I. Introduction

This attachment provides an overview of the flood damage reduction costs and benefits of this Proposal for the Greater Los Angeles County Region (Region), as well as the benefits associated with each individual project. This attachment provides information regarding benefits that may be derived from the Proposal, which extend beyond the water supply benefits described in Attachment 7 and water quality and other expected benefits described in Attachment 8. This attachment contains a narrative discussion of expected flood damage reduction costs and benefits and provides complimentary qualitative analyses.

Table 9.1: Costs and Benefits Summary

Project	Agency	Total Present Value Project Costs	Total Present Value Project Benefits				Benefit/ Cost Ratio
			Water Supply	Flood Damage Reduction	Water Quality & Other	Total	
(a)	(b)	(c)	(d)	(e)	(f)	(g) (d) + (e) + (f)	(h) f/(c)
Hahamongna Basin Multi-Use Project	Arroyo Seco Foundation	$7,340,486	$50,567,382	$0	$689,771	$51,257,154	6.98
Citywide Smart Irrigation Control System and Recycled Water Improvements	City of Calabasas	$849,234	$612,985	$0	$1,214,757	$1,827,741	2.15
Storm Drain Improvements and Installation of Infiltration Chambers on Hawthorne Blvd	City of Hawthorne	$10,603,033	$0	$0	$0	$0	0
Penmar Water Quality Improvement and Runoff Reuse Project	City of Los Angeles, Bureau of Sanitation	$27,269,735	$1,764,283	$0	$0	$1,764,283	0.06
Model Equestrian Center	City of Rolling Hills	$6,470,364	$12,574	$0	$363,881	$376,454	0.06
16th Street Watershed Runoff	City of Santa Monica	$1,890,356	$68,612	$0	$0	$68,612	0.04
Covina Irrigating Co. Surface Water Treatment Plant Improvements	Covina Irrigating Company	$1,918,312	$68,612	$0	$0	$68,612	0.04

Table 9.1: Costs and Benefits Summary

Project	Agency	Total Present Value Project Costs	Total Present Value Project Benefits				Benefit/ Cost Ratio
			Water Supply	Flood Damage Reduction	Water Quality & Other	Total	
(a)	(b)	(c)	(d)	(e)	(f)	(g) (d) + (e) + (f)	(h) f/(c)
Central Los Angeles County - Regional Water Recycling Program	Los Angeles Department of Water and Power (LADWP)	$10,660,636	$172,150,784	$0	$0	$172,150,784	16.15
Tujunga Spreading Grounds Enhancements	Three Valleys Municipal Water District	$11,383,796	$4,231,326	$0	$0	$4,231,326	0.37
San Antonio Spreading Grounds Improvements	Three Valleys MWD	$4,279,286	$36,937,911	$0	$0	$36,937,911	8.63
Leo J. Vander Lans Advanced Water Treatment Plant Expansion	Water Replenishment District of Southern California	$54,232,760	$45,285,312	$0	$0	$45,285,312	0.84
Whittier Narrows Conservation Pool Project	Water Replenishment District of Southern California	$4,406,336	$7,781,351	$0	$0	$7,781,351	1.8
Water and Energy Efficiency in the School and Hotel/Motel Sectors	West Basin Municipal Water District	$475,660	$1,028,177	$0	$1,713,048	$2,741,224	5.76
TOTAL		**$164,829,606**	**$399,212,426**	**$0**	**$3,981,457**	**$403,193,881**	**2.45**

Detailed information and background regarding the qualitative and quantitative costs and water supply benefits of each individual project follows.

II. Hahamongna Basin Multi-Use Project

Flood Damage Reduction Costs and Benefits

This Project would provide a flood damage reduction benefit. This benefit is described in detail below and summarized in Table 9.2.

Reduced Local Flooding

This Project will alleviate current local flooding by increasing the amount of stormwater captured at the Hahamongna Basin that would otherwise be sent downstream to areas where the river level may already be high, potentially contributing to physical damage.

Table 9.2: Benefits Summary

Type of Benefit	Assessment Level	Beneficiaries
Reduced Local Flooding	Qualitative	Local/Regional

Distribution of Project Benefits and Identification of Beneficiaries

The following table summarizes the Project's beneficiaries. The Project will benefit both local and regional residents by reducing flooding and improving the quality of life.

Table 9.3: Project Beneficiaries Summary

Local	Regional	Statewide
Local Residents	Regional Residents	n/a

Project Benefits Timeline Description

The Project benefits would be received beginning in 2013.

Uncertainty of Benefits

There is an uncertainty of the flood damage reduction benefits since they cannot be monetized, however these benefits are likely to increase the net benefits relative to the quantified estimates.

