

Santa Margarita River Conjunctive Use

Pre-Feasibility Plan Formulation Study

Appendices—Pre-Feasibility Cost Estimates

Pre-Feasibility Alternatives
Line Item Cost Summaries, Operations, Maintenance Costs, and
Total Cost Analyses

San Diego County, California

prepared by



U.S. Department of the Interior
Bureau of Reclamation
Technical Service Center
Denver, Colorado

May 2005

Santa Margarita River Conjunctive Use

Pre-Feasibility Plan Formulation Study

Appendix A—with Advanced Water Treatment

**Pre-Feasibility Alternatives
Line Item Cost Summaries, Operations, Maintenance Costs, and
Total Cost Analyses**

San Diego County, California

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**U.S. Department of the Interior
Bureau of Reclamation
Technical Service Center
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January 2005

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Appendix A—with Advanced Water Treatment

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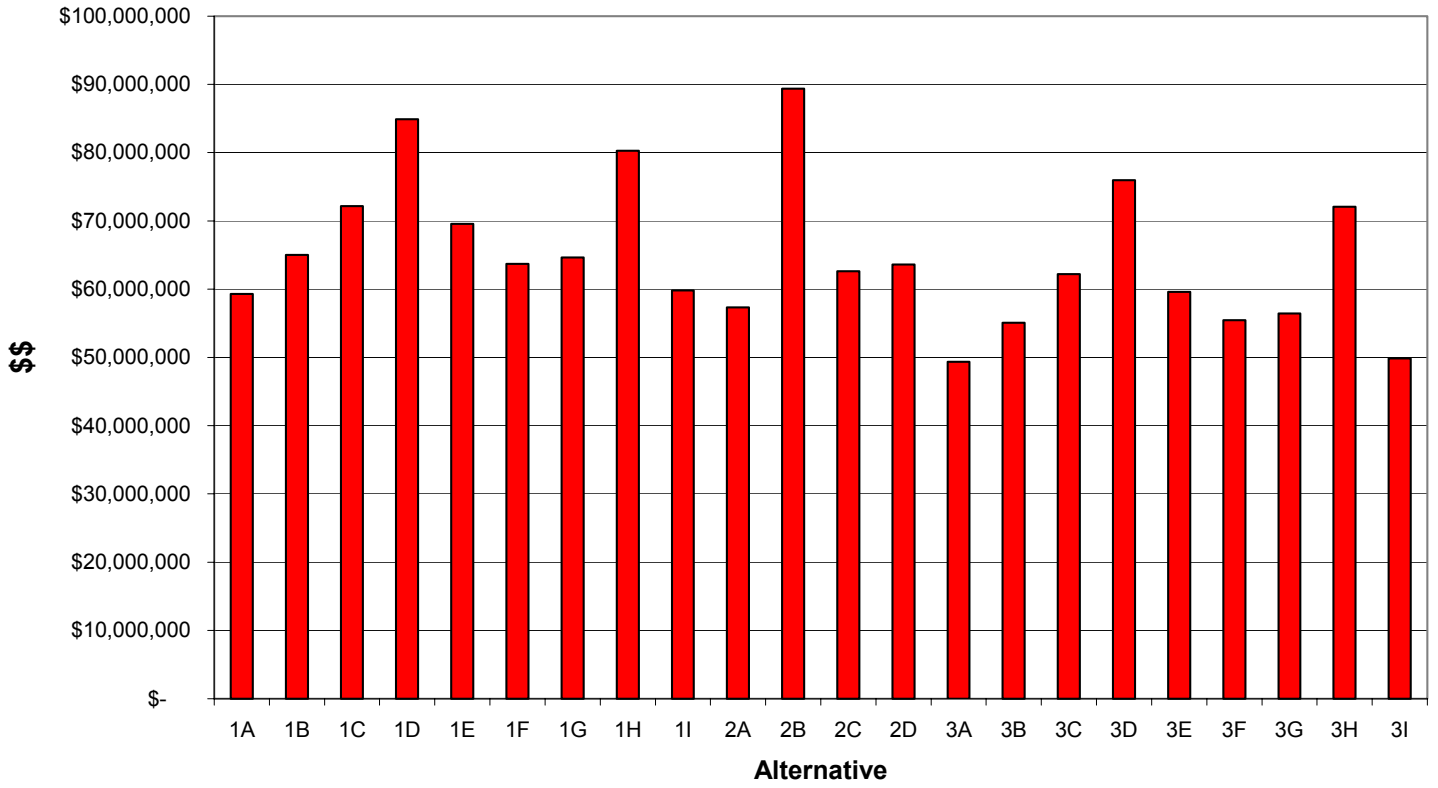
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**Santa Margarita Conjunctive Use Project
Pre-Feasibility Cost Summary
With Advanced Water Treatment**

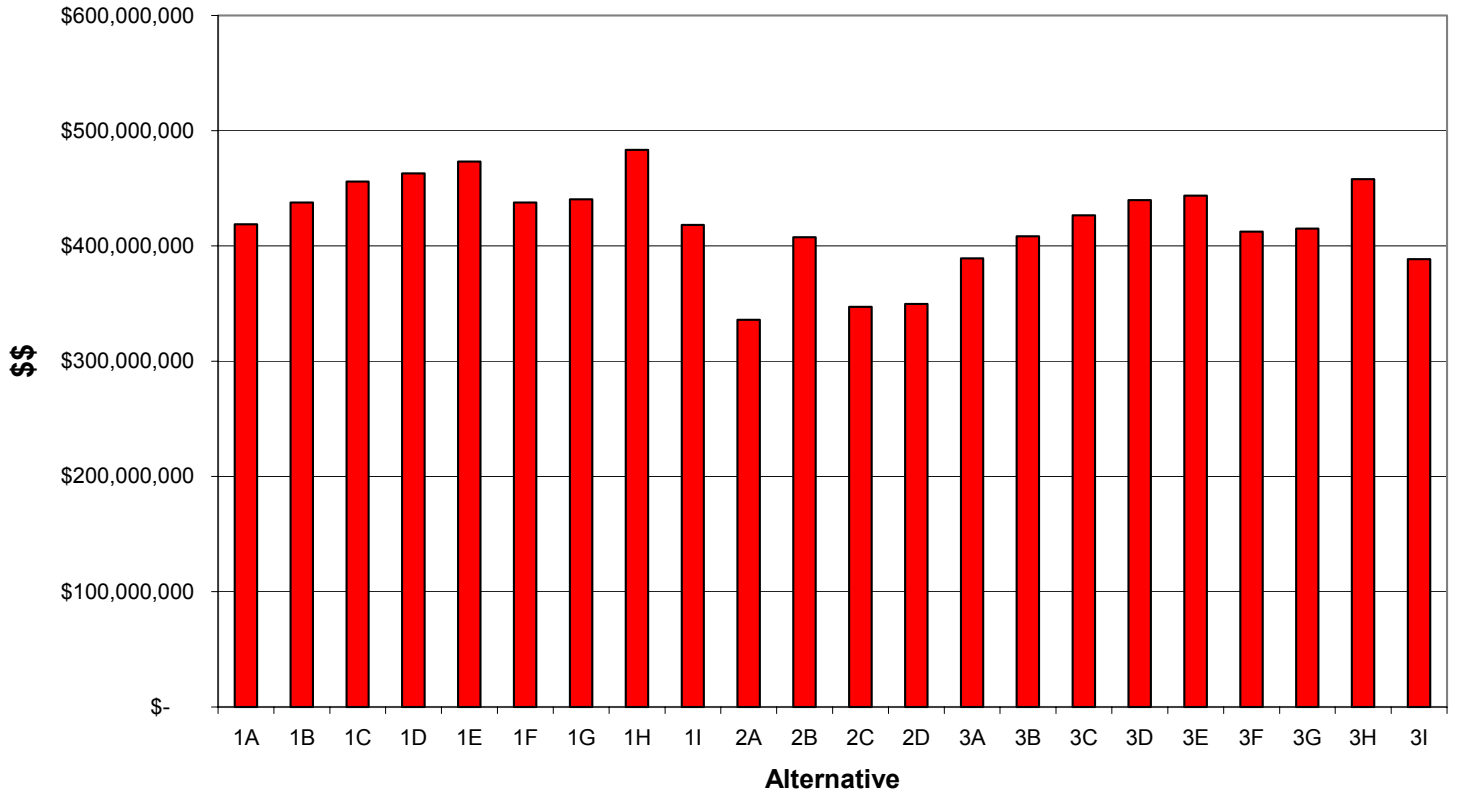
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Alternative #	Net Project Yield (af)	Construction Cost (\$)	Net Present Value (\$)	Cost Per Acre-Foot (\$/af)
1A	11985	\$ 59,291,411	\$ 418,670,579	\$ 699
1B	14785	\$ 65,029,881	\$ 437,762,022	\$ 592
1C	14365	\$ 72,171,912	\$ 455,892,644	\$ 635
1D	14875	\$ 84,879,796	\$ 463,017,856	\$ 623
1E	13770	\$ 69,559,781	\$ 473,187,890	\$ 687
1F	12835	\$ 63,673,283	\$ 437,826,750	\$ 682
1G	12835	\$ 64,661,920	\$ 440,498,927	\$ 686
1H	12580	\$ 80,270,169	\$ 483,402,908	\$ 769
1I	11985	\$ 59,792,614	\$ 418,370,604	\$ 698
2A	10710	\$ 57,305,930	\$ 335,812,680	\$ 627
2B	14020	\$ 89,360,710	\$ 407,484,135	\$ 581
2C	11560	\$ 62,621,571	\$ 347,081,931	\$ 600
2D	11560	\$ 63,610,208	\$ 349,617,994	\$ 605
3A	10200	\$ 49,335,123	\$ 389,299,251	\$ 763
3B	13000	\$ 55,073,592	\$ 408,374,617	\$ 628
3C	12580	\$ 62,215,623	\$ 426,505,239	\$ 678
3D	13090	\$ 75,988,566	\$ 439,886,739	\$ 672
3E	11985	\$ 59,614,085	\$ 443,820,735	\$ 741
3F	11050	\$ 55,469,995	\$ 412,342,047	\$ 746
3G	11050	\$ 56,458,632	\$ 415,014,224	\$ 751
3H	10795	\$ 72,066,882	\$ 457,934,281	\$ 848
3I	10200	\$ 49,836,326	\$ 388,637,559	\$ 762

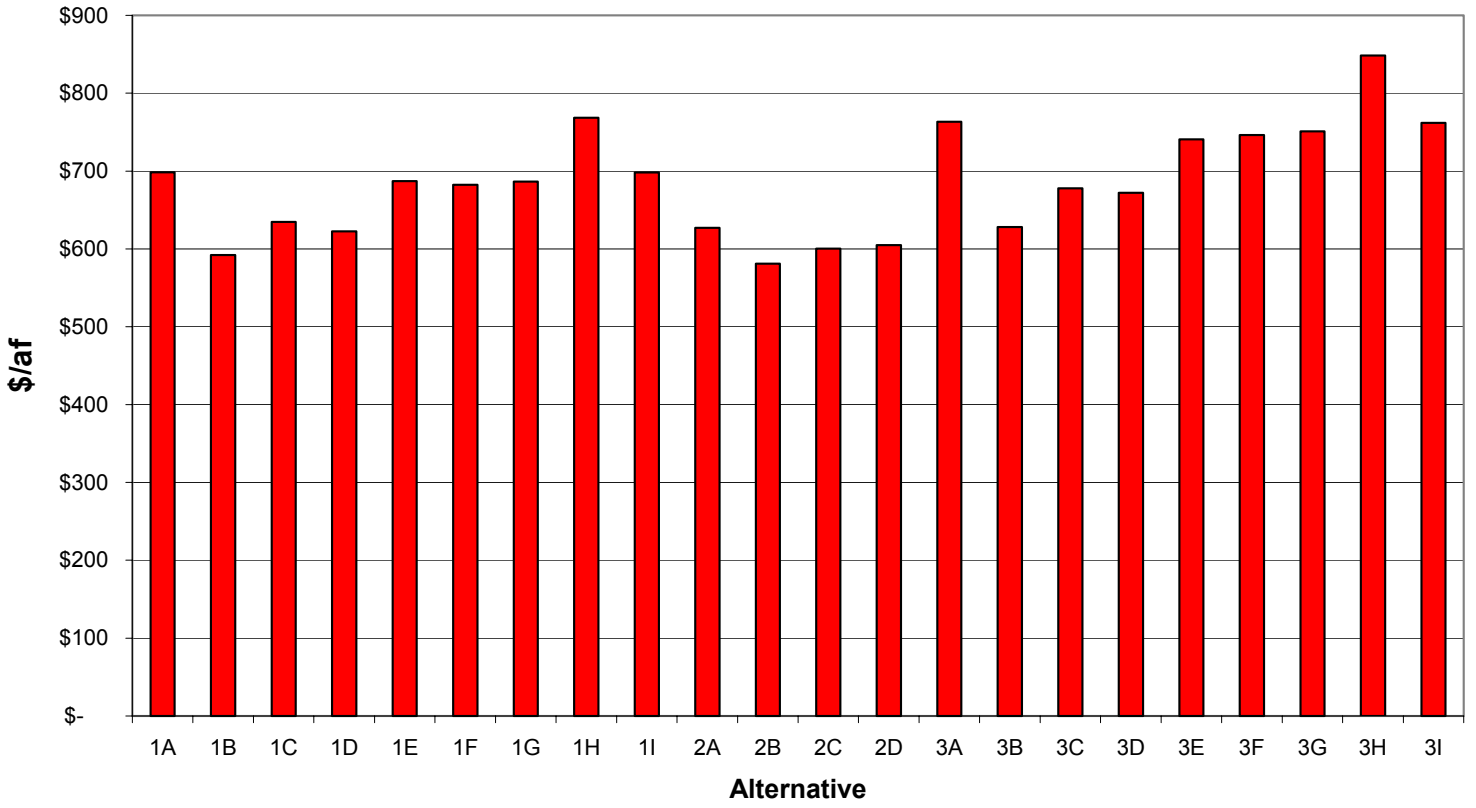
**Santa Margarita Conjunctive Use Project
Pre-Feasibility Construction Costs
With Advanced Water Treatment**



**Santa Margarita Conjunctive Use Project
Pre-Feasibility Net Present Values
With Advanced Water Treatment**



**Santa Margarita Conjunctive Use Project
Pre-Feasibility Costs per Acre-foot
With Advanced Water Treatment**



Alternative 1a
Santa Margarita Project - Pre-Feasibility Study
Project Capital Cost Breakdown

With Advanced Water Treatment

20-Jan-05

Alternative 1A		
Feature	Component Details	Capital costs Item Costs \$
Diversion dam -Obermeyer installation	280' long, 7.9' high, Replaces existing sheet pile diversion dam	\$ 2,738,000
Headworks gates - reconstructed with Obermeyer dam	Increased from 60 to 200 cfs	\$ 101,791
O'Neill ditch - widening improvements along with road siphon crossings	Increased from 60 to 200 cfs	\$ 406,219
Recharge ponds	Rehab 1-5 existing ponds: 312 AF;	\$ 1,261,473
	Construct 2 new ponds, 6&7: 242 AF	\$ 2,269,454
Groundwater extraction wells	6 wells, 10 cfs net	\$ 812,685
Groundwater collection pipe system	Based on 750 gpm wells pumped into existing collector	\$ 87,128
Water treatment plant	Haybarn Canyon; brine disposal assumed included, train 1, 29 cfs	\$ 28,740,909
Distribution main pipeline	Bi-directional to Fallbrook: 67,000', 30"-27" dia, 1100' head, 24-19 cfs	\$ 10,050,353
Storage tanks	At water treatment clearwell or existing	
Pumping plants	Base in water treatment; mid-booster included in pipeline	
Lake O'Neill rehab	LC designs	\$ 12,823,400
Open space management zone	Land purchase, included below	
TOTAL		\$ 59,291,411

Alternative 1a
Santa Margarita Project - Pre-Feasibility Study
Alternative Total Cost Analysis

