ATTACHMENT 8. BENEFITS AND COST ANALYSIS

Att8_IG2_BenCost_1of2

ASSUMPTIONS

- All costs are presented in 2012 dollars
- All costs necessary to achieve the stated benefits are included
- The economic analysis is based on a comparison of with-project benefits versus without project benefits
- The period of analysis assumes a 50-year project life from the on-line date
- The analysis is performed using the "DWR Method" described in the November 2012 PSP

SECTION D1. FLOOD DAMAGE REDUCTION BENEFIT ANALYSIS

An analysis of flood damage reduction was completed by Peterson-Brustad, Inc. in April 2011, and is reported below.[21]

Study Methodology

The benefits of the Wisconsin Pump Station Improvement Project are presented in terms of flood damage reduction at various annual exceedance probabilities (100-year, 25-year, and 10-year). San Joaquin County Assessor's office data was used to estimate existing parcel area and structure area by type of land use throughout the Wisconsin Pump Station drainage basin.

Given that functional integrity of the existing pump station has deteriorated to a point where it is essentially in failure mode, flood depths for the 100-year, 25-year, and 10-year storm events were developed assuming the existing pump station has failed and is inoperable. Flood damage was estimated for land, infrastructure, automobiles, structures and structure contents for these flood events. Flood emergency response costs as well as residential displacement and shelter costs were also estimated.

The flood damages for structures and contents were developed using guidance from the USACE Planning Guidance Notebook, ER1105-2-100, April 2000. Land damage was estimated at 10% of the land value based on previous work done for the Sacramento Area Flood Control Agency's (SAFCA) Engineer's Report for SAFCA Operation and Maintenance Assessment, 1991.

"Without" project benefits are based on the total flood damages at the 100-year, 25-year, and 10- year storm events assuming the pump station is inoperable. Benefits associated with events less frequent

[21] Peterson-Brustad, Inc., April 21, 2011, "Technical Memorandum, Flood Damage Economic Analysis, Wisconsin Pump Station"

than the 100-year event (e.g. 200-year) for both the "Without" and "With" project were assumed to be equal to the damages estimated for the 100-year event. USACE methods were then used to determine the expected annual damages for both the "Without" and "With" project scenarios. Appendix A presents a summary of the expected annual damage computation procedures.

Annual project benefits were determined from the difference between expected annual damage for the "Without" project and the "With" project scenarios. Annual project costs were developed from the project's capital construction and estimated annual maintenance cost. The construction cost of the project was evaluated over 50 years at a discount rate of 6%.

Wisconsin Pump Station Drainage Basin

To determine the flood damages for the basin, the values of the land, structures, structure contents, and automobiles within the basin must be determined. Since damages will be determined by flood depth, the Wisconsin Pump Station Drainage Basin was divided into 5 areas (A through E) based on ground surface elevation. The following discussion presents the assumptions used for determining the value for the items potentially damaged by flood water. At the end of the discussion, the values for land, structures, structure contents, and automobiles are summarized by area within the drainage basin.

Land Value

For the purposes of this study, it was assumed that the land value for residential property within the study area is $75,000 per lot. Land values for commercial, public, and vacant land were taken directly from the San Joaquin County Tax Assessor's records. There is no industrial or agricultural land use within the Wisconsin Pump Station Drainage Area.

Structure and Content Value

San Joaquin County Tax Assessor's records include land use, structure value and living area data for each parcel within the study area. Structure values for commercial and public land use were taken directly from the County data. Residential structure values were determined using USACE data developed in connection with the USACE Draft Economic Reevaluation Report, American River Watershed Project, 2007. Content values for all land use types were determined using the same USACE data. Table 20 presents the structure and content values for each land use type used in this damage assessment.

Table 20 - Structure and Content Values based on Land Use

Land Use	Structure Value ($/SF)	Content Value (% of structure value)
Residential	$60	50%
Commercial	Per County Data	107%
Public	Per County Data	107%
Vacant	--	--

Automobile Value

The number of automobiles in the Wisconsin Pump Station Drainage Basin is based on the 2008 US Census Bureau data that assigns 1.45 automobiles per residential structure. The 2009 National Auto Dealer Association estimates the average depreciated replacement value at $15,200 per automobile. The total value of automobiles within the drainage basin is based on these two values. However, the automobile value used in this damage assessment estimates that 50% of the automobiles will be removed from the damage areas during flood events and will avoid damage.

Drainage Basin Value Summary

Table 21 presents a summary of the land, structure, contents, and automobile values for each of the areas (differentiated by ground surface elevation) within the Wisconsin Pump Station Drainage Basin.

Table 21 - Drainage Basin Values for Damage Assessment

Wisconsin Pump Station Drainage Area	Total Area (ac)	Number of Parcels	Land Value ($1,000)	Structure Value ($1,000)	Content Value ($1,000)	Auto Value ($1,000)
Area A (Elev = -2 ft)	2.2	11	825	804	402	121
Area B (Elev = -1 ft)	23.3	70	5,142	4,600	2,306	727
Area C (Elev = 0 ft)	47.0	188	13,978	15,649	7,825	2,050
Area D (Elev = +1 ft)	243.5	462	34,581	44,333	27,168	4,992
Area E (Elev = +2 ft)	139.0	460	33,634	47,885	24,637	4,816
TOTAL	455.1	1,191	88,160	113,272	62,338	12,706

Flood Damage Assessment

This analysis of the flood damage reduction benefit for the Wisconsin Pump Station drainage basin is based on the avoidance of damage to structures, to the contents of the structures, to automobiles, to infrastructure, and to land. Other benefits that were considered were avoidance of flood emergency response costs as well as residential displacement and shelter costs. Most of these damages are dependent upon the depth of the flood water. The flood damage assessment below addresses the "Without" project conditions.

Flood Depth

The "Without" project flood elevation was determined for the 100-year, 25-year, and 10-year storm events (KSN, Erik Almaas). To determine the flood depth, the Wisconsin Pump Station drainage basin was divided into 5 areas (A through E) based on the parcel's ground surface elevation. Table 22 presents the flood depth for each area for each of the annual exceedance events. Note that negative flood depths reflect the height above the flood water elevation for the drainage area. These flood depths, rounded to the nearest foot, were used in the depth-damage relationships for each type of damage.

Table 22 - Flood Depths

Wisconsin Pump Station Drainage Area	Flood Depths (ft) for Annual Exceedance Probability		
	100-year (Flood Elev = 0.1 ft)	25-year (Flood Elev = -0.4 ft)	10-year (Flood Elev = -1.1 ft)
Area A (Elev = -2 ft)	2.1	1.6	0.9
Area B (Elev = -1 ft)	1.1	0.6	-0.1
Area C (Elev = 0 ft)	0.1	-0.4	-1.1
Area D (Elev = +1 ft)	-0.9	-1.4	-2.1
Area E (Elev = +2 ft)	-1.9	-2.4	-3.1

Land Damage

There are a number of factors that contribute to the flood damage to land, both vacant and improved. These include, but are not limited to, physical damage to the land during a flood, increased cost of development, and reduction of land values. Based on the determination in Sutter Butte Flood Control Agency's Feather River West Levee Strengthening EIP Project Preliminary Benefit-Cost Analysis, 1991, all parcels in that basin would be subject to a ten- percent land damage factor regardless of flood depth. This assumption was used to determine the land damage for each of the annual exceedance events.

Table 23 presents the estimated land damage for each area within the drainage basin for the 100-year, 25-year, and 10-year events.

