

ATTACHMENT 8

WATER QUALITY AND OTHER EXPECTED BENEFITS

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Attachment 8 Water Quality and Other Expected Benefits	1
Hi-Desert Water District Wastewater Treatment and Water Reclamation Project	2
Table 1 - Assumptions used to compute cost of building moratorium	4
Table 2 - Cost of bi-weekly septic tank pumping	4
Table 3 - 2009 U.S. Census Bureau Data for Yucca Valley	5
Table 4 - Application "Table 16" Water Quality Benefits, HDWD Water Treatment Plant	6



HI-DESERT WATER DISTRICT WASTEWATER TREATMENT AND WATER RECLAMATION PROJECT

The Hi-Desert Water District is proposing to construct a wastewater treatment plant and eliminate septic system discharges. The Colorado River RWQCB is scheduled to impose a septic prohibition in March 2016 to protect the drinking water supply. Phase 1a of the project will sewer the eastern portion of the Town of Yucca Valley and convey and treat an average of 0.125 mgd. Phase 1a is a portion of the ultimate project that will collect up to 4 mgd of sewage. Not implementing the Hi-Desert wastewater treatment plant project would result in RWQCB enforcement. Such enforcement for the similar Los Osos area includes prohibitions on new connections and requirements for bi-weekly pumping of septic systems. Such provisions would have severe near-term and long-term impacts on the local economy.

The U.S. Census Bureau¹ reports a 2009 population of 20,066 with a per capita income of \$22,976 for Yucca Valley. The MWA 2005 Regional Water Management Plan estimates a 2.0 percent annual growth between 2010 and 2030. This would translate into a population growth of 52 percent from 2009 to 2030. Projections beyond 2030 are not available. For this analysis it is conservatively estimated that the population would grow to this 2030 level and thence remain static from the remainder of the project life. If no new connections are permitted after 2016, it is assumed this would halt economic growth. The loss of economic activity should not be constructed is used a benefit of project implementation. These assumptions are displayed in Table 1, and fully tabulated in Table 4. The discounted value of continued economic development is a very large number on the order of \$1.2 billion, and should be considered a gross reflection of the potential impact to the community of a septic tank moratorium².

¹ http://factfinder.census.gov/servlet/ACSSAFFacts?_event=Search&geo_id=&_geoContext=&_street=&_county=yucca+valley&_cityTown=yucca+valley&_state=04000US06&_zip=&_lang=en&_sse=on&pctxt=fph&pgsl=010

² Strictly speaking, a moratorium on new septic tanks is not necessarily the same as a building moratorium, but it is likely to have the same effect. Under a septic tank moratorium, building could continue if a small (e.g. “package”) treatment plant was constructed, and so new large developments might still be possible. This would not be cost effective for most new construction and most new development would cease. Under a septic moratorium, all homes (existing and new) would be subject to a zero discharge requirement.



Other measures imposed the Central Coast Regional Board include enforcement provisions for mandatory bi-weekly pumping of septic tank systems. Typical prices for septic tank pumping range from \$75 to \$200. One local septic pumping service provider³ has quoted prices of \$199 per thousand gallons.

Assuming a cost of \$100 per pumping, bi-weekly pumping of all 5,500 septic tanks in the service area would cost \$14,300,000 per year, as shown in Table 2. Although the RWCQB enforcement is likely to apply to the entire district, for the purposes of Table 4, only pumping in the Phase 1a area is assumed as an avoided cost benefit.



• Septic Pumping	\$199.00 per 1000 Gallons
• Grease Interceptor Pumping	\$199.00 per 1000 Gallons
• Storm Drain / Catch Basin Pumping	Price Quote Upon Request
• Rooter Service	\$125.00 Includes 1 Hour Labor
• Labor / Expose Septic Lids	\$75.00 per Hour
• Camera	\$225.00
• Jetting	Price Quote Upon Request
• Septic Inspections / Certification	\$365.00 - \$395.00

<http://www.asappumping.com/>

Other benefits of the project include:

- Removal of nitrates, suspended solids, and other contaminants from the waste stream and preventing their entry to the drinking water aquifer
- Recharge of the aquifer system with 140 acre-feet per year of reclaimed tertiary-treated water, avoiding the need for additional water supply imports

³ <http://www.asappumping.com/>

Table 1 - Assumptions used to compute cost of building moratorium

	Projected Population at 2% growth	Per capita Income (2009\$) (2009\$)	Total Income (2009\$M)	Loss in Income assuming 2016 Building Moritorium (2009\$M)
2009 ¹	20,066	\$22,976	\$461	\$0
...				
2016	23,050	\$22,976	\$530	\$0
2017	23,511	\$22,976	\$540	\$11
...				
2030	30,413	\$22,976	\$699	\$169
2031 ²	30,413	\$22,976	\$699	\$169
...				
2063 ²	30,413	\$22,976	\$699	\$169

¹ U.S. Census data

² Projections not available beyond 2030

Table 2 - Cost of bi-weekly septic tank pumping

Connections		Septic Pumping Frequency (times/year)	Unit Cost	Annual Cost
Phase 1a	175	26	\$100	\$455,000
Entire District	5,500	26	\$100	\$14,300,000