With Advanced Water Treatment

20-Jan-05

TOTAL COST ANALYSIS			
1A			
Total Construction Costs		\$	59,291,411
	Mobilization 5 %	\$	2,964,571
	Unlisted Items 15 %	\$	8,893,712
Total Contract Costs		\$	71,149,693
	Contingencies 25 %	\$	17,787,423
Total Field Costs		\$	88,937,117
	Non-Contract 33 %	\$	29,349,249
	Open Space Management Zone	\$	13,000,000
Total Project Costs		\$	131,286,365
	PV of Annual O&M Costs	\$	287,384,214
Net Present Value		\$	418,670,579
	Yield, ac-ft		14100
	Net Project Yield, ac-ft		11,985
Cost Per Acre-Foot per year		\$	699

Alternative 1a
Santa Margarita Project - Pre-Feasibility Study
Alternative Annual Costs

With Advanced Water Treatment

20-Jan-05

Annual Operating costs		
1A	Variables	Annual \$
Wells, pumping		
flow, cfs	10	
drawdown, ft	20	
Water treatment plants, O&M		\$ 13,591,096
Pumping plants, pipe, O&M		\$ 100,504
Distribution systems, pumping		
flow, cfs (base)	24	
head, ft	500	
flow, cfs (mid)	19	
head, ft	700	
flow, cfs		
head, ft		
Power value, \$/kw-hr	\$0.11	
Power for pumping, annually		\$ 2,971,113
Interest rate	5.375%	
Assumed design life, years	50	
Present worth factor	17.25	

Alternative 1b
Santa Margarita Project - Pre-Feasibility Study
Alternative Total Cost Analysis

With Advanced Water Treatment

20-Jan-05

TOTAL COST ANALYSIS	
1B	
Total Construction Costs	\$ 65,029,881
Mobilization 5 %	\$ 2,964,571
Unlisted Items 15 %	\$ 9,754,482
Total Contract Costs	\$ 77,748,933
Contingencies 25 %	\$ 19,437,233
Total Field Costs	\$ 97,186,167
Non-Contract 33 %	\$ 32,071,435
Open Space Management Zone	\$ 13,000,000
Total Project Costs	\$ 142,257,602
PV of Annual O&M Costs	\$ 295,504,420
Net Present Value	\$ 437,762,022
	Yield, ac-ft 16900
	Net Project Yield, ac-ft 14,785
Cost Per Acre-Foot per year	\$ 592

Alternative 1b
Santa Margarita Project - Pre-Feasibility Study
Alternative Annual Costs

With Advanced Water Treatment

20-Jan-05

Annual Operating costs		
1B	Variables	Annual \$
Wells, pumping		
flow, cfs	14	
drawdown, ft	20	
Water treatment plants, O&M		\$ 13,632,096
Pumping plants, pipe, O&M		\$ 153,977
Distribution systems, pumping		
flow, cfs	24	
head, ft	500	
flow, cfs	19	
head, ft	700	
flow, cfs (SMC)	7	
head, ft (OC)	450	
Power value, \$/kw-hr	\$0.11	
Power for pumping, annually		\$ 3,347,454
Interest rate	5.375%	
Assumed design life, years	50	
Present worth factor	17.25	

Alternative 1c
Santa Margarita Project - Pre-Feasibility Study
Alternative Total Cost Analysis

With Advanced Water Treatment

20-Jan-05

TOTAL COST ANALYSIS			
1C			
	Total Construction Costs	\$	72,171,912
	Mobilization 5 %	\$	2,964,571
	Unlisted Items 15 %	\$	10,825,787
	Total Contract Costs	\$	85,962,269
	Contingencies 25 %	\$	21,490,567
	Total Field Costs	\$	107,452,836
	Non-Contract 33 %	\$	35,459,436
	Open Space Management Zone	\$	13,000,000
	Total Project Costs	\$	155,912,273
	PV of Annual O&M Costs	\$	299,980,371
	Net Present Value	\$	455,892,644
		Yield, ac-ft	16900
		Net Project Yield, ac-ft	14,365
	Cost Per Acre-Foot per year	\$	635

Alternative 1c
Santa Margarita Project - Pre-Feasibility Study
Alternative Annual Costs

With Advanced Water Treatment

20-Jan-05

Annual Operating costs		
1C	Variables	Annual \$
Wells, pumping		
flow, cfs	14	
drawdown, ft	20	
Water treatment plants, O&M		\$ 13,591,096
Pumping plants, pipe, O&M		\$ 209,816
Distribution systems, pumping		
flow, cfs	24	
head, ft	500	
flow, cfs	19	
head, ft	700	
flow, cfs	7	
head, ft (Cross Base)	750	
Power value, \$/kw-hr	\$0.11	
Power for pumping, annually		\$ 3,592,134
Interest rate	5.375%	
Assumed design life, years	50	
Present worth factor	17.25	

Alternative 1d
Santa Margarita Project - Pre-Feasibility Study
Alternative Total Cost Analysis

With Advanced Water Treatment

20-Jan-05

TOTAL COST ANALYSIS	
1D	
Total Construction Costs	\$ 84,879,796
Mobilization 5 %	\$ 2,964,571
Unlisted Items 15 %	\$ 12,731,969
Total Contract Costs	\$ 100,576,336
Contingencies 25 %	\$ 25,144,084
Total Field Costs	\$ 125,720,421
Non-Contract 33 %	\$ 41,487,739
Open Space Management Zone	\$ 13,000,000
Total Project Costs	\$ 180,208,159
PV of Annual O&M Costs	\$ 282,809,697
Net Present Value	\$ 463,017,856
	Yield, ac-ft 17500
	Net Project Yield, ac-ft 14,875
Cost Per Acre-Foot per year	\$ 623

Alternative 1d
Santa Margarita Project - Pre-Feasibility Study
Alternative Annual Costs

With Advanced Water Treatment

20-Jan-05

Annual Operating costs		
1D	Variables	Annual \$
Wells, pumping		
flow, cfs	16	
drawdown, ft	20	
Water treatment plants, O&M		\$ 13,634,096
Pumping plants, pipe, O&M		\$ 162,786
Distribution systems, pumping		
flow, cfs (24+8)	32	
head, ft	500	
flow, cfs	0	
head, ft	700	
flow, cfs (1/5 of year)	40	
head, ft, averaged	750	
Power value, \$/kw-hr	\$0.11	
Power for pumping, annually		\$ 2,600,598
Interest rate	5.375%	
Assumed design life, years	50	
Present worth factor	17.25	

Alternative 1e
Santa Margarita Project - Pre-Feasibility Study
Project Capital Cost Breakdown

With Advanced Water Treatment

20-Jan-05

<i>Alternative 1E</i>		
Feature	Component Details	Capital costs Item Costs \$
Similar to Alt 1A w/ larger pumping, as below		\$ 20,500,150
NWS - Treatment wetlands and reservoir	Wetland: 18 acres	\$ 630,000
	Reservoir: earth dam, H= x ft; 49 surface acres, V= 1,600 ac-ft	\$ 4,145,041
Land Outfall Pipeline	9,000 ft, 12" dia, 50' head, flow =3.5 cfs	\$ 312,303
Treatment-Reservoir Pipeline	1,000 ft, flow =3.5 cfs, open channel ditch	\$ -
Clarified water Pipeline	5,800 ft, 18" dia, min head, flow =8.7 cfs	\$ 333,777
Spreading basin	As is - no change	TBD
Groundwater extraction wells	add 2 more wells than in 1A, 8 total	\$ 270,895
Groundwater collection pipe system	Based on 750 gpm wells pumped into existing collector	\$ 29,043
Water treatment plant	Haybarn Canyon; brine disposal assumed included, train 1, 33 cfs	\$ 32,001,276
Distribution main pipeline	Bi-directional to Fallbrook: 67,000', 33"-30" dia, 1100' head, 28-23 cfs	\$ 11,337,296
	TOTAL	\$ 69,559,781

Alternative 1e
Santa Margarita Project - Pre-Feasibility Study
Alternative Total Cost Analysis

With Advanced Water Treatment

20-Jan-05

TOTAL COST ANALYSIS	
1E	
Total Construction Costs	\$ 69,559,781
Mobilization 5 %	\$ 2,964,571
Unlisted Items 15 %	\$ 10,433,967
Total Contract Costs	\$ 82,958,319
Contingencies 25 %	\$ 20,739,580
Total Field Costs	\$ 103,697,899
Non-Contract 33 %	\$ 34,220,307
Open Space Management Zone	\$ 13,000,000
Total Project Costs	\$ 150,918,205
PV of Annual O&M Costs	\$ 322,269,685
Net Present Value	\$ 473,187,890
	Yield, ac-ft 16200
	Net Project Yield, ac-ft 13,770
Cost Per Acre-Foot per year	\$ 687

Alternative 1e
Santa Margarita Project - Pre-Feasibility Study
Alternative Annual Costs

With Advanced Water Treatment

20-Jan-05

Annual Operating costs		
1E	Variables	Annual \$
Wells, pumping		
flow, cfs	14	
drawdown, ft	20	
Water treatment plants, O&M		\$ 15,067,271
Pumping plants, pipe, wetlands, dam		\$ 78,420
Distribution systems, pumping		
flow, cfs	28	
head, ft	500	
flow, cfs	23	
head, ft	700	
Power value, \$/kw-hr	\$0.11	
Power for pumping, annually		\$ 3,539,703
Interest rate	5.375%	
Assumed design life, years	50	
Present worth factor	17.25	

Alternative 1f
Santa Margarita Project - Pre-Feasibility Study
Project Capital Cost Breakdown

With Advanced Water Treatment

20-Jan-05

Alternative 1F		
Feature	Component Details	Capital costs Item Costs \$
Alt 1A w/ larger pumping, as below		\$ 20,500,150
Pueblitos Canyon - wetlands	Wetland: 33 acres	\$ 1,155,000
	Expansion area: 12 acres	\$ 420,000
Land Outfall Pipeline	18,400 ft, 16" dia, 150' head, flow =6.3 cfs	\$ 918,355
De-nitrified Pipeline	5,700 ft, 16" dia, gravity head, flow =6.3 cfs	\$ 284,490
Groundwater spreading Pipeline	9,400 ft, 16" dia, gravity head, flow =6.3 cfs	\$ 469,160
Groundwater extraction wells	1 more well than in Alt 1A, 7 total	\$ 135,448
Groundwater collection pipe system	Based on 750 gpm wells pumped into existing collector	\$ 14,521
Water treatment plant	Haybarn Canyon; brine disposal assumed included, train 1, 30 cfs	\$ 29,557,097
Distribution main pipeline	Bi-directional to Fallbrook: 67,000', 30"-27" dia, 1100' head, 26-21 cfs	\$ 10,219,062
	TOTAL	\$ 63,673,283

Alternative 1f
Santa Margarita Project - Pre-Feasibility Study
Alternative Total Cost Analysis

With Advanced Water Treatment

20-Jan-05

TOTAL COST ANALYSIS	
1F	
Total Construction Costs	\$ 63,673,283
Mobilization 5 %	\$ 2,964,571
Unlisted Items 15 %	\$ 9,550,992
Total Contract Costs	\$ 76,188,846
Contingencies 25 %	\$ 19,047,212
Total Field Costs	\$ 95,236,058
Non-Contract 33 %	\$ 31,427,899
Open Space Management Zone	\$ 13,000,000
Total Project Costs	\$ 139,663,957
PV of Annual O&M Costs	\$ 298,162,794
Net Present Value	\$ 437,826,750
	Yield, ac-ft 15100
	Net Project Yield, ac-ft 12,835
Cost Per Acre-Foot per year	\$ 682

Alternative 1f
Santa Margarita Project - Pre-Feasibility Study
Alternative Annual Costs

With Advanced Water Treatment

20-Jan-05

Annual Operating costs		
1F	Variables	Annual \$
Wells, pumping		
flow, cfs	12	
drawdown, ft	20	
Water treatment plants, O&M		\$ 13,960,184
Pumping plants, pipe, wetlands O&M		\$ 72,070
Distribution systems, pumping		
flow, cfs	26	
head, ft	500	
flow, cfs	21	
head, ft	700	
Power value, \$/kw-hr	\$0.11	
Power for pumping, annually		\$ 3,255,408
Interest rate	5.375%	
Assumed design life, years	50	
Present worth factor	17.25	

**Alternative 1g
Santa Margarita Project - Pre-Feasibility Study
Project Capital Cost Breakdown**

With Advanced Water Treatment

20-Jan-05

<i>Alternative 1G</i>		
Feature	Component Details	Capital costs Item Costs \$
Alt 1A w/ larger pumping, as below		\$ 20,500,150
Newton Canyon - wetlands	Wetland: 35 acres	\$ 1,225,000
	Expansion area: 11 acres	\$ 385,000
Land Outfall Pipeline	7,300 ft, 15" dia, connects to existing pump head, flow =6.3 cfs	\$ 364,347
De-nitrified Pipeline	20,600 ft, 15" dia, pump head 60', flow =6.3 cfs	\$ 1,792,135
Groundwater spreading Pipeline	9,400 ft, 16" dia, gravity head, flow =6.3 cfs	\$ 469,160
Groundwater extraction wells	1 more well than in Alt 1A, 7 total	\$ 135,448
Groundwater collection pipe system	Based on 750 gpm wells pumped into existing collector	\$ 14,521
Water treatment plant, same as 1F	Haybarn Canyon; brine disposal assumed included, train 1, 30 cfs	\$ 29,557,097
Distribution main pipeline	Bi-directional to Fallbrook: 67,000', 30"-27" dia, 1100' head, 26-21 cfs	\$ 10,219,062
TOTAL		\$ 64,661,920

Alternative 1g
Santa Margarita Project - Pre-Feasibility Study
Alternative Total Cost Analysis

With Advanced Water Treatment

20-Jan-05

TOTAL COST ANALYSIS			
1G			
Total Construction Costs		\$	64,661,920
	Mobilization 5 %	\$	2,964,571
	Unlisted Items 15 %	\$	9,699,288
Total Contract Costs		\$	77,325,779
	Contingencies 25 %	\$	19,331,445
Total Field Costs		\$	96,657,223
	Non-Contract 33 %	\$	31,896,884
	Open Space Management Zone	\$	13,000,000
Total Project Costs		\$	141,554,107
	PV of Annual O&M Costs	\$	298,944,820
Net Present Value		\$	440,498,927
	Yield, ac-ft		15100
	Net Project Yield, ac-ft		12,835
Cost Per Acre-Foot per year		\$	686

Alternative 1g
Santa Margarita Project - Pre-Feasibility Study
Alternative Annual Costs

With Advanced Water Treatment

20-Jan-05

Annual Operating costs		
1G	Variables	Annual \$
Wells, pumping		
flow, cfs	12	
drawdown, ft	20	
Water treatment plants, O&M		\$ 13,960,184
Pumping plants, pipe, wetlands O&M		\$ 73,370
Distribution systems, pumping		
flow, cfs	26	
head, ft	500	
flow, cfs	21	
head, ft	700	
flow, cfs (denitrified)	6.3	
head, ft	60	
Power value, \$/kw-hr	\$0.11	
Power for pumping, annually		\$ 3,299,451
Interest rate	5.375%	
Assumed design life, years	50	
Present worth factor	17.25	

Alternative 1h
Santa Margarita Project - Pre-Feasibility Study
Alternative Total Cost Analysis

With Advanced Water Treatment

20-Jan-05

TOTAL COST ANALYSIS	
1H	
Total Construction Costs	\$ 80,270,169
Mobilization 5 %	\$ 2,964,571
Unlisted Items 15 %	\$ 12,040,525
Total Contract Costs	\$ 95,275,265
Contingencies 25 %	\$ 23,818,816
Total Field Costs	\$ 119,094,082
Non-Contract 33 %	\$ 39,301,047
Open Space Management Zone	\$ 13,000,000
Total Project Costs	\$ 171,395,129
PV of Annual O&M Costs	\$ 312,007,780
Net Present Value	\$ 483,402,908
	Yield, ac-ft 14800
	Net Project Yield, ac-ft 12,580
Cost Per Acre-Foot per year	\$ 769

Alternative 1h
Santa Margarita Project - Pre-Feasibility Study
Alternative Annual Costs

With Advanced Water Treatment

20-Jan-05

Annual Operating costs		
1H	Variables	Annual \$
Wells, pumping		
flow, cfs	10	
drawdown, ft	20	
Water treatment plants, O&M		\$ 13,960,184
Pumping plants, pipe, dam		\$ 133,780
Distribution systems, pumping		
flow, cfs	26	
head, ft	500	
flow, cfs	21	
head, ft	700	
flow, cfs (2/5 of year)	40	
head, ft	400	
Power value, \$/kw-hr	\$0.11	
Power for pumping, annually		\$ 3,996,439
Interest rate	5.375%	
Assumed design life, years	50	
Present worth factor	17.25	

