ATTACHMENT 8

Economic Analysis – Water Supply Costs and Benefits

8-1 Narrative description of the expected water supply benefits of the project:

The purpose of this project is a flood control project; however, there are also water supply benefits of the project.

The 21-acre flood control facility is also currently used as a park. The park, including the basin slopes, is planted with non-native turf grass (Bermuda grass). The entire park is irrigated and the grass is mowed.

The project includes the removal of all the turf grass and the irrigation from the basin slopes. The basin slopes will be planted with native plants. The basin slopes will be temporarily irrigated with water from the existing basin or with municipal water supplies. This native plant restoration area is being designed to be self-sustaining, and will not require long term irrigation.

An existing turf area will be converted into a new parking lot for 44 cars and this turf area will no longer need to be irrigated.

The project includes the construction of a new recreational field. The new recreational field is expected to provide an open recreational area which can be utilized as two (2) soccer fields. A state-of-the-art irrigation system will be installed for the new recreational field using SMART irrigation controllers.

The existing landscaping and the irrigation system for the landscaping around the basin perimeter (3900 feet long) will be removed with this project. The existing landscaping is non-native plants.

8-2 Water Demand Reduction Benefit

The existing annual water usage is approximately 25 acre-feet. DWR's Water Budget Workbook was used to calculate the Maximum Applied Water Allowance (MAWA) and Estimated Total Water Use (ETWU). The resultant values for MAWA and ETWU are 17.16 acre-feet and 14.87 acre-feet, respectively (rounded values 17 and 15 acre-feet). The MAWA and ETWU tables on the next page contain the calculations. With the Haster Basin project improvements, a net annual water usage reduction of 10 acre-feet is projected by subtracting the ETWU value of 15 acre-feet from the existing Table 15 is used to calculate the Present Value of the Annual Water Supply Benefit, assuming a 50-year project rate and a 6% interest rate. The following values are used in Table 15:

- **Column (d)** is the Without Project condition. The existing annual water usage is 25 acre-feet.
- **Column (e)** is the With Project condition. The projected annual water usage is 15 acre-feet that is calculated as shown in the ETWU calculation table.
- **Column (f)** is the change resulting from the Project, which is a net water usage reduction of 10 acre-feet per year.
- **Column (g)** is the project cost of imported water supply. The unit water supply cost values are calculated using the Metropolitan Water District Tier 1 Full

Service Treated Volumetric Cost for imported water in 2012, which is $794 per acre-foot. The 2012 unit water supply cost is escalated by 2 percent per year to estimate water supply costs in future years.

- **Column (h)** is the annual cost benefit that will be realized from the projected reduction in water usage of 10 acre-feet per year. The values in Column (h) are the product of the Column (f) the annual amount of water that will be saved and the Column (g) the unit water supply cost.
- **Column (i)** contains the discount factors at 6 percent interest for each year in the 50-year life of the project.
- **Column (j)** is the annual discounted benefit of water savings. The annual discounted benefit of water usage reduction is the product of Column (h) the annual cost savings for water usage reduction and Column (i) the discount factors at 6 percent interest.

As calculated in Table 15, the Total Present Value of the Water Usage Reduction of the 50-year project life is $129,794. This Total Present Value of the Water Usage Reduction value is transferred to Table 18 The Total Present Value of the Water Usage Reduction will also be entered as a Present Value Benefit in the Cost-Benefit Analysis to be presented in Table 20.

Maximum Applied Water Allowance (MAWA) Calculation for New Haster Basin Landscapes

Maximum Applied Water Allowance Calculations for New and Rehabilitated Landscapes		
Enter value in Pale Blue Cells		
Tan Cells Show Results		
Messages and Warnings		
Click on the blue cell on right to Pick City Name	Irvine	Name of City
ET_o of City from Appendix A	49.60	ET_o (inches/year)
Enter total landscape including SLA	214,130.00	LA (ft^2)
Enter Special Landscape Area	106,660.00	SLA (ft^2)
Results:		
MAWA = (ET_o) x (0.62) x [(0.7 x LA)+(0.3 x SLA)]	5,593,086.75	Gallons
	747,689.43	Cubic Feet
	7,476.89	HCF
	17.16	**Acre-feet**
	5.59	Millions of Gallons

Estimated Total Water Use (ETWU) Calculation for New Haster Basin Landscapes

Estimated Total Water Use Equation:

$ETWU = (ET_o) \times (0.62) \times [(PF \times HA/IE) + SLA]$

Enter values in Pale Blue Cells	
Tan Cells Show Results	
Messages and Warnings	
Enter Irrigation Efficiency (equal to or greater than 0.71)	0.75
Irrigation Efficiency Default Value	0.71

Plant Water Use Type	Plant Factor
Low	0 - 0.3
Medium	0.4 - 0.6
High	0.7 - 1.0
SLA	1.00

Hydrozone	Plant Water Use Type (s) (low, medium, high)	Plant Factor (PF)	Hydrozone Area (HA) (ft^2)	PF x HA (ft^2)
1	High	0.80	18,155	14,524
2	High	0.70	0	0
3	Medium	0.50	5,375	2,688
4	Low	0.30	41,990	12,597
5	Low	0.20	41,950	8,390
				0
				38,199
	SLA	1	106,660	106,660
		Sum	214,130	