Table 9.4: Omissions, Biases, and Uncertainties and their Effect on the Project

Benefit or cost category	Likely impact on net benefits*	Comment
Flood Reduction	+	Not Monetized

* *Direction and magnitude of effects on net benefits*
+ Likely to increase net benefits relative to quantified estimates
++ Likely to increase net benefits significantly
- Likely to decrease net benefits
-- Likely to decrease net benefits significantly
+/- Uncertain

The "Without Project" Baseline

If the Project were not implemented, local flooding would continue to occur during storm events reducing the quality of life for local and regional residents and creating the potential for physical damage.

Potential Adverse Effects from the Project

Any potential adverse effects from this Project would occur during construction and will be mitigated.

Project Benefit Costs Comparison

The total present value of the Project costs, along with monetized and qualitative benefits is provided in Table 9.5.

Table 9.5: Benefit-Cost Analysis Overview

	Present Value (in 2009 dollars)
Costs – Total Capital and O&M	$7,340,486
Monetizable Benefits	
Water Supply Benefits	$50,567,382
Power Benefits	$689,771
Total Benefits	**$51,257,154**
Qualitative Benefits	**Qualitative Indicator****
Improved water supply reliability	+
Trash and sediment reduction	+
Ecosystem restoration	+
Recreation	+
Reduced Local and Regional Flooding	+

** *Magnitude of effect on net benefits*
+/- (negligible or unknown)
+ (moderate)
++ (significant)

Methods used to Estimate With and Without Project Conditions

There are no flood event damages that are quantified or expected annual damage benefits from the Project.

III. Citywide Smart Irrigation Control System and Recycled Water Improvements

There are no expected flood damage reduction costs or benefits associated with this Project.

IV. Storm Drain Improvements and Installation of Infiltration Chambers

Flood Damage Reduction Costs and Benefits

This Project will provide flood damage reduction benefits. These benefits are described in detail below and summarized in Table 9.6.

Avoided Transportation System Disruptions

This Project will improve management of stormwater runoff, which will improve roadway conditions and avoid transportation system disruptions, including the reduction of hydroplane instances. Additionally, the Project will reduce the flooding of streets, sidewalks and driveways and thus increasing the regional economic activity and quality of life for residents in this area. Due to the lack of quantitative data available for the present flooding conditions and potential improvements associated with the Project, this benefit is qualitative.

Table 9.6: Benefits Summary

Type of Benefit	Assessment Level	Beneficiaries
Reduced local flooding and hydroplaning events	Qualitative	Local

Distribution of Project Benefits and Identification of Beneficiaries

The following table summarizes the Project's beneficiaries. The Project will benefit local residents and business owners through avoided transportation system disruptions by reducing street flooding and hydroplaning events thus improving the quality of life and economic activity on Hawthorne Boulevard.

Table 9.7: Project Beneficiaries Summary

Local	Regional	Statewide
Local residents and business owners	*Not applicable*	*Not applicable*

Project Benefits Timeline Description

The Project benefits would be received beginning in 2014.

Uncertainty of Benefits

There is an uncertainty of the flood damage reduction benefits as they cannot be monetized; however, these benefits are likely to increase the net benefits relative to the quantified estimates.

Table 9.8: Omissions, Biases, and Uncertainties and their Effect on the Project

Benefit or cost category	Likely impact on net benefits*	Comment
Flood reduction	+	Not monetized. It is unclear the extent to which there would be avoided costs associated with property damages

* *Direction and magnitude of effects on net benefits*
- *+ Likely to increase net benefits relative to quantified estimates*
- *++ Likely to increase net benefits significantly*
- *- Likely to decrease net benefits*
- *-- Likely to decrease net benefits significantly*
- *+/- Uncertain*

The "Without Project" Baseline

If the Project were not implemented, flooding of sidewalks and streets as well as hydroplaning instances on Hawthorne Boulevard would lower the quality of life of local residents and reduce the economic activity of local businesses.

Potential Adverse Effects from the Project

Any potential adverse effects from this Project would occur during construction and will be mitigated.

Project Benefit Costs Comparison

The total present value of the Project costs, along with monetized and qualitative benefits are provided in Table 9.9.

Table 9.9: Benefit-Cost Analysis Overview

	Present Value (In 2009 Dollars)
Costs – Total Capital and O&M	$10,603,033
Monetizable Benefits	$0
Qualitative Benefits	**Qualitative Indicator****
Reduction in pollution to groundwater	+
Reduction in pollution discharge to ocean	+
Flood damage reduction	+

** *Magnitude of effect on net benefits*
+/- (negligible or unknown)
+ (moderate)
++ (significant)

Methods used to Estimate With- and Without-Project Conditions

There are no flood event damages that are quantified or expected annual damage benefits from the Project.