Alternative 1i
Santa Margarita Project - Pre-Feasibility Study
Alternative Total Cost Analysis

With Advanced Water Treatment

20-Jan-05

TOTAL COST ANALYSIS			
1/			
Total Construction Costs		\$	59,792,614
	Mobilization 5 %	\$	2,964,571
	Unlisted Items 15 %	\$	8,968,892
Total Contract Costs		\$	71,726,077
	Contingencies 25 %	\$	17,931,519
Total Field Costs		\$	89,657,596
	Non-Contract 33 %	\$	29,587,007
	Open Space Management Zone	\$	13,000,000
Total Project Costs		\$	132,244,602
	PV of Annual O&M Costs	\$	286,126,002
Net Present Value		\$	418,370,604
	Yield, ac-ft		14100
	Net Project Yield, ac-ft		11,985
Cost Per Acre-Foot per year		\$	698

Alternative 1i
Santa Margarita Project - Pre-Feasibility Study
Alternative Annual Costs

With Advanced Water Treatment

20-Jan-05

Annual Operating costs		
1/		
	Variables	Annual \$
Wells, pumping		
flow, cfs	6.4	
drawdown, ft	50	
Water treatment plants, O&M		\$ 13,591,096
Pumping plants, pipe, O&M		\$ 13,570
Distribution systems, pumping		
flow, cfs	24	
head, ft	500	
flow, cfs	19	
head, ft	700	
Power value, \$/kw-hr	\$0.11	
Power for pumping, annually		\$ 2,985,095
Interest rate	5.375%	
Assumed design life, years	50	
Present worth factor	17.25	

Alternative 2a
Santa Margarita Project - Pre-Feasibility Study
Project Capital Cost Breakdown

With Advanced Water Treatment

20-Jan-05

Alternative 2A		
Feature	Component Details	Capital costs Item Costs \$
Diversion dam -Obermeyer installation	280' long, 7.9' high, Replaces existing sheet pile diversion dam	\$ 2,738,000
Headworks gates - reconstructed with Obermeyer dam	Increased from 60 to 200 cfs	\$ 101,791
O'Neill ditch - widening improvements along with road siphon crossings	Increased from 60 to 200 cfs	\$ 406,219
Recharge ponds	Rehab 1-5 existing ponds: 312 AF;	\$ 1,261,473
	Construct 2 new ponds, 6&7: 242 AF	\$ 2,269,454
Groundwater extraction wells	4 wells, 6.4 cfs net	\$ 541,790
Groundwater collection pipe system	Based on 750 gpm wells pumped into existing collector	\$ 58,085
Water treatment plant	Haybarn Canyon; brine disposal assumed included, train 1, 21 cfs	\$ 22,274,560
Distribution main pipeline	From WTP pumps, 18 cfs, 27" pipeline to existing So. CPEN tanks	\$ 1,170,791
Diversion weir	Fallbrook PUD sump, 357'x10'	\$ 4,363,688
Fallbrook sump to Red Mtn pipeline	29,000', 15" dia, 700' head, 5 cfs	\$ 2,427,864
Water treatment plant	Red Mountain - train 2	\$ 3,590,600
New Oceanside- Morro Hill pipeline	28,000', 27" dia, gravity head, 20 cfs	\$ 3,278,215
Lake O'Neill rehab	same as Alt 1a	\$ 12,823,400
Open space management zone	land purchase, included below	
TOTAL		\$ 57,305,930

Alternative 2a
Santa Margarita Project - Pre-Feasibility Study
Alternative Total Cost Analysis

With Advanced Water Treatment

20-Jan-05

TOTAL COST ANALYSIS			
2A			
	Total Construction Costs	\$	57,305,930
	Mobilization 5 %	\$	2,865,297
	Unlisted Items 15 %	\$	8,595,890
	Total Contract Costs	\$	68,767,116
	Contingencies 25 %	\$	17,191,779
	Total Field Costs	\$	85,958,895
	Non-Contract 33 %	\$	21,489,724
	Open Space Management Zone	\$	13,000,000
	Total Project Costs	\$	120,448,619
	PV of Annual O&M Costs	\$	215,364,060
	Net Present Value	\$	335,812,680
		Yield, ac-ft	12600
		Net Project Yield, ac-ft	10710
	Cost Per Acre-Foot per year	\$	627

Alternative 2a
Santa Margarita Project - Pre-Feasibility Study
Alternative Annual Costs

With Advanced Water Treatment

20-Jan-05

Annual Operating costs		
2A	Variables	Annual \$
Wells, pumping		
flow, cfs	6.4	
drawdown, ft	20	
Water treatment plants, O&M		\$ 10,921,355
Pumping plants, pipe, O&M		\$ 35,987
Distribution systems, pumping		
flow, cfs (base)	18	
head, ft	500	
flow, cfs (mid)	0	
head, ft	700	
flow, cfs (FPUD to RMR)	5	
head, ft	800	
Power value, \$/kw-hr	\$0.11	
Power for pumping, annually		\$ 1,529,599
Interest rate	5.375%	
Assumed design life, years	50	
Present worth factor	17.25	

Alternative 2b
Santa Margarita Project - Pre-Feasibility Study
Project Capital Cost Breakdown

With Advanced Water Treatment

20-Jan-05

Alternative 2B		
Feature	Component Details	Capital costs Item Costs \$
Alt 2A without Morro Hill Pipeline, plus larger Haybarn WTP per below		\$ 30,582,364
San Mateo ponds - rehab	Area and depth affect costs - 2'; haul mile assumed	\$ 306,000
San Mateo wells	3 new wells, 5 cfs	\$ 406,343
Well head treatment	8 cfs, chloramination	\$ 86,000
Pipeline to Orange County (OC)	23,000 ft, 18" dia, 450' head, flow = 8 cfs, new storage tank	\$ 6,090,640
Pipeline from Santa Margarita river basin	Bi-directional, 104,000 ft, 36" dia, 750' head, flow = 40 cfs 1-way	\$ 27,334,678
Groundwater extraction wells	2 additional SMR wells over 2a	\$ 270,895
Groundwater collection pipe system	Based on 750 gpm wells pumped into existing collector	\$ 29,043
Existing Oceanside- Morro Hill pipeline	28,000', 12" dia, gravity head	\$ -
Water treatment plant	Haybarn Canyon; brine disposal assumed included, train 1, 22 cfs	\$ 23,083,957
Distribution main pipeline	From WTP pumps, 18 cfs, 27" pipeline to existing So. CPEN tanks	\$ 1,170,791
		\$ 89,360,710

Alternative 2b
Santa Margarita Project - Pre-Feasibility Study
Alternative Total Cost Analysis

With Advanced Water Treatment

20-Jan-05

TOTAL COST ANALYSIS			
2B			
	Total Construction Costs	\$	89,360,710
	Mobilization 5 %	\$	2,865,297
	Unlisted Items 15 %	\$	13,404,107
	Total Contract Costs	\$	105,630,114
	Contingencies 25 %	\$	26,407,528
	Total Field Costs	\$	132,037,642
	Non-Contract 33 %	\$	33,009,410
	Open Space Management Zone	\$	13,000,000
	Total Project Costs	\$	178,047,052
	PV of Annual O&M Costs	\$	229,437,083
	Net Present Value	\$	407,484,135
		Yield, ac-ft	16000
		Net Project Yield, ac-ft	14020
	Cost Per Acre-Foot per year	\$	581

Alternative 2b
Santa Margarita Project - Pre-Feasibility Study
Alternative Annual Costs

With Advanced Water Treatment

20-Jan-05

Annual Operating costs		
2B	Variables	Annual \$
Wells, pumping		
flow, cfs	15	
drawdown, ft	20	
Water treatment plants, O&M		\$ 11,333,171
Pumping plants, pipe, O&M		\$ 187,064
Distribution systems, pumping		
flow, cfs (base)	18	
head, ft	500	
flow, cfs (OC)	8	
head, ft	450	
flow, cfs (1/5 of year)	40	
head, ft	750	
Power value, \$/kw-hr	\$0.11	
Power for pumping, annually		\$ 1,782,668
Interest rate	5.375%	
Assumed design life, years	50	
Present worth factor	17.25	

Alternative 2c
Santa Margarita Project - Pre-Feasibility Study
Project Capital Cost Breakdown

With Advanced Water Treatment

20-Jan-05

Alternative 2C		
Feature	Component Details	Capital costs Item Costs \$
Alt 2A with treatment plant and wells as below, plus below		\$ 33,860,579
Pueblitos Canyon - wetlands	Wetland: 33 acres	\$ 1,155,000
	Expansion area: 12 acres	\$ 420,000
Land Outfall Pipeline	18,400 ft, 16" dia, 150' head, flow =6.3 cfs	\$ 918,355
De-nitrified Pipeline	5,700 ft, 16" dia, gravity head, flow =6.3 cfs	\$ 284,490
Groundwater spreading Pipeline	9,400 ft, 16" dia, gravity head, flow =6.3 cfs	\$ 469,160
Groundwater extraction wells	3 additional SMR wells over 2a	\$ 406,343
Groundwater collection pipe system	Based on 750 gpm wells pumped into existing collector	\$ 43,564
Water treatment plant	Haybarn Canyon; brine disposal assumed included, train 1, 23 cfs	\$ 23,893,290
Distribution main pipeline	From WTP pumps, 20 cfs, 27" pipeline to existing So. CPEN tanks	\$ 1,170,791
		\$ 62,621,571

Alternative 2c
Santa Margarita Project - Pre-Feasibility Study
Alternative Total Cost Analysis

With Advanced Water Treatment

20-Jan-05

TOTAL COST ANALYSIS	
2C	
Total Construction Costs	\$ 62,621,571
Mobilization 5 %	\$ 2,865,297
Unlisted Items 15 %	\$ 9,393,236
Total Contract Costs	\$ 74,880,104
Contingencies 25 %	\$ 18,720,026
Total Field Costs	\$ 93,600,130
Non-Contract 33 %	\$ 23,400,032
Open Space Management Zone	\$ 13,000,000
Total Project Costs	\$ 130,000,162
PV of Annual O&M Costs	\$ 217,081,769
Net Present Value	\$ 347,081,931
	Yield, ac-ft 13600
	Net Project Yield, ac-ft 11560
Cost Per Acre-Foot per year	\$ 600

Alternative 2c
Santa Margarita Project - Pre-Feasibility Study
Alternative Annual Costs

With Advanced Water Treatment

20-Jan-05

Annual Operating costs		
2C	Variables	Annual \$
Wells, pumping		
flow, cfs	12	
drawdown, ft	20	
Water treatment plants, O&M		\$ 11,322,544
Pumping plants, pipe, O&M		\$ 24,279
Distribution systems, pumping		
flow, cfs (base)	20	
head, ft	520	
flow, cfs	0	
head, ft	0	
flow, cfs (denitrified)	6.3	
head, ft	0	
Power value, \$/kw-hr	\$0.11	
Power for pumping, annually		\$ 1,239,712
Interest rate	5.375%	
Assumed design life, years	50	
Present worth factor	17.25	

Alternative 2d
Santa Margarita Project - Pre-Feasibility Study
Project Capital Cost Breakdown

With Advanced Water Treatment

20-Jan-05

Alternative 2D		
Feature	Component Details	Capital costs Item Costs \$
Alt 2A with treatment plant and wells as below, plus below		\$ 33,860,579
Newton Canyon - wetlands	Wetland: 35 acres	\$ 1,225,000
	Expansion area: 11 acres	\$ 385,000
Land Outfall Pipeline	7,300 ft, 15" dia, connects to existing pump head, flow =6.3 cfs	\$ 364,347
De-nitrified Pipeline	20,600 ft, 15" dia, pump head 60', flow =6.3 cfs	\$ 1,792,135
Groundwater spreading Pipeline	9,400 ft, 16" dia, gravity head, flow =6.3 cfs	\$ 469,160
Groundwater extraction wells	3 additional SMR wells over 2a	\$ 406,343
Groundwater collection pipe system	Based on 750 gpm wells pumped into existing collector	\$ 43,564
Water treatment plant, same as 2C	Haybarn Canyon; brine disposal assumed included, train 1, 23 cfs	\$ 23,893,290
Distribution main pipeline	From WTP pumps, 20 cfs, 27" pipeline to existing So. CPEN tanks	\$ 1,170,791
		\$ 63,610,208

Alternative 2d
Santa Margarita Project - Pre-Feasibility Study
Alternative Total Cost Analysis

With Advanced Water Treatment

20-Jan-05

TOTAL COST ANALYSIS	
2D	
	Total Construction Costs \$ 63,610,208
	Mobilization 5 % \$ 2,865,297
	Unlisted Items 15 % \$ 9,541,531
	Total Contract Costs \$ 76,017,036
	Contingencies 25 % \$ 19,004,259
	Total Field Costs \$ 95,021,295
	Non-Contract 33 % \$ 23,755,324
	Open Space Management Zone \$ 13,000,000
	Total Project Costs \$ 131,776,619
	PV of Annual O&M Costs \$ 217,841,375
	Net Present Value \$ 349,617,994
	Yield, ac-ft 13600
	Net Project Yield, ac-ft 11560
	Cost Per Acre-Foot per year \$ 605

Alternative 2d
Santa Margarita Project - Pre-Feasibility Study
Alternative Annual Costs

With Advanced Water Treatment

20-Jan-05

Annual Operating costs		
2D	Variables	Annual \$
Wells, pumping		
flow, cfs	12	
drawdown, ft	20	
Water treatment plants, O&M		\$ 11,322,544
Pumping plants, pipe, O&M		\$ 24,279
Distribution systems, pumping		
flow, cfs (base)	20	
head, ft	520	
flow, cfs	0	
head, ft	700	
flow, cfs	6.3	
head, ft	60	
Power value, \$/kw-hr	\$0.11	
Power for pumping, annually		\$ 1,283,754
Interest rate	5.375%	
Assumed design life, years	50	
Present worth factor	17.25	

Alternative 3a
Santa Margarita Project - Pre-Feasibility Study
Project Capital Cost Breakdown

With Advanced Water Treatment

20-Jan-05

Alternative 3A		
Feature	Component Details	Capital costs Item Costs \$
Diversion dam - SMR	Obermeyer replacement not done with this alternative	\$ -
Headworks gates - reconstruct	Increased from 60 to 100 cfs	\$ 101,791
O'Neill ditch - widening improvements along with road siphon crossings	Increased from 60 to 100 cfs	\$ 179,369
Recharge ponds	Rehab 1-5 existing ponds: 312 AF;	\$ 1,261,473
	Construct 2 new ponds, 6&7: 242 AF	\$ -
Groundwater extraction wells	4 wells, 6.4 cfs net	\$ 541,790
Groundwater collection pipe system	Based on 750 gpm wells pumped into existing collector	\$ 58,085
Water treatment plant	Haybarn Canyon; brine disposal assumed included, train 1, 25 cfs	\$ 25,514,909
Distribution main pipeline	Bi-directional to Fallbrook: 67,000', 30"-27" dia, 1100' head, 24-16 cfs	\$ 8,837,597
Storage tanks	At water treatment clearwell or existing	
Pumping plants	Base in water treatment; mid-booster included in pipeline	
Instream checks	4 Instream Check Structures in the Chappo Basin, 3 feet high, 200 to 400 ft in length	\$ 16,709
Lake O'Neill rehab	LC designs	\$ 12,823,400
Open space management zone	land purchase, included below	
TOTAL		\$ 49,335,123

Alternative 3a
Santa Margarita Project - Pre-Feasibility Study
Alternative Total Cost Analysis

With Advanced Water Treatment

20-Jan-05

TOTAL COST ANALYSIS			
3A			
	Total Construction Costs	\$	49,335,123
	Mobilization 5 %	\$	2,466,756
	Unlisted Items 15 %	\$	7,400,268
	Total Contract Costs	\$	59,202,147
	Contingencies 25 %	\$	14,800,537
	Total Field Costs	\$	74,002,684
	Non-Contract 33 %	\$	24,420,886
	Open Space Management Zone	\$	13,000,000
	Total Project Costs	\$	111,423,570
	PV of Annual O&M Costs	\$	277,875,681
	Net Present Value	\$	389,299,251
		Yield, ac-ft	12000
		Net Project Yield, ac-ft	10200
	Cost Per Acre-Foot per year	\$	763