Table 23 - Flood Land Damage

Wisconsin Pump Station Drainage Area	Flood Damage to Land ($)		
	100-year Event	25-year Event	10-year Event
Area A	$ 82,500	$ 82,500	$ 82,500
Area B	$ 514,186	$ 514,186	--
Area C	--	--	--
Area D	--	--	--
Area E	--	--	--
TOTAL	$ 596,686	$ 596,686	$ 82,500

Structure and Content Damage

USACE defines potential flood damages to structures and contents by land use category:

- Commercial and Public - structure value and content value including equipment and furniture, supplies, merchandise, and other items used in the conduct of business.
- Residential - physical damages to dwelling units (single-family and multi-family) and to residential contents including household items and personal property.

The structure and content damage was determined as a function of the flood depth and based on a percentage of the structure and content value. The structure and content damage percentages used are based on the USACE American River Watershed Common Features Project, Appendix H – Economics, 2010. Table 24 presents the structure and content percent damage as a function of flood depth for each of the four land use types within the drainage basin.

Table 24 - Structure and Content Damage by Flood Depth

Land Use	Structure Damage (% of Structure Value)				Content Damage (% of Content Value)			
	Flood Depth 2 ft	Flood Depth 1 ft	Flood Depth 0 ft	Flood Depth 1 ft	Flood Depth 2 ft	Flood Depth 1 ft	Flood Depth 0 ft	Flood Depth- 1 ft
Residential, One Story	32%	23%	13%	3%	18%	13%	8%	2%
Residential, Two Stories	21%	15%	9%	3%	13%	9%	5%	1%
Commercial	27%	22%	7%	0%	96%	91%	0%	0%
Public	27%	22%	7%	0%	98%	97%	0%	0%
Vacant	--	--	--	--	--	--	--	--

Table 25 presents the estimated structure and contents damage for each area within the drainage basin for the 100-year, 25-year, and 10-year events.

Table 25 - Flood Structure and Contents Damage

Wisconsin Pump Station Drainage Area	Flood Damage to Structures ($)			Flood Damage to Contents ($)		
	100-year Event	25-year Event	10-year Event	100-year Event	25-year Event	10-year Event
Area A	$ 257,318	$ 257,318	$ 184,948	$ 72,371	$ 72,371	$ 52,268
Area B	$ 1,057,996	$ 1,057,996	$ 597,403	$ 308,970	$ 308,970	$ 183,581
Area C	$ 1,979,084	$ 1,979,084	$ 469,475	$ 605,226	$ 605,226	$ 149,578
Area D	$ 1,066,736	$ 1,066,736	$ -	$ 347,886	$ 347,886	$ -
Area E	$ -	$ -	$ -	$ -	$ -	$ -
TOTAL	$ 4,361,135	$ 4,361,135	$ 1,251,826	$ 1,334,453	$ 1,334,453	$ 385,427

Automobile Damage

The damages to automobiles were determined based on the values estimated previously along with the flood depth for each area of the drainage basin. The automobile damage percentages used are based on the USACE Generic Depth-Damage Relationships for Vehicles, 2009. Table 26 presents the automobile percent damage as a function of flood depth.

Table 26 - Automobile Damage by Flood Depth

Flood Depth (ft)	Automobile Damage (% of Value)
2	57%
1	41%
0	22%
-1	0%

Table 27 presents the estimated automobile damage for each area within the basin for the 100- year, 25-year, and 10-year events.

Table 27 - Automobile Flood Damage

Wisconsin Pump Station Drainage Area	Flood Damage to Automobiles ($)		
	100-year Event	25-year Event	10-year Event
Area A	$ 69,095	$ 69,095	$ 49,700
Area B	$ 298,201	$ 298,201	$ 160,010
Area C	$ 450,938	$ 450,938	$ -
Area D	$ -	$ -	$ -
Area E	$ -	$ -	$ -
TOTAL	$ 818,235	$ 818,235	$ 209,711

Infrastructure Damage

Infrastructure damage within the Wisconsin Pump Station Drainage Basin will mainly consist of road damage. Road repair damages were estimated at an average $1 per square foot of paved area in the flooded areas only. Table 28 presents the estimated infrastructure damage for each area within the basin for the 100-year, 25-year, and 10-year events.

Table 28 - Infrastructure Flood Damage

Wisconsin Pump Station Drainage Area	Flood Damage to Infrastructure ($)		
	100-year Event	25-year Event	10-year Event
Area A	$ 14,421	$ 14,421	$ 14,421
Area B	$ 152,425	$ 152,425	$ -
Area C	$ -	$ -	$ -
Area D	$ -	$ -	$ -
Area E	$ -	$ -	$ -
TOTAL	$ 166,846	$ 166,846	$ 14,421

Displacement Costs

Displacement of residents during a flood event represents costs other than the property damage described previously. This is a consequence of the time residents are displaced due to flood damage. For this project, FEMA's method for estimating typical displacement times and costs were used based on the FEMA software for Benefit-Cost Analysis for Flood Mitigation Projects, 2009. Typical displacement times are based on flood depth:

- Less than 1 ft flood depth: no displacement time
- 1 ft flood depth: 45 days displacement

- Greater than 1 ft flood depth: 45 additional days of displacement for each foot above 1 ft up to a maximum of 720 days

Table 29 presents a depth-damage function for the four land use types in the drainage basin based on computations performed in the Smith Canal Closure Structure Inundation-Reduction Benefit Analysis, 2010 (David Ford Consulting).

Table 29 - Displacement Costs by Flood Depth

Flood Depth (ft)	Displacement Costs (% of Structure Value)
2	8.0%
1	4.2%
0	0%
-1	0%

Table 30 presents the estimated displacement costs for each area within the basin for the 100- year, 25-year, and 10-year events.

Table 30 - Displacement Costs associated with Flood Damage

Wisconsin Pump Station Drainage Area	Displacement Costs ($)		
	100-year Event	25-year Event	10-year Event
Area A	$ 64,330	$ 64,330	$ 33,773
Area B	$ 193,219	$ 193,219	$ -
Area C	$ -	$ -	$ -
Area D	$ -	$ -	$ -
Area E	$ -	$ -	$ -
TOTAL	$ 257,549	$ 257,549	$ 33,773

Emergency Response Costs

Emergency response costs within the Wisconsin Pump Station Drainage Basin that were considered include the following costs:

- Evacuation
- Security
- Debris Removal
- Cleanup

Emergency repair costs were estimated at an average $25,000 per acre of flooded area. Table 31 presents the estimated emergency response costs for each area within the basin for the 100-year, 25-year, and 10-year events.

Table 31 - Emergency Response Costs associated with Flood Damage

Wisconsin Pump Station Drainage Area	Emergency Response Costs ($)		
	100-year Event	25-year Event	10-year Event
Area A	$ 55,175	$ 55,175	$ 55,175
Area B	$ 583,200	$ 583,200	$ -
Area C	$ -	$ -	$ -
Area D	$ -	$ -	$ -
Area E	$ -	$ -	$ -
TOTAL	$ 638,375	$ 638,375	$ 55,175

Damage Assessment Summary

Table 32 presents a summary of the "Without" project flood damages and costs categories within the basin for the 100-year, 25-year, and 10-year events.