V. Penmar Water Quality Improvement and Runoff Reuse Project

Flood Damage Reduction Costs and Benefits

This Project will provide flood damage reduction benefits. These benefits are described in detail below and summarized in Table 9.10.

Reduced Storm Flow Loading

This Project will improve management of stormwater runoff through the diversion of up to 2.75 million gallons of wet weather flows from the storm drain creating additional storm flow capacity downstream. Due to the lack of quantitative data available for the present flooding conditions and potential improvements associated with the Project, this benefit is qualitative.

Table 9.10: Benefits Summary

Type of Benefit	Assessment Level	Beneficiaries
Reduced Storm Flow Loading	Qualitative	Local

Distribution of Project Benefits and Identification of Beneficiaries

The following table summarizes the Project's beneficiaries. The Project will benefit local residents by reducing the potential for street flooding downstream.

Table 9.11: Project Beneficiaries Summary

Local	Regional	Statewide
Local residents	Not applicable	Not applicable

Project Benefits Timeline Description

The Project benefits would be received beginning in 2013.

Uncertainty of Benefits

There is an uncertainty of the flood damage reduction benefits as they cannot be monetized; however, these benefits are likely to increase the net benefits relative to the quantified estimates.

Table 9.12: Omissions, Biases, and Uncertainties and their Effect on the Project

Benefit or cost category	Likely impact on net benefits*	Comment
Flood reduction	+	Not monetized. It is unclear the extent to which there would be avoided costs associated with property damages

* *Direction and magnitude of effects on net benefits*
- *+ Likely to increase net benefits relative to quantified estimates*
- *++ Likely to increase net benefits significantly*
- *- Likely to decrease net benefits*
- *-- Likely to decrease net benefits significantly*
- *+/- Uncertain*

The "Without Project" Baseline

If the Project were not implemented additional downstream capacity for storm flow would not be available.

Potential Adverse Effects from the Project

Any potential adverse effects from this Project would occur during construction and will be mitigated.

Project Benefit Costs Comparison

The total present value of the Project costs, along with monetized and qualitative benefits are provided in Table 9.13.

Table 9.13: Benefit-Cost Analysis Overview

	Present Value (In 2009 Dollars)
Costs – Total Capital and O&M	$27,269,735
Monetizable Benefits	
Water Supply Benefits	$1,764,283
Total Benefits	**$1,764,283**
Qualitative Benefits	**Qualitative Indicator****
Improved water supply reliability	+
Reduction in pollutant discharged to ocean	++
Recreation benefits from improved ocean water quality Flood damage reduction	+
	+

** *Magnitude of effect on net benefits*
+/- (negligible or unknown)
+ (moderate)
++ (significant)

Methods used to Estimate With- and Without-Project Conditions

There are no flood event damages that are quantified or expected annual damage benefits from the Project.

VI. Model Equestrian Center

There are no expected flood damage reduction costs or benefits associated with this Project.

VII. 16th Street Watershed Runoff Use Project

There are no expected flood damage reduction costs or benefits associated with this Project.

VIII. Surface Water Treatment Plant Improvements

There are no expected flood damage reduction costs or benefits associated with this Project.

IX. Central Los Angeles County Regional Water Recycling Program-

There are no expected flood damage reduction costs or benefits associated with this Project.

X. Tujunga Spreading Grounds Enhancement

Flood Damage Reduction Costs and Benefits

This Project would provide a flood damage reduction benefit. This benefit is described in detail below and summarized in Table 9.14.

Reduced Local Flooding

This Project will alleviate current local flooding by increasing the amount of stormwater diverted and captured at the Tujunga Spreading Grounds.

Table 9.14: Benefits Summary

Type of Benefit	Assessment Level	Beneficiaries
Reduced Local Flooding	Qualitative	Local

Distribution of Project Benefits and Identification of Beneficiaries

The following table summarizes the Project's beneficiaries. The Project will benefit local residents by reducing local flooding and improving the quality of life.

Table 9.15: Project Beneficiaries Summary

Local	Regional	Statewide
Local Residents	NA	NA

Project Benefits Timeline Description

The Project benefits would be received beginning in 2013.

Uncertainty of Benefits

There is an uncertainty of the flood damage reduction benefits as they cannot be monetized, however these benefits are likely to increase the net benefits relative to the quantified estimates.

Table 9.16: Omissions, Biases, and Uncertainties and their Effect on the Project

Benefit or cost category	Likely impact on net benefits*	Comment
Flood Reduction	+	Not Monetized.

