, are also entered in Table 20, which summarizes the total costs and benefits for the entire suite of 13 projects.

Table 11- Annual Cost of Project
(All costs should be in 2009 Dollars)
EMWD
Project (j) Perris II Desalination Facility (EMWD)

	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	$120,000	$0	$0	$0	$0	$0	$120,000	0.890	$106,800
2012	$1,300,000	$0	$0	$0	$0	$0	$1,300,000	0.840	$1,091,505
2013	$915,752	$0	$0	$0	$0	$0	$915,752	0.792	$725,361
2014	$0	$7,724	$66,934	$10,307	$0	$0	$84,965	0.747	$63,491
2015	$0	$7,724	$66,934	$10,307	$0	$0	$84,965	0.705	$59,897
2016	$0	$7,724	$66,934	$10,307	$0	$0	$84,965	0.665	$56,507
2017	$0	$7,724	$66,934	$10,307	$0	$0	$84,965	0.627	$53,308
2018	$0	$7,724	$66,934	$10,307	$0	$0	$84,965	0.592	$50,291
2019	$0	$7,724	$66,934	$10,307	$0	$0	$84,965	0.558	$47,444
2020	$0	$7,724	$66,934	$10,307	$0	$0	$84,965	0.527	$44,759
2021	$0	$7,724	$66,934	$10,307	$0	$0	$84,965	0.497	$42,225
2022	$0	$7,724	$66,934	$10,307	$0	$0	$84,965	0.469	$39,835
2023	$0	$7,724	$66,934	$10,307	$0	$0	$84,965	0.442	$37,580
2024	$0	$7,724	$66,934	$10,307	$0	$0	$84,965	0.417	$35,453
2025	$0	$7,724	$66,934	$10,307	$0	$0	$84,965	0.394	$33,446
2026	$0	$7,724	$66,934	$10,307	$0	$0	$84,965	0.371	$31,553
2027	$0	$7,724	$66,934	$10,307	$0	$0	$84,965	0.350	$29,767
2028	$0	$7,724	$66,934	$10,307	$0	$0	$84,965	0.331	$28,082
2029	$0	$7,724	$66,934	$10,307	$0	$0	$84,965	0.312	$26,492
2030	$0	$7,724	$66,934	$10,307	$0	$0	$84,965	0.294	$24,993
2031	$0	$7,724	$66,934	$10,307	$0	$0	$84,965	0.278	$23,578
2032	$0	$7,724	$66,934	$10,307	$0	$0	$84,965	0.262	$22,244
2033	$0	$7,724	$66,934	$10,307	$0	$0	$84,965	0.247	$20,985
2034	$0	$7,724	$66,934	$10,307	$0	$0	$84,965	0.233	$19,797
2035	$0	$7,724	$66,934	$10,307	$0	$0	$84,965	0.220	$18,676
2036	$0	$7,724	$66,934	$10,307	$0	$0	$84,965	0.207	$17,619
2037	$0	$7,724	$66,934	$10,307	$0	$0	$84,965	0.196	$16,622
2038	$0	$7,724	$66,934	$10,307	$0	$0	$84,965	0.185	$15,681
2039	$0	$7,724	$66,934	$10,307	$0	$0	$84,965	0.174	$14,793
2040	$0	$7,724	$66,934	$10,307	$0	$0	$84,965	0.164	$13,956
2041	$0	$7,724	$66,934	$10,307	$0	$0	$84,965	0.155	$13,166
2042	$0	$7,724	$66,934	$10,307	$0	$0	$84,965	0.146	$12,421
2043	$0	$7,724	$66,934	$10,307	$0	$0	$84,965	0.138	$11,718
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									$2,850,042

Comments:

(1) The incremental change in O&M costs attributable to the project.

Table 12 - Annual Water Supply Benefits
(All benefits should be in 2009 dollars)
EMWD
Project (j) Perris II Desalination Facility (EMWD)

(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	New Water Supply	Acre-Feet	0	0	0		$0	1.000	$0
2010	New Water Supply	Acre-Feet	0	0	0		$0	0.943	$0
2011	New Water Supply	Acre-Feet	0	0	0		$0	0.890	$0
2012	New Water Supply	Acre-Feet	0	0	0		$0	0.840	$0
2013	New Water Supply	Acre-Feet	0	700	700	$314	$219,800	0.792	$174,102
2014	New Water Supply	Acre-Feet	0	700	700	$337	$235,900	0.747	$176,278
2015	New Water Supply	Acre-Feet	0	700	700	$364	$254,800	0.705	$179,624
2016	New Water Supply	Acre-Feet	0	700	700	$391	$273,700	0.665	$182,026
2017	New Water Supply	Acre-Feet	0	700	700	$420	$294,000	0.627	$184,459
2018	New Water Supply	Acre-Feet	0	700	700	$450	$315,000	0.592	$186,448
2019	New Water Supply	Acre-Feet	0	700	700	$480	$336,000	0.558	$187,621
2020	New Water Supply	Acre-Feet	0	700	700	$512	$358,400	0.527	$188,801
2021	New Water Supply	Acre-Feet	0	700	700	$544	$380,800	0.497	$189,246
2022	New Water Supply	Acre-Feet	0	700	700	$577	$403,900	0.469	$189,364
2023	New Water Supply	Acre-Feet	0	700	700	$612	$428,400	0.442	$189,482
2024	New Water Supply	Acre-Feet	0	700	700	$647	$452,900	0.417	$188,979
2025	New Water Supply	Acre-Feet	0	700	700	$684	$478,800	0.394	$188,478
2026	New Water Supply	Acre-Feet	0	700	700	$721	$504,700	0.371	$187,428
2027	New Water Supply	Acre-Feet	0	700	700	$760	$532,000	0.350	$186,383
2028	New Water Supply	Acre-Feet	0	700	700	$800	$560,000	0.331	$185,087
2029	New Water Supply	Acre-Feet	0	700	700	$841	$588,700	0.312	$183,559
2030	New Water Supply	Acre-Feet	0	700	700	$883	$618,100	0.294	$181,817
2031	New Water Supply	Acre-Feet	0	700	700	$926	$648,200	0.278	$179,879
2032	New Water Supply	Acre-Feet	0	700	700	$971	$679,700	0.262	$177,944
2033	New Water Supply	Acre-Feet	0	700	700	$1,017	$711,900	0.247	$175,824
2034	New Water Supply	Acre-Feet	0	700	700	$1,065	$745,185	0.233	$173,627
2035	New Water Supply	Acre-Feet	0	700	700	$1,114	$779,469	0.220	$171,335
2036	New Water Supply	Acre-Feet	0	700	700	$1,164	$814,781	0.207	$168,959
2037	New Water Supply	Acre-Feet	0	700	700	$1,216	$851,152	0.196	$166,511
2038	New Water Supply	Acre-Feet	0	700	700	$1,269	$888,615	0.185	$164,000
2039	New Water Supply	Acre-Feet	0	700	700	$1,325	$927,201	0.174	$161,435
2040	New Water Supply	Acre-Feet	0	700	700	$1,381	$966,945	0.164	$158,825
2041	New Water Supply	Acre-Feet	0	700	700	$1,440	$1,007,881	0.155	$156,179
2042	New Water Supply	Acre-Feet	0	700	700	$1,500	$1,050,046	0.146	$153,502
2043	New Water Supply	Acre-Feet	0	700	700	$1,562	$1,093,475	0.138	$150,803
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)									$5,488,006

Comments:

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

Table 15. Total Water Supply Benefits (All benefits should be in 2009 dollars) EMWD Project (j) Perris II Desalination Facility (EMWD)			
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)
$5,488,006	NA	$0	$5,488,006
Comments:			

Project (k) Perchlorate Wellhead Treatment System Pipelines

A. Water Supply Benefits:

Narrative description of the project's economic costs:

The estimated capital cost to construct 3,000 LF of 16-inch pipeline including all other related costs is $1.5 million and will be incurred between 2010 and 2012. Operation and maintenance (O&M) costs are estimated to be approximately $4,300 per year, starting in 2012. The present value of the O&M costs of the Project, assuming a useful life of 30 years, is $ 1.4 million. Furthermore, the net present value of the water supply benefits and the water quality benefits over the same useful life is $39.5 million. Therefore, the cost benefit ratio of the project is 28.4.

Introduction:

The Perchlorate Wellhead Treatment System Pipeline project (the "Project") is part of a larger groundwater contamination wellhead treatment project ("WTP") which involves the construction and operation of a groundwater wellhead treatment system to remove perchlorate, nitrate and volatile organic compounds ("VOCs"), including trichloroethylene ("TCE"), from groundwater coming from two Public Water System ("PWS") drinking water production wells: Rialto Well No. 6 and West Valley Water District ("WVWD") Well No. 11. The Project includes the necessary piping to connect the WTP to the two contaminated drinking water production wells located in the Rialto-Colton Groundwater Basin (the "Basin"), and represents the last unfunded piece of the WTP.