Alternative 3a
Santa Margarita Project - Pre-Feasibility Study
Alternative Annual Costs

With Advanced Water Treatment

20-Jan-05

Annual Operating costs		
3A	Variables	Annual \$
Wells, pumping		
flow, cfs	6.4	
drawdown, ft	20	
Water treatment plants, O&M		\$ 13,462,056
Pumping plants, pipe, O&M		\$ 100,504
Distribution systems, pumping		
flow, cfs (base)	21	
head, ft	500	
flow, cfs (mid)	16	
head, ft	700	
flow, cfs		
head, ft		
Power value, \$/kw-hr	\$0.11	
Power for pumping, annually		\$ 2,543,273
Repair to river check structures		\$ 5,570
Interest rate	5.375%	
Assumed design life, years	50	
Present worth factor	17.25	

Alternative 3b
Santa Margarita Project - Pre-Feasibility Study
Alternative Total Cost Analysis

With Advanced Water Treatment

20-Jan-05

TOTAL COST ANALYSIS			
3B			
Total Construction Costs		\$	55,073,592
	Mobilization 5 %	\$	2,466,756
	Unlisted Items 15 %	\$	8,261,039
Total Contract Costs		\$	65,801,387
	Contingencies 25 %	\$	16,450,347
Total Field Costs		\$	82,251,734
	Non-Contract 33 %	\$	27,143,072
	Open Space Management Zone	\$	13,000,000
Total Project Costs		\$	122,394,806
	PV of Annual O&M Costs	\$	285,979,811
Net Present Value		\$	408,374,617
	Yield, ac-ft		14800
	Net Project Yield, ac-ft		13000
Cost Per Acre-Foot per year		\$	628

Alternative 3b
Santa Margarita Project - Pre-Feasibility Study
Alternative Annual Costs

With Advanced Water Treatment

20-Jan-05

Annual Operating costs		
3B	Variables	Annual \$
Wells, pumping		
flow, cfs	10	
drawdown, ft	20	
Water treatment plants, O&M		\$ 13,503,056
Pumping plants, pipe, O&M		\$ 153,977
Distribution systems, pumping		
flow, cfs (base)	21	
head, ft	500	
flow, cfs (mid)	16	
head, ft	700	
flow, cfs (SMC)	7	
head, ft (OC)	450	
Power value, \$/kw-hr	\$0.11	
Power for pumping, annually		\$ 2,918,682
Repair to river check structures		\$ 5,570
Interest rate	5.375%	
Assumed design life, years	50	
Present worth factor	17.25	

Alternative 3c
Santa Margarita Project - Pre-Feasibility Study
Alternative Total Cost Analysis

With Advanced Water Treatment

20-Jan-05

TOTAL COST ANALYSIS	
3C	
Total Construction Costs	\$ 62,215,623
Mobilization 5 %	\$ 2,466,756
Unlisted Items 15 %	\$ 9,332,344
Total Contract Costs	\$ 74,014,723
Contingencies 25 %	\$ 18,503,681
Total Field Costs	\$ 92,518,404
Non-Contract 33 %	\$ 30,531,073
Open Space Management Zone	\$ 13,000,000
Total Project Costs	\$ 136,049,477
PV of Annual O&M Costs	\$ 290,455,762
Net Present Value	\$ 426,505,239
	Yield, ac-ft 14800
	Net Project Yield, ac-ft 12580
Cost Per Acre-Foot per year	\$ 678

Alternative 3c
Santa Margarita Project - Pre-Feasibility Study
Alternative Annual Costs

With Advanced Water Treatment

20-Jan-05

Annual Operating costs		
3C	Variables	Annual \$
Wells, pumping		
flow, cfs	10	
drawdown, ft	20	
Water treatment plants, O&M		\$ 13,462,056
Pumping plants, pipe, O&M		\$ 209,816
Distribution systems, pumping		
flow, cfs	21	
head, ft	500	
	16	
	700	
flow, cfs	7	
head, ft (Cross Base)	750	
Power value, \$/kw-hr	\$0.11	
Power for pumping, annually		\$ 3,163,362
Repair to river check structures		\$ 5,570
Interest rate	5.375%	
Assumed design life, years	50	
Present worth factor	17.25	

Alternative 3d
Santa Margarita Project - Pre-Feasibility Study
Alternative Total Cost Analysis

With Advanced Water Treatment

20-Jan-05

TOTAL COST ANALYSIS		
3D		
	Total Construction Costs	\$ 75,988,566
	Mobilization 5 %	\$ 2,466,756
	Unlisted Items 15 %	\$ 11,398,285
	Total Contract Costs	\$ 89,853,607
	Contingencies 25 %	\$ 22,463,402
	Total Field Costs	\$ 112,317,009
	Non-Contract 33 %	\$ 37,064,613
	Open Space Management Zone	\$ 13,000,000
	Total Project Costs	\$ 162,381,622
	PV of Annual O&M Costs	\$ 277,505,117
	Net Present Value	\$ 439,886,739
	Yield, ac-ft	15400
	Net Project Yield, ac-ft	13090
	Cost Per Acre-Foot per year	\$ 672

Alternative 3d
Santa Margarita Project - Pre-Feasibility Study
Alternative Annual Costs

With Advanced Water Treatment

20-Jan-05

Annual Operating costs		
3D	Variables	Annual \$
Wells, pumping		
flow, cfs	12	
drawdown, ft	20	
Water treatment plants, O&M		\$ 13,505,056
Pumping plants, pipe, O&M		\$ 162,786
Distribution systems, pumping		
flow, cfs (21+8)	29	
head, ft	500	
flow, cfs	0	
head, ft	700	
flow, cfs (1/5 of year)	40	
head, ft, averaged	750	
Power value, \$/kw-hr	\$0.11	
Power for pumping, annually		\$ 2,416,506
Repair to river check structures		\$ 5,570
Interest rate	5.375%	
Assumed design life, years	50	
Present worth factor	17.25	

Alternative 3e
Santa Margarita Project - Pre-Feasibility Study
Project Capital Cost Breakdown

With Advanced Water Treatment

20-Jan-05

Alternative 3E		
Feature	Component Details	Item Costs \$
Similar to Alt 3A w/ larger pumping, as below		\$ 14,982,618
NWS - Treatment wetlands and reservoir	Wetland: 18 acres	\$ 630,000
	Reservoir: earth dam, H= x ft; 49 surface acres, V= 1,600 ac-ft	\$ 4,145,041
Land Outfall Pipeline	9,000 ft, 12" dia, 50' head, flow =3.5 cfs	\$ 312,303
Treatment-Reservoir Pipeline	1,000 ft, flow =3.5 cfs, open channel ditch	\$ -
Clarified water Pipeline	5,800 ft, 18" dia, min head, flow =8.7 cfs	\$ 333,777
Spreading basin	As is - no change	TBD
Groundwater extraction wells	2 more wells than in Alt 3A, 6 total	\$ 270,895
Groundwater collection pipe system	Based on 750 gpm wells pumped into existing collector	\$ 29,043
Water treatment plant	Haybarn Canyon; brine disposal assumed included, train 1, 29 cfs	\$ 28,775,276
Distribution main pipeline	Bi-directional to Fallbrook: 67,000', 30"-27" dia, 1100' head, 25-20 cfs	\$ 10,135,132
	TOTAL	\$ 59,614,085

Alternative 3e
Santa Margarita Project - Pre-Feasibility Study
Alternative Total Cost Analysis

With Advanced Water Treatment

20-Jan-05

TOTAL COST ANALYSIS			
3E			
	Total Construction Costs	\$	59,614,085
	Mobilization 5 %	\$	2,466,756
	Unlisted Items 15 %	\$	8,942,113
	Total Contract Costs	\$	71,022,953
	Contingencies 25 %	\$	17,755,738
	Total Field Costs	\$	88,778,692
	Non-Contract 33 %	\$	29,296,968
	Open Space Management Zone	\$	13,000,000
	Total Project Costs	\$	131,075,660
	PV of Annual O&M Costs	\$	312,745,076
	Net Present Value	\$	443,820,735
		Yield, ac-ft	14100
		Net Project Yield, ac-ft	11985
	Cost Per Acre-Foot per year	\$	741

Alternative 3e
Santa Margarita Project - Pre-Feasibility Study
Alternative Annual Costs

With Advanced Water Treatment

20-Jan-05

Annual Operating costs		
3E	Variables	Annual \$
Wells, pumping		
flow, cfs	10	
drawdown, ft	20	
Water treatment plants, O&M		\$ 14,938,231
Pumping plants, pipe, wetlands, dam		\$ 78,420
Distribution systems, pumping		
flow, cfs	25	
head, ft	500	
flow, cfs	20	
head, ft	700	
Power value, \$/kw-hr	\$0.11	
Power for pumping, annually		\$ 3,110,930
Repair to river check structures		\$ 5,570
Interest rate	5.375%	
Assumed design life, years	50	
Present worth factor	17.25	

Alternative 3f
Santa Margarita Project - Pre-Feasibility Study
Project Capital Cost Breakdown

With Advanced Water Treatment

20-Jan-05

Alternative 3F		
Feature	Component Details	Item Costs \$
Alt 3A w/ larger pumping, as below		\$ 14,982,618
Pueblitos Canyon - reservoir	Wetland: 33 acres	\$ 1,155,000
	Expansion area: 12 acres	\$ 420,000
Land Outfall Pipeline	18,400 ft, 16" dia, 150' head, flow =6.3 cfs	\$ 918,355
De-nitrified Pipeline	5,700 ft, 16" dia, gravity head, flow =6.3 cfs	\$ 284,490
Groundwater spreading Pipeline	9,400 ft, 16" dia, gravity head, flow =6.3 cfs	\$ 469,160
Groundwater extraction wells	1 more well than in Alt 3A, 5 total	\$ 135,448
Groundwater collection pipe system	Based on 750 gpm wells pumped into existing collector	\$ 14,521
Water treatment plant	Haybarn Canyon; brine disposal assumed included, train 1, 27 cfs	\$ 27,130,045
Distribution main pipeline	Bi-directional to Fallbrook: 67,000', 30"-27" dia, 1100' head, 26-21 cfs	\$ 9,960,359
	TOTAL	\$ 55,469,995

Alternative 3f
Santa Margarita Project - Pre-Feasibility Study
Alternative Total Cost Analysis

With Advanced Water Treatment

20-Jan-05

TOTAL COST ANALYSIS			
3F			
Total Construction Costs		\$	55,469,995
Mobilization 5 %		\$	2,466,756
Unlisted Items 15 %		\$	8,320,499
Total Contract Costs		\$	66,257,251
Contingencies 25 %		\$	16,564,313
Total Field Costs		\$	82,821,563
Non-Contract 33 %		\$	27,331,116
Open Space Management Zone		\$	13,000,000
Total Project Costs		\$	123,152,679
PV of Annual O&M Costs		\$	289,189,368
Net Present Value		\$	412,342,047
	Yield, ac-ft		13000
	Net Project Yield, ac-ft		11050
Cost Per Acre-Foot per year		\$	746

Alternative 3f
Santa Margarita Project - Pre-Feasibility Study
Alternative Annual Costs

With Advanced Water Treatment

20-Jan-05

Annual Operating costs			
3F		Variables	Annual \$
Wells, pumping			
flow, cfs		8	
drawdown, ft		20	
Water treatment plants, O&M			\$ 13,863,102
Pumping plants, pipe, wetlands O&M			\$ 72,070
Distribution systems, pumping			
flow, cfs		23	
head, ft		500	
flow, cfs		18	
head, ft		700	
Power value, \$/kw-hr		\$0.11	
Power for pumping, annually			\$ 2,826,636
Repair to river check structures			\$ 5,570
Interest rate		5.375%	
Assumed design life, years		50	
Present worth factor		17.25	

Alternative 3g
Santa Margarita Project - Pre-Feasibility Study
Alternative Total Cost Analysis

With Advanced Water Treatment

20-Jan-05

TOTAL COST ANALYSIS		
3G		
	Total Construction Costs	\$ 56,458,632
	Mobilization 5 %	\$ 2,466,756
	Unlisted Items 15 %	\$ 8,468,795
	Total Contract Costs	\$ 67,394,183
	Contingencies 25 %	\$ 16,848,546
	Total Field Costs	\$ 84,242,729
	Non-Contract 33 %	\$ 27,800,101
	Open Space Management Zone	\$ 13,000,000
	Total Project Costs	\$ 125,042,829
	PV of Annual O&M Costs	\$ 289,971,394
	Net Present Value	\$ 415,014,224
	Yield, ac-ft	13000
	Net Project Yield, ac-ft	11050
	Cost Per Acre-Foot per year	\$ 751

Alternative 3g
Santa Margarita Project - Pre-Feasibility Study
Alternative Annual Costs

With Advanced Water Treatment

20-Jan-05

Annual Operating costs		
3G	Variables	Annual \$
Wells, pumping		
flow, cfs	8	
drawdown, ft	20	
Water treatment plants, O&M		\$ 13,863,102
Pumping plants, pipe, wetlands O&M		\$ 73,370
Distribution systems, pumping		
flow, cfs	23	
head, ft	500	
flow, cfs	18	
head, ft	700	
flow, cfs (denitrified)	6.3	
head, ft	60	
Power value, \$/kw-hr	\$0.11	
Power for pumping, annually		\$ 2,870,678
Repair to river check structures		\$ 5,570
Interest rate	5.375%	
Assumed design life, years	50	
Present worth factor	17.25	

Alternative 3h
Santa Margarita Project - Pre-Feasibility Study
Alternative Total Cost Analysis

With Advanced Water Treatment

20-Jan-05

TOTAL COST ANALYSIS	
3H	
Total Construction Costs	\$ 72,066,882
Mobilization 5 %	\$ 2,466,756
Unlisted Items 15 %	\$ 10,810,032
Total Contract Costs	\$ 85,343,670
Contingencies 25 %	\$ 21,335,917
Total Field Costs	\$ 106,679,587
Non-Contract 33 %	\$ 35,204,264
Open Space Management Zone	\$ 13,000,000
Total Project Costs	\$ 154,883,851
PV of Annual O&M Costs	\$ 303,050,430
Net Present Value	\$ 457,934,281
	Yield, ac-ft 12700
	Net Project Yield, ac-ft 10795
Cost Per Acre-Foot per year	\$ 848

Alternative 3h
Santa Margarita Project - Pre-Feasibility Study
Alternative Annual Costs

With Advanced Water Treatment

20-Jan-05

Annual Operating costs		
3H	Variables	Annual \$
Wells, pumping		
flow, cfs	6.4	
drawdown, ft	20	
Water treatment plants, O&M		\$ 13,863,102
Pumping plants, pipe, dam		\$ 133,780
Distribution systems, pumping		
flow, cfs	23	
head, ft	500	
flow, cfs	18	
head, ft	700	
flow, cfs (2/5 of year)	40	
head, ft	400	
Power value, \$/kw-hr	\$0.11	
Power for pumping, annually		\$ 3,568,598
Repair to river check structures		\$ 5,570
Interest rate	5.375%	
Assumed design life, years	50	
Present worth factor	17.25	

Alternative 3i
Santa Margarita Project - Pre-Feasibility Study
Alternative Total Cost Analysis

With Advanced Water Treatment

20-Jan-05

TOTAL COST ANALYSIS			
3i			
	Total Construction Costs	\$	49,836,326
	Mobilization 5 %	\$	2,466,756
	Unlisted Items 15 %	\$	7,475,449
	Total Contract Costs	\$	59,778,531
	Contingencies 25 %	\$	14,944,633
	Total Field Costs	\$	74,723,163
	Non-Contract 33 %	\$	24,658,644
	Open Space Management Zone	\$	13,000,000
	Total Project Costs	\$	112,381,807
	PV of Annual O&M Costs	\$	276,255,752
	Net Present Value	\$	388,637,559
		Yield, ac-ft	12000
		Net Project Yield, ac-ft	10200
	Cost Per Acre-Foot per year	\$	762

Alternative 3i
Santa Margarita Project - Pre-Feasibility Study
Alternative Annual Costs

With Advanced Water Treatment

20-Jan-05

Annual Operating costs		
3i	Variables	Annual \$
Wells, pumping		
flow, cfs	3.4	
drawdown, ft	20	
Water treatment plants, O&M		\$ 13,462,056
Pumping plants, pipe, O&M		\$ 13,570
Distribution systems, pumping		
flow, cfs	21	
head, ft	500	
flow, cfs	16	
head, ft	700	
Power value, \$/kw-hr	\$0.11	
Power for pumping, annually		\$ 2,536,282
Repair to river check structures		\$ 5,570
Interest rate	5.375%	
Assumed design life, years	50	
Present worth factor	17.25	

Santa Margarita River Conjunctive Use

Pre-Feasibility Plan Formulation Study

Appendix B—with Minimal Water Treatment

**Pre-Feasibility Alternatives
Line Item Cost Summaries, Operations, Maintenance Costs, and
Total Cost Analyses**

San Diego County, California

prepared by



**U.S. Department of the Interior
Bureau of Reclamation
Technical Service Center
Denver, Colorado**

January 2005

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Appendix B—with Minimal Water Treatment

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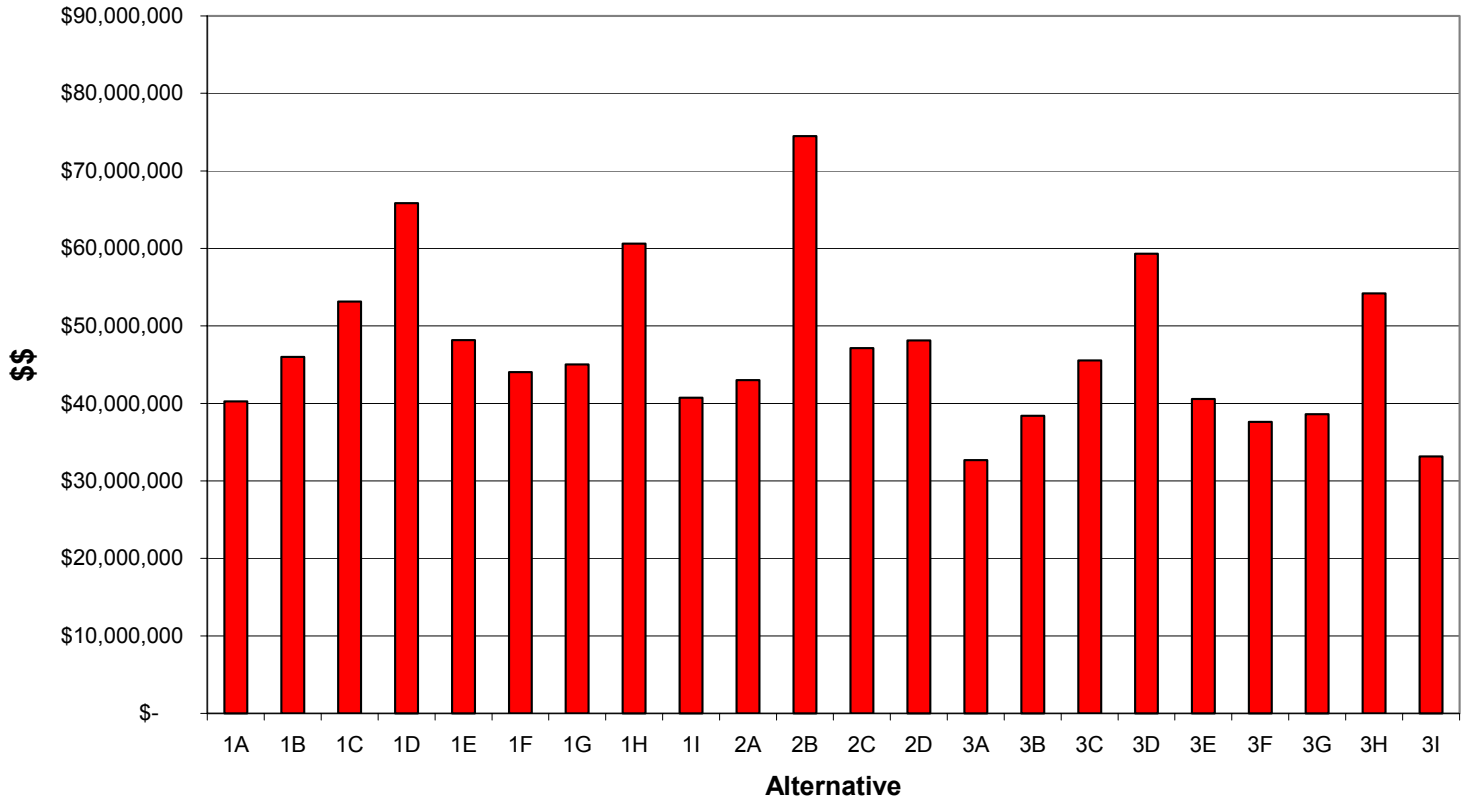
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**Santa Margarita Conjunctive Use Project
Pre-Feasibility Cost Summary
With Minimal Water Treatment**

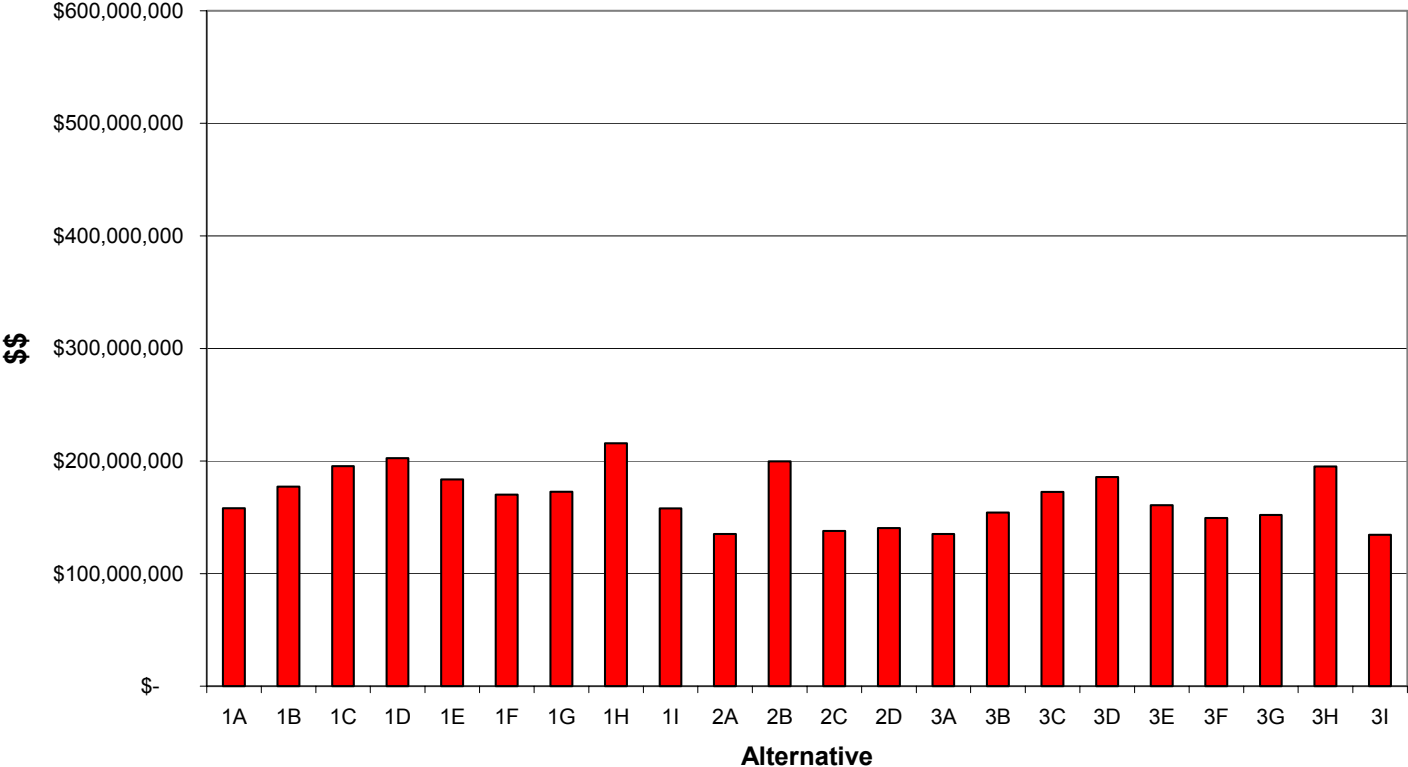
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Alternative #	Net Project Yield (af)	Construction Cost (\$)	Net Present Value (\$)	Cost Per Acre-Foot (\$/af)
1A	14100	\$ 40,248,371	\$ 158,213,697	\$ 224
1B	16900	\$ 45,986,841	\$ 177,305,140	\$ 210
1C	16900	\$ 53,128,872	\$ 195,435,763	\$ 231
1D	17500	\$ 65,836,756	\$ 202,560,974	\$ 231
1E	16200	\$ 48,141,301	\$ 183,822,099	\$ 227
1F	15100	\$ 44,036,383	\$ 170,142,641	\$ 225
1G	15100	\$ 45,025,020	\$ 172,814,818	\$ 229
1H	14800	\$ 60,633,269	\$ 215,718,799	\$ 292
1I	14100	\$ 40,749,574	\$ 157,913,723	\$ 224
2A	12600	\$ 43,013,770	\$ 135,283,593	\$ 215
2B	16000	\$ 74,474,690	\$ 199,796,115	\$ 250
2C	13600	\$ 47,141,691	\$ 137,917,124	\$ 203
2D	13600	\$ 48,130,328	\$ 140,453,186	\$ 207
3A	12000	\$ 32,667,523	\$ 135,220,154	\$ 225
3B	14800	\$ 38,405,992	\$ 154,295,521	\$ 209
3C	14800	\$ 45,548,023	\$ 172,426,143	\$ 233
3D	15400	\$ 59,320,966	\$ 185,807,643	\$ 241
3E	14100	\$ 40,571,045	\$ 160,832,730	\$ 228
3F	13000	\$ 37,614,675	\$ 149,490,641	\$ 230
3G	13000	\$ 38,603,312	\$ 152,162,818	\$ 234
3H	12700	\$ 54,211,562	\$ 195,082,876	\$ 307
3I	12000	\$ 33,168,726	\$ 134,558,463	\$ 224

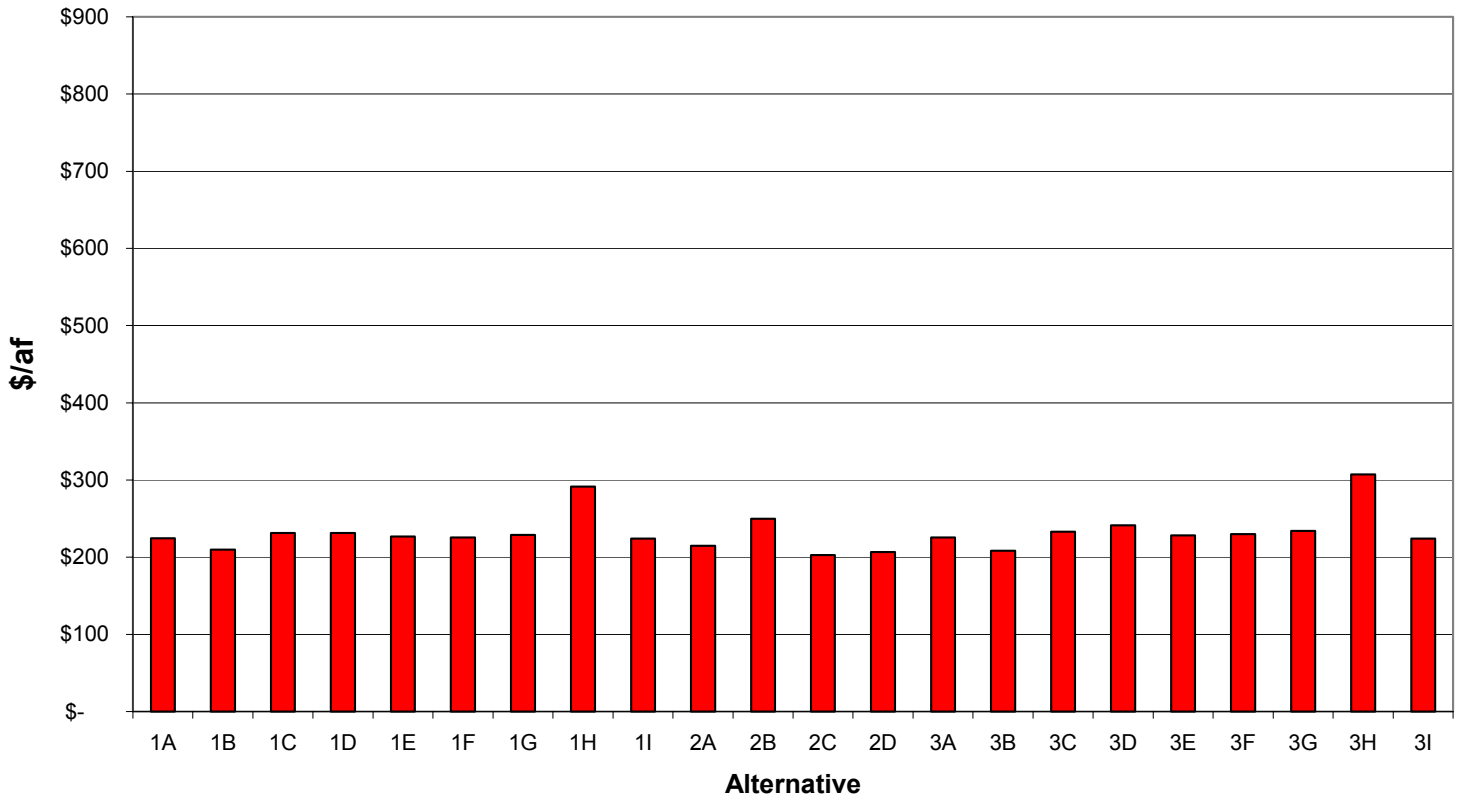
**Santa Margarita Conjunctive Use Project
Pre-Feasibility Construction Costs
With Minimal Water Treatment**



**Santa Margarita Conjunctive Use Project
Pre-Feasibility Net Present Values
With Minimal Water Treatment**



**Santa Margarita Conjunctive Use Project
Pre-Feasibility Costs per Acre-foot
With Minimal Water Treatment**



Alternative 1a
Santa Margarita Project - Pre-Feasibility Study
Project Capital Cost Breakdown

With Minimal Water Treatment

20-Jan-05

Alternative 1A		
Feature	Component Details	Capital costs Item Costs \$
Diversion dam -Obermeyer installation	280' long, 7.9' high, Replaces existing sheet pile diversion dam	\$ 2,738,000
Headworks gates - reconstructed with Obermeyer dam	Increased from 60 to 200 cfs	\$ 101,791
O'Neill ditch - widening improvements along with road siphon crossings	Increased from 60 to 200 cfs	\$ 406,219
Recharge ponds	Rehab 1-5 existing ponds: 312 AF;	\$ 1,261,473
	Construct 2 new ponds, 6&7: 242 AF	\$ 2,269,454
Groundwater extraction wells	6 wells, 10 cfs net	\$ 812,685
Groundwater collection pipe system	Based on 750 gpm wells pumped into existing collector	\$ 87,128
Water treatment plant	Haybarn Canyon; train 2, 29 cfs	\$ 9,697,869
Distribution main pipeline	Bi-directional to Fallbrook: 67,000', 30"-27" dia, 1100' head, 24-19 cfs	\$ 10,050,353
Storage tanks	At water treatment clearwell or existing	
Pumping plants	Base in water treatment; mid-booster included in pipeline	
Lake O'Neill rehab	LC designs	\$ 12,823,400
Open space management zone	Land purchase, included below	
TOTAL		\$ 40,248,371

Alternative 1a
Santa Margarita Project - Pre-Feasibility Study
Alternative Total Cost Analysis

With Minimal Water Treatment

20-Jan-05

TOTAL COST ANALYSIS			
1A			
	Total Construction Costs	\$	40,248,371
	Mobilization 5 %	\$	2,012,419
	Unlisted Items 15 %	\$	6,037,256
	Total Contract Costs	\$	48,298,045
	Contingencies 25 %	\$	12,074,511
	Total Field Costs	\$	60,372,557
	Non-Contract 33 %	\$	19,922,944
	Open Space Management Zone	\$	13,000,000
	Total Project Costs	\$	93,295,500
	PV of Annual O&M Costs	\$	64,918,197
	Net Present Value	\$	158,213,697
		Yield, ac-ft	14100
		Net Project Yield, ac-ft	14,100
	Cost Per Acre-Foot per year	\$	224

Alternative 1a
Santa Margarita Project - Pre-Feasibility Study
Alternative Annual Costs

With Minimal Water Treatment

20-Jan-05

Annual Operating costs		
1A	Variables	Annual \$
Wells, pumping		
flow, cfs	10	
drawdown, ft	20	
Water treatment plants, O&M		\$ 692,380
Pumping plants, pipe, O&M		\$ 100,504
Distribution systems, pumping		
flow, cfs (base)	24	
head, ft	500	
flow, cfs (mid)	19	
head, ft	700	
flow, cfs		
head, ft		
Power value, \$/kw-hr	\$0.11	
Power for pumping, annually		\$ 2,971,113
Interest rate	5.375%	
Assumed design life, years	50	
Present worth factor	17.25	

Alternative 1b
Santa Margarita Project - Pre-Feasibility Study
Alternative Total Cost Analysis

With Minimal Water Treatment

20-Jan-05

TOTAL COST ANALYSIS	
1B	
Total Construction Costs	\$ 45,986,841
Mobilization 5 %	\$ 2,012,419
Unlisted Items 15 %	\$ 6,898,026
Total Contract Costs	\$ 54,897,285
Contingencies 25 %	\$ 13,724,321
Total Field Costs	\$ 68,621,607
Non-Contract 33 %	\$ 22,645,130
Open Space Management Zone	\$ 13,000,000
Total Project Costs	\$ 104,266,737
PV of Annual O&M Costs	\$ 73,038,403
Net Present Value	\$ 177,305,140
	Yield, ac-ft 16900
	Net Project Yield, ac-ft 16,900
Cost Per Acre-Foot per year	\$ 210

Alternative 1b
Santa Margarita Project - Pre-Feasibility Study
Alternative Annual Costs

With Minimal Water Treatment

20-Jan-05

Annual Operating costs		
1B	Variables	Annual \$
Wells, pumping		
flow, cfs	14	
drawdown, ft	20	
Water treatment plants, O&M		\$ 733,380
Pumping plants, pipe, O&M		\$ 153,977
Distribution systems, pumping		
flow, cfs	24	
head, ft	500	
flow, cfs	19	
head, ft	700	
flow, cfs (SMC)	7	
head, ft (OC)	450	
Power value, \$/kw-hr	\$0.11	
Power for pumping, annually		\$ 3,347,454
Interest rate	5.375%	
Assumed design life, years	50	
Present worth factor	17.25	

Alternative 1c
Santa Margarita Project - Pre-Feasibility Study
Alternative Total Cost Analysis

With Minimal Water Treatment

20-Jan-05

TOTAL COST ANALYSIS	
1C	
Total Construction Costs	\$ 53,128,872
Mobilization 5 %	\$ 2,012,419
Unlisted Items 15 %	\$ 7,969,331
Total Contract Costs	\$ 63,110,621
Contingencies 25 %	\$ 15,777,655
Total Field Costs	\$ 78,888,276
Non-Contract 33 %	\$ 26,033,131
Open Space Management Zone	\$ 13,000,000
Total Project Costs	\$ 117,921,408
PV of Annual O&M Costs	\$ 77,514,355
Net Present Value	\$ 195,435,763
	Yield, ac-ft 16900
	Net Project Yield, ac-ft 16,900
Cost Per Acre-Foot per year	\$ 231

Alternative 1c
Santa Margarita Project - Pre-Feasibility Study
Alternative Annual Costs

With Minimal Water Treatment

20-Jan-05

Annual Operating costs		
1C	Variables	Annual \$
Wells, pumping		
flow, cfs	14	
drawdown, ft	20	
Water treatment plants, O&M		\$ 692,380
Pumping plants, pipe, O&M		\$ 209,816
Distribution systems, pumping		
flow, cfs	24	
head, ft	500	
flow, cfs	19	
head, ft	700	
flow, cfs	7	
head, ft (Cross Base)	750	
Power value, \$/kw-hr	\$0.11	
Power for pumping, annually		\$ 3,592,134
Interest rate	5.375%	
Assumed design life, years	50	
Present worth factor	17.25	

Alternative 1d
Santa Margarita Project - Pre-Feasibility Study
Alternative Total Cost Analysis

With Minimal Water Treatment

20-Jan-05

TOTAL COST ANALYSIS			
1D			
Total Construction Costs		\$	65,836,756
	Mobilization 5 %	\$	2,012,419
	Unlisted Items 15 %	\$	9,875,513
Total Contract Costs		\$	77,724,688
	Contingencies 25 %	\$	19,431,172
Total Field Costs		\$	97,155,861
	Non-Contract 33 %	\$	32,061,434
	Open Space Management Zone	\$	13,000,000
Total Project Costs		\$	142,217,295
	PV of Annual O&M Costs	\$	60,343,680
Net Present Value		\$	202,560,974
	Yield, ac-ft		17500
	Net Project Yield, ac-ft		17,500
Cost Per Acre-Foot per year		\$	231

Alternative 1d
Santa Margarita Project - Pre-Feasibility Study
Alternative Annual Costs

With Minimal Water Treatment

20-Jan-05

Annual Operating costs		
1D	Variables	Annual \$
Wells, pumping		
flow, cfs	16	
drawdown, ft	20	
Water treatment plants, O&M		\$ 735,380
Pumping plants, pipe, O&M		\$ 162,786
Distribution systems, pumping		
flow, cfs (24+8)	32	
head, ft	500	
flow, cfs	0	
head, ft	700	
flow, cfs (1/5 of year)	40	
head, ft, averaged	750	
Power value, \$/kw-hr	\$0.11	
Power for pumping, annually		\$ 2,600,598
Interest rate	5.375%	
Assumed design life, years	50	
Present worth factor	17.25	

Alternative 1e
Santa Margarita Project - Pre-Feasibility Study
Project Capital Cost Breakdown

With Minimal Water Treatment

20-Jan-05

Alternative 1E		
Feature	Component Details	Capital costs Item Costs \$
Similar to Alt 1A w/ larger pumping, as below		\$ 20,500,150
NWS - Treatment wetlands and reservoir	Wetland: 18 acres	\$ 630,000
	Reservoir: earth dam, H= x ft; 49 surface acres, V= 1,600 ac-ft	\$ 4,145,041
Land Outfall Pipeline	9,000 ft, 12" dia, 50' head, flow =3.5 cfs	\$ 312,303
Treatment-Reservoir Pipeline	1,000 ft, flow =3.5 cfs, open channel ditch	\$ -
Clarified water Pipeline	5,800 ft, 18" dia, min head, flow =8.7 cfs	\$ 333,777
Spreading basin	As is - no change	TBD
Groundwater extraction wells	add 2 more wells than in 1A, 8 total	\$ 270,895
Groundwater collection pipe system	Based on 750 gpm wells pumped into existing collector	\$ 29,043
Water treatment plant	Haybarn Canyon; train 2, 33 cfs	\$ 10,582,796
Distribution main pipeline	Bi-directional to Fallbrook: 67,000', 33"-30" dia, 1100' head, 28-23 cfs	\$ 11,337,296
	TOTAL	\$ 48,141,301

Alternative 1e
Santa Margarita Project - Pre-Feasibility Study
Alternative Total Cost Analysis

With Minimal Water Treatment

20-Jan-05

TOTAL COST ANALYSIS			
1E			
Total Construction Costs		\$	48,141,301
	Mobilization 5 %	\$	2,012,419
	Unlisted Items 15 %	\$	7,221,195
Total Contract Costs		\$	57,374,915
	Contingencies 25 %	\$	14,343,729
Total Field Costs		\$	71,718,644
	Non-Contract 33 %	\$	23,667,152
	Open Space Management Zone	\$	13,000,000
Total Project Costs		\$	108,385,796
	PV of Annual O&M Costs	\$	75,436,303
Net Present Value		\$	183,822,099
	Yield, ac-ft		16200
	Net Project Yield, ac-ft		16,200
Cost Per Acre-Foot per year		\$	227

Alternative 1e
Santa Margarita Project - Pre-Feasibility Study
Alternative Annual Costs

With Minimal Water Treatment

20-Jan-05

Annual Operating costs		
1E	Variables	Annual \$
Wells, pumping		
flow, cfs	14	
drawdown, ft	20	
Water treatment plants, O&M		\$ 755,720
Pumping plants, pipe, wetlands, dam		\$ 78,420
Distribution systems, pumping		
flow, cfs	28	
head, ft	500	
flow, cfs	23	
head, ft	700	
Power value, \$/kw-hr	\$0.11	
Power for pumping, annually		\$ 3,539,703
Interest rate	5.375%	
Assumed design life, years	50	
Present worth factor	17.25	

Alternative 1f
Santa Margarita Project - Pre-Feasibility Study
Project Capital Cost Breakdown

With Minimal Water Treatment

20-Jan-05

Alternative 1F		
Feature	Component Details	Capital costs Item Costs \$
Alt 1A w/ larger pumping, as below		\$ 20,500,150
Pueblitos Canyon - wetlands	Wetland: 33 acres	\$ 1,155,000
	Expansion area: 12 acres	\$ 420,000
Land Outfall Pipeline	18,400 ft, 16" dia, 150' head, flow =6.3 cfs	\$ 918,355
De-nitrified Pipeline	5,700 ft, 16" dia, gravity head, flow =6.3 cfs	\$ 284,490
Groundwater spreading Pipeline	9,400 ft, 16" dia, gravity head, flow =6.3 cfs	\$ 469,160
Groundwater extraction wells	1 more well than in Alt 1A, 7 total	\$ 135,448
Groundwater collection pipe system	Based on 750 gpm wells pumped into existing collector	\$ 14,521
Water treatment plant	Haybarn Canyon; train 2, 30 cfs	\$ 9,920,197
Distribution main pipeline	Bi-directional to Fallbrook: 67,000', 30"-27" dia, 1100' head, 26-21 cfs	\$ 10,219,062
	TOTAL	\$ 44,036,383

Alternative 1f
Santa Margarita Project - Pre-Feasibility Study
Alternative Total Cost Analysis

With Minimal Water Treatment

20-Jan-05

TOTAL COST ANALYSIS			
1F			
Total Construction Costs		\$	44,036,383
	Mobilization 5 %	\$	2,012,419
	Unlisted Items 15 %	\$	6,605,457
Total Contract Costs		\$	52,654,259
	Contingencies 25 %	\$	13,163,565
Total Field Costs		\$	65,817,824
	Non-Contract 33 %	\$	21,719,882
	Open Space Management Zone	\$	13,000,000
Total Project Costs		\$	100,537,706
	PV of Annual O&M Costs	\$	69,604,936
Net Present Value		\$	170,142,641
	Yield, ac-ft		15100
	Net Project Yield, ac-ft		15,100
Cost Per Acre-Foot per year		\$	225

Alternative 1f
Santa Margarita Project - Pre-Feasibility Study
Alternative Annual Costs

With Minimal Water Treatment

20-Jan-05

Annual Operating costs		
1F	Variables	Annual \$
Wells, pumping		
flow, cfs	12	
drawdown, ft	20	
Water treatment plants, O&M		\$ 708,259
Pumping plants, pipe, wetlands O&M		\$ 72,070
Distribution systems, pumping		
flow, cfs	26	
head, ft	500	
flow, cfs	21	
head, ft	700	
Power value, \$/kw-hr	\$0.11	
Power for pumping, annually		\$ 3,255,408
Interest rate	5.375%	
Assumed design life, years	50	
Present worth factor	17.25	

Alternative 1g
Santa Margarita Project - Pre-Feasibility Study
Project Capital Cost Breakdown

With Minimal Water Treatment

20-Jan-05

Alternative 1G		
Feature	Component Details	Capital costs Item Costs \$
Alt 1A w/ larger pumping, as below		\$ 20,500,150
Newton Canyon - wetlands	Wetland: 35 acres	\$ 1,225,000
	Expansion area: 11 acres	\$ 385,000
Land Outfall Pipeline	7,300 ft, 15" dia, connects to existing pump head, flow =6.3 cfs	\$ 364,347
De-nitrified Pipeline	20,600 ft, 15" dia, pump head 60', flow =6.3 cfs	\$ 1,792,135
Groundwater spreading Pipeline	9,400 ft, 16" dia, gravity head, flow =6.3 cfs	\$ 469,160
Groundwater extraction wells	1 more well than in Alt 1A, 7 total	\$ 135,448
Groundwater collection pipe system	Based on 750 gpm wells pumped into existing collector	\$ 14,521
Water treatment plant, same as 1F	Haybarn Canyon; train 2, 30 cfs	\$ 9,920,197
Distribution main pipeline	Bi-directional to Fallbrook: 67,000', 30"-27" dia, 1100' head, 26-21 cfs	\$ 10,219,062
	TOTAL	\$ 45,025,020

Alternative 1g
Santa Margarita Project - Pre-Feasibility Study
Alternative Total Cost Analysis

With Minimal Water Treatment

20-Jan-05

TOTAL COST ANALYSIS			
1G			
Total Construction Costs		\$	45,025,020
	Mobilization 5 %	\$	2,012,419
	Unlisted Items 15 %	\$	6,753,753
Total Contract Costs		\$	53,791,192
	Contingencies 25 %	\$	13,447,798
Total Field Costs		\$	67,238,989
	Non-Contract 33 %	\$	22,188,867
	Open Space Management Zone	\$	13,000,000
Total Project Costs		\$	102,427,856
	PV of Annual O&M Costs	\$	70,386,962
Net Present Value		\$	172,814,818
	Yield, ac-ft		15100
	Net Project Yield, ac-ft		15,100
Cost Per Acre-Foot per year		\$	229

Alternative 1g
Santa Margarita Project - Pre-Feasibility Study
Alternative Annual Costs

With Minimal Water Treatment

20-Jan-05

Annual Operating costs		
1G	Variables	Annual \$
Wells, pumping		
flow, cfs	12	
drawdown, ft	20	
Water treatment plants, O&M		\$ 708,259
Pumping plants, pipe, wetlands O&M		\$ 73,370
Distribution systems, pumping		
flow, cfs	26	
head, ft	500	
flow, cfs	21	
head, ft	700	
flow, cfs (denitrified)	6.3	
head, ft	60	
Power value, \$/kw-hr	\$0.11	
Power for pumping, annually		\$ 3,299,451
Interest rate	5.375%	
Assumed design life, years	50	
Present worth factor	17.25	

Alternative 1h
Santa Margarita Project - Pre-Feasibility Study
Alternative Total Cost Analysis

With Minimal Water Treatment

20-Jan-05

TOTAL COST ANALYSIS			
1H			
Total Construction Costs		\$	60,633,269
	Mobilization 5 %	\$	2,012,419
	Unlisted Items 15 %	\$	9,094,990
Total Contract Costs		\$	71,740,678
	Contingencies 25 %	\$	17,935,170
Total Field Costs		\$	89,675,848
	Non-Contract 33 %	\$	29,593,030
	Open Space Management Zone	\$	13,000,000
Total Project Costs		\$	132,268,878
	PV of Annual O&M Costs	\$	83,449,922
Net Present Value		\$	215,718,799
	Yield, ac-ft		14800
	Net Project Yield, ac-ft		14,800
Cost Per Acre-Foot per year		\$	292

Alternative 1h
Santa Margarita Project - Pre-Feasibility Study
Alternative Annual Costs

With Minimal Water Treatment

20-Jan-05

Annual Operating costs		
1H	Variables	Annual \$
Wells, pumping		
flow, cfs	10	
drawdown, ft	20	
Water treatment plants, O&M		\$ 708,259
Pumping plants, pipe, dam		\$ 133,780
Distribution systems, pumping		
flow, cfs	26	
head, ft	500	
flow, cfs	21	
head, ft	700	
flow, cfs (2/5 of year)	40	
head, ft	400	
Power value, \$/kw-hr	\$0.11	
Power for pumping, annually		\$ 3,996,439
Interest rate	5.375%	
Assumed design life, years	50	
Present worth factor	17.25	

Alternative 1i
Santa Margarita Project - Pre-Feasibility Study
Alternative Total Cost Analysis