* *Direction and magnitude of effects on net benefits*
+ Likely to increase net benefits relative to quantified estimates
++ Likely to increase net benefits significantly
- Likely to decrease net benefits
-- Likely to decrease net benefits significantly
+/- Uncertain

The "Without Project" Baseline

If the Project were not implemented, local flooding would continue to occur during storm events reducing the quality of life for local residents.

Potential Adverse Effects from the Project

Any potential adverse effects from this Project would occur during construction and will be mitigated.

Project Benefit Costs Comparison

The total present value of the Project costs, along with monetized and qualitative benefits is provided in Table 9.17.

Table 9.17: Benefit-Cost Analysis Overview

	Present Value (in 2009 dollars)
Costs – Total Capital and O&M	$24,939,968
Monetizable Benefits	
Water Supply Benefits	$78,771,729
Total Benefits	**$78,771,729**
Qualitative Benefits	**Qualitative Indicator****
Improved water supply reliability	+/-
Improved groundwater quality	+
Habitat enhancement and open space	+
Recreation	+
Community	+
Reduced Local Flooding	+

** *Magnitude of effect on net benefits*
+/- (negligible or unknown)
+ (moderate)
++ (significant)

Methods used to Estimate With- and Without-Project Conditions

There are no flood event damages that are quantified or expected annual damage benefits from the Project.

XI. San Antonio Spreading Grounds Improvements

There are no expected flood damage reduction costs or benefits associated with this Project.

XII. Leo J Vander Lans Advanced Treatment Plant Expansion

There are no expected flood damage reduction costs or benefits associated with this Project.

XIII. Whittier Narrows Conservation Pool Project

Flood Damage Reduction Costs and Benefits

This Project would provide a flood damage reduction benefit. This benefit is described in detail below and summarized in Table 9.18.

Reduced Local Flooding

This Project will alleviate current local flooding by increasing the amount of stormwater captured at Whittier Narrows that would otherwise be sent downstream to areas where the river level may already be high, potentially contributing to physical damage.

Table 9.18: Benefits Summary

Type of Benefit	Assessment Level	Beneficiaries
Reduced Local Flooding	Qualitative	Local/Regional

Distribution of Project Benefits and Identification of Beneficiaries

The following table summarizes the Project's beneficiaries. The Project will benefit both local and regional residents by reducing flooding and improving the quality of life.

Table 9.19: Project Beneficiaries Summary

Local	Regional	Statewide
Local Residents	Regional Residents	n/a

Project Benefits Timeline Description

The Project benefits would be received beginning in 2015.

Uncertainty of Benefits

There is an uncertainty of the flood damage reduction benefits since they cannot be monetized, however these benefits are likely to increase the net benefits relative to the quantified estimates.

Table 9.20: Omissions, Biases, and Uncertainties and their Effect on the Project

Benefit or cost category	Likely impact on net benefits*	Comment
Flood Reduction	+	Not Monetized

* *Direction and magnitude of effects on net benefits*
- *+ Likely to increase net benefits relative to quantified estimates*
- *++ Likely to increase net benefits significantly*
- *- Likely to decrease net benefits*
- *-- Likely to decrease net benefits significantly*
- *+/- Uncertain*

The "Without Project" Baseline

If the Project were not implemented, local flooding would continue to occur during storm events reducing the quality of life for local and regional residents and creating the potential for physical damage.

Potential Adverse Effects from the Project

Any potential adverse effects from this Project would occur during construction and will be mitigated.

Project Benefit Costs Comparison

The total present value of the Project costs, along with monetized and qualitative benefits is provided in Table 9.21.

Table 9.21: Benefit-Cost Analysis Overview

	Present Value (in 2009 dollars)
Costs – Total Capital and O&M	$4,412,611
Monetizable Benefits Water Supply Benefits (Avoided water supply purchases) **Total Benefits**	$7,781,351 **$7,781,351**
Qualitative Benefits	**Qualitative Indicator****
Water Supply Benefits (Improved supply reliability)	+
Other (Enhanced ecosystem habitat)	+
Other (Enhanced beach recreation)	+/-
Other (Avoided public health costs)	+/-+
Reduced Local and Regional Flooding	+

** *Magnitude of effect on net benefits*
+/- (negligible or unknown)
+ (moderate)
++ (significant)

Methods used to Estimate With- and Without-Project Conditions

There are no flood event damages that are quantified or expected annual damage benefits from the Project.

XIV. Water and Energy Efficiency in the Multi-Family and Hotel Sectors

There are no expected flood damage reduction costs or benefits associated with this Project.