Table 3 - 2009 U.S. Census Bureau Data for Yucca Valley

Social Characteristics - show more >>			
	Estimate	Percent	Margin of Error
Average household size	2.39	(X)	+/-0.12
Average family size	3.06	(X)	+/-0.13
Population 25 years and over	13,581		+/-438
High school graduate or higher	(X)	83.8	(X)
Bachelor's degree or higher	(X)	16.7	(X)
Civilian veterans (civilian population 18 years and over)	2,168	14.6	+/-339
With a Disability	(X)	(X)	(X)
Foreign born	1,482	7.4	+/-330
Male, Now married, except separated (population 15 years and over)	4,113	55.7	+/-292
Female, Now married, except separated (population 15 years and over)	4,047	47.2	+/-276
Speak a language other than English at home (population 5 years and over)	2,509	13.3	+/-637
Household population	19,935		+/-220
Group quarters population	(X)	(X)	(X)
Economic Characteristics - show more >>			
	Estimate	Percent	Margin of Error
In labor force (population 16 years and over)	8,462	54.0	+/-509
Mean travel time to work in minutes (workers 16 years and over)	28.4	(X)	+/-3.2
Median household income (in 2009 inflation-adjusted dollars)	42,120	(X)	+/-3,745
Median family income (in 2009 inflation-adjusted dollars)	51,847	(X)	+/-5,138
Per capita income (in 2009 inflation-adjusted dollars)	22,976	(X)	+/-1,776
Families below poverty level	(X)	9.6	+/-3.1
Individuals below poverty level	(X)	13.0	+/-3.2

Table 4 - Application "Table 16" Water Quality Benefits, HDWD Water Treatment Plant

Table 16 - Water Quality and Other Expected Benefits (All benefits should be in 2009 dollars) Project Title: Hi-Desert Water District Wastewater Treatment and Water Reclamation Project (CR)									
(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 (l)	Annual \$ Value (f) x (g) (l)	Discount Factor (l)	Discounted Benefits (h) x (i) (l)
2009	Avoid Loss in Economic Activity from Building Moratorium	Population	20,066	20,066	0	\$22,976	\$0	1.000	\$0
2009	Avoid Bi-Weekly Septic Tank Pumping	Connections	0	0	0	-\$2,600	\$0	1.000	\$0
2009	Water Quality Improvement (remove nitrate, TSS, other contaminants)	acre-feet per year	0	0	0		\$0	1.000	\$0
2009	Recharge Aquifer with Tertiary-Treated Reclaimed Water	acre-feet per year	0	0	0		\$0	1.000	\$0
2010	Avoid Loss in Economic Activity from Building Moratorium	Population	20,467	20,467	0	\$22,976	\$0	0.943	\$0
2010	Avoid Septic B-Weekly Tank Pumping	Connections	0	0	0	-\$2,600	\$0	0.943	\$0
2010	Water Quality Improvement (remove nitrate, TSS, other contaminants)	acre-feet per year	0	0	0		\$0	0.943	\$0
2010	Recharge Aquifer with Tertiary-Treated Reclaimed Water	acre-feet per year	0	0	0		\$0	0.943	\$0
2011	Avoid Loss in Economic Activity from Building Moratorium	Population	20,877	20,877	0	\$22,976	\$0	0.890	\$0
2011	Avoid Septic B-Weekly Tank Pumping	Connections	0	0	0	-\$2,600	\$0	0.890	\$0
2011	Water Quality Improvement (remove nitrate, TSS, other contaminants)	acre-feet per year	0	0	0		\$0	0.890	\$0
2011	Recharge Aquifer with Tertiary-Treated Reclaimed Water	acre-feet per year	0	0	0		\$0	0.890	\$0
2012	Avoid Loss in Economic Activity from Building Moratorium	Population	21,294	21,294	0	\$22,976	\$0	0.840	\$0
2012	Avoid Septic B-Weekly Tank Pumping	Connections	0	0	0	-\$2,600	\$0	0.840	\$0
2012	Water Quality Improvement (remove nitrate, TSS, other contaminants)	acre-feet per year	0	0	0		\$0	0.840	\$0
2012	Recharge Aquifer with Tertiary-Treated Reclaimed Water	acre-feet per year	0	0	0		\$0	0.840	\$0
2013	Avoid Loss in Economic Activity from Building Moratorium	Population	21,720	21,720	0	\$22,976	\$0	0.792	\$0
2013	Avoid Septic B-Weekly Tank Pumping	Connections	0	0	0	-\$2,600	\$0	0.792	\$0
2013	Water Quality Improvement (remove nitrate, TSS, other contaminants)	acre-feet per year	0	0	0		\$0	0.792	\$0
2013	Recharge Aquifer with Tertiary-Treated Reclaimed Water	acre-feet per year	0	0	0		\$0	0.792	\$0
2014	Avoid Loss in Economic Activity from Building Moratorium	Population	22,154	22,154	0	\$22,976	\$0	0.747	\$0
2014	Avoid Septic B-Weekly Tank Pumping	Connections	0	0	0	-\$2,600	\$0	0.747	\$0
2014	Water Quality Improvement (remove nitrate, TSS, other contaminants)	acre-feet per year	0	140	140		\$0	0.747	\$0
2014	Recharge Aquifer with Tertiary-Treated Reclaimed Water	acre-feet per year	0	140	140		\$0	0.747	\$0
2015	Avoid Loss in Economic Activity from Building Moratorium	Population	22,598	22,598	0	\$22,976	\$0	0.705	\$0
2015	Avoid Septic B-Weekly Tank Pumping	Connections	0	0	0	-\$2,600	\$0	0.705	\$0
2015	Water Quality Improvement (remove nitrate, TSS, other contaminants)	acre-feet per year	0	140	140		\$0	0.705	\$0
2015	Recharge Aquifer with Tertiary-Treated Reclaimed Water	acre-feet per year	0	140	140		\$0	0.705	\$0
2016	Avoid Loss in Economic Activity from Building Moratorium	Population	23,050	23,050	0	\$22,976	\$0	0.665	\$0
2016	Avoid Septic B-Weekly Tank Pumping	Connections	0	0	0	-\$2,600	\$0	0.665	\$0
2016	Water Quality Improvement (remove nitrate, TSS, other contaminants)	acre-feet per year	0	140	140		\$0	0.665	\$0
2016	Recharge Aquifer with Tertiary-Treated Reclaimed Water	acre-feet per year	0	140	140		\$0	0.665	\$0
2017	Avoid Loss in Economic Activity from Building Moratorium	Population	23,050	23,511	461	\$22,976	\$10,591,718	0.627	\$6,645,375
2017	Avoid Septic B-Weekly Tank Pumping	Connections	175	0	-175	-\$2,600	\$455,000	0.627	\$285,473