Cost details for the entire project using Table 11 and the information in Table 7:

See Table 11.

Estimates of without-project conditions; e.g. current and future water supplies and demand:

The groundwater coming from the two PWS wells, Rialto Well No. 6 and WVWD Well No. 11 that are owned and operated by the City of Rialto (the "City") and WVWD respectively, is a major source of supply for the City and the WVWD service area. Based on the WVWD 2006 Urban Water Management Plan ("UWMP"), the service area population is expected to grow from approximately 90,000 to approximately 124,000 residents by 2025. However, due to the presence of perchlorate, approximately 50% of the total capacity of the Rialto-Colton Basin has been lost. Specifically, WVWD's production capacity has dropped from more than 6,300 acre-feet per year ("AFY") to 3,067 AFY (WVWD UWMP, 2005), while the City's production capacity has dropped from more than 4,300 AFY to 2,800 AFY (City UWMP, 2006). The impacted groundwater from the Basin would represent more than 40% of the WVWD's normal uncontaminated supply, and more than 33% of the City's normal uncontaminated supply.

Without the Project, the production capacity of Rialto Well No. 6 and WVWD Well No. 11 will not be restored. The City and WVWD will place greater reliance on imported State Water Project ("SWP") water to meet the demands of future growth. The cost of imported water from San Bernardino Valley Municipal Water District ("SBVMWD") is $513.23 per acre-foot ("AF"). However, the availability of SWP supply is variable and may fluctuate annually depending on precipitation, regulatory restrictions, legislative restrictions, and operational conditions, and is subject to severe curtailment during dry years. Currently, WVWD and the City mainly meet the balance of their demands with local groundwater and a small amount of surface water. However, both will face greater risk of losing additional groundwater capacity in the future, as a result of the migration of the perchlorate contamination.

Estimates of with-project conditions; e.g. improvements in new water supplies made available to meet demand:

The Project will restore 4,302 AFY in local groundwater supplies lost due to water quality impairment and will decrease WVWD's reliance on SWP water. With the Project in place, WVWD will be able to produce water at a cost of $230.44 per AF, or $282.79 per AF less than the cost of importing water. This cost saving benefit is quantified in Table 12 and amounts to approximately $1.2 million per year. The net present value of the benefit over the 30 year life of the Project is approximately $14.4 million. The Project will also protect existing groundwater supplies in the Basin by reducing levels of perchlorate, TCE and nitrates. This will allow existing wells to maintain current levels of supply, and facilitate the development of additional groundwater resources.

The Project will further benefit the City and WVWD, by replacing SWP water with more reliable local groundwater. The reliability of water supply refers to the ability to meet water demands on a consistent basis, even in times of drought or when other constraints on source water availability are in place. While it is difficult to quantify the reliability benefit, a number of studies have been prepared on this subject attempting to achieve this. Although these methodologies have limitations that need to be acknowledged and considered, they generally conclude that residential and non-residential users tend to value water reliability highly.

Description of methods used to estimate without- and with-project conditions:

The Project, which consists of a 3,000 linear feet of 16-inch pipeline, is part of a larger fully funded WTP designed to treat perchlorate and nitrate coming from the groundwater wells.

In calculating the "with and without Project" conditions, the cost of importing potable water from SBVMWD is compared to the estimated treatment cost of groundwater. This cost savings is the basis of the quantified benefits related to water supply. The metric used to quantify the total benefit is acre-ft of treated water. The previously mentioned 4,302 AFY of pumped groundwater is entered in column (e) of Table 12.

The cost of importing water, to be treated locally, was determined to be $513.23 per AF, based on historical data. Furthermore, the cost of utilizing the WTP was estimated to be $230.44 per AF. Therefore, the unit cost savings incurred as a result of additional local water supplies is the difference between these two unit costs, or $282.79 per AF. This value is entered in column (g), "Unit $ Value", of Table 12.

Description of the distribution of local, regional, and statewide benefits:

Benefit	**Measure**	**Value**	**Beneficiaries**
Greater Water Reliability	Qualitative	++	Local/Regional/Statewide
Creation of new local water supply	Quantitative	$282.79 per AF	Local/Regional

+ Likely to have minor impacts
++ Likely to have significant impacts
+++ Likely to have very significant impacts

Local/Regional:

1. The Project will increase the local water supply and reduce the need to import SWP water.

2. The Project will protect and maintain existing groundwater supplies in the Basin by preventing contaminant plume from migrating.

Statewide:

1. The Project will reduce the demand for imported SWP water.

Identification of beneficiaries:

1. City of Rialto and WVWD will benefit from an increased overall reliability as a result of the Project, by reducing the need for imported SWP water.

2. Water producers and end-users downgradient from the Project will benefit from prevention of contaminant migration which will protect existing water supplies and increase water reliability.

3. The State will benefit from reduced demand for State Project Water.

When the benefits will be received:

Benefits will be received starting in 2012.

Uncertainty of Benefits:

There are no uncertainties to the benefits of the Project. All other aspects of the WTP are fully funded and will be functional starting in 2012.

Description of any adverse effects:

There are no known adverse effects resulting from the Project.

Narrative discussion that describes, qualifies, and supports the values entered in the tables:

Per the CEQA document and Proposition 84 DPH Grant Application documents, assuming 16 hours of operation per day, the Perchlorate Wellhead Treatment System pipeline has been designed to handle 4,000 gpm (3.8 MGD), which equates to 4,302 AF/year as identified in Table 12.

If possible, quantified estimates of physical and economic benefits using Table 12, 13, and 14, as applicable. Table 12 is used to present physical and economic benefits. Table 13 is used for the benefits in an avoided cost of future projects. Table 14 is used if the benefit is estimated in some other way (i.e., not using a unit monetary value or an avoided cost):

[See Table 12]

Documentation to support information presented in the project, including studies, reports, and technical data, which will be used to assess the project's ability to produce the benefits claimed. Applicants may provide requested information for each project to help document the project, including using Table 11 through 14 on a project basis. However, the evaluation score will be determined based on the information provided for the project in its entirety:

SBVMWD Water Rates:
Source: Department of Water Resources (See Att7_WVWD_WSBen_2of3.pdf.)

Project Treatment Costs:
Source: WVWD historical data (See Att7_WVWD_WSBen_3of3.pdf.)

If the project includes a suite of projects, describe the relationship of each project to the overall project costs and to the overall water supply benefits of the entire project:

See Attachment 3 Work plan for description.

Table 11- Annual Cost of Project

(All costs should be in 2009 Dollars)

Project (k) Perchlorate Wellhead Treatment System Pipelines (WVWD)

	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 (Permit Upkeep, Sampling, Analysis & Reporting)	Operation	Maintenance	Replacement	Other	Total Costs (a) +...+ (f)	Discount Factor	Discounted Costs(g) x (h)
2009	$0						$0	1.000	$0
2010	$60,000						$60,000	0.943	$56,580
2011	$785,000						$785,000	0.890	$698,650
2012	$696,000	$624	$0	$102	$0	$0	$696,726	0.840	$585,250
2013	$0	$3,745	$0	$610	$0	$0	$4,355	0.792	$3,449
2014	$0	$3,745	$0	$610	$0	$0	$4,355	0.747	$3,253
2015	$0	$3,745	$0	$610	$0	$0	$4,355	0.705	$3,070
2016	$0	$3,745	$0	$610	$0	$0	$4,355	0.665	$2,896
2017	$0	$3,745	$0	$610	$0	$0	$4,355	0.627	$2,731
2018	$0	$3,745	$0	$610	$0	$0	$4,355	0.592	$2,578
2019	$0	$3,745	$0	$610	$0	$0	$4,355	0.558	$2,430
2020	$0	$3,745	$0	$610	$0	$0	$4,355	0.527	$2,295
2021	$0	$3,745	$0	$610	$0	$0	$4,355	0.497	$2,164
2022	$0	$3,745	$0	$610	$0	$0	$4,355	0.469	$2,042
2023	$0	$3,745	$0	$610	$0	$0	$4,355	0.442	$1,925
2024	$0	$3,745	$0	$610	$0	$0	$4,355	0.417	$1,816
2025	$0	$3,745	$0	$610	$0	$0	$4,355	0.394	$1,716
2026	$0	$3,745	$0	$610	$0	$0	$4,355	0.371	$1,616
2027	$0	$3,745	$0	$610	$0	$0	$4,355	0.350	$1,524
2028	$0	$3,745	$0	$610	$0	$0	$4,355	0.331	$1,442
2029	$0	$3,745	$0	$610	$0	$0	$4,355	0.312	$1,359
2030	$0	$3,745	$0	$610	$0	$0	$4,355	0.294	$1,280
2031	$0	$3,745	$0	$610	$0	$0	$4,355	0.278	$1,211
2032	$0	$3,745	$0	$610	$0	$0	$4,355	0.262	$1,141
2033	$0	$3,745	$0	$610	$0	$0	$4,355	0.247	$1,076
2034	$0	$3,745	$0	$610	$0	$0	$4,355	0.233	$1,015
2035	$0	$3,745	$0	$610	$0	$0	$4,355	0.220	$958
2036	$0	$3,745	$0	$610	$0	$0	$4,355	0.207	$901
2037	$0	$3,745	$0	$610	$0	$0	$4,355	0.196	$854
2038	$0	$3,745	$0	$610	$0	$0	$4,355	0.185	$806
2039	$0	$3,745	$0	$610	$0	$0	$4,355	0.174	$758
2040	$0	$3,745	$0	$610	$0	$0	$4,355	0.164	$714
2041	$0	$3,745	$0	$610	$0	$0	$4,355	0.155	$675
2042	$0	$3,745	$0	$610	$0	$0	$4,355	0.146	$636
2043	$0	$3,745	$0	$610	$0	$0	$4,355	0.138	$601
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									$1,391,411