Table 32 - "Without Project" Damage Assessment Summary

Damage/Cost	Flood Damages and Costs ($)		
	100-year Event	25-year Event	10-year Event
Land Damage	$ 596,686	$ 596,686	$ 82,500
Structure Damage	$ 4,361,135	$ 4,361,135	$ 1,251,826
Contents Damage	$ 1,334,453	$ 1,334,453	$ 385,427
Automobile Damage	$ 818,235	$ 818,235	$ 209,711
Infrastructure Damage	$ 166,846	$ 166,846	$ 14,421
Displacement Costs	$ 257,549	$ 257,549	$ 33,773
Emergency Response Costs	$ 638,375	$ 638,375	$ 55,175
TOTAL	$ 8,173,279	$ 8,173,279	$ 2,032,832

Expected Annual Project Benefits

The expected annual project benefits were determined using the 100-year, 25-year, and 10-year exceedance probabilities. The difference between the "Without" project and "With" project flood damages and costs represents the project benefits.

Expected Annual Damages

The expected flood damage was determined using the methodology in the USACE's Expected Annual Flood Damage Computation User's Manual, 1989, for both the "Without" project and "With" project

scenarios. The "Without" project expected flood damage and costs were taken from Table 32 above. The "With" project expected flood damage and costs were assumed to be for event less frequent that the 100-year event. For the purposes of this analysis, it was assumed that the "With" project damage equals the 100-year event damage. Figure 16 presents the damage-frequency curve for both "Without" project and "With" project scenarios. The area beneath the damage-frequency curve represents the expected annual damage for each scenario. Table 33 presents the expected annual flood damage for the two project scenarios. The difference between the two expected annual flood damage scenarios is considered the Annual Damage Reduction or Project Benefit. The Annual Project Benefit and its present value are presented in Table 34.

Figure 16 - Damage-Frequency Curves

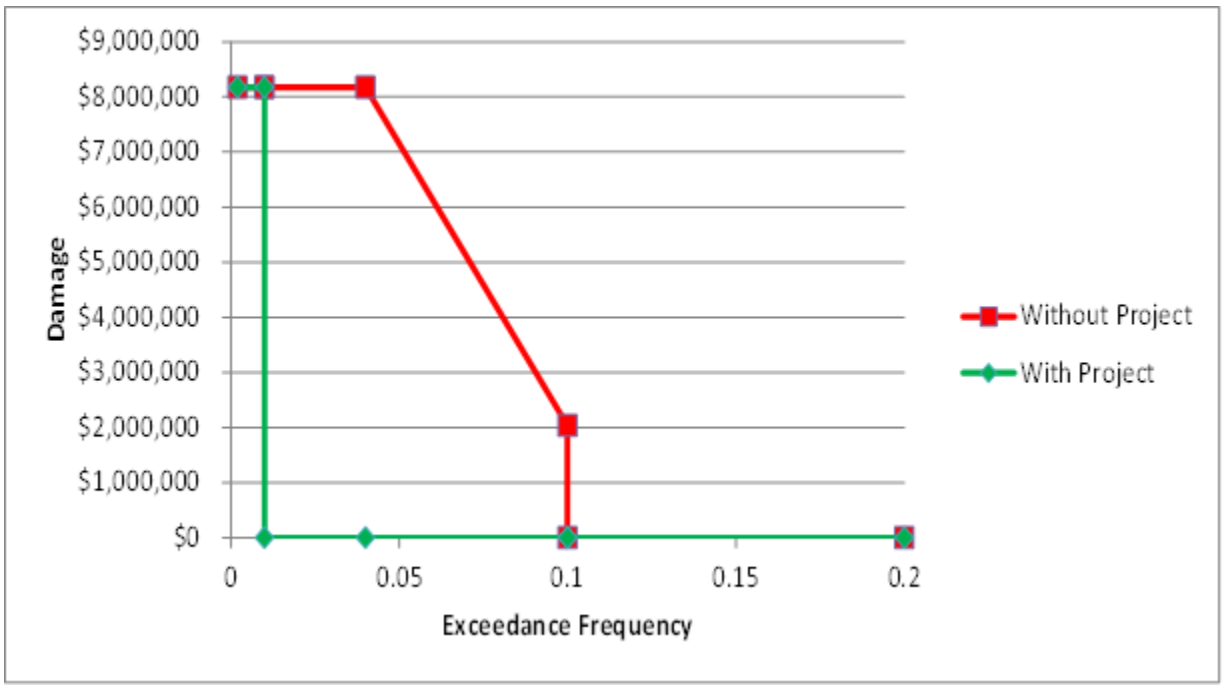

Table 33 – Calculation of Expected Annual Flood Damage (DWR Table 17)

DWR Table 17 – Calculation of Expected Annual Damage RD1614 Wisconsin Avenue Pumping Station Replacement											
Hydrologic Event	Event Exceedance Probability	Event Damage if Flood Structures Fail	Probability Structural Failure		Expected Event Damage		Interval Probability	Average Damage in Interval		Average Damage in Interval times Interval Probability	
			Without Project	With Project	Without Project	With Project		Without Project	With Project	Without Project	With Project
(a)	(b)	(c)	(d)	(e)	(f)	(g)	(i)	(j)	(k)	(l)	(m)
					(c) x (d)	(c) x (e)	from (b)	from (f)	from (g)	(i) x (j)	(i) x (k)
5-year	0.2000	$0	0	0	$0	$0					
10-Year	0.1000	$0	0	0	$0	$0	0.1000	$0	$0	$0	$0
10-Year	0.1000	$2,032,832	1	0	$2,032,832	$0	0.0000	$1,016,416	$0	$0	$0
25-Year	0.0400	$8,173,279	1	0	$8,173,279	$0	0.0600	$5,103,056	$0	$306,183	$0
100-Year	0.0100	$8,173,279	1	0	$8,173,279	$0	0.0300	$8,173,279	$0	$245,198	$0
100-Year	0.0100	$8,173,279	1	1	$8,173,279	$8,173,279	0.0000	$8,173,279	$4,086,640	$0	$0
Max	0.0000	$8,173,279	1	1	$8,173,279	$8,173,279	0.0100	$8,173,279	$8,173,279	$81,733	$81,733
									Expected Annual Damages, Without and With Project	$633,114	$81,733

Table 34 - Present Value of Expected Annual Damage Benefits (DWR Table 18)

DWR Table 18 – Present Value of Expected Annual Damage Benefits Project: Wisconsin Avenue Pump Station Replacement			
(a)	Expected Annual Damage Without Project [1]		**$633,114**
(b)	Expected Annual Damage With Project [1]		**$81,733**
(c)	Expected Annual Benefit	(a) – (b)	**$551,382**
(d)	Present Value Coefficient [2]		**15.76**
(e)	**Present Value of Future Benefits Transfer to Table 17, column (d).**	**(c) x (d)**	**$8,689,776**
(1) This program assumes no land use changes in the floodplain. So, EAD will be constant over analysis period.			
(2) 6% discount rate; 50-year analysis period			

SECTION D2. NON-MONETIZED BENEFIT ANALYSIS

The completed DWR Non-monetized Benefits Checklist is presented below as Table 36. The Calaveras River Integrated Water Management Project will provide this additional, non-monetized benefits:

- **Community/Social Benefits**
  - Helps avoid or reduce public water resources conflicts by providing flood management benefits without redirected impacts. Interior flood drainage pumped to the Calaveras River will be equaled or exceeded by water removed upstream on the Calaveras River and diverted to the flood detention/groundwater recharge ponds.
  - Reduces pumping costs to all groundwater users in the region, including disadvantaged communities
- **Environmental Stewardship Benefit**
  - Provides benefits to wildlife by providing protected water-based nesting habitat. The flood detention/groundwater recharge ponds will incorporate waterfowl nesting islands similar to those installed at SEWD's existing recharge ponds.
- **Sustainability Benefits**
  - The project will make use of stormwater currently not used for beneficial purposes.
  - Higher groundwater levels will reduce seepage from rivers and increase flow into the Delta.
  - The project promotes aquifer storage and recharge.
  - The project will replenish groundwater storage in a critically overdrafted groundwater basin by providing a net groundwater recharge averaging 10,800 af/yr.
  - The project will provide the capacity to extract up to 17,400 af/yr of previously banked groundwater in dry years, reducing groundwater overdraft by an equivalent amount.
  - Raised groundwater tables will substantially reduce pumping energy requirements (counted as a monetized benefit) and reduce greenhouse gas emissions from power generation (non-monetized benefit)
  - The banked groundwater will reduce supply uncertainty and provide a more flexible mix of water sources.