Table 16 - Water Quality and Other Expected Benefits

(All benefits should be in 2009 dollars)

Project Title: Hi-Desert Water District Wastewater Treatment and Water Reclamation Project (CR)

(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)
2017	Water Quality Improvement (remove nitrate, TSS, other contaminants)	acre-feet per year	0	140	140		\$0	0.627	\$0
2017	Recharge Aquifer with Tertiary-Treated Reclaimed Water	acre-feet per year	0	140	140		\$0	0.627	\$0
2018	Avoid Loss in Economic Activity from Building Moratorium	Population	23,050	23,981	931	\$22,976	\$21,395,271	0.592	\$12,663,828
2018	Aviod Septic B-Weekly Tank Pumping	Connections	175	0	-175	-\$2,600	\$455,000	0.592	\$269,314
2018	Water Quality Improvement (remove nitrate, TSS, other contaminants)	acre-feet per year	0	140	140		\$0	0.592	\$0
2018	Recharge Aquifer with Tertiary-Treated Reclaimed Water	acre-feet per year	0	140	140		\$0	0.592	\$0
2019	Avoid Loss in Economic Activity from Building Moratorium	Population	23,050	24,460	1,411	\$22,976	\$32,414,895	0.558	\$18,100,308
2019	Aviod Septic B-Weekly Tank Pumping	Connections	175	0	-175	-\$2,600	\$455,000	0.558	\$254,070
2019	Water Quality Improvement (remove nitrate, TSS, other contaminants)	acre-feet per year	0	140	140		\$0	0.558	\$0
2019	Recharge Aquifer with Tertiary-Treated Reclaimed Water	acre-feet per year	0	140	140		\$0	0.558	\$0
2020	Avoid Loss in Economic Activity from Building Moratorium	Population	23,050	24,950	1,900	\$22,976	\$43,654,912	0.527	\$22,996,863
2020	Aviod Septic B-Weekly Tank Pumping	Connections	175	0	-175	-\$2,600	\$455,000	0.527	\$239,688
2020	Water Quality Improvement (remove nitrate, TSS, other contaminants)	acre-feet per year	0	140	140		\$0	0.527	\$0
2020	Recharge Aquifer with Tertiary-Treated Reclaimed Water	acre-feet per year	0	140	140		\$0	0.527	\$0
2021	Avoid Loss in Economic Activity from Building Moratorium	Population	23,050	25,449	2,399	\$22,976	\$55,119,728	0.497	\$27,392,816
2021	Aviod Septic B-Weekly Tank Pumping	Connections	175	0	-175	-\$2,600	\$455,000	0.497	\$226,121
2021	Water Quality Improvement (remove nitrate, TSS, other contaminants)	acre-feet per year	0	140	140		\$0	0.497	\$0
2021	Recharge Aquifer with Tertiary-Treated Reclaimed Water	acre-feet per year	0	140	140		\$0	0.497	\$0
2022	Avoid Loss in Economic Activity from Building Moratorium	Population	23,050	25,958	2,908	\$22,976	\$66,813,841	0.469	\$31,324,936
2022	Aviod Septic B-Weekly Tank Pumping	Connections	175	0	-175	-\$2,600	\$455,000	0.469	\$213,322
2022	Water Quality Improvement (remove nitrate, TSS, other contaminants)	acre-feet per year	0	140	140		\$0	0.469	\$0
2022	Recharge Aquifer with Tertiary-Treated Reclaimed Water	acre-feet per year	0	140	140		\$0	0.469	\$0
2023	Avoid Loss in Economic Activity from Building Moratorium	Population	23,050	26,477	3,427	\$22,976	\$78,741,837	0.442	\$34,827,590
2023	Aviod Septic B-Weekly Tank Pumping	Connections	175	0	-175	-\$2,600	\$455,000	0.442	\$201,247
2023	Water Quality Improvement (remove nitrate, TSS, other contaminants)	acre-feet per year	0	140	140		\$0	0.442	\$0
2023	Recharge Aquifer with Tertiary-Treated Reclaimed Water	acre-feet per year	0	140	140		\$0	0.442	\$0
2024	Avoid Loss in Economic Activity from Building Moratorium	Population	23,050	27,006	3,957	\$22,976	\$90,908,392	0.417	\$37,932,896
2024	Aviod Septic B-Weekly Tank Pumping	Connections	175	0	-175	-\$2,600	\$455,000	0.417	\$189,856
2024	Water Quality Improvement (remove nitrate, TSS, other contaminants)	acre-feet per year	0	140	140		\$0	0.417	\$0
2024	Recharge Aquifer with Tertiary-Treated Reclaimed Water	acre-feet per year	0	140	140		\$0	0.417	\$0
2025	Avoid Loss in Economic Activity from Building Moratorium	Population	23,050	27,546	4,497	\$22,976	\$103,318,278	0.394	\$40,670,856
2025	Aviod Septic B-Weekly Tank Pumping	Connections	175	0	-175	-\$2,600	\$455,000	0.394	\$179,109
2025	Water Quality Improvement (remove nitrate, TSS, other contaminants)	acre-feet per year	0	140	140		\$0	0.394	\$0
2025	Recharge Aquifer with Tertiary-Treated Reclaimed Water	acre-feet per year	0	140	140		\$0	0.394	\$0