Comments: Project to Start Operating in the last 2 months of 2012.

1. Project life is assumed to be 30 years.
2. Cost of lease easement for Flood Control property is $3,745 annually.
3. Per the American Concrete Pressure Pipe Association, steel pipe has an O&M cost of approximately $610 per mile/per year. Assume 1 mile of pipe is installed for project.

Table 12 - Annual Water Supply Benefits (All benefits should be in 2009 dollars) Project (k) Perchlorate Wellhead Treatment System Pipelines (WVWD)									
(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	Potable Water	Acre-Feet	0	0	0	$282.79	$0	1.000	$0
2010	Potable Water	Acre-Feet	0	0	0	$282.79	$0	0.943	$0
2011	Potable Water	Acre-Feet	0	0	0	$282.79	$0	0.890	$0
2012	Potable Water	Acre-Feet	0	717	717	$282.79	$202,760	0.840	$170,319
2013	Potable Water	Acre-Feet	0	4,302	4,302	$282.79	$1,216,563	0.792	$963,518
2014	Potable Water	Acre-Feet	0	4,302	4,302	$282.79	$1,216,563	0.747	$908,772
2015	Potable Water	Acre-Feet	0	4,302	4,302	$282.79	$1,216,563	0.705	$857,677
2016	Potable Water	Acre-Feet	0	4,302	4,302	$282.79	$1,216,563	0.665	$809,014
2017	Potable Water	Acre-Feet	0	4,302	4,302	$282.79	$1,216,563	0.627	$762,785
2018	Potable Water	Acre-Feet	0	4,302	4,302	$282.79	$1,216,563	0.592	$720,205
2019	Potable Water	Acre-Feet	0	4,302	4,302	$282.79	$1,216,563	0.558	$678,842
2020	Potable Water	Acre-Feet	0	4,302	4,302	$282.79	$1,216,563	0.527	$641,128
2021	Potable Water	Acre-Feet	0	4,302	4,302	$282.79	$1,216,563	0.497	$604,632
2022	Potable Water	Acre-Feet	0	4,302	4,302	$282.79	$1,216,563	0.469	$570,568
2023	Potable Water	Acre-Feet	0	4,302	4,302	$282.79	$1,216,563	0.442	$537,721
2024	Potable Water	Acre-Feet	0	4,302	4,302	$282.79	$1,216,563	0.417	$507,307
2025	Potable Water	Acre-Feet	0	4,302	4,302	$282.79	$1,216,563	0.394	$479,326
2026	Potable Water	Acre-Feet	0	4,302	4,302	$282.79	$1,216,563	0.371	$451,345
2027	Potable Water	Acre-Feet	0	4,302	4,302	$282.79	$1,216,563	0.350	$425,797
2028	Potable Water	Acre-Feet	0	4,302	4,302	$282.79	$1,216,563	0.331	$402,682
2029	Potable Water	Acre-Feet	0	4,302	4,302	$282.79	$1,216,563	0.312	$379,568
2030	Potable Water	Acre-Feet	0	4,302	4,302	$282.79	$1,216,563	0.294	$357,669
2031	Potable Water	Acre-Feet	0	4,302	4,302	$282.79	$1,216,563	0.278	$338,204
2032	Potable Water	Acre-Feet	0	4,302	4,302	$282.79	$1,216,563	0.262	$318,739
2033	Potable Water	Acre-Feet	0	4,302	4,302	$282.79	$1,216,563	0.247	$300,491
2034	Potable Water	Acre-Feet	0	4,302	4,302	$282.79	$1,216,563	0.233	$283,459
2035	Potable Water	Acre-Feet	0	4,302	4,302	$282.79	$1,216,563	0.220	$267,644
2036	Potable Water	Acre-Feet	0	4,302	4,302	$282.79	$1,216,563	0.207	$251,828
2037	Potable Water	Acre-Feet	0	4,302	4,302	$282.79	$1,216,563	0.196	$238,446
2038	Potable Water	Acre-Feet	0	4,302	4,302	$282.79	$1,216,563	0.185	$225,064
2039	Potable Water	Acre-Feet	0	4,302	4,302	$282.79	$1,216,563	0.174	$211,682
2040	Potable Water	Acre-Feet	0	4,302	4,302	$282.79	$1,216,563	0.164	$199,516
2041	Potable Water	Acre-Feet	0	4,302	4,302	$282.79	$1,216,563	0.155	$188,567
2042	Potable Water	Acre-Feet	0	4,302	4,302	$282.79	$1,216,563	0.146	$177,618
2043	Potable Water	Acre-Feet	0	4,302	4,302	$282.79	$1,216,563	0.138	$167,886
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)									$14,398,018
Comments: (g) Cost of State Water Project imported water for West Valley Water District = $513.23/af compared to the FBR treated water alternative cost = $230.44/af, so Unit Value = $282.79/af.									

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

Table 15. Total Water Supply Benefits (All benefits should be in 2009 dollars)			
Project (k) Perchlorate Wellhead Treatment System Pipelines (WVWD)			
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)
$14,398,018	NA	$0	$14,398,018
Comments:			

TABLE B-24. Equivalent Unit Charge for Water Supply for Each Contractor[a]

(in dollars per acre-foot)