With Minimal Water Treatment

20-Jan-05

TOTAL COST ANALYSIS			
1/			
Total Construction Costs		\$	40,749,574
	Mobilization 5 %	\$	2,012,419
	Unlisted Items 15 %	\$	6,112,436
Total Contract Costs		\$	48,874,429
	Contingencies 25 %	\$	12,218,607
Total Field Costs		\$	61,093,036
	Non-Contract 33 %	\$	20,160,702
	Open Space Management Zone	\$	13,000,000
Total Project Costs		\$	94,253,738
	PV of Annual O&M Costs	\$	63,659,985
Net Present Value		\$	157,913,723
	Yield, ac-ft		14100
	Net Project Yield, ac-ft		14,100
Cost Per Acre-Foot per year		\$	224

Alternative 1i
Santa Margarita Project - Pre-Feasibility Study
Alternative Annual Costs

With Minimal Water Treatment

20-Jan-05

Annual Operating costs		
1/	Variables	Annual \$
Wells, pumping		
flow, cfs	6.4	
drawdown, ft	50	
Water treatment plants, O&M		\$ 692,380
Pumping plants, pipe, O&M		\$ 13,570
Distribution systems, pumping		
flow, cfs	24	
head, ft	500	
flow, cfs	19	
head, ft	700	
Power value, \$/kw-hr	\$0.11	
Power for pumping, annually		\$ 2,985,095
Interest rate	5.375%	
Assumed design life, years	50	
Present worth factor	17.25	

Alternative 2a
Santa Margarita Project - Pre-Feasibility Study
Project Capital Cost Breakdown

With Minimal Water Treatment

20-Jan-05

Alternative 2A		
Feature	Component Details	Capital costs Item Costs \$
Diversion dam -Obermeyer installation	280' long, 7.9' high, Replaces existing sheet pile diversion dam	\$ 2,738,000
Headworks gates - reconstructed with Obermeyer dam	Increased from 60 to 200 cfs	\$ 101,791
O'Neill ditch - widening improvements along with road siphon crossings	Increased from 60 to 200 cfs	\$ 406,219
Recharge ponds	Rehab 1-5 existing ponds: 312 AF;	\$ 1,261,473
	Construct 2 new ponds, 6&7: 242 AF	\$ 2,269,454
Groundwater extraction wells	4 wells, 6.4 cfs net	\$ 541,790
Groundwater collection pipe system	Based on 750 gpm wells pumped into existing collector	\$ 58,085
Water treatment plant	Haybarn Canyon; train 2, 21 cfs	\$ 7,982,400
Distribution main pipeline	From WTP pumps, 18 cfs, 27" pipeline to existing So. CPEN tanks	\$ 1,170,791
Diversion weir	Fallbrook PUD sump, 357'x10'	\$ 4,363,688
Fallbrook sump to Red Mtn pipeline	29,000', 15" dia, 700' head, 5 cfs	\$ 2,427,864
Water treatment plant	Red Mountain - train 2	\$ 3,590,600
New Oceanside- Morro Hill pipeline	28,000', 27" dia, gravity head, 20 cfs	\$ 3,278,215
Lake O'Neill rehab	same as Alt 1a	\$ 12,823,400
Open space management zone	land purchase, included below	
TOTAL		\$ 43,013,770

Alternative 2a
Santa Margarita Project - Pre-Feasibility Study
Alternative Total Cost Analysis

With Minimal Water Treatment

20-Jan-05

TOTAL COST ANALYSIS			
2A			
	Total Construction Costs	\$	43,013,770
	Mobilization 5 %	\$	2,150,689
	Unlisted Items 15 %	\$	6,452,066
	Total Contract Costs	\$	51,616,524
	Contingencies 25 %	\$	12,904,131
	Total Field Costs	\$	64,520,655
	Non-Contract 33 %	\$	16,130,164
	Open Space Management Zone	\$	13,000,000
	Total Project Costs	\$	93,650,819
	PV of Annual O&M Costs	\$	41,632,774
	Net Present Value	\$	135,283,593
		Yield, ac-ft	12600
		Net Project Yield, ac-ft	12600
	Cost Per Acre-Foot per year	\$	215

Alternative 2a
Santa Margarita Project - Pre-Feasibility Study
Alternative Annual Costs

With Minimal Water Treatment

20-Jan-05

Annual Operating costs		
2A	Variables	Annual \$
Wells, pumping		
flow, cfs	6.4	
drawdown, ft	20	
Water treatment plants, O&M		\$ 848,308
Pumping plants, pipe, O&M		\$ 35,987
Distribution systems, pumping		
flow, cfs (base)	18	
head, ft	500	
flow, cfs (mid)	0	
head, ft	700	
flow, cfs (FPUD to RMR)	5	
head, ft	800	
Power value, \$/kw-hr	\$0.11	
Power for pumping, annually		\$ 1,529,599
Interest rate	5.375%	
Assumed design life, years	50	
Present worth factor	17.25	

Alternative 2b
Santa Margarita Project - Pre-Feasibility Study
Project Capital Cost Breakdown

With Minimal Water Treatment

20-Jan-05

Alternative 2B		
Feature	Component Details	Capital costs Item Costs \$
Alt 2A without Morro Hill Pipeline, plus larger Haybarn WTP per below		\$ 30,582,364
San Mateo ponds - rehab	Area and depth affect costs - 2'; haul mile assumed	\$ 306,000
San Mateo wells	3 new wells, 5 cfs	\$ 406,343
Well head treatment	8 cfs, chloramination	\$ 86,000
Pipeline to Orange County (OC)	23,000 ft, 18" dia, 450' head, flow = 8 cfs, new storage tank	\$ 6,090,640
Pipeline from Santa Margarita river basin	Bi-directional, 104,000 ft, 36" dia, 750' head, flow = 40 cfs 1-way	\$ 27,334,678
Groundwater extraction wells	2 additional SMR wells over 2a	\$ 270,895
Groundwater collection pipe system	Based on 750 gpm wells pumped into existing collector	\$ 29,043
Existing Oceanside- Morro Hill pipeline	28,000', 12" dia, gravity head	\$ -
Water treatment plant	Haybarn Canyon; brine disposal assumed included, train 2, 22 cfs	\$ 8,197,937
Distribution main pipeline	From WTP pumps, 18 cfs, 27" pipeline to existing So. CPEN tanks	\$ 1,170,791
		\$ 74,474,690

Alternative 2b
Santa Margarita Project - Pre-Feasibility Study
Alternative Total Cost Analysis

With Minimal Water Treatment

20-Jan-05

TOTAL COST ANALYSIS			
2B			
Total Construction Costs		\$	74,474,690
	Mobilization 5 %	\$	2,150,689
	Unlisted Items 15 %	\$	11,171,204
Total Contract Costs		\$	87,796,583
	Contingencies 25 %	\$	21,949,146
Total Field Costs		\$	109,745,728
	Non-Contract 33 %	\$	27,436,432
	Open Space Management Zone	\$	13,000,000
Total Project Costs		\$	150,182,160
	PV of Annual O&M Costs	\$	49,613,955
Net Present Value		\$	199,796,115
	Yield, ac-ft		16000
	Net Project Yield, ac-ft		16000
Cost Per Acre-Foot per year		\$	250

Alternative 2b
Santa Margarita Project - Pre-Feasibility Study
Alternative Annual Costs

With Minimal Water Treatment

20-Jan-05

Annual Operating costs		
2B	Variables	Annual \$
Wells, pumping		
flow, cfs	15	
drawdown, ft	20	
Water treatment plants, O&M		\$ 906,915
Pumping plants, pipe, O&M		\$ 187,064
Distribution systems, pumping		
flow, cfs (base)	18	
head, ft	500	
flow, cfs (OC)	8	
head, ft	450	
flow, cfs (1/5 of year)	40	
head, ft	750	
Power value, \$/kw-hr	\$0.11	
Power for pumping, annually		\$ 1,782,668
Interest rate	5.375%	
Assumed design life, years	50	
Present worth factor	17.25	

Alternative 2c
Santa Margarita Project - Pre-Feasibility Study
Project Capital Cost Breakdown

With Minimal Water Treatment

20-Jan-05

Alternative 2C		
Feature	Component Details	Capital costs Item Costs \$
Alt 2A with treatment plant and wells as below, plus below		\$ 33,860,579
Pueblitos Canyon - wetlands	Wetland: 33 acres	\$ 1,155,000
	Expansion area: 12 acres	\$ 420,000
Land Outfall Pipeline	18,400 ft, 16" dia, 150' head, flow =6.3 cfs	\$ 918,355
De-nitrified Pipeline	5,700 ft, 16" dia, gravity head, flow =6.3 cfs	\$ 284,490
Groundwater spreading Pipeline	9,400 ft, 16" dia, gravity head, flow =6.3 cfs	\$ 469,160
Groundwater extraction wells	3 additional SMR wells over 2a	\$ 406,343
Groundwater collection pipe system	Based on 750 gpm wells pumped into existing collector	\$ 43,564
Water treatment plant	Haybarn Canyon; train 2, 23 cfs	\$ 8,413,410
Distribution main pipeline	From WTP pumps, 20 cfs, 27" pipeline to existing So. CPEN tanks	\$ 1,170,791
		\$ 47,141,691

Alternative 2c
Santa Margarita Project - Pre-Feasibility Study
Alternative Total Cost Analysis

With Minimal Water Treatment

20-Jan-05

TOTAL COST ANALYSIS			
2C			
	Total Construction Costs	\$	47,141,691
	Mobilization 5 %	\$	2,150,689
	Unlisted Items 15 %	\$	7,071,254
	Total Contract Costs	\$	56,363,634
	Contingencies 25 %	\$	14,090,908
	Total Field Costs	\$	70,454,542
	Non-Contract 33 %	\$	17,613,636
	Open Space Management Zone	\$	13,000,000
	Total Project Costs	\$	101,068,178
	PV of Annual O&M Costs	\$	36,848,946
	Net Present Value	\$	137,917,124
			Yield, ac-ft 13600
			Net Project Yield, ac-ft 13600
	Cost Per Acre-Foot per year	\$	203

Alternative 2c
Santa Margarita Project - Pre-Feasibility Study
Alternative Annual Costs

With Minimal Water Treatment

20-Jan-05

Annual Operating costs		
2C	Variables	Annual \$
Wells, pumping		
flow, cfs	12	
drawdown, ft	20	
Water treatment plants, O&M		\$ 872,534
Pumping plants, pipe, O&M		\$ 24,279
Distribution systems, pumping		
flow, cfs (base)	20	
head, ft	520	
flow, cfs	0	
head, ft	0	
flow, cfs (denitrified)	6.3	
head, ft	0	
Power value, \$/kw-hr	\$0.11	
Power for pumping, annually		\$ 1,239,712
Interest rate	5.375%	
Assumed design life, years	50	
Present worth factor	17.25	

Alternative 2d
Santa Margarita Project - Pre-Feasibility Study
Project Capital Cost Breakdown

With Minimal Water Treatment

20-Jan-05

Alternative 2D		
Feature	Component Details	Capital costs Item Costs \$
Alt 2A with treatment plant and wells as below, plus below		\$ 33,860,579
Newton Canyon - wetlands	Wetland: 35 acres	\$ 1,225,000
	Expansion area: 11 acres	\$ 385,000
Land Outfall Pipeline	7,300 ft, 15" dia, connects to existing pump head, flow =6.3 cfs	\$ 364,347
De-nitrified Pipeline	20,600 ft, 15" dia, pump head 60', flow =6.3 cfs	\$ 1,792,135
Groundwater spreading Pipeline	9,400 ft, 16" dia, gravity head, flow =6.3 cfs	\$ 469,160
Groundwater extraction wells	3 additional SMR wells over 2a	\$ 406,343
Groundwater collection pipe system	Based on 750 gpm wells pumped into existing collector	\$ 43,564
Water treatment plant, same as 2c	Haybarn Canyon; train 2, 23 cfs	\$ 8,413,410
Distribution main pipeline	From WTP pumps, 20 cfs, 27" pipeline to existing So. CPEN tanks	\$ 1,170,791
		\$ 48,130,328

Alternative 2d
Santa Margarita Project - Pre-Feasibility Study
Alternative Total Cost Analysis

With Minimal Water Treatment

20-Jan-05

TOTAL COST ANALYSIS	
2D	
Total Construction Costs	\$ 48,130,328
Mobilization 5 %	\$ 2,150,689
Unlisted Items 15 %	\$ 7,219,549
Total Contract Costs	\$ 57,500,566
Contingencies 25 %	\$ 14,375,142
Total Field Costs	\$ 71,875,708
Non-Contract 33 %	\$ 17,968,927
Open Space Management Zone	\$ 13,000,000
Total Project Costs	\$ 102,844,634
PV of Annual O&M Costs	\$ 37,608,552
Net Present Value	\$ 140,453,186
	Yield, ac-ft 13600
	Net Project Yield, ac-ft 13600
Cost Per Acre-Foot per year	\$ 207

Alternative 2d
Santa Margarita Project - Pre-Feasibility Study
Alternative Annual Costs

With Minimal Water Treatment

20-Jan-05

Annual Operating costs		
2D	Variables	Annual \$
Wells, pumping		
flow, cfs	12	
drawdown, ft	20	
Water treatment plants, O&M		\$ 872,534
Pumping plants, pipe, O&M		\$ 24,279
Distribution systems, pumping		
flow, cfs (base)	20	
head, ft	520	
flow, cfs	0	
head, ft	700	
flow, cfs	6.3	
head, ft	60	
Power value, \$/kw-hr	\$0.11	
Power for pumping, annually		\$ 1,283,754
Interest rate	5.375%	
Assumed design life, years	50	
Present worth factor	17.25	

Alternative 3a
Santa Margarita Project - Pre-Feasibility Study
Project Capital Cost Breakdown

With Minimal Water Treatment

20-Jan-05

Alternative 3A		
Feature	Component Details	Capital costs Item Costs \$
Diversion dam - SMR	Obermeyer replacement not done with this alternative	\$ -
Headworks gates - reconstruct	Increased from 60 to 100 cfs	\$ 101,791
O'Neill ditch - widening improvements along with road siphon crossings	Increased from 60 to 100 cfs	\$ 179,369
Recharge ponds	Rehab 1-5 existing ponds: 312 AF;	\$ 1,261,473
	Construct 2 new ponds, 6&7: 242 AF	\$ -
Groundwater extraction wells	4 wells, 6.4 cfs net	\$ 541,790
Groundwater collection pipe system	Based on 750 gpm wells pumped into existing collector	\$ 58,085
Water treatment plant	Haybarn Canyon; train 2, 29 cfs	\$ 8,847,309
Distribution main pipeline	Bi-directional to Fallbrook: 67,000', 30"-27" dia, 1100' head, 24-16 cfs	\$ 8,837,597
Storage tanks	At water treatment clearwell or existing	
Pumping plants	Base in water treatment; mid-booster included in pipeline	
Instream checks	4 Instream Check Structures in the Chappo Basin, 3 feet high, 200 to 400 ft in length	\$ 16,709
Lake O'Neill rehab	LC designs	\$ 12,823,400
Open space management zone	land purchase, included below	
TOTAL		\$ 32,667,523

Alternative 3a
Santa Margarita Project - Pre-Feasibility Study
Alternative Total Cost Analysis

With Minimal Water Treatment

20-Jan-05

TOTAL COST ANALYSIS			
3A			
Total Construction Costs		\$	32,667,523
Mobilization 5 %		\$	1,633,376
Unlisted Items 15 %		\$	4,900,128
Total Contract Costs		\$	39,201,027
Contingencies 25 %		\$	9,800,257
Total Field Costs		\$	49,001,284
Non-Contract 33 %		\$	16,170,424
Open Space Management Zone		\$	13,000,000
Total Project Costs		\$	78,171,708
PV of Annual O&M Costs		\$	57,048,446
Net Present Value		\$	135,220,154
	Yield, ac-ft		12000
	Net Project Yield, ac-ft		12000
Cost Per Acre-Foot per year		\$	225

Alternative 3a
Santa Margarita Project - Pre-Feasibility Study
Alternative Annual Costs