Table 16 - Water Quality and Other Expected Benefits

(All benefits should be in 2009 dollars)

Project Title: Hi-Desert Water District Wastewater Treatment and Water Reclamation Project (CR)

(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 (t)	(h) Annual \$ Value (f) x (g) (t)	(i) Discount Factor (t)	(j) Discounted Benefits (h) x (i) (t)
2026	Avoid Loss in Economic Activity from Building Moratorium	Population	23,050	28,097	5,048	\$22,976	\$115,976,362	0.371	\$43,069,494
2026	Aviod Septic B-Weekly Tank Pumping	Connections	175	0	-175	-\$2,600	\$455,000	0.371	\$168,971
2026	Water Quality Improvement (remove nitrate, TSS, other contaminants)	acre-feet per year	0	140	140		\$0	0.371	\$0
2026	Recharge Aquifer with Tertiary-Treated Reclaimed Water	acre-feet per year	0	140	140		\$0	0.371	\$0
2027	Avoid Loss in Economic Activity from Building Moratorium	Population	23,050	28,659	5,610	\$22,976	\$128,887,608	0.350	\$45,154,973
2027	Aviod Septic B-Weekly Tank Pumping	Connections	175	0	-175	-\$2,600	\$455,000	0.350	\$159,406
2027	Water Quality Improvement (remove nitrate, TSS, other contaminants)	acre-feet per year	0	140	140		\$0	0.350	\$0
2027	Recharge Aquifer with Tertiary-Treated Reclaimed Water	acre-feet per year	0	140	140		\$0	0.350	\$0
2028	Avoid Loss in Economic Activity from Building Moratorium	Population	23,050	29,232	6,183	\$22,976	\$142,057,078	0.331	\$46,951,713
2028	Aviod Septic B-Weekly Tank Pumping	Connections	175	0	-175	-\$2,600	\$455,000	0.331	\$150,383
2028	Water Quality Improvement (remove nitrate, TSS, other contaminants)	acre-feet per year	0	140	140		\$0	0.331	\$0
2028	Recharge Aquifer with Tertiary-Treated Reclaimed Water	acre-feet per year	0	140	140		\$0	0.331	\$0
2029	Avoid Loss in Economic Activity from Building Moratorium	Population	23,050	29,817	6,767	\$22,976	\$155,489,938	0.312	\$48,482,498
2029	Aviod Septic B-Weekly Tank Pumping	Connections	175	0	-175	-\$2,600	\$455,000	0.312	\$141,871
2029	Water Quality Improvement (remove nitrate, TSS, other contaminants)	acre-feet per year	0	140	140		\$0	0.312	\$0
2029	Recharge Aquifer with Tertiary-Treated Reclaimed Water	acre-feet per year	0	140	140		\$0	0.312	\$0
2030	Avoid Loss in Economic Activity from Building Moratorium	Population	23,050	30,413	7,364	\$22,976	\$169,191,456	0.294	\$49,768,581
2030	Aviod Septic B-Weekly Tank Pumping	Connections	175	0	-175	-\$2,600	\$455,000	0.294	\$133,841
2030	Water Quality Improvement (remove nitrate, TSS, other contaminants)	acre-feet per year	0	140	140		\$0	0.294	\$0
2030	Recharge Aquifer with Tertiary-Treated Reclaimed Water	acre-feet per year	0	140	140		\$0	0.294	\$0
2031	Avoid Loss in Economic Activity from Building Moratorium	Population	23,050	30,413	7,364	\$22,976	\$169,191,456	0.278	\$46,951,491
2031	Aviod Septic B-Weekly Tank Pumping	Connections	175	0	-175	-\$2,600	\$455,000	0.278	\$126,265
2031	Water Quality Improvement (remove nitrate, TSS, other contaminants)	acre-feet per year	0	140	140		\$0	0.278	\$0
2031	Recharge Aquifer with Tertiary-Treated Reclaimed Water	acre-feet per year	0	140	140		\$0	0.278	\$0
2032	Avoid Loss in Economic Activity from Building Moratorium	Population	23,050	30,413	7,364	\$22,976	\$169,191,456	0.262	\$44,293,860
2032	Aviod Septic B-Weekly Tank Pumping	Connections	175	0	-175	-\$2,600	\$455,000	0.262	\$119,118
2032	Water Quality Improvement (remove nitrate, TSS, other contaminants)	acre-feet per year	0	140	140		\$0	0.262	\$0
2032	Recharge Aquifer with Tertiary-Treated Reclaimed Water	acre-feet per year	0	140	140		\$0	0.262	\$0
2033	Avoid Loss in Economic Activity from Building Moratorium	Population	23,050	30,413	7,364	\$22,976	\$169,191,456	0.247	\$41,786,660
2033	Aviod Septic B-Weekly Tank Pumping	Connections	175	0	-175	-\$2,600	\$455,000	0.247	\$112,375
2033	Water Quality Improvement (remove nitrate, TSS, other contaminants)	acre-feet per year	0	140	140		\$0	0.247	\$0
2033	Recharge Aquifer with Tertiary-Treated Reclaimed Water	acre-feet per year	0	140	140		\$0	0.247	\$0
2034	Avoid Loss in Economic Activity from Building Moratorium	Population	23,050	30,413	7,364	\$22,976	\$169,191,456	0.233	\$39,421,377
2034	Aviod Septic B-Weekly Tank Pumping	Connections	175	0	-175	-\$2,600	\$455,000	0.233	\$106,014