Results

MAWA =	5,593,087	ETWU=	4,845,933	Gallons
			647,809	Cubic Feet
			6,478	HCF
			14.87	**Acre-feet**
			4.85	Millions of Gallons

ETWU complies with MAWA

Table 15- Annual Water Supply Benefits
(All benefits should be in 2009 dollars)
Project: Haster Retarding Basin and Haster Pump Station

(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)
2014	water demand reduction	acre-feet/year	25	15	10	$826	$8,260	0.747	$6,170
2015	water demand reduction	acre-feet/year	25	15	10	$843	$8,425	0.705	$5,940
2016	water demand reduction	acre-feet/year	25	15	10	$859	$8,594	0.665	$5,715
2017	water demand reduction	acre-feet/year	25	15	10	$877	$8,766	0.627	$5,496
2018	water demand reduction	acre-feet/year	25	15	10	$894	$8,941	0.592	$5,293
2019	water demand reduction	acre-feet/year	25	15	10	$912	$9,120	0.558	$5,089
2020	water demand reduction	acre-feet/year	25	15	10	$930	$9,302	0.527	$4,902
2021	water demand reduction	acre-feet/year	25	15	10	$949	$9,488	0.497	$4,716
2022	water demand reduction	acre-feet/year	25	15	10	$968	$9,678	0.469	$4,539
2023	water demand reduction	acre-feet/year	25	15	10	$987	$9,871	0.442	$4,363
2024	water demand reduction	acre-feet/year	25	15	10	$1,007	$10,069	0.417	$4,199
2025	water demand reduction	acre-feet/year	25	15	10	$1,027	$10,270	0.394	$4,046
2026	water demand reduction	acre-feet/year	25	15	10	$1,048	$10,476	0.371	$3,886
2027	water demand reduction	acre-feet/year	25	15	10	$1,069	$10,685	0.350	$3,740
2028	water demand reduction	acre-feet/year	25	15	10	$1,090	$10,899	0.330	$3,597
2029	water demand reduction	acre-feet/year	25	15	10	$1,112	$11,117	0.312	$3,468
2030	water demand reduction	acre-feet/year	25	15	10	$1,134	$11,339	0.294	$3,334
2031	water demand reduction	acre-feet/year	25	15	10	$1,157	$11,566	0.278	$3,215
2032	water demand reduction	acre-feet/year	25	15	10	$1,180	$11,797	0.262	$3,091
2033	water demand reduction	acre-feet/year	25	15	10	$1,203	$12,033	0.247	$2,972
2034	water demand reduction	acre-feet/year	25	15	10	$1,227	$12,274	0.233	$2,860
2035	water demand reduction	acre-feet/year	25	15	10	$1,252	$12,519	0.220	$2,754
2036	water demand reduction	acre-feet/year	25	15	10	$1,277	$12,770	0.207	$2,643
2037	water demand reduction	acre-feet/year	25	15	10	$1,303	$13,025	0.196	$2,553
2038	water demand reduction	acre-feet/year	25	15	10	$1,329	$13,286	0.185	$2,458
2039	water demand reduction	acre-feet/year	25	15	10	$1,355	$13,551	0.174	$2,358
2040	water demand reduction	acre-feet/year	25	15	10	$1,382	$13,822	0.164	$2,267
2041	water demand reduction	acre-feet/year	25	15	10	$1,410	$14,099	0.155	$2,185
2042	water demand reduction	acre-feet/year	25	15	10	$1,438	$14,381	0.146	$2,100
2043	water demand reduction	acre-feet/year	25	15	10	$1,467	$14,668	0.138	$2,024
2044	water demand reduction	acre-feet/year	25	15	10	$1,496	$14,962	0.130	$1,945
2045	water demand reduction	acre-feet/year	25	15	10	$1,526	$15,261	0.123	$1,877
2046	water demand reduction	acre-feet/year	25	15	10	$1,557	$15,566	0.116	$1,806
2047	water demand reduction	acre-feet/year	25	15	10	$1,588	$15,878	0.109	$1,731
2048	water demand reduction	acre-feet/year	25	15	10	$1,620	$16,195	0.103	$1,668
2049	water demand reduction	acre-feet/year	25	15	10	$1,652	$16,519	0.097	$1,602
2050	water demand reduction	acre-feet/year	25	15	10	$1,685	$16,849	0.092	$1,550
2051	water demand reduction	acre-feet/year	25	15	10	$1,719	$17,186	0.087	$1,495
2052	water demand reduction	acre-feet/year	25	15	10	$1,753	$17,530	0.082	$1,437
2053	water demand reduction	acre-feet/year	25	15	10	$1,788	$17,881	0.077	$1,377
2054	water demand reduction	acre-feet/year	25	15	10	$1,824	$18,238	0.073	$1,331
Project Life	50 years							…	
							Total Present Value of Discounted Benefits Based on Unit Value (Sum of the values in Column (j) for all Benefits shown in table)		**$129,794**
Comments:									

Table 18 - Total Water Supply Benefits (All benefits should be in 2009 dollars) Project: Haster Retarding Basin and Haster Pump Station			
Total Discounted Water Supply Benefits (a)	Total Discounted Avoided Project Costs (b)	Other Discounted Water Supply Benefits (c)	Total Present Value of Discounted Benefits (d) (a) + (c) or (b) + (c)
$129,784	$0	$0	**$129,784**
Comments:			