Table 35 - Water Balance for Flood Detention/Groundwater Recharge Project

	Capacity (af/yr)	Use Frequency	Water Balance (af/yr)
Recharge	27,700	63%	17,300
Extraction	17,400	38%	(6,500)
		100%	10,800

Table 36 - Non-monetized Benefits Checklist (DWR Table 12)

Table 12 – Non-monetized Benefits Checklist		
No.	Question	Enter "Yes", "No" or "Neg"
	Community/Social Benefits **Will the proposal**	
1	**Provide education or technology benefits?**	
	Examples are not limited to, but may include: - Include educational features that should result in water supply, water quality, or flood damage reduction benefits? - Develop, test or document a new technology for water supply, water quality, or flood damage reduction management? - Provide some other education or technological benefit?	No
2	**Provide social recreation or access benefits?**	
	Examples are not limited to, but may include: - Provide new or improved outdoor recreation opportunities? - Provide more access to open space? - Provide some other recreation or public access benefit?	No
3	**Help avoid, reduce or resolve various public water resources conflicts?**	
	Examples are not limited to, but may include: - Provide more opportunities for public involvement in water management? - Help avoid or resolve an existing conflict as evidenced by recurring fines or litigation? - Help meet an existing state mandate (e.g., water quality, water conservation, flood control)?	Yes
4	**Promote social health and safety?**	
	Examples are not limited to, but may include: - Increase urban water supply reliability for fire-fighting and critical services following seismic events? - Reduce risk to life from dam failure or flooding? - Reduce exposure to water-related hazards?	Yes
5	**Have other social benefits?**	
	Examples are not limited to, but may include: - Redress or increase inequitable distribution of environmental burdens? - Have disproportionate beneficial or adverse effects on disadvantaged communities, Native Americans, or other distinct cultural groups?	No
	Environmental Stewardship Benefits: **Will the proposal**	
6	**Benefit wildlife or habitat in ways that were not quantified in Attachment 7?**	
	Examples are not limited to, but may include: - Cause an increase in the amount or quality of terrestrial, aquatic, riparian or wetland habitat?	Yes

Table 12 – Non-monetized Benefits Checklist		
No.	Question	Enter "Yes", "No" or "Neg"
	- Contribute to an existing biological opinion or recovery plan for a listed special status species? - Preserve or restore designated critical habitat of a listed species? - Enhance wildlife protection or habitat?	
7	**Improve water quality in ways that were not quantified in Attachment 7?**	
	Examples are not limited to, but may include: - Cause an improvement in water quality in an impaired water body or sensitive habitat? - Prevent water quality degradation? - Cause some other improvement in water quality?	No
8	**Reduce net emissions in ways that were not quantified in Attachment 7?**	
	Examples are not limited to, but may include: - Reduce net production of greenhouse gasses? - Reduce net emissions of other harmful chemicals into the air or water?	No
9	**Provide other environmental stewardship benefits, other than those claimed in Sections D1, D3 or D4?**	
	Sustainability Benefits: **Will the proposal**	
10	**Improve the overall, long-term management of California groundwater resources?**	
	Examples are not limited to, but may include: - Reduce extraction of non-renewable groundwater? - Promote aquifer storage or recharge?	Yes
11	**Reduce demand for net diversions for the regions from the Delta?**	No
12	**Provide a long-term solution in place of a short-term one?**	
	Examples are not limited to, but may include: - Replace a temporary water supply with a more permanent supply? - Replace a temporary water quality solution with a more permanent solution? - Replace temporary flood control management with a more permanent solution? - Replace temporary habitat with a more permanent solution?	No
13	**Reduce water consumption on a permanent basis?**	No
14	**Promote energy savings or replace fossil fuel based energy sources with renewable energy and resources?**	
	Examples are not limited to, but may include: - Reduce net energy use on a permanent basis? - Increase renewable energy production? - Include new buildings or modify buildings to include certified LEED features? - Provide a net increase in recycling or reuse of materials?	No

Table 12 – Non-monetized Benefits Checklist		
No.	Question	Enter "Yes", "No" or "Neg"
	- Replace unsustainable land or water management practices with recognized sustainable practices?	
15	**Improve water supply reliability in ways not quantified in Attachment 7?**	
	Examples are not limited to, but may include: - Provide a more flexible mix of water sources? - Reduce likelihood of catastrophic supply outages? - Reduce supply uncertainty? - Reduce supply variability?	Yes
16	**Other (If the above listed categories do not apply, provide non-monetized benefit description)?**	Neg

SECTION D3. MONETIZED BENEFIT ANALYSIS

Annual Benefit

The Calaveras River Integrated Water Management Project will provide direct flood damage reduction benefits to an interior portion of urban Stockton, and mitigates potential flood impacts along the Calaveras River by diverting an equivalent amount of flood water upstream at the SEWD Flood Retention and Groundwater Recharge Ponds. These recharge ponds also provide water supply reliability benefits, water quality benefits, and obviate the need for more costly supplies.

Based on historical hydrology, up to 27,700 acre-feet of water (including stormwater) will be available for recharge in about six out of ten years (see Table 37). Existing water rights and conveyances will be used. In dry years, up to 17,400 acre-feet would be extracted to help meet demands in urban Stockton. Net groundwater storage of 10,800 acre-feet per year will accumulate, recharging the critically overdrafted aquifer, and providing a regional groundwater lift benefit that increases with time.

Absent use of groundwater banking of available wet-season flows, water would be purchased and transferred from Oakdale Irrigation District and South San Joaquin Irrigation District. Avoiding this water purchase is a distinct and separate benefit from the pumping lift reduction. This avoided water purchase is presented in the next section.

Table 37 - Water Balance for Flood Detention/Groundwater Recharge Project

	Capacity (af/yr)	Use Frequency	Water Balance (af/yr)
Recharge	27,700	63%	17,300
Extraction	17,400	38%	(6,500)
		100%	10,800

Total water deliveries to the SEWD Drinking Water Treatment Plan are constrained by the 166 cfs capacity of the combined Bellota and Peters Pipelines. All needed water rights and contracts have been secured. Up to 73 cfs would be diverted from the Calaveras River via the Bellota Pipeline. In years when these pipelines can be kept continuous filled, up to 120,300 af/yr could be delivered. Analyses performed for the 2008 Stockton East Water District Water Supply Plan show that annual deliveries would average about 87,200 af/yr. At 2015 levels of demand, the Stockton Area Water Suppliers would

utilize about 69,900 af/yr, leaving an average 17,300 af/yr available for groundwater recharge. [22] Excerpts from the SEWD Water Management Plan are included as Appendix F.