Table 16 - Water Quality and Other Expected Benefits

(All benefits should be in 2009 dollars)

Project Title: Hi-Desert Water District Wastewater Treatment and Water Reclamation Project (CR)

(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)
2034	Water Quality Improvement (remove nitrate, TSS, other contaminants)	acre-feet per year	0	140	140		\$0	0.233	\$0
2034	Recharge Aquifer with Tertiary-Treated Reclaimed Water	acre-feet per year	0	140	140		\$0	0.233	\$0
2035	Avoid Loss in Economic Activity from Building Moratorium	Population	23,050	30,413	7,364	\$22,976	\$169,191,456	0.220	\$37,189,979
2035	Aviod Septic B-Weekly Tank Pumping	Connections	175	0	-175	-\$2,600	\$455,000	0.220	\$100,014
2035	Water Quality Improvement (remove nitrate, TSS, other contaminants)	acre-feet per year	0	140	140		\$0	0.220	\$0
2035	Recharge Aquifer with Tertiary-Treated Reclaimed Water	acre-feet per year	0	140	140		\$0	0.220	\$0
2036	Avoid Loss in Economic Activity from Building Moratorium	Population	23,050	30,413	7,364	\$22,976	\$169,191,456	0.207	\$35,084,886
2036	Aviod Septic B-Weekly Tank Pumping	Connections	175	0	-175	-\$2,600	\$455,000	0.207	\$94,352
2036	Water Quality Improvement (remove nitrate, TSS, other contaminants)	acre-feet per year	0	140	140		\$0	0.207	\$0
2036	Recharge Aquifer with Tertiary-Treated Reclaimed Water	acre-feet per year	0	140	140		\$0	0.207	\$0
2037	Avoid Loss in Economic Activity from Building Moratorium	Population	23,050	30,413	7,364	\$22,976	\$169,191,456	0.196	\$33,098,949
2037	Aviod Septic B-Weekly Tank Pumping	Connections	175	0	-175	-\$2,600	\$455,000	0.196	\$89,012
2037	Water Quality Improvement (remove nitrate, TSS, other contaminants)	acre-feet per year	0	140	140		\$0	0.196	\$0
2037	Recharge Aquifer with Tertiary-Treated Reclaimed Water	acre-feet per year	0	140	140		\$0	0.196	\$0
2038	Avoid Loss in Economic Activity from Building Moratorium	Population	23,050	30,413	7,364	\$22,976	\$169,191,456	0.185	\$31,225,423
2038	Aviod Septic B-Weekly Tank Pumping	Connections	175	0	-175	-\$2,600	\$455,000	0.185	\$83,973
2038	Water Quality Improvement (remove nitrate, TSS, other contaminants)	acre-feet per year	0	140	140		\$0	0.185	\$0
2038	Recharge Aquifer with Tertiary-Treated Reclaimed Water	acre-feet per year	0	140	140		\$0	0.185	\$0
2039	Avoid Loss in Economic Activity from Building Moratorium	Population	23,050	30,413	7,364	\$22,976	\$169,191,456	0.174	\$29,457,947
2039	Aviod Septic B-Weekly Tank Pumping	Connections	175	0	-175	-\$2,600	\$455,000	0.174	\$79,220
2039	Water Quality Improvement (remove nitrate, TSS, other contaminants)	acre-feet per year	0	140	140		\$0	0.174	\$0
2039	Recharge Aquifer with Tertiary-Treated Reclaimed Water	acre-feet per year	0	140	140		\$0	0.174	\$0
2040	Avoid Loss in Economic Activity from Building Moratorium	Population	23,050	30,413	7,364	\$22,976	\$169,191,456	0.164	\$27,790,516
2040	Aviod Septic B-Weekly Tank Pumping	Connections	175	0	-175	-\$2,600	\$455,000	0.164	\$74,736
2040	Water Quality Improvement (remove nitrate, TSS, other contaminants)	acre-feet per year	0	140	140		\$0	0.164	\$0
2040	Recharge Aquifer with Tertiary-Treated Reclaimed Water	acre-feet per year	0	140	140		\$0	0.164	\$0
2041	Avoid Loss in Economic Activity from Building Moratorium	Population	23,050	30,413	7,364	\$22,976	\$169,191,456	0.155	\$26,217,468
2041	Aviod Septic B-Weekly Tank Pumping	Connections	175	0	-175	-\$2,600	\$455,000	0.155	\$70,506
2041	Water Quality Improvement (remove nitrate, TSS, other contaminants)	acre-feet per year	0	140	140		\$0	0.155	\$0
2041	Recharge Aquifer with Tertiary-Treated Reclaimed Water	acre-feet per year	0	140	140		\$0	0.155	\$0
2042	Avoid Loss in Economic Activity from Building Moratorium	Population	23,050	30,413	7,364	\$22,976	\$169,191,456	0.146	\$24,733,460
2042	Aviod Septic B-Weekly Tank Pumping	Connections	175	0	-175	-\$2,600	\$455,000	0.146	\$66,515
2042	Water Quality Improvement (remove nitrate, TSS, other contaminants)	acre-feet per year	0	140	140		\$0	0.146	\$0
2042	Recharge Aquifer with Tertiary-Treated Reclaimed Water	acre-feet per year	0	140	140		\$0	0.146	\$0