Project Service Area and Water Supply Contractor	Transportation Charge					Delta Water Charge	Water System Revenue Bond Surcharge	Total Equivalent Unit Charge
	Capital Cost Component	Minimum OMP&R Component	Off-Aqueduct Component	Variable OMP&R Component	Total			
	[1]	[2]	[3]	[4]	[5]	[6]	[7]	[8]
FEATHER RIVER AREA								
City of Yuba City	0.00	0.00	0.00	0.00	0.00	61.78	8.44	70.23
County of Butte	0.00	0.00	0.00	0.00	0.00	35.99	0.96	36.95
Plumas County Flood Control and Water Conservation District	26.28	3.55	0.00	0.00	29.82	32.92	4.72	67.46
Feather River Area	3.03	0.41	0.00	0.00	3.44	42.38	3.35	49.17
NORTH BAY AREA								
Napa County Flood Control and Water Conservation District	139.44	44.77	4.35	17.07	205.62	21.25	10.95	237.82
Solano County Water Agency	86.40	35.93	4.53	11.14	137.99	28.05	10.29	176.33
North Bay Area	106.49	39.27	4.46	13.38	163.61	25.47	10.54	199.62
SOUTH BAY AREA								
Alameda County Flood Control and Water Conservation District, Zone 7	39.46	35.78	7.93	24.63	107.80	26.78	7.07	141.64
Alameda County Water District	26.92	27.01	7.08	18.16	79.16	22.31	4.29	105.77
Santa Clara Valley Water District	23.14	19.85	6.35	13.11	62.45	15.73	3.06	81.24
South Bay Area	26.76	23.96	6.76	16.06	73.54	18.85	4.00	96.39
SAN JOAQUIN VALLEY AREA								
County of Kings	5.09	5.55	3.47	9.81	23.92	21.09	3.33	48.34
Dudley Ridge Water District	5.10	4.94	3.19	5.99	19.22	16.43	2.15	37.81
Empire West Side Irrigation District	1.99	4.15	2.46	5.49	14.08	17.71	1.65	33.44
Kern County Water Agency	9.15	9.52	4.90	8.27	31.84	19.32	2.29	53.44
Oak Flat Water District	2.00	2.33	1.97	3.72	10.01	16.25	1.64	27.90
Tulare Lake Basin Water Storage District	5.17	4.80	3.12	5.70	18.80	16.75	2.07	37.62
San Joaquin Valley Area	8.44	8.72	4.59	5.75	27.50	16.89	2.09	46.48
CENTRAL COASTAL AREA								
San Luis Obispo County Flood Control and Water Conservation District	192.68	95.68	12.23	126.39	426.97	68.99	23.09	519.05
Santa Barbara County Flood Control and Water Conservation District	751.47	120.63	18.11	108.93	999.14	50.66	51.78	1,101.58
Central Coastal Area	592.80	113.54	16.44	113.89	836.68	55.86	43.63	936.17
SOUTHERN CALIFORNIA AREA								
Antelope Valley-East Kern Water Agency	46.23	42.38	29.13	88.06	205.80	34.28	7.70	247.79
Castaic Lake Water Agency	50.97	43.94	22.88	54.48	172.27	29.38	12.18	213.82
Coachella Valley Water District	80.49	52.72	37.81	100.27	271.28	23.12	9.58	303.98
Crestline-Lake Arrowhead Water Agency	114.38	94.21	32.32	115.02	355.93	45.05	14.39	415.37
Desert Water Agency	47.89	40.73	48.41	59.95	196.98	20.49	6.29	223.76
Littlerock Creek Irrigation District	61.64	55.96	28.44	98.89	244.93	44.54	9.89	299.36
Mojave Water Agency	102.37	107.85	25.57	168.88	404.66	63.01	20.52	488.19
Palmdale Water District	52.38	49.90	36.68	115.02	253.97	43.31	8.94	306.22
San Bernardino Valley Municipal Water District	180.24	125.79	26.51	107.56	440.09	54.74	18.39	513.23
San Gabriel Valley Municipal Water District	97.31	81.88	41.21	74.13	294.52	36.94	11.93	343.39
San Gorgonio Pass Water Agency	587.79	204.78	22.37	163.37	978.31	60.03	13.17	1,051.50
The Metropolitan Water District of Southern California	79.25	57.41	35.13	58.72	230.51	32.50	9.62	272.63
Ventura County Flood Control District	137.93	103.83	24.21	131.78	397.75	60.40	19.10	477.25
Southern California Area	74.07	54.32	31.86	60.22	220.47	31.77	9.30	261.54
ALL AREAS	48.70	34.66	19.03	36.43	138.82	26.03	6.40	171.25

a) Hypothetical charges, which, if assessed on all Table A water delivered to date, all surplus water delivered prior to May 1, 1973, and all Table A water estimated to be delivered during the remainder of the project repayment period (Table B-5B), would provide a sum at the end of the period financially equivalent to all Transportation Charge and Delta Water Charge payments required under a water supply contract, considering interest at the Project Interest Rate, 4.608 percent per annum.

West Valley Water District

DRAFT

FBR - Cost Estimate: Operation
Kennedy/Jenks Consultants
19-Aug-2009

SUMMARY

Annual Costs

80% Design Capacity

Category	Water Production Costs	FBR Treatment Costs	**Total Costs**	Cost/AF
Electrical Costs	$155,731	$135,931	**$291,662**	$113.01
Chemical Costs	-	$243,329	**$243,329**	$94.28
O&M (Labor)	$4,838	$23,577	**$28,414**	$11.01
Permit Upkeep, Sampling, Analysis & Reporting	-	$31,313	**$31,313**	$12.13
TOTAL (Annual Cost)	$160,568	$434,150	**$594,719**	$230.44
Costs per Acre-ft.	$62.22	$168.22	$230.44	

Notes:

1. The Design Capacity of the FBR System is 2,000 gpm
2. This Cost Estimate is based on 80% of the design capacity, or 1,600 gpm
3. Water Production Costs include electrical costs for the wells pumps, as well as miscellaneous and O&M costs for the wells.
4. The O&M and Sampling Costs are not affected by the percent of treatment and pumping capacity used.
5. Costs for Solids Disposal and Handling are not included in this estimate
6. Costs for Wastewater Disposal are not included in this estimate

Project (l) Chino Creek Wellfield Development

A. Water Supply Benefits:

Narrative description of the project's economic costs:

The estimated capital cost to construct the wells is $6.3 million, which will be incurred between 2011 and 2012. Operation and maintenance costs are estimated to be approximately $169,000 per year, starting in 2013. The present value costs of the Chino Creek Well Field (CCWF) Development project (the "Project"), assuming a useful life of 50 years, is $7.66 million. Furthermore, the net present value of the quantifiable water supply benefits and the water quality benefits over the same useful life is $40.9 million. Therefore, the cost benefit ratio of the project is 5.3.

Cost details for the entire project using Table 11 and the information in Table 7:

See Table 11.

Estimates of without-project conditions; e.g. current and future water supplies and demand:

The Project is part of a large Chino Desalter Phase 3 Expansion, aimed at enhancing the ability of local agencies to treat Chino Basin groundwater and achieving hydraulic control of Chino Basin groundwater. The Project consists of three (3) wells to be developed in the Chino Creek area of the Chino Basin. The wells are proposed to extract an additional 2,900 acre-feet per year ("AFY") of raw water to be sent for treatment at the Chino Desalters, to produce approximately 2,500 AFY of product water.

Western Municipal Water District ("WMWD") serves more than 61,000 customers in Western Riverside County. The majority of WMWD potable water comes from the State Water Project ("SWP") purchased from the Metropolitan Water District of Southern California ("MWD"), and supplemental water is received from the City of Riverside. Based on estimates prepared for the 2010 WMWD Urban Water Management Plan ("UWMP"), the service area population is expected to grow at a rate of 3.3% to about 139,000 by 2030.

Without this Project, WMWD will need to import approximately 2,500 AFY of potable water from the SWP water to meet the demands for future growth. The cost of Full Service Treated water from MWD, effective January 2011, will be $869 per acre-foot ("AF"). Based on projection to 2020 provided by MWD, the cost of imported water is expected to increase by an average of 5% annually. With various factors affecting the supply of imported water - such as increasing competition for new water supply, concerns for endangered species affected by water diversions, and drought conditions - the WMWD service area will continue to face water reliability challenges, especially as new development takes place.

Estimates of with-project conditions; e.g. improvements in new water supplies made available to meet demand:

The Project will create approximately 2,500 AFY of potable water for the region and reduce WMWD's reliance on imported MWD water. The existing Chino I Desalter can produce potable water at a cost of

$558 per AF. As mentioned in the previous section, the rates for imported water are expected to increase annually. For purposes of calculating the benefit, the 2011 MWD rate of $869 was discounted by 3% annually over 2 years (to $819 per AF), to account for the inflation factor built into the rate since 2009. Furthermore, all future MWD rates were also discounted by 3% to reflect expected real increases over time. As a result the cost-savings benefit in 2012 is estimated to be $285 per AF, and is expected to increase annually to $1,722 per AF by 2062. The net present value of the benefit over the 50 year life of the Project is quantified in Table 12, and amounts to approximately $20.8 million.

The Project will further benefit WMWD by replacing imported water with more reliable local groundwater. The reliability of water supply refers to the ability to meet water demands on a consistent basis, even in times of drought or other constraints on source water availability. While it is difficult to quantify the reliability benefit, a number of studies have been prepared on this subject. Although these methodologies have limitations that need to be acknowledged and considered, they generally conclude that residential and non-residential users tend to highly value water supply reliability.

<u>Description of methods used to estimate without- and with-project conditions:</u>

The Project is a part of a larger Chino Desalter Phase 3 Expansion, developed by WMWD, Jurupa Community Services District, and the City of Ontario to provide for expansion of the Chino Desalter System. Part of the Chino Desalter Phase 3 Expansion includes development of a new wellfield in the Chino Creek area of Chino Basin, expansion of production from the existing Chino II Desalter wellfield, and evaluation of potential well sites for future expansion of the Chino II Desalter wellfield. The Project can stand alone without the other components of the Chino Desalter Phase 3 Expansion because it will construct new wells and utilize existing capacity in the Chino I Desalter to provide additional water supply.

Quantified water supply benefits are summarized in Table 12 “Annual Water Supply Benefits”. The metric used to estimate the benefits of the Project, is the annual cost-savings resulting from additional local water supplies. The Project is expected to produce 2,500 AFY shown in column (e), from 2,900 AFY of raw water. Effective January 2011, the cost of imported water will be $869 per AF. For purposes of calculating benefit, the MWD water rates were discounted by 3% to account for the inflation factor included in the annual cost increases. Specifically, the MWD rate effective January 2011 of $869 per AF was discounted by 3% annually over 2 years (to $819 per AF) to account for the inflation factor built into the rate since 2009. Similarly, all projected MWD rates were also discounted by 3% to reflect expected real increases over time. As projections were only available through 2020, it was assumed that the MWD rates would continue to increase annually by 2% which is average growth rate of projected MWD rates (approximately 5%), less 3% for inflation.

Moreover, the cost of desalting was estimated at $568 per AF based on the historical costs at the Menifee and Perris I Desalters. Therefore, the resulting annual cost savings in 2012 was estimated to be $285 per AF and is found in column (g) of Table 12. Because the real annual costs of desalting are expected to remain flat over time, the cost-savings benefit per AF is expected increase annually, also shown in Table 12.

Description of the distribution of local, regional, and statewide benefits:

Benefit	Measure	Value	Beneficiaries
Creation of new local water supply	Quantitative	$285 per AF (2012)	Local/Regional/Statewide
Greater Water Reliability	Qualitative	++	Local/Regional

+ Likely to have minor impacts
++ Likely to have significant impacts
+++ Likely to have very significant impacts

Local/Regional Benefits:

1. The Project will provide for the production of 2,500 AFY of potable water that will be utilized in WMWD's service area.

2. The Project will improve water reliability by decreasing reliance on imported water, which may be affected by drought or environmental regulations.

3. The Project will stabilize the water supply cost to WMWD's customers by producing water locally rather than importing supplies.

4. The Project will benefit all agencies utilizing the Chino I Desalter by spreading fixed costs over a large production volume, thereby reducing the unit cost of water.

Statewide Benefits:

1. The Project will reduce the demand for imported water, thereby reducing annual and seasonal peak demands on the Sacramento Bay Delta, and increasing the SWP yield through conjunctive use and storage.

Identification of beneficiaries:

1. WMWD customers will benefit from the Project by replacing imported water with a more reliable source of potable water for their service area.

2. Agencies in the SAWPA region, including the City of Chino Hills, the City of Chino, Jurupa Community Services District, the Santa Ana River Water Company, the City of Norco, the City of Ontario, as well as the WMWD Service area will benefit from the Project by facilitating the conveyance of supplies.

3. The State will benefit from the reduced demand for SWP water, as a result of the Project.

When the benefits will be received:

The benefits of the Project will be received starting in 2012, when the well begins to supply the existing Chino I Desalter with groundwater.

Uncertainty of Benefits:

The Project consists of three (3) wells that, based on extensive study and testing, are expected to produce approximately 2,900 AFY in raw water. This estimate may be an over- or under-estimation depending on the geology of the site and the final well depth achieved. Project capital and treatment costs are based on expected well depth and water quality among other factors. Actual conditions may vary, and could impact project costs and benefits.

Description of any adverse effects:

There are no known adverse effects resulting from the Project.

Narrative discussion that describes, qualifies, and supports the values entered in the tables:

The wells are expected to produce approximately 2,900 AFY of raw water. It is estimated that treating 2,900 AFY from the Chino Creek Wellfield will result in approximately 2,500 AFY in potable water. This is based on the assumption that 70% of water (or 2,030 AFY) from Chino Creek Wellfield wells 1, 2, and 3 is treated by reverse osmosis ("RO") and 30% (or 870 AFY) of the water bypasses the RO process. Approximately 80% of the water treated (or 1,624 AFY) by RO is recovered, and is blended with the 30% (870 AFY) that bypassed the RO process. This results in approximately 2,500 AFY in potable water.

If possible, quantified estimates of physical and economic benefits using Table 12, 13, and 14, as applicable. Table 12 is used to present physical and economic benefits. Table 13 is used for the benefits in an avoided cost of future projects. Table 14 is used if the benefit is estimated in some other way (i.e., not using a unit monetary value or an avoided cost):

[See Table 12]

Documentation to support information presented in the project, including studies, reports, and technical data, which will be used to assess the project's ability to produce the benefits claimed. Applicants may provide requested information for each project to help document the project, including using Table 11 through 14 on a project basis. However, the evaluation score will be determined based on the information provided for the project in its entirety:

MWD Water Rates:
Metropolitan Water District Water Rates and Charges,
http://www.mwdh2o.com/mwdh2o/pages/finance/finance_03.html

Desalting Costs:
Chino Desalter Phase 3 – Comprehensive Predesign Report, June 2010

Impacts of High Salinity:
Pitzer, Water Education Foundation, Salinity in the Central Valley: A Critical Problem
Poland, Groundwater in California, AIME TRANSACTIONS, FEB 1950, VOL 187, pg. 280

If the project includes a suite of projects, describe the relationship of each project to the overall project costs and to the overall water supply benefits of the entire project:

The Project works in concert with Eastern Municipal Water District (“EMWD”) Brackish Water Well project, and SAWPA’s Brine Line Reach IVB project. Brine discharge from WMWD’s desalter and EMWD’s desalter will be conveyed to SAWPA’s Santa Ana Regional Interceptor (“SARI”) Line. Expansion of the SARI Line will provide needed capacity to accept brine discharge from the desalter facilities that accept, treat and deliver new potable water suppliers. These three projects work together and represent three of the thirteen projects that make up SAWPA’s “suite of projects”.

The economic costs and benefits for this project as well as the costs and benefits for the EMWD project and the SAWPA benefits, as calculated in the respective Table 12 and 16, are also entered in Table 20, which summarizes the total costs and benefits for the entire suite of 13 projects.

Table 11- Annual Cost of Project
(All costs should be in 2009 Dollars)
WMWD
Project (l) Chino Creek Wellfield Development (WMWD)

	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	$615,000	$0	$0	$0	$0	$0	$615,000	0.890	$547,348
2012	$5,660,562	$9,000	$124,700	$0	$0	$0	$5,794,262	0.840	$4,864,974
2013	$0	$9,000	$124,700	$27,000	$9,000	$0	$169,700	0.792	$134,418
2014	$0	$9,000	$124,700	$27,000	$9,000	$0	$169,700	0.747	$126,810
2015	$0	$9,000	$124,700	$27,000	$9,000	$0	$169,700	0.705	$119,632
2016	$0	$9,000	$124,700	$27,000	$9,000	$0	$169,700	0.665	$112,860
2017	$0	$9,000	$124,700	$27,000	$9,000	$0	$169,700	0.627	$106,472
2018	$0	$9,000	$124,700	$27,000	$9,000	$0	$169,700	0.592	$100,445
2019	$0	$9,000	$124,700	$27,000	$9,000	$0	$169,700	0.558	$94,760
2020	$0	$9,000	$124,700	$27,000	$9,000	$0	$169,700	0.527	$89,396
2021	$0	$9,000	$124,700	$27,000	$9,000	$0	$169,700	0.497	$84,336
2022	$0	$9,000	$124,700	$27,000	$9,000	$0	$169,700	0.469	$79,562
2023	$0	$9,000	$124,700	$27,000	$9,000	$0	$169,700	0.442	$75,058
2024	$0	$9,000	$124,700	$27,000	$9,000	$0	$169,700	0.417	$70,810
2025	$0	$9,000	$124,700	$27,000	$9,000	$0	$169,700	0.394	$66,802
2026	$0	$9,000	$124,700	$27,000	$9,000	$0	$169,700	0.371	$63,021
2027	$0	$9,000	$124,700	$27,000	$9,000	$0	$169,700	0.350	$59,453
2028	$0	$9,000	$124,700	$27,000	$9,000	$0	$169,700	0.331	$56,088
2029	$0	$9,000	$124,700	$27,000	$9,000	$0	$169,700	0.312	$52,913
2030	$0	$9,000	$124,700	$27,000	$9,000	$0	$169,700	0.294	$49,918
2031	$0	$9,000	$124,700	$27,000	$9,000	$0	$169,700	0.278	$47,093
2032	$0	$9,000	$124,700	$27,000	$9,000	$0	$169,700	0.262	$44,427
2033	$0	$9,000	$124,700	$27,000	$9,000	$0	$169,700	0.247	$41,912
2034	$0	$9,000	$124,700	$27,000	$9,000	$0	$169,700	0.233	$39,540
2035	$0	$9,000	$124,700	$27,000	$9,000	$0	$169,700	0.220	$37,302
2036	$0	$9,000	$124,700	$27,000	$9,000	$0	$169,700	0.207	$35,190
2037	$0	$9,000	$124,700	$27,000	$9,000	$0	$169,700	0.196	$33,198
2038	$0	$9,000	$124,700	$27,000	$9,000	$0	$169,700	0.185	$31,319
2039	$0	$9,000	$124,700	$27,000	$9,000	$0	$169,700	0.174	$29,546
2040	$0	$9,000	$124,700	$27,000	$9,000	$0	$169,700	0.164	$27,874
2041	$0	$9,000	$124,700	$27,000	$9,000	$0	$169,700	0.155	$26,296
2042	$0	$9,000	$124,700	$27,000	$9,000	$0	$169,700	0.146	$24,808
2043	$0	$9,000	$124,700	$27,000	$9,000	$0	$169,700	0.138	$23,404
2044	$0	$9,000	$124,700	$27,000	$9,000	$0	$169,700	0.130	$22,079
2045	$0	$9,000	$124,700	$27,000	$9,000	$0	$169,700	0.123	$20,829
2046	$0	$9,000	$124,700	$27,000	$9,000	$0	$169,700	0.116	$19,650
2047	$0	$9,000	$124,700	$27,000	$9,000	$0	$169,700	0.109	$18,538
2048	$0	$9,000	$124,700	$27,000	$9,000	$0	$169,700	0.103	$17,489
2049	$0	$9,000	$124,700	$27,000	$9,000	$0	$169,700	0.097	$16,499
2050	$0	$9,000	$124,700	$27,000	$9,000	$0	$169,700	0.092	$15,565
2051	$0	$9,000	$124,700	$27,000	$9,000	$0	$169,700	0.087	$14,684
2052	$0	$9,000	$124,700	$27,000	$9,000	$0	$169,700	0.082	$13,853
2053	$0	$9,000	$124,700	$27,000	$9,000	$0	$169,700	0.077	$13,068
2054	$0	$9,000	$124,700	$27,000	$9,000	$0	$169,700	0.073	$12,329
2055	$0	$9,000	$124,700	$27,000	$9,000	$0	$169,700	0.069	$11,631
2056	$0	$9,000	$124,700	$27,000	$9,000	$0	$169,700	0.065	$10,973
2057	$0	$9,000	$124,700	$27,000	$9,000	$0	$169,700	0.061	$10,351
2058	$0	$9,000	$124,700	$27,000	$9,000	$0	$169,700	0.058	$9,765
2059	$0	$9,000	$124,700	$27,000	$9,000	$0	$169,700	0.054	$9,213
2060	$0	$9,000	$124,700	$27,000	$9,000	$0	$169,700	0.051	$8,691
2061	$0	$9,000	$124,700	$27,000	$9,000	$0	$169,700	0.048	$8,199
2062	$0	$9,000	$124,700	$27,000	$9,000	$0	$169,700	0.046	$7,735
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									$7,658,125
Comments:									