The recharge ponds would operate for up to 335 days out of the year leaving a minimum 30-day window for annual maintenance. An average recharge rate is estimated as 0.40 feet per day over the life of the project, consistent with long-term recharge rates at the current recharge areas at the SEWD Water Treatment Plant. The annual recharge capacity is approximately 27,700 acre-feet per year. Over the 50-year life of the project, a total of 865,000 acre-feet will be recharged.

Recovery of the stored surface water will be accomplished through use of 11 wells in the vicinity of the SEWD Water Treatment Plant. Recovery of stored water is expected to take place in about four out of every 10 years when surface through existing water contracts are reduced.

The remaining banked recharge water will provide a net groundwater recharge averaging 10,800 acre-feet per year, and will total 540,000 acre-feet over the 50-year life of the project. This net recharge will reduce pumping lifts throughout the region, resulting in significant energy savings for existing groundwater pumpers.

The calculation of the pump lift reduction benefit is displayed in Table 38. The average net recharge of 10,800 acre-feet will raise water tables 1.28 feet throughout the Stockton East Water District for each year of operation. This benefit accumulates with time. Assuming an average pump efficiency of 70 percent, and an average e power cost of $0.191 per kWh[23], this pump lift reduction will result in savings of $49,800 per year for area pumpers extracting a nominal 140,000 acre-feet per year.

Table 38 - Derivation of Pump Lift Reduction Benefit

Pump Lift Reduction Calculation		
Average Net Recharge	10,800	af/yr
SEWD Acreage	116,000	ac
Average Net Recharge Per Acre	0.093	ft/yr
Specific Yield	7.3%	
Average Pump Lift Benefit	1.28	ft/yr
SEWD Pumping	140,000	af/yr
Unit Power Use	1.46	kWh/af/ft lift
Power Benefit Rate	260,900	kWh/yr
Power Rate	$0.191	$/kWh
Incremental Annual Power Benefit	$49,800	$/yr

This Benefits Analysis is presented in 2012 dollars. The time stream of groundwater lift reduction benefits is presented in Table 39.

[22] Stockton Area Water Suppliers, December 2008, "Stockton East Water District Water Supply Plan", Fig.7-1
[23] PG&E Electric Schedule AG-1, Agricultural Power, effective March 30, 1012

Table 39 - Annual Benefits (DWR Table 15)

DWR Table 15 – Annual Benefit (All benefits should be in 2012 dollars) Project: SEWD Flood Detention and Groundwater Recharge Facility									
(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 [1] (f) x (g)	Discount Factor [1]	Discounted Benefits [1] (h) x (i)
2012								1.000	
2013								0.943	
2014								0.890	
2015								0.840	
2016	Pump lift reduction	AF-ft	0	178,600	178,600	$0.28	$49,827	0.792	**$39,468**
2017	Pump lift reduction	AF-ft	0	357,100	357,100	$0.28	$99,626	0.747	**$74,446**
2018	Pump lift reduction	AF-ft	0	535,700	535,700	$0.28	$149,453	0.705	**$105,359**
2019	Pump lift reduction	AF-ft	0	714,200	714,200	$0.28	$199,252	0.665	**$132,514**
2020	Pump lift reduction	AF-ft	0	892,800	892,800	$0.28	$249,079	0.627	**$156,275**
2021	Pump lift reduction	AF-ft	0	1,071,300	1,071,300	$0.28	$298,878	0.592	**$176,906**
2022	Pump lift reduction	AF-ft	0	1,249,900	1,249,900	$0.28	$348,705	0.558	**$194,715**
2023	Pump lift reduction	AF-ft	0	1,428,400	1,428,400	$0.28	$398,505	0.527	**$209,927**
2024	Pump lift reduction	AF-ft	0	1,607,000	1,607,000	$0.28	$448,332	0.497	**$222,807**
2025	Pump lift reduction	AF-ft	0	1,785,500	1,785,500	$0.28	$498,131	0.469	**$233,543**
2026	Pump lift reduction	AF-ft	0	1,964,100	1,964,100	$0.28	$547,958	0.442	**$242,362**
2027	Pump lift reduction	AF-ft	0	2,142,700	2,142,700	$0.28	$597,785	0.417	**$249,435**
2028	Pump lift reduction	AF-ft	0	2,321,200	2,321,200	$0.28	$647,584	0.394	**$254,919**
2029	Pump lift reduction	AF-ft	0	2,499,800	2,499,800	$0.28	$697,411	0.371	**$258,994**
2030	Pump lift reduction	AF-ft	0	2,678,300	2,678,300	$0.28	$747,210	0.350	**$261,780**
2031	Pump lift reduction	AF-ft	0	2,856,900	2,856,900	$0.28	$797,037	0.331	**$263,431**
2032	Pump lift reduction	AF-ft	0	3,035,400	3,035,400	$0.28	$846,836	0.312	**$264,048**
2033	Pump lift reduction	AF-ft	0	3,214,000	3,214,000	$0.28	$896,663	0.294	**$263,758**
2034	Pump lift reduction	AF-ft	0	3,392,500	3,392,500	$0.28	$946,462	0.278	**$262,648**
2035	Pump lift reduction	AF-ft	0	3,571,100	3,571,100	$0.28	$996,289	0.262	**$260,826**
2036	Pump lift reduction	AF-ft	0	3,749,600	3,749,600	$0.28	$1,046,089	0.247	**$258,361**
2037	Pump lift reduction	AF-ft	0	3,928,200	3,928,200	$0.28	$1,095,916	0.233	**$255,347**
2038	Pump lift reduction	AF-ft	0	4,106,800	4,106,800	$0.28	$1,145,743	0.220	**$251,846**
2039	Pump lift reduction	AF-ft	0	4,285,300	4,285,300	$0.28	$1,195,542	0.207	**$247,917**
2040	Pump lift reduction	AF-ft	0	4,463,900	4,463,900	$0.28	$1,245,369	0.196	**$243,632**
2041	Pump lift reduction	AF-ft	0	4,642,400	4,642,400	$0.28	$1,295,168	0.185	**$239,032**
2042	Pump lift reduction	AF-ft	0	4,821,000	4,821,000	$0.28	$1,344,995	0.174	**$234,177**
2043	Pump lift reduction	AF-ft	0	4,999,500	4,999,500	$0.28	$1,394,794	0.164	**$229,102**
2044	Pump lift reduction	AF-ft	0	5,178,100	5,178,100	$0.28	$1,444,621	0.155	**$223,855**
2045	Pump lift reduction	AF-ft	0	5,356,600	5,356,600	$0.28	$1,494,420	0.146	**$218,464**
2046	Pump lift reduction	AF-ft	0	5,535,200	5,535,200	$0.28	$1,544,247	0.138	**$212,970**
2047	Pump lift reduction	AF-ft	0	5,713,700	5,713,700	$0.28	$1,594,046	0.130	**$207,394**
2048	Pump lift reduction	AF-ft	0	5,892,300	5,892,300	$0.28	$1,643,873	0.123	**$201,770**
2049	Pump lift reduction	AF-ft	0	6,070,900	6,070,900	$0.28	$1,693,700	0.116	**$196,119**
2050	Pump lift reduction	AF-ft	0	6,249,400	6,249,400	$0.28	$1,743,500	0.109	**$190,458**
2051	Pump lift reduction	AF-ft	0	6,428,000	6,428,000	$0.28	$1,793,327	0.103	**$184,812**
2052	Pump lift reduction	AF-ft	0	6,606,500	6,606,500	$0.28	$1,843,126	0.097	**$179,193**
2053	Pump lift reduction	AF-ft	0	6,785,100	6,785,100	$0.28	$1,892,953	0.092	**$173,620**
2054	Pump lift reduction	AF-ft	0	6,963,600	6,963,600	$0.28	$1,942,752	0.087	**$168,101**
2055	Pump lift reduction	AF-ft	0	7,142,200	7,142,200	$0.28	$1,992,579	0.082	**$162,653**
2056	Pump lift reduction	AF-ft	0	7,320,700	7,320,700	$0.28	$2,042,378	0.077	**$157,282**
2057	Pump lift reduction	AF-ft	0	7,499,300	7,499,300	$0.28	$2,092,205	0.073	**$151,999**
2058	Pump lift reduction	AF-ft	0	7,677,800	7,677,800	$0.28	$2,142,004	0.069	**$146,808**
2059	Pump lift reduction	AF-ft	0	7,856,400	7,856,400	$0.28	$2,191,831	0.065	**$141,720**
2060	Pump lift reduction	AF-ft	0	8,035,000	8,035,000	$0.28	$2,241,658	0.061	**$136,738**
2061	Pump lift reduction	AF-ft	0	8,213,500	8,213,500	$0.28	$2,291,457	0.058	**$131,863**
2062	Pump lift reduction	AF-ft	0	8,392,100	8,392,100	$0.28	$2,341,284	0.054	**$127,104**
2063	Pump lift reduction	AF-ft	0	8,570,600	8,570,600	$0.28	$2,391,084	0.051	**$122,460**
2064	Pump lift reduction	AF-ft	0	8,749,200	8,749,200	$0.28	$2,440,911	0.048	**$117,936**
2065	Pump lift reduction	AF-ft	0	8,927,700	8,927,700	$0.28	$2,490,710	0.046	**$113,530**
							Total Present Value of Discounted Benefits Based on Unit Value		**$9,754,425**

Annual Avoided Costs

Water Purchase Costs

Stockton East Water District supplies treated water to urban Stockton. SEWD's supplies from the Calaveras River have been supplemented in recent years with water transfers from the Oakdale Irrigation District and the South San Joaquin Water Conservation District. This agreement to transfer water at a price of $72.31 per acre-foot expired in 2009. The districts have priced renewal of these transfer supplies at $200 per acre-foot, would require "take-or-pay" contracts that would mandate payment whether the water is used or not, and would impose shortages in dry years when it would be most needed.

In 2009 a new water transfer agreement was negotiated with South San Joaquin Irrigation district for 15,000 acre feet per year in normal to wet years ("SSJID Agreement"), but this agreement has not yet been fully executed. In dry years, depending upon storage levels in the New Hogan Reservoir, the amount to be provided to SEWD under the SSJID Agreement falls to either 6,250 or 4,000 acre feet. The SSJID Agreement would be a "take or pay" agreement meaning that regardless of SEWD's use, the District would be obligated to pay $3,000,000 per year for the water (i.e., potentially as little as 4,000 acre feet). Because provisions in the SSJID Agreement reduce water deliveries to SEWD when New Melones storage levels are low, it does not provide the District with an adequate dry-year supply and in dry years does not provide SEWD with the minimum 20,000 acre feet required by the Second Amended Contract. The proposed SSJID Agreement provides only 4,000 acre feet delivered in dry years, and the effective cost of that water is $750 per acre foot.

Renewal of the transfer agreements at $200 per acre-foot is the least expensive available option if groundwater banking of available wet-season flows is not implemented. Avoiding this water purchase is a distinct and separate benefit from the pumping lift reduction discussed in the previous section. Water would be purchased to meet municipal supply needs, and not for groundwater replenishment or banking. Take-or-pay contracts for 17,400 acre-feet per year (see Table 37) would be required at an annual cost of $3,480,000. This is the avoided cost reported in Table 40 if the flood detention/water recharge facility is constructed.

Table 40 - Annual Avoided Costs, Water Purchase (DWR Table 16)

DWR Table 16– Annual Avoided Costs (All avoided costs in 2012 dollars) Project: SEWD Flood Detention and Groundwater Recharge Facility						
	Costs				Discounting Calculations	
(a)	(b)	(c)	(d)	(e)	(f)	(g)
Year	Alternative (Avoided Project Name): Water Transfer from OID/ SSJID Avoided Cost Description: Purchase and transfer of Stanislaus River Water from OID and SSJID at $200 per acre-foot				Discount Factor	Discounted Costs (e) x (f)
	Avoided Capital Costs	Avoided Replacement Costs	Avoided Operations and Maintenance Costs	Total Cost Avoided for Individual Alternatives (b) + (c) + (d)		
2012					1.000	
2013					0.943	
2014					0.890	
2015					0.840	
2016	$0	$0	$3,480,000	$3,480,000	0.792	$2,756,486
2017	$0	$0	$3,480,000	$3,480,000	0.747	$2,600,458
2018	$0	$0	$3,480,000	$3,480,000	0.705	$2,453,263
2019	$0	$0	$3,480,000	$3,480,000	0.665	$2,314,399
2020	$0	$0	$3,480,000	$3,480,000	0.627	$2,183,395
2021	$0	$0	$3,480,000	$3,480,000	0.592	$2,059,807
2022	$0	$0	$3,480,000	$3,480,000	0.558	$1,943,214
2023	$0	$0	$3,480,000	$3,480,000	0.527	$1,833,221
2024	$0	$0	$3,480,000	$3,480,000	0.497	$1,729,453
2025	$0	$0	$3,480,000	$3,480,000	0.469	$1,631,560
2026	$0	$0	$3,480,000	$3,480,000	0.442	$1,539,207
2027	$0	$0	$3,480,000	$3,480,000	0.417	$1,452,082
2028	$0	$0	$3,480,000	$3,480,000	0.394	$1,369,889
2029	$0	$0	$3,480,000	$3,480,000	0.371	$1,292,348
2030	$0	$0	$3,480,000	$3,480,000	0.350	$1,219,196
2031	$0	$0	$3,480,000	$3,480,000	0.331	$1,150,185
2032	$0	$0	$3,480,000	$3,480,000	0.312	$1,085,080
2033	$0	$0	$3,480,000	$3,480,000	0.294	$1,023,661
2034	$0	$0	$3,480,000	$3,480,000	0.278	$965,718
2035	$0	$0	$3,480,000	$3,480,000	0.262	$911,054
2036	$0	$0	$3,480,000	$3,480,000	0.247	$859,485
2037	$0	$0	$3,480,000	$3,480,000	0.233	$810,835
2038	$0	$0	$3,480,000	$3,480,000	0.220	$764,939
2039	$0	$0	$3,480,000	$3,480,000	0.207	$721,640
2040	$0	$0	$3,480,000	$3,480,000	0.196	$680,793
2041	$0	$0	$3,480,000	$3,480,000	0.185	$642,257
2042	$0	$0	$3,480,000	$3,480,000	0.174	$605,903
2043	$0	$0	$3,480,000	$3,480,000	0.164	$571,607
2044	$0	$0	$3,480,000	$3,480,000	0.155	$539,252
2045	$0	$0	$3,480,000	$3,480,000	0.146	$508,728
2046	$0	$0	$3,480,000	$3,480,000	0.138	$479,932
2047	$0	$0	$3,480,000	$3,480,000	0.130	$452,766
2048	$0	$0	$3,480,000	$3,480,000	0.123	$427,138
2049	$0	$0	$3,480,000	$3,480,000	0.116	$402,960
2050	$0	$0	$3,480,000	$3,480,000	0.109	$380,151
2051	$0	$0	$3,480,000	$3,480,000	0.103	$358,633
2052	$0	$0	$3,480,000	$3,480,000	0.097	$338,333
2053	$0	$0	$3,480,000	$3,480,000	0.092	$319,182
2054	$0	$0	$3,480,000	$3,480,000	0.087	$301,115
2055	$0	$0	$3,480,000	$3,480,000	0.082	$284,071
2056	$0	$0	$3,480,000	$3,480,000	0.077	$267,992
2057	$0	$0	$3,480,000	$3,480,000	0.073	$252,822
2058	$0	$0	$3,480,000	$3,480,000	0.069	$238,512
2059	$0	$0	$3,480,000	$3,480,000	0.065	$225,011
2060	$0	$0	$3,480,000	$3,480,000	0.061	$212,274
2061	$0	$0	$3,480,000	$3,480,000	0.058	$200,259
2062	$0	$0	$3,480,000	$3,480,000	0.054	$188,923
2063	$0	$0	$3,480,000	$3,480,000	0.051	$178,230
2064	$0	$0	$3,480,000	$3,480,000	0.048	$168,141
2065	$0	$0	$3,480,000	$3,480,000	0.046	$158,624
Total Present Value of Discounted Costs						**$46,054,188**
(%) Avoided Cost Claimed by Project						**100%**
Total Present Value of Discounted Avoided Project Costs Claimed by alternative Project						**$46,054,188**

SECTION D4. PROJECT BENEFITS AND COST SUMMARY

Project Costs

Operations and maintenance costs were taken from the technical reports (Appendices B and C) and are summarized in Table 41 and Table 42. Capital costs from Table 9 and Table 13 are also summarized in these tables.

Table 41 - Annual Costs, Wisconsin Avenue Pumping Station Replacement (DWR Table 19)

DWR Table 19 – Annual Costs of Project
(All costs in 2012 Dollars)
Project: RD1614 Wisconsin Avenue Pumping Station Replacement

	Initial Costs Grand Total Cost from Table 5 (row (i), column (d))	Adjusted Grant Total Cost[1]	Annual Costs [2]						Discounting Calculations	
			Admin	Operation	Maintenance	Replacement	Other	Total Costs (a) +...+ (g)	Discount Factor	Discounted Project Costs (h) x (i)
Year	(a)	(b)	(c)	(d)	(e)	(f)	(g)	(h)	(i)	(j)
2012	$11,200							$11,200	1.000	$11,200
2013	$7,500		$0					$7,500	0.943	$7,075
2014	$207,040		$0					$207,040	0.890	$184,265
2015	$9,570		$0					$9,570	0.840	$8,035
2016	$0		$0					$0	0.792	$0
2017	$2,118,820		$0					$2,118,820	0.747	$1,583,306
2018			$0	$7,000	$23,541	$0	$0	$30,541	0.705	$21,530
2019			$0	$7,000	$23,541	$0	$0	$30,541	0.665	$20,312
2020			$0	$7,000	$23,541	$0	$0	$30,541	0.627	$19,162
2021			$0	$7,000	$23,541	$0	$0	$30,541	0.592	$18,077
2022			$0	$7,000	$23,541	$0	$0	$30,541	0.558	$17,054
2023			$0	$7,000	$23,541	$0	$0	$30,541	0.527	$16,089
2024			$0	$7,000	$23,541	$0	$0	$30,541	0.497	$15,178
2025			$0	$7,000	$23,541	$0	$0	$30,541	0.469	$14,319
2026			$0	$7,000	$23,541	$0	$0	$30,541	0.442	$13,508
2027			$0	$7,000	$23,541	$0	$0	$30,541	0.417	$12,744
2028			$0	$7,000	$23,541	$0	$0	$30,541	0.394	$12,022
2029			$0	$7,000	$23,541	$0	$0	$30,541	0.371	$11,342
2030			$0	$7,000	$23,541	$0	$0	$30,541	0.350	$10,700
2031			$0	$7,000	$23,541	$0	$0	$30,541	0.331	$10,094
2032			$0	$7,000	$23,541	$0	$0	$30,541	0.312	$9,523
2033			$0	$7,000	$23,541	$0	$0	$30,541	0.294	$8,984
2034			$0	$7,000	$23,541	$0	$0	$30,541	0.278	$8,475
2035			$0	$7,000	$23,541	$0	$0	$30,541	0.262	$7,996
2036			$0	$7,000	$23,541	$0	$0	$30,541	0.247	$7,543
2037			$0	$7,000	$23,541	$0	$0	$30,541	0.233	$7,116
2038			$0	$7,000	$23,541	$0	$0	$30,541	0.220	$6,713
2039			$0	$7,000	$23,541	$0	$0	$30,541	0.207	$6,333
2040			$0	$7,000	$23,541	$0	$0	$30,541	0.196	$5,975
2041			$0	$7,000	$23,541	$0	$0	$30,541	0.185	$5,637
2042			$0	$7,000	$23,541	$0	$0	$30,541	0.174	$5,317
2043			$0	$7,000	$23,541	$0	$0	$30,541	0.164	$5,017
2044			$0	$7,000	$23,541	$0	$0	$30,541	0.155	$4,733
2045			$0	$7,000	$23,541	$0	$0	$30,541	0.146	$4,465
2046			$0	$7,000	$23,541	$0	$0	$30,541	0.138	$4,212
2047			$0	$7,000	$23,541	$0	$0	$30,541	0.130	$3,974
2048			$0	$7,000	$23,541	$0	$0	$30,541	0.123	$3,749
2049			$0	$7,000	$23,541	$0	$0	$30,541	0.116	$3,536
2050			$0	$7,000	$23,541	$0	$0	$30,541	0.109	$3,336
2051			$0	$7,000	$23,541	$0	$0	$30,541	0.103	$3,147
2052			$0	$7,000	$23,541	$0	$0	$30,541	0.097	$2,969
2053			$0	$7,000	$23,541	$0	$0	$30,541	0.092	$2,801
2054			$0	$7,000	$23,541	$0	$0	$30,541	0.087	$2,643
2055			$0	$7,000	$23,541	$0	$0	$30,541	0.082	$2,493
2056			$0	$7,000	$23,541	$0	$0	$30,541	0.077	$2,352
2057			$0	$7,000	$23,541	$0	$0	$30,541	0.073	$2,219
2058			$0	$7,000	$23,541	$0	$0	$30,541	0.069	$2,093
2059			$0	$7,000	$23,541	$0	$0	$30,541	0.065	$1,975
2060			$0	$7,000	$23,541	$0	$0	$30,541	0.061	$1,863
2061			$0	$7,000	$23,541	$0	$0	$30,541	0.058	$1,758
2062			$0	$7,000	$23,541	$0	$0	$30,541	0.054	$1,658
2063			$0	$7,000	$23,541	$0	$0	$30,541	0.051	$1,564
2064			$0	$7,000	$23,541	$0	$0	$30,541	0.048	$1,476
2065			$0	$7,000	$23,541	$0	$0	$30,541	0.046	$1,392
2066			$0	$7,000	$23,541	$0	$0	$30,541	0.043	$1,313
2067			$0	$7,000	$23,541	$0	$0	$30,541	0.041	$1,239
Total	$2,354,130	$0	$0	$350,000	$1,177,050	$0	$0	$3,881,180	...	
									Total Present Value of Discounted Costs (Sum of Column (j))	**$2,153,598**