Table 16 - Water Quality and Other Expected Benefits

(All benefits should be in 2009 dollars)

Project Title: Hi-Desert Water District Wastewater Treatment and Water Reclamation Project (CR)

(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 (t)	(h) Annual \$ Value (f) x (g) (t)	(i) Discount Factor (t)	(j) Discounted Benefits (h) x (i) (t)
2043	Avoid Loss in Economic Activity from Building Moratorium	Population	23,050	30,413	7,364	\$22,976	\$169,191,456	0.138	\$23,333,453
2043	Aviod Septic B-Weekly Tank Pumping	Connections	175	0	-175	-\$2,600	\$455,000	0.138	\$62,750
2043	Water Quality Imporvement (remove nitrate, TSS, other contaminants)	acre-feet per year	0	140	140		\$0	0.138	\$0
2043	Recharge Aquifer with Tertiary-Treated Reclaimed Water	acre-feet per year	0	140	140		\$0	0.138	\$0
2044	Avoid Loss in Economic Activity from Building Moratorium	Population	23,050	30,413	7,364	\$22,976	\$169,191,456	0.130	\$22,012,691
2044	Aviod Septic B-Weekly Tank Pumping	Connections	175	0	-175	-\$2,600	\$455,000	0.130	\$59,198
2044	Water Quality Imporvement (remove nitrate, TSS, other contaminants)	acre-feet per year	0	140	140		\$0	0.130	\$0
2044	Recharge Aquifer with Tertiary-Treated Reclaimed Water	acre-feet per year	0	140	140		\$0	0.130	\$0
2045	Avoid Loss in Economic Activity from Building Moratorium	Population	23,050	30,413	7,364	\$22,976	\$169,191,456	0.123	\$20,766,690
2045	Aviod Septic B-Weekly Tank Pumping	Connections	175	0	-175	-\$2,600	\$455,000	0.123	\$55,847
2045	Water Quality Imporvement (remove nitrate, TSS, other contaminants)	acre-feet per year	0	140	140		\$0	0.123	\$0
2045	Recharge Aquifer with Tertiary-Treated Reclaimed Water	acre-feet per year	0	140	140		\$0	0.123	\$0
2046	Avoid Loss in Economic Activity from Building Moratorium	Population	23,050	30,413	7,364	\$22,976	\$169,191,456	0.116	\$19,591,217
2046	Aviod Septic B-Weekly Tank Pumping	Connections	175	0	-175	-\$2,600	\$455,000	0.116	\$52,686
2046	Water Quality Imporvement (remove nitrate, TSS, other contaminants)	acre-feet per year	0	140	140		\$0	0.116	\$0
2046	Recharge Aquifer with Tertiary-Treated Reclaimed Water	acre-feet per year	0	140	140		\$0	0.116	\$0
2047	Avoid Loss in Economic Activity from Building Moratorium	Population	23,050	30,413	7,364	\$22,976	\$169,191,456	0.109	\$18,482,280
2047	Aviod Septic B-Weekly Tank Pumping	Connections	175	0	-175	-\$2,600	\$455,000	0.109	\$49,704
2047	Water Quality Imporvement (remove nitrate, TSS, other contaminants)	acre-feet per year	0	140	140		\$0	0.109	\$0
2047	Recharge Aquifer with Tertiary-Treated Reclaimed Water	acre-feet per year	0	140	140		\$0	0.109	\$0
2048	Avoid Loss in Economic Activity from Building Moratorium	Population	23,050	30,413	7,364	\$22,976	\$169,191,456	0.103	\$17,436,113
2048	Aviod Septic B-Weekly Tank Pumping	Connections	175	0	-175	-\$2,600	\$455,000	0.103	\$46,890
2048	Water Quality Imporvement (remove nitrate, TSS, other contaminants)	acre-feet per year	0	140	140		\$0	0.103	\$0
2048	Recharge Aquifer with Tertiary-Treated Reclaimed Water	acre-feet per year	0	140	140		\$0	0.103	\$0
2049	Avoid Loss in Economic Activity from Building Moratorium	Population	23,050	30,413	7,364	\$22,976	\$169,191,456	0.097	\$16,449,163
2049	Aviod Septic B-Weekly Tank Pumping	Connections	175	0	-175	-\$2,600	\$455,000	0.097	\$44,236
2049	Water Quality Imporvement (remove nitrate, TSS, other contaminants)	acre-feet per year	0	140	140		\$0	0.097	\$0
2049	Recharge Aquifer with Tertiary-Treated Reclaimed Water	acre-feet per year	0	140	140		\$0	0.097	\$0
2050	Avoid Loss in Economic Activity from Building Moratorium	Population	23,050	30,413	7,364	\$22,976	\$169,191,456	0.092	\$15,518,079
2050	Aviod Septic B-Weekly Tank Pumping	Connections	175	0	-175	-\$2,600	\$455,000	0.092	\$41,732
2050	Water Quality Imporvement (remove nitrate, TSS, other contaminants)	acre-feet per year	0	140	140		\$0	0.092	\$0
2050	Recharge Aquifer with Tertiary-Treated Reclaimed Water	acre-feet per year	0	140	140		\$0	0.092	\$0
2051	Avoid Loss in Economic Activity from Building Moratorium	Population	23,050	30,413	7,364	\$22,976	\$169,191,456	0.087	\$14,639,697
2051	Aviod Septic B-Weekly Tank Pumping	Connections	175	0	-175	-\$2,600	\$455,000	0.087	\$39,370