(1) The incremental change in O&M costs attributable to the project.

Table 12 - Annual Water Supply Benefits
(All benefits should be in 2009 dollars)
WMWD
Project (I) Chino Creek Wellfield Development (WMWD)

(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	New Water Supply	Acre-Feet	0	0	0		$0	1.000	$0
2010	New Water Supply	Acre-Feet	0	0	0		$0	0.943	$0
2011	New Water Supply	Acre-Feet	0	0	0	$261	$0	0.890	$0
2012	New Water Supply	Acre-Feet	0	2,500	2,500	$285	$711,537	0.840	$597,420
2013	New Water Supply	Acre-Feet	0	2,500	2,500	$304	$760,537	0.792	$602,416
2014	New Water Supply	Acre-Feet	0	2,500	2,500	$324	$809,320	0.747	$604,771
2015	New Water Supply	Acre-Feet	0	2,500	2,500	$340	$849,084	0.705	$598,571
2016	New Water Supply	Acre-Feet	0	2,500	2,500	$358	$895,120	0.665	$595,306
2017	New Water Supply	Acre-Feet	0	2,500	2,500	$377	$942,656	0.627	$591,434
2018	New Water Supply	Acre-Feet	0	2,500	2,500	$395	$987,428	0.592	$584,457
2019	New Water Supply	Acre-Feet	0	2,500	2,500	$415	$1,037,194	0.558	$579,164
2020	New Water Supply	Acre-Feet	0	2,500	2,500	$434	$1,085,744	0.527	$571,956
2021	New Water Supply	Acre-Feet	0	2,500	2,500	$454	$1,135,359	0.497	$564,239
2022	New Water Supply	Acre-Feet	0	2,500	2,500	$474	$1,185,966	0.469	$556,027
2023	New Water Supply	Acre-Feet	0	2,500	2,500	$495	$1,237,586	0.442	$547,385
2024	New Water Supply	Acre-Feet	0	2,500	2,500	$516	$1,290,237	0.417	$538,371
2025	New Water Supply	Acre-Feet	0	2,500	2,500	$538	$1,343,942	0.394	$529,038
2026	New Water Supply	Acre-Feet	0	2,500	2,500	$559	$1,398,721	0.371	$519,435
2027	New Water Supply	Acre-Feet	0	2,500	2,500	$582	$1,454,595	0.350	$509,608
2028	New Water Supply	Acre-Feet	0	2,500	2,500	$605	$1,511,587	0.331	$499,599
2029	New Water Supply	Acre-Feet	0	2,500	2,500	$628	$1,569,719	0.312	$489,446
2030	New Water Supply	Acre-Feet	0	2,500	2,500	$652	$1,629,013	0.294	$479,183
2031	New Water Supply	Acre-Feet	0	2,500	2,500	$676	$1,689,494	0.278	$468,843
2032	New Water Supply	Acre-Feet	0	2,500	2,500	$700	$1,751,183	0.262	$458,455
2033	New Water Supply	Acre-Feet	0	2,500	2,500	$726	$1,814,107	0.247	$448,046
2034	New Water Supply	Acre-Feet	0	2,500	2,500	$751	$1,878,289	0.233	$437,639
2035	New Water Supply	Acre-Feet	0	2,500	2,500	$778	$1,943,755	0.220	$427,257
2036	New Water Supply	Acre-Feet	0	2,500	2,500	$804	$2,010,530	0.207	$416,920
2037	New Water Supply	Acre-Feet	0	2,500	2,500	$831	$2,078,641	0.196	$406,645
2038	New Water Supply	Acre-Feet	0	2,500	2,500	$859	$2,148,114	0.185	$396,449
2039	New Water Supply	Acre-Feet	0	2,500	2,500	$888	$2,218,976	0.174	$386,346
2040	New Water Supply	Acre-Feet	0	2,500	2,500	$917	$2,291,255	0.164	$376,350
2041	New Water Supply	Acre-Feet	0	2,500	2,500	$946	$2,364,980	0.155	$366,471
2042	New Water Supply	Acre-Feet	0	2,500	2,500	$976	$2,440,180	0.146	$356,721
2043	New Water Supply	Acre-Feet	0	2,500	2,500	$1,007	$2,516,884	0.138	$347,107
2044	New Water Supply	Acre-Feet	0	2,500	2,500	$1,038	$2,595,121	0.130	$337,639
2045	New Water Supply	Acre-Feet	0	2,500	2,500	$1,070	$2,674,924	0.123	$328,322
2046	New Water Supply	Acre-Feet	0	2,500	2,500	$1,103	$2,756,322	0.116	$319,163
2047	New Water Supply	Acre-Feet	0	2,500	2,500	$1,136	$2,839,349	0.109	$310,167
2048	New Water Supply	Acre-Feet	0	2,500	2,500	$1,170	$2,924,036	0.103	$301,338
2049	New Water Supply	Acre-Feet	0	2,500	2,500	$1,204	$3,010,416	0.097	$292,679
2050	New Water Supply	Acre-Feet	0	2,500	2,500	$1,239	$3,098,525	0.092	$284,194
2051	New Water Supply	Acre-Feet	0	2,500	2,500	$1,275	$3,188,395	0.087	$275,884
2052	New Water Supply	Acre-Feet	0	2,500	2,500	$1,312	$3,280,063	0.082	$267,750
2053	New Water Supply	Acre-Feet	0	2,500	2,500	$1,349	$3,373,564	0.077	$259,795
2054	New Water Supply	Acre-Feet	0	2,500	2,500	$1,388	$3,468,936	0.073	$252,018
2055	New Water Supply	Acre-Feet	0	2,500	2,500	$1,426	$3,566,214	0.069	$244,421
2056	New Water Supply	Acre-Feet	0	2,500	2,500	$1,466	$3,665,439	0.065	$237,001
2057	New Water Supply	Acre-Feet	0	2,500	2,500	$1,507	$3,766,647	0.061	$229,759
2058	New Water Supply	Acre-Feet	0	2,500	2,500	$1,548	$3,869,880	0.058	$222,695
2059	New Water Supply	Acre-Feet	0	2,500	2,500	$1,590	$3,975,178	0.054	$215,806
2060	New Water Supply	Acre-Feet	0	2,500	2,500	$1,633	$4,082,581	0.051	$209,091
2061	New Water Supply	Acre-Feet	0	2,500	2,500	$1,677	$4,192,133	0.048	$202,549
2062	New Water Supply	Acre-Feet	0	2,500	2,500	$1,722	$4,303,876	0.046	$196,177
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)									$20,837,524

Comments:

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

Table 15. Total Water Supply Benefits (All benefits should be in 2009 dollars)			
WMWD			
Project (l) Chino Creek Wellfield Development (WMWD)			
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)
$20,837,524	NA	$0	$20,837,524
Comments:			

Project (m) Impaired Groundwater Recovery

A. Water Supply Benefits:

Narrative description of the project's economic costs:

The Wells 21 and 22 Project will recover and treat impaired groundwater to increase local drinking water supplies for the Irvine Ranch Water District (IRWD) service area to meet growing demands. The Project will supplement IRWD's current annual potable supplies, reduce demands off imported water, and increase IRWD's diversity of local supply. The projected Wells 21 and 22 Project yield is expected to be 6,330 acre-feet per year (AFY). IRWD currently receives imported treated water from the Metropolitan Water District of Southern California (MWD).

Cost details for the entire project using Table 11 and the information in Table 7:

See Table 11.

Estimates of without-project conditions; e.g. current and future water supplies and demand:

IRWD owns wells 21 and 22 located within the City of Tustin, southeast of the Newport and Santa Ana Freeways. Agricultural and urban drainage, as well as salt concentration have degraded this portion of the Basin. In the past, the project area of the Orange County Groundwater Basin (Basin) had been exclusively used for irrigation of agricultural crops and livestock. Natural geology, past agricultural practices (farming and livestock operations) have resulted in high total dissolved solids (TDS), salts and nitrate concentrations. The concentrations have accumulated in the groundwater to the point that it cannot be used as a municipal supply without treatment. In order to utilize these wells and the water supply,
IRWD proposes to construct a nearby treatment plant and conveyance facilities for Wells 21 and 22.

Estimates of with-project conditions; e.g. improvements in new water supplies made available to meet demand:

The Wells 21 & 22 project will provide benefits by pumping impaired groundwater, producing a new local supply and removing nitrates and TDS concentrations from the basin. The benefits to the groundwater basin include removing and beneficially using poor-quality groundwater and reducing or preventing the spread of poor-quality groundwater into non-degraded aquifer zones. The Project utilizes unusable groundwater for higher quality purposes and it will help to reduce nitrate levels, salinity and hardness in the basin which benefits all local producers. The recovered groundwater from the Project utilizes an otherwise unusable water source, improves regional water quality, reduces reliance on imported water, and diversifies local water supply.

Description of methods used to estimate without- and with-project conditions:

Development of additional groundwater and recycled water are projected to reduce dependence on imported water supply for future District operations. If the groundwater supplies are expanded as planned, IRWD's potable demand will be served primarily from local supplies produced, supplemented by MWD imported water. Should IRWD choose to not expand groundwater resources for cost or other reasons, future demands would need to be served with imported treated water from MWD. The proposed groundwater recovery and treatment project will help to meet existing and new demands and will reduce demands on MWD for imported supplies.

Description of the distribution of local, regional, and statewide benefits:

Recover and treat local impaired groundwater for potable use to satisfy increasing water demands and provide a reliable local water supply source of approximately 6,330 acre-feet per year (AFY).

Reduce local dependency on imported water from Bay-Delta thereby alleviating freshwater shortages,

Build sustainable infrastructure and provide long-term benefits for the IRWD service area, and

(4) Improve the Orange County Groundwater Basin water quality by removing salts and nitrates.

Identification of beneficiaries:

Rate payers in the IRWD service area.

When the benefits will be received:

Benefits will be received as soon as construction repairs are complete.

Uncertainty of Benefits:

Wells 21 and 22 currently are not able to produce potable water without treatment therefore the Project is considered a new drinking water supply. The Project will enable IRWD to increase local supplies by 6,330 AFY which directly offsets the need for imported water. By using treated, impaired groundwater, the project will reduce imported water demands for the region and result in overall water conservation by effectively utilizing local water supplies that would otherwise be an unusable water source.

Description of any adverse effects:

There are no known adverse effects resulting from the Project.

Narrative discussion that describes, qualifies, and supports the values entered in the tables:

The Wells 21 and 22 Project is subject to the environmental review process established in the California Environmental Quality Act (CEQA). IRWD complied with CEQA by preparing an Initial Study and adopting a Mitigated Negative Declaration. In addition, this project was selected to receive federal funding through IRWD's Title XVI authorization and will require compliance with the National Environmental Protection Act (NEPA). An environmental assessment (EA) was also completed on this project as required in federal funding assistance. CEQA and NEPA environmental review work for the Project began in August 2009 and environmental certification was completed on February 8, 2010.

If possible, quantified estimates of physical and economic benefits using Table 12, 13, and 14, as applicable. Table 12 is used to present physical and economic benefits. Table 13 is used for the benefits in an avoided cost of future projects. Table 14 is used if the benefit is estimated in some other way (i.e., not using a unit monetary value or an avoided cost):

[See Table 12]

Documentation to support information presented in the project, including studies, reports, and technical data, which will be used to assess the project's ability to produce the benefits claimed. Applicants may provide requested information for each project to help document the project, including using Table 11 through 14 on a project basis. However, the evaluation score will be determined based on the information provided for the project in its entirety:

See Attachment 3 Work plan for supporting documents.

If the project includes a suite of projects, describe the relationship of each project to the overall project costs and to the overall water supply benefits of the entire project:

See Attachment 3 Work plan for description.

Table 11- Annual Cost of Project (All costs should be in 2009 Dollars) Project (m) Impaired Groundwater Recovery (IRWD)									
	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 (Power, Chemical, Labor)	Replacement & Misc. Maintentance	Brine Disposal	Replenishment Assessment	Total Costs (a) +...+ (f)	Discount Factor	Discounted Costs(g) x (h)
2009	$0	$0	$0	$0	$0	$0	$0	$0	$0
2010	$0	$0	$0	$0	$0	$0	$0	$0	$0
2011	$36,370,000	$40,000	$1,929,985	$354,326	$621,000	$1,575,000	$40,890,311	1.000	$40,890,311
2012		$41,960	$2,024,555	$364,956	$657,639	$1,652,175	$4,741,284	0.943	$4,471,031
2013		$44,016	$2,123,758	$375,904	$696,440	$1,733,132	$4,973,249	0.890	$4,426,192
2014		$46,173	$2,227,822	$387,181	$737,530	$1,818,055	$5,216,761	0.840	$4,382,079
2015		$48,435	$2,336,985	$398,797	$781,044	$1,907,140	$5,472,401	0.792	$4,334,142
2016		$50,809	$2,451,497	$410,761	$827,125	$2,000,590	$5,740,782	0.747	$4,288,364
2017		$53,298	$2,571,621	$423,084	$875,926	$2,098,618	$6,022,547	0.705	$4,245,896
2018		$55,910	$2,697,630	$435,776	$927,606	$2,201,451	$6,318,373	0.665	$4,201,718
2019		$58,649	$2,829,814	$448,849	$982,334	$2,309,322	$6,628,969	0.627	$4,156,364
2020		$61,523	$2,968,475	$462,315	$1,040,292	$2,422,479	$6,955,084	0.592	$4,117,410
2021		$64,538	$3,113,930	$476,184	$1,101,669	$2,541,180	$7,297,502	0.558	$4,072,006
2022		$67,700	$3,266,513	$490,470	$1,166,668	$2,665,698	$7,657,049	0.527	$4,035,265
2023		$71,018	$3,426,572	$505,184	$1,235,501	$2,796,317	$8,034,592	0.497	$3,993,192
2024		$74,497	$3,594,474	$520,340	$1,308,396	$2,933,337	$8,431,043	0.469	$3,954,159
2025		$78,148	$3,770,603	$535,950	$1,385,591	$3,077,070	$8,847,362	0.442	$3,910,534
2026		$81,977	$3,955,363	$552,028	$1,467,341	$3,227,847	$9,284,555	0.417	$3,871,660
2027		$85,994	$4,149,176	$568,589	$1,553,914	$3,386,011	$9,743,684	0.394	$3,839,011
2028		$90,208	$4,352,485	$585,647	$1,645,595	$3,551,926	$10,225,860	0.371	$3,793,794
2029		$94,628	$4,565,757	$603,216	$1,742,685	$3,725,970	$10,732,256	0.350	$3,756,290
2030		$99,265	$4,789,479	$621,313	$1,845,503	$3,908,542	$11,264,102	0.331	$3,728,418
2031		$104,129	$5,024,163	$639,952	$1,954,388	$4,100,061	$11,822,693	0.312	$3,688,680
2032		$109,231	$5,270,347	$659,151	$2,069,697	$4,300,964	$12,409,390	0.294	$3,648,361
2033		$114,583	$5,528,594	$678,925	$2,191,809	$4,511,711	$13,025,623	0.278	$3,621,123
2034		$120,198	$5,799,496	$699,293	$2,321,126	$4,732,785	$13,672,897	0.262	$3,582,299
2035		$126,087	$6,083,671	$720,272	$2,458,072	$4,964,692	$14,352,794	0.247	$3,545,140
2036		$132,266	$6,381,771	$741,880	$2,603,099	$5,207,961	$15,066,976	0.233	$3,510,605
2037		$138,747	$6,694,478	$764,136	$2,756,681	$5,463,152	$15,817,193	0.220	$3,479,783
2038		$145,545	$7,022,507	$787,060	$2,919,326	$5,730,846	$16,605,284	0.207	$3,437,294
2039		$152,677	$7,366,610	$810,672	$3,091,566	$6,011,657	$17,433,182	0.196	$3,416,904
2040		$160,158	$7,727,574	$834,992	$3,273,968	$6,306,229	$18,302,921	0.185	$3,386,040