Comments:

(1) If any, based on opportunity costs, sunk costs and associated costs

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

Table 42 - Annual Costs, SEWD Flood Detention and Groundwater Recharge Facility (DWR Table 19)

DWR Table 19 – Annual Costs of Project
(All costs in 2012 Dollars)
Project: SEWD Flood Detention and Groundwater Recharge Facility

	Initial Costs Grand Total Cost from Table 6 (row (i), column (d))	Adjusted Grant Total Cost[1]	Annual Costs [2]						Discounting Calculations	
			Admin	Operation	Maintenance	Replacement	Other	Total Costs (a) +...+ (g)	Discount Factor	Discounted Project Costs (h) x (i)
Year	(a)	(b)	(c)	(d)	(e)	(f)	(g)	(h)	(i)	(j)
2012	$79,500		$0					$79,500	1.000	$79,500
2013	$502,000		$0					$502,000	0.943	$473,585
2014	$218,400		$0					$218,400	0.890	$194,375
2015	$17,742,600		$0					$17,742,600	0.840	$14,897,029
2016	$4,300		$0	$638,570	$81,710	$0	$0	$724,580	0.792	$573,935
2017	$0		$0	$638,570	$81,710	$0	$0	$720,280	0.747	$538,235
2018			$0	$638,570	$81,710	$0	$0	$720,280	0.705	$507,769
2019			$0	$638,570	$81,710	$0	$0	$720,280	0.665	$479,027
2020			$0	$638,570	$81,710	$0	$0	$720,280	0.627	$451,913
2021			$0	$638,570	$81,710	$0	$0	$720,280	0.592	$426,333
2022			$0	$638,570	$81,710	$0	$0	$720,280	0.558	$402,201
2023			$0	$638,570	$81,710	$0	$0	$720,280	0.527	$379,435
2024			$0	$638,570	$81,710	$0	$0	$720,280	0.497	$357,957
2025			$0	$638,570	$81,710	$0	$0	$720,280	0.469	$337,695
2026			$0	$638,570	$81,710	$0	$0	$720,280	0.442	$318,581
2027			$0	$638,570	$81,710	$0	$0	$720,280	0.417	$300,548
2028			$0	$638,570	$81,710	$0	$0	$720,280	0.394	$283,536
2029			$0	$638,570	$81,710	$0	$0	$720,280	0.371	$267,486
2030			$0	$638,570	$81,710	$0	$0	$720,280	0.350	$252,346
2031			$0	$638,570	$81,710	$0	$0	$720,280	0.331	$238,062
2032			$0	$638,570	$81,710	$0	$0	$720,280	0.312	$224,587
2033			$0	$638,570	$81,710	$0	$0	$720,280	0.294	$211,874
2034			$0	$638,570	$81,710	$0	$0	$720,280	0.278	$199,881
2035			$0	$638,570	$81,710	$0	$0	$720,280	0.262	$188,567
2036			$0	$638,570	$81,710	$0	$0	$720,280	0.247	$177,894
2037			$0	$638,570	$81,710	$0	$0	$720,280	0.233	$167,824
2038			$0	$638,570	$81,710	$0	$0	$720,280	0.220	$158,325
2039			$0	$638,570	$81,710	$0	$0	$720,280	0.207	$149,363
2040			$0	$638,570	$81,710	$0	$0	$720,280	0.196	$140,908
2041			$0	$638,570	$81,710	$0	$0	$720,280	0.185	$132,933
2042			$0	$638,570	$81,710	$0	$0	$720,280	0.174	$125,408
2043			$0	$638,570	$81,710	$0	$0	$720,280	0.164	$118,309
2044			$0	$638,570	$81,710	$0	$0	$720,280	0.155	$111,613
2045			$0	$638,570	$81,710	$0	$0	$720,280	0.146	$105,295
2046			$0	$638,570	$81,710	$0	$0	$720,280	0.138	$99,335
2047			$0	$638,570	$81,710	$0	$0	$720,280	0.130	$93,712
2048			$0	$638,570	$81,710	$0	$0	$720,280	0.123	$88,408
2049			$0	$638,570	$81,710	$0	$0	$720,280	0.116	$83,404
2050			$0	$638,570	$81,710	$0	$0	$720,280	0.109	$78,683
2051			$0	$638,570	$81,710	$0	$0	$720,280	0.103	$74,229
2052			$0	$638,570	$81,710	$0	$0	$720,280	0.097	$70,027
2053			$0	$638,570	$81,710	$0	$0	$720,280	0.092	$66,063
2054			$0	$638,570	$81,710	$0	$0	$720,280	0.087	$62,324
2055			$0	$638,570	$81,710	$0	$0	$720,280	0.082	$58,796
2056			$0	$638,570	$81,710	$0	$0	$720,280	0.077	$55,468
2057			$0	$638,570	$81,710	$0	$0	$720,280	0.073	$52,328
2058			$0	$638,570	$81,710	$0	$0	$720,280	0.069	$49,366
2059			$0	$638,570	$81,710	$0	$0	$720,280	0.065	$46,572
2060			$0	$638,570	$81,710	$0	$0	$720,280	0.061	$43,936
2061			$0	$638,570	$81,710	$0	$0	$720,280	0.058	$41,449
2062			$0	$638,570	$81,710	$0	$0	$720,280	0.054	$39,103
2063			$0	$638,570	$81,710	$0	$0	$720,280	0.051	$36,889
2064			$0	$638,570	$81,710	$0	$0	$720,280	0.048	$34,801
2065			$0	$638,570	$81,710	$0	$0	$720,280	0.046	$32,831
2066			$0						0.043	
2067			$0						0.041	
Last Year of Project Life									...	
									Total Present Value of Discounted Costs (Sum of Column (j))	**$25,180,053**

Comments:

(1) If any, based on opportunity costs, sunk costs and associated costs

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

Proposal Benefits and Costs Summary

Total present value costs and benefits for the entire proposal are summarized in Table 43.

Table 43 - Proposal Benefits and Costs Summary (DWR Table 20)

DWR Table 20 – Proposal Benefits and Costs Summary Proposal: Calaveras River Integrated Stormwater Management Project Agency: Eastern San Joaquin Groundwater Banking Authority						
Project	Project Proponent	Total Present Value Project Costs [1]	Total Present Value Project Benefits			From Section D2 – Briefly describe the main Non-monetized benefits
			From Section D2 – Flood Damage Reduction [2]	From Section D3 – Monetized [3]	Total	
(a)	(b)	(c)	(d)	(e)	(f) = (d) + (e)	(g)
Wisconsin Avenue Pumping Station Replacement	RD1614	$2,153,598	$8,689,776	$0	$8,689,776	Incremental flood damages from interior pump outfall to Calaveras River mitigated by diversion to SEWD flood detention facility
Flood Detention and Groundwater Recharge Facility	SEWD	$25,180,053		$55,808,613	$55,808,613	Provides water reliability benefits; Increased recharge slows movement of saline water, improving water quality; Recharge ponds include waterfowl habitat
Total		$27,333,652	$8,689,776	$55,808,613	$64,498,389	

(1) From DWR Table 16

(2) From DWR Table 12

(3) From DWR Table 14