Table 16 - Water Quality and Other Expected Benefits

(All benefits should be in 2009 dollars)

Project Title: Hi-Desert Water District Wastewater Treatment and Water Reclamation Project (CR)

(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)
2051	Water Quality Improvement (remove nitrate, TSS, other contaminants)	acre-feet per year	0	140	140		\$0	0.087	\$0
2051	Recharge Aquifer with Tertiary-Treated Reclaimed Water	acre-feet per year	0	140	140		\$0	0.087	\$0
2052	Avoid Loss in Economic Activity from Building Moratorium	Population	23,050	30,413	7,364	\$22,976	\$169,191,456	0.082	\$13,811,035
2052	Aviod Septic B-Weekly Tank Pumping	Connections	175	0	-175	-\$2,600	\$455,000	0.082	\$37,141
2052	Water Quality Improvement (remove nitrate, TSS, other contaminants)	acre-feet per year	0	140	140		\$0	0.082	\$0
2052	Recharge Aquifer with Tertiary-Treated Reclaimed Water	acre-feet per year	0	140	140		\$0	0.082	\$0
2053	Avoid Loss in Economic Activity from Building Moratorium	Population	23,050	30,413	7,364	\$22,976	\$169,191,456	0.077	\$13,029,278
2053	Aviod Septic B-Weekly Tank Pumping	Connections	175	0	-175	-\$2,600	\$455,000	0.077	\$35,039
2053	Water Quality Improvement (remove nitrate, TSS, other contaminants)	acre-feet per year	0	140	140		\$0	0.077	\$0
2053	Recharge Aquifer with Tertiary-Treated Reclaimed Water	acre-feet per year	0	140	140		\$0	0.077	\$0
2054	Avoid Loss in Economic Activity from Building Moratorium	Population	23,050	30,413	7,364	\$22,976	\$169,191,456	0.073	\$12,291,772
2054	Aviod Septic B-Weekly Tank Pumping	Connections	175	0	-175	-\$2,600	\$455,000	0.073	\$33,056
2054	Water Quality Improvement (remove nitrate, TSS, other contaminants)	acre-feet per year	0	140	140		\$0	0.073	\$0
2054	Recharge Aquifer with Tertiary-Treated Reclaimed Water	acre-feet per year	0	140	140		\$0	0.073	\$0
2055	Avoid Loss in Economic Activity from Building Moratorium	Population	23,050	30,413	7,364	\$22,976	\$169,191,456	0.069	\$11,596,011
2055	Aviod Septic B-Weekly Tank Pumping	Connections	175	0	-175	-\$2,600	\$455,000	0.069	\$31,185
2055	Water Quality Improvement (remove nitrate, TSS, other contaminants)	acre-feet per year	0	140	140		\$0	0.069	\$0
2055	Recharge Aquifer with Tertiary-Treated Reclaimed Water	acre-feet per year	0	140	140		\$0	0.069	\$0
2056	Avoid Loss in Economic Activity from Building Moratorium	Population	23,050	30,413	7,364	\$22,976	\$169,191,456	0.065	\$10,939,633
2056	Aviod Septic B-Weekly Tank Pumping	Connections	175	0	-175	-\$2,600	\$455,000	0.065	\$29,420
2056	Water Quality Improvement (remove nitrate, TSS, other contaminants)	acre-feet per year	0	140	140		\$0	0.065	\$0
2056	Recharge Aquifer with Tertiary-Treated Reclaimed Water	acre-feet per year	0	140	140		\$0	0.065	\$0
2057	Avoid Loss in Economic Activity from Building Moratorium	Population	23,050	30,413	7,364	\$22,976	\$169,191,456	0.061	\$10,320,409
2057	Aviod Septic B-Weekly Tank Pumping	Connections	175	0	-175	-\$2,600	\$455,000	0.061	\$27,754
2057	Water Quality Improvement (remove nitrate, TSS, other contaminants)	acre-feet per year	0	140	140		\$0	0.061	\$0
2057	Recharge Aquifer with Tertiary-Treated Reclaimed Water	acre-feet per year	0	140	140		\$0	0.061	\$0
2058	Avoid Loss in Economic Activity from Building Moratorium	Population	23,050	30,413	7,364	\$22,976	\$169,191,456	0.058	\$9,736,235
2058	Aviod Septic B-Weekly Tank Pumping	Connections	175	0	-175	-\$2,600	\$455,000	0.058	\$26,183
2058	Water Quality Improvement (remove nitrate, TSS, other contaminants)	acre-feet per year	0	140	140		\$0	0.058	\$0
2058	Recharge Aquifer with Tertiary-Treated Reclaimed Water	acre-feet per year	0	140	140		\$0	0.058	\$0
2059	Avoid Loss in Economic Activity from Building Moratorium	Population	23,050	30,413	7,364	\$22,976	\$169,191,456	0.054	\$9,185,127
2059	Aviod Septic B-Weekly Tank Pumping	Connections	175	0	-175	-\$2,600	\$455,000	0.054	\$24,701
2059	Water Quality Improvement (remove nitrate, TSS, other contaminants)	acre-feet per year	0	140	140		\$0	0.054	\$0
2059	Recharge Aquifer with Tertiary-Treated Reclaimed Water	acre-feet per year	0	140	140		\$0	0.054	\$0