With Minimal Water Treatment

20-Jan-05

Annual Operating costs		
3A	Variables	Annual \$
Wells, pumping		
flow, cfs	6.4	
drawdown, ft	20	
Water treatment plants, O&M		\$ 658,358
Pumping plants, pipe, O&M		\$ 100,504
Distribution systems, pumping		
flow, cfs (base)	21	
head, ft	500	
flow, cfs (mid)	16	
head, ft	700	
flow, cfs		
head, ft		
Power value, \$/kw-hr	\$0.11	
Power for pumping, annually		\$ 2,543,273
Repair to river check structures		\$ 5,570
Interest rate	5.375%	
Assumed design life, years	50	
Present worth factor	17.25	

Alternative 3b
Santa Margarita Project - Pre-Feasibility Study
Alternative Total Cost Analysis

With Minimal Water Treatment

20-Jan-05

TOTAL COST ANALYSIS	
3B	
Total Construction Costs	\$ 38,405,992
Mobilization 5 %	\$ 1,633,376
Unlisted Items 15 %	\$ 5,760,899
Total Contract Costs	\$ 45,800,267
Contingencies 25 %	\$ 11,450,067
Total Field Costs	\$ 57,250,334
Non-Contract 33 %	\$ 18,892,610
Open Space Management Zone	\$ 13,000,000
Total Project Costs	\$ 89,142,944
PV of Annual O&M Costs	\$ 65,152,576
Net Present Value	\$ 154,295,521
	Yield, ac-ft 14800
	Net Project Yield, ac-ft 14800
Cost Per Acre-Foot per year	\$ 209

Alternative 3b
Santa Margarita Project - Pre-Feasibility Study
Alternative Annual Costs

With Minimal Water Treatment

20-Jan-05

Annual Operating costs		
3B	Variables	Annual \$
Wells, pumping		
flow, cfs	10	
drawdown, ft	20	
Water treatment plants, O&M		\$ 699,358
Pumping plants, pipe, O&M		\$ 153,977
Distribution systems, pumping		
flow, cfs (base)	21	
head, ft	500	
flow, cfs (mid)	16	
head, ft	700	
flow, cfs (SMC)	7	
head, ft (OC)	450	
Power value, \$/kw-hr	\$0.11	
Power for pumping, annually		\$ 2,918,682
Repair to river check structures		\$ 5,570
Interest rate	5.375%	
Assumed design life, years	50	
Present worth factor	17.25	

Alternative 3c
Santa Margarita Project - Pre-Feasibility Study
Alternative Total Cost Analysis

With Minimal Water Treatment

20-Jan-05

TOTAL COST ANALYSIS	
3C	
Total Construction Costs	\$ 45,548,023
Mobilization 5 %	\$ 1,633,376
Unlisted Items 15 %	\$ 6,832,204
Total Contract Costs	\$ 54,013,603
Contingencies 25 %	\$ 13,503,401
Total Field Costs	\$ 67,517,004
Non-Contract 33 %	\$ 22,280,611
Open Space Management Zone	\$ 13,000,000
Total Project Costs	\$ 102,797,615
PV of Annual O&M Costs	\$ 69,628,528
Net Present Value	\$ 172,426,143
Yield, ac-ft	14800
Net Project Yield, ac-ft	14800
Cost Per Acre-Foot per year	\$ 233

Alternative 3c
Santa Margarita Project - Pre-Feasibility Study
Alternative Annual Costs

With Minimal Water Treatment

20-Jan-05

Annual Operating costs		
3C		
	Variables	Annual \$
Wells, pumping		
flow, cfs	10	
drawdown, ft	20	
Water treatment plants, O&M		\$ 658,358
Pumping plants, pipe, O&M		\$ 209,816
Distribution systems, pumping		
flow, cfs	21	
head, ft	500	
	16	
	700	
flow, cfs	7	
head, ft (Cross Base)	750	
Power value, \$/kw-hr	\$0.11	
Power for pumping, annually		\$ 3,163,362
Repair to river check structures		\$ 5,570
Interest rate	5.375%	
Assumed design life, years	50	
Present worth factor	17.25	

Alternative 3d
Santa Margarita Project - Pre-Feasibility Study
Alternative Total Cost Analysis

With Minimal Water Treatment

20-Jan-05

TOTAL COST ANALYSIS	
3D	
Total Construction Costs	\$ 59,320,966
Mobilization 5 %	\$ 1,633,376
Unlisted Items 15 %	\$ 8,898,145
Total Contract Costs	\$ 69,852,487
Contingencies 25 %	\$ 17,463,122
Total Field Costs	\$ 87,315,609
Non-Contract 33 %	\$ 28,814,151
Open Space Management Zone	\$ 13,000,000
Total Project Costs	\$ 129,129,760
PV of Annual O&M Costs	\$ 56,677,883
Net Present Value	\$ 185,807,643
Yield, ac-ft	15400
Net Project Yield, ac-ft	15400
Cost Per Acre-Foot per year	\$ 241

Alternative 3d
Santa Margarita Project - Pre-Feasibility Study
Alternative Annual Costs

With Minimal Water Treatment

20-Jan-05

Annual Operating costs		
3D		
	Variables	Annual \$
Wells, pumping		
flow, cfs	12	
drawdown, ft	20	
Water treatment plants, O&M		\$ 701,358
Pumping plants, pipe, O&M		\$ 162,786
Distribution systems, pumping		
flow, cfs (21+8)	29	
head, ft	500	
flow, cfs	0	
head, ft	700	
flow, cfs (1/5 of year)	40	
head, ft, averaged	750	
Power value, \$/kw-hr	\$0.11	
Power for pumping, annually		\$ 2,416,506
Repair to river check structures		\$ 5,570
Interest rate	5.375%	
Assumed design life, years	50	
Present worth factor	17.25	

Alternative 3e
Santa Margarita Project - Pre-Feasibility Study
Project Capital Cost Breakdown

With Minimal Water Treatment

20-Jan-05

Alternative 3E		
Feature	Component Details	Item Costs \$
Similar to Alt 3A w/ larger pumping, as below		\$ 14,982,618
NWS - Treatment wetlands and reservoir	Wetland: 18 acres	\$ 630,000
	Reservoir: earth dam, H= x ft; 49 surface acres, V= 1,600 ac-ft	\$ 4,145,041
Land Outfall Pipeline	9,000 ft, 12" dia, 50' head, flow =3.5 cfs	\$ 312,303
Treatment-Reservoir Pipeline	1,000 ft, flow =3.5 cfs, open channel ditch	\$ -
Clarified water Pipeline	5,800 ft, 18" dia, min head, flow =8.7 cfs	\$ 333,777
Spreading basin	As is - no change	TBD
Groundwater extraction wells	2 more wells than in Alt 3A, 6 total	\$ 270,895
Groundwater collection pipe system	Based on 750 gpm wells pumped into existing collector	\$ 29,043
Water treatment plant	Haybarn Canyon; train 2, 29 cfs	\$ 9,732,236
Distribution main pipeline	Bi-directional to Fallbrook: 67,000', 30"-27" dia, 1100' head, 25-20 cfs	\$ 10,135,132
	TOTAL	\$ 40,571,045

Alternative 3e
Santa Margarita Project - Pre-Feasibility Study
Alternative Total Cost Analysis

With Minimal Water Treatment

20-Jan-05

TOTAL COST ANALYSIS			
3E			
	Total Construction Costs	\$	40,571,045
	Mobilization 5 %	\$	1,633,376
	Unlisted Items 15 %	\$	6,085,657
	Total Contract Costs	\$	48,290,077
	Contingencies 25 %	\$	12,072,519
	Total Field Costs	\$	60,362,597
	Non-Contract 33 %	\$	19,919,657
	Open Space Management Zone	\$	13,000,000
	Total Project Costs	\$	93,282,254
	PV of Annual O&M Costs	\$	67,550,476
	Net Present Value	\$	160,832,730
		Yield, ac-ft	14100
		Net Project Yield, ac-ft	14100
	Cost Per Acre-Foot per year	\$	228

Alternative 3e
Santa Margarita Project - Pre-Feasibility Study
Alternative Annual Costs

With Minimal Water Treatment

20-Jan-05

Annual Operating costs		
3E	Variables	Annual \$
Wells, pumping		
flow, cfs	10	
drawdown, ft	20	
Water treatment plants, O&M		\$ 721,698
Pumping plants, pipe, wetlands, dam		\$ 78,420
Distribution systems, pumping		
flow, cfs	25	
head, ft	500	
flow, cfs	20	
head, ft	700	
Power value, \$/kw-hr	\$0.11	
Power for pumping, annually		\$ 3,110,930
Repair to river check structures		\$ 5,570
Interest rate	5.375%	
Assumed design life, years	50	
Present worth factor	17.25	

Alternative 3f
Santa Margarita Project - Pre-Feasibility Study
Project Capital Cost Breakdown

With Minimal Water Treatment

20-Jan-05

<i>Alternative 3F</i>		
<i>Feature</i>	<i>Component Details</i>	<i>Item Costs \$</i>
Alt 3A w/ larger pumping, as below		\$ 14,982,618
Pueblitos Canyon - reservoir	Wetland: 33 acres	\$ 1,155,000
	Expansion area: 12 acres	\$ 420,000
Land Outfall Pipeline	18,400 ft, 16" dia, 150' head, flow =6.3 cfs	\$ 918,355
De-nitrified Pipeline	5,700 ft, 16" dia, gravity head, flow =6.3 cfs	\$ 284,490
Groundwater spreading Pipeline	9,400 ft, 16" dia, gravity head, flow =6.3 cfs	\$ 469,160
Groundwater extraction wells	1 more well than in Alt 3A, 5 total	\$ 135,448
Groundwater collection pipe system	Based on 750 gpm wells pumped into existing collector	\$ 14,521
Water treatment plant	Haybarn Canyon; train 2, 27 cfs	\$ 9,274,725
Distribution main pipeline	Bi-directional to Fallbrook: 67,000', 30"-27" dia, 1100' head, 26-21 cfs	\$ 9,960,359
TOTAL		\$ 37,614,675

Alternative 3f
Santa Margarita Project - Pre-Feasibility Study
Alternative Total Cost Analysis

With Minimal Water Treatment

20-Jan-05

TOTAL COST ANALYSIS	
3F	
Total Construction Costs	\$ 37,614,675
Mobilization 5 %	\$ 1,633,376
Unlisted Items 15 %	\$ 5,642,201
Total Contract Costs	\$ 44,890,253
Contingencies 25 %	\$ 11,222,563
Total Field Costs	\$ 56,112,816
Non-Contract 33 %	\$ 18,517,229
Open Space Management Zone	\$ 13,000,000
Total Project Costs	\$ 87,630,045
PV of Annual O&M Costs	\$ 61,860,596
Net Present Value	\$ 149,490,641
Yield, ac-ft	13000
Net Project Yield, ac-ft	13000
Cost Per Acre-Foot per year	\$ 230

Alternative 3f
Santa Margarita Project - Pre-Feasibility Study
Alternative Annual Costs

With Minimal Water Treatment

20-Jan-05

Annual Operating costs		
3F	Variables	Annual \$
Wells, pumping		
flow, cfs	8	
drawdown, ft	20	
Water treatment plants, O&M		\$ 682,440
Pumping plants, pipe, wetlands O&M		\$ 72,070
Distribution systems, pumping		
flow, cfs	23	
head, ft	500	
flow, cfs	18	
head, ft	700	
Power value, \$/kw-hr	\$0.11	
Power for pumping, annually		\$ 2,826,636
Repair to river check structures		\$ 5,570
Interest rate	5.375%	
Assumed design life, years	50	
Present worth factor	17.25	

Alternative 3g
Santa Margarita Project - Pre-Feasibility Study
Alternative Total Cost Analysis

With Minimal Water Treatment

20-Jan-05

TOTAL COST ANALYSIS			
3G			
Total Construction Costs		\$	38,603,312
	Mobilization 5 %	\$	1,633,376
	Unlisted Items 15 %	\$	5,790,497
Total Contract Costs		\$	46,027,185
	Contingencies 25 %	\$	11,506,796
Total Field Costs		\$	57,533,981
	Non-Contract 33 %	\$	18,986,214
	Open Space Management Zone	\$	13,000,000
Total Project Costs		\$	89,520,195
	PV of Annual O&M Costs	\$	62,642,623
Net Present Value		\$	152,162,818
	Yield, ac-ft		13000
	Net Project Yield, ac-ft		13000
Cost Per Acre-Foot per year		\$	234

Alternative 3g
Santa Margarita Project - Pre-Feasibility Study
Alternative Annual Costs

With Minimal Water Treatment

20-Jan-05

Annual Operating costs			
3G		Variables	Annual \$
Wells, pumping			
	flow, cfs	8	
	drawdown, ft	20	
Water treatment plants, O&M			\$ 682,440
Pumping plants, pipe, wetlands O&M			\$ 73,370
Distribution systems, pumping			
	flow, cfs	23	
	head, ft	500	
	flow, cfs	18	
	head, ft	700	
	flow, cfs (denitrified)	6.3	
	head, ft	60	
Power value, \$/kw-hr		\$0.11	
Power for pumping, annually			\$ 2,870,678
Repair to river check structures			\$ 5,570
Interest rate		5.375%	
Assumed design life, years		50	
Present worth factor		17.25	

Alternative 3h
Santa Margarita Project - Pre-Feasibility Study
Alternative Total Cost Analysis

With Minimal Water Treatment

20-Jan-05

TOTAL COST ANALYSIS			
3H			
Total Construction Costs		\$	54,211,562
	Mobilization 5 %	\$	1,633,376
	Unlisted Items 15 %	\$	8,131,734
Total Contract Costs		\$	63,976,672
	Contingencies 25 %	\$	15,994,168
Total Field Costs		\$	79,970,840
	Non-Contract 33 %	\$	26,390,377
	Open Space Management Zone	\$	13,000,000
Total Project Costs		\$	119,361,217
	PV of Annual O&M Costs	\$	75,721,659
Net Present Value		\$	195,082,876
	Yield, ac-ft		12700
	Net Project Yield, ac-ft		12700
Cost Per Acre-Foot per year		\$	307

Alternative 3h
Santa Margarita Project - Pre-Feasibility Study
Alternative Annual Costs

With Minimal Water Treatment

20-Jan-05

Annual Operating costs		
3H	Variables	Annual \$
Wells, pumping		
flow, cfs	6.4	
drawdown, ft	20	
Water treatment plants, O&M		\$ 682,440
Pumping plants, pipe, dam		\$ 133,780
Distribution systems, pumping		
flow, cfs	23	
head, ft	500	
flow, cfs	18	
head, ft	700	
flow, cfs (2/5 of year)	40	
head, ft	400	
Power value, \$/kw-hr	\$0.11	
Power for pumping, annually		\$ 3,568,598
Repair to river check structures		\$ 5,570
Interest rate	5.375%	
Assumed design life, years	50	
Present worth factor	17.25	

Alternative 3i
Santa Margarita Project - Pre-Feasibility Study
Alternative Total Cost Analysis

With Minimal Water Treatment

20-Jan-05

TOTAL COST ANALYSIS	
3i	
Total Construction Costs	\$ 33,168,726
Mobilization 5 %	\$ 1,633,376
Unlisted Items 15 %	\$ 4,975,309
Total Contract Costs	\$ 39,777,411
Contingencies 25 %	\$ 9,944,353
Total Field Costs	\$ 49,721,763
Non-Contract 33 %	\$ 16,408,182
Open Space Management Zone	\$ 13,000,000
Total Project Costs	\$ 79,129,945
PV of Annual O&M Costs	\$ 55,428,518
Net Present Value	\$ 134,558,463
	Yield, ac-ft 12000
	Net Project Yield, ac-ft 12000
Cost Per Acre-Foot per year	\$ 224

Alternative 3i
Santa Margarita Project - Pre-Feasibility Study
Alternative Annual Costs

With Minimal Water Treatment

20-Jan-05

Annual Operating costs		
3i	Variables	Annual \$
Wells, pumping		
flow, cfs	3.4	
drawdown, ft	20	
Water treatment plants, O&M		\$ 658,358
Pumping plants, pipe, O&M		\$ 13,570
Distribution systems, pumping		
flow, cfs	21	
head, ft	500	
flow, cfs	16	
head, ft	700	
Power value, \$/kw-hr	\$0.11	
Power for pumping, annually		\$ 2,536,282
Repair to river check structures		\$ 5,570
Interest rate	5.375%	
Assumed design life, years	50	
Present worth factor	17.25	