Table 11- Annual Cost of Project (All costs should be in 2009 Dollars) Project (m) Impaired Groundwater Recovery (IRWD)									
	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 (Power, Chemical, Labor)	Replacement & Misc. Maintentance	Brine Disposal	Replenishment Assessment	Total Costs (a) +...+ (f)	Discount Factor	Discounted Costs(g) x (h)
2041		$168,006	$8,106,225	$860,042	$3,467,132	$6,615,234	$19,216,639	0.174	$3,343,695
2042		$176,238	$8,503,430	$885,843	$3,671,693	$6,939,380	$20,176,585	0.164	$3,308,960
2043		$184,874	$8,920,098	$912,419	$3,888,323	$7,279,410	$21,185,123	0.155	$3,283,694
2044		$193,933	$9,357,183	$939,791	$4,117,734	$7,636,101	$22,244,742	0.146	$3,247,732
2045		$203,435	$9,815,685	$967,985	$4,360,680	$8,010,270	$23,358,055	0.138	$3,223,412
2046		$213,404	$10,296,653	$997,024	$4,617,960	$8,402,773	$24,527,815	0.130	$3,188,616
2047		$223,861	$10,801,189	$1,026,935	$4,890,420	$8,814,509	$25,756,914	0.123	$3,168,100
2048		$234,830	$11,330,447	$1,057,743	$5,178,955	$9,246,420	$27,048,395	0.116	$3,137,614
2049		$246,336	$11,885,639	$1,089,475	$5,484,513	$9,699,495	$28,405,459	0.109	$3,096,195
2050		$258,407	$12,468,036	$1,122,160	$5,808,099	$10,174,770	$29,831,472	0.103	$3,072,642
2051		$271,069	$13,078,969	$1,155,825	$6,150,777	$10,673,334	$31,329,974	0.097	$3,039,007
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									$ 188,893,730
Comments: Irvine Ranch Water District Administrative costs for project administration are estimated based on similarly managed treatment plants escalated at 5%; Operations Costs are based on engineer's estimate from Preliminary Design Report escalated at 5%; Replacement costs and miscellaneous costs are based on engineer's estimate from Preliminary Design Report escalated at 3%; Brine disposal cost estimates are based on engineers estimated from Preliminary Design Report and escalated at 6% based on estimates from Orange County Sanitation District; Replenishment Assessment projections are based on engineers estimates from Preliminary Design Report and escalated at 5% based on Orange County Water District projected estimates.									

(1) The incremental change in O&M costs attributable to the project.

Table 12 - Annual Water Supply Benefits
(All benefits should be in 2009 dollars)
Project (m) Impaired Groundwater Recovery (IRWD)

(a)	(b)	(c)	(d)	(e)	(f)	(g)	(h)	(i)	(j)
Year	Type of Benefit	Measure of Benefit (AF)	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		AF	0	0	0	$0	$0	0.000	$0
2010		AF	0	0	0	$0	$0	0.000	$0
2011	Other source-new groundwater	AF	0	4800	4800	-$3,602	-$17,290,760	1.000	-$17,290,760
2012	"	AF	0	6330	6330	$1	$6,216	0.943	$5,861
2013	"	AF	0	6330	6330	$14	$90,751	0.890	$80,768
2014	"	AF	0	6330	6330	$15	$94,109	0.840	$79,052
2015	"	AF	0	6330	6330	$18	$116,989	0.792	$92,655
2016	"	AF	0	6330	6330	$19	$120,798	0.747	$90,236
2017	"	AF	0	6330	6330	$25	$155,533	0.705	$109,651
2018	"	AF	0	6330	6330	$31	$195,197	0.665	$129,806
2019	"	AF	0	6330	6330	$38	$239,081	0.627	$149,904
2020	"	AF	0	6330	6330	$53	$337,076	0.592	$199,549
2021	"	AF	0	6330	6330	$67	$425,098	0.558	$237,205
2022	"	AF	0	6330	6330	$85	$538,900	0.527	$284,000
2023	"	AF	0	6330	6330	$104	$661,260	0.497	$328,646
2024	"	AF	0	6330	6330	$125	$792,757	0.469	$371,803
2025	"	AF	0	6330	6330	$148	$934,004	0.442	$412,830
2026	"	AF	0	6330	6330	$172	$1,085,656	0.417	$452,718
2027	"	AF	0	6330	6330	$197	$1,248,407	0.394	$491,872
2028	"	AF	0	6330	6330	$225	$1,422,998	0.371	$527,932
2029	"	AF	0	6330	6330	$254	$1,610,213	0.350	$563,575
2030	"	AF	0	6330	6330	$286	$1,810,890	0.331	$599,405
2031	"	AF	0	6330	6330	$320	$2,025,917	0.312	$632,086
2032	"	AF	0	6330	6330	$356	$2,256,238	0.294	$663,334
2033	"	AF	0	6330	6330	$395	$2,502,857	0.278	$695,794
2034	"	AF	0	6330	6330	$437	$2,766,841	0.262	$724,912

Table 12 - Annual Water Supply Benefits (All benefits should be in 2009 dollars) Project (m) Impaired Groundwater Recovery (IRWD)									
(a)	(b)	(c)	(d)	(e)	(f)	(g)	(h)	(i)	(j)
Year	Type of Benefit	Measure of Benefit (AF)	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)
2035	"	AF	0	6330	6330	$482	$3,049,325	0.247	$753,183
2036	"	AF	0	6330	6330	$529	$3,351,512	0.233	$780,902
2037	"	AF	0	6330	6330	$581	$3,674,683	0.220	$808,430
2038	"	AF	0	6330	6330	$635	$4,020,197	0.207	$832,181
2039	"	AF	0	6330	6330	$693	$4,389,499	0.196	$860,342
2040	"	AF	0	6330	6330	$756	$4,784,123	0.185	$885,063
2041	"	AF	0	6330	6330	$822	$5,205,699	0.174	$905,792
2042	"	AF	0	6330	6330	$894	$5,655,957	0.164	$927,577
2043	"	AF	0	6330	6330	$969	$6,136,735	0.155	$951,194
2044	"	AF	0	6330	6330	$1,051	$6,649,983	0.146	$970,898
2045	"	AF	0	6330	6330	$1,137	$7,197,775	0.138	$993,293
2046	"	AF	0	6330	6330	$1,229	$7,782,308	0.130	$1,011,700
2047	"	AF	0	6330	6330	$1,328	$8,405,917	0.123	$1,033,928
2048	"	AF	0	6330	6330	$1,433	$9,071,081	0.116	$1,052,245
2049	"	AF	0	6330	6330	$1,545	$9,780,431	0.109	$1,066,067
2050	"	AF	0	6330	6330	$1,665	$10,536,757	0.103	$1,085,286
2051	"	AF	0	6330	6330	$1,792	$11,343,024	0.097	$1,100,273
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)									$6,651,189

Comments: The Wells 21 and 22 Project will produce 6,330 AF net, new potable water supply to IRWD service area. The new water supply would replace imported treated water purchased through Metropolitan Water District of Southern California (MWD) through IRWD's member agency Municipal Water District of Orange County (MWDOC). The unit value is based on the Project Costs (Table 11) per year per acre foot less the estimated MWD treated water (Tier 1) rate plus the surcharge imposed by MWDOC.

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

Table 15. Total Water Supply Benefits (All benefits should be in 2009 dollars)			
Project (m) Impaired Groundwater Recovery (IRWD)			
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)
$ 6,651,189	$ -	$ -	$ 6,651,189
Comments:			