Table 16 - Water Quality and Other Expected Benefits

(All benefits should be in 2009 dollars)

Project Title: Hi-Desert Water District Wastewater Treatment and Water Reclamation Project (CR)

(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)
2060	Avoid Loss in Economic Activity from Building Moratorium	Population	23,050	30,413	7,364	\$22,976	\$169,191,456	0.051	\$8,665,214
2060	Avoid Septic B-Weekly Tank Pumping	Connections	175	0	-175	-\$2,600	\$455,000	0.051	\$23,303
2060	Water Quality Improvement (remove nitrate, TSS, other contaminants)	acre-feet per year	0	140	140		\$0	0.051	\$0
2060	Recharge Aquifer with Tertiary-Treated Reclaimed Water	acre-feet per year	0	140	140		\$0	0.051	\$0
2061	Avoid Loss in Economic Activity from Building Moratorium	Population	23,050	30,413	7,364	\$22,976	\$169,191,456	0.048	\$8,174,730
2061	Avoid Septic B-Weekly Tank Pumping	Connections	175	0	-175	-\$2,600	\$455,000	0.048	\$21,984
2061	Water Quality Improvement (remove nitrate, TSS, other contaminants)	acre-feet per year	0	140	140		\$0	0.048	\$0
2061	Recharge Aquifer with Tertiary-Treated Reclaimed Water	acre-feet per year	0	140	140		\$0	0.048	\$0
2062	Avoid Loss in Economic Activity from Building Moratorium	Population	23,050	30,413	7,364	\$22,976	\$169,191,456	0.046	\$7,712,010
2062	Avoid Septic B-Weekly Tank Pumping	Connections	175	0	-175	-\$2,600	\$455,000	0.046	\$20,740
2062	Water Quality Improvement (remove nitrate, TSS, other contaminants)	acre-feet per year	0	140	140		\$0	0.046	\$0
2062	Recharge Aquifer with Tertiary-Treated Reclaimed Water	acre-feet per year	0	140	140		\$0	0.046	\$0
2063	Avoid Loss in Economic Activity from Building Moratorium	Population	23,050	30,413	7,364	\$22,976	\$169,191,456	0.043	\$7,275,481
2063	Avoid Septic B-Weekly Tank Pumping	Connections	175	0	-175	-\$2,600	\$455,000	0.043	\$19,566
2063	Water Quality Improvement (remove nitrate, TSS, other contaminants)	acre-feet per year	0	140	140		\$0	0.043	\$0
2063	Recharge Aquifer with Tertiary-Treated Reclaimed Water	acre-feet per year	0	140	140		\$0	0.043	\$0
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) Transfer to Table 20, column (f), Exhibit F: Proposal Costs and Benefits Summaries									\$1,178,918,315

Comments:

