



**US Army Corps  
of Engineers®**

**Los Angeles County Drainage Area  
Whittier Narrows Dam Flood Control  
Project  
Dam Safety Modification Study  
Draft Environmental Impact Statement**



**U.S. Army Corps of Engineers  
Los Angeles District  
915 Wilshire Blvd.  
Los Angeles, CA 90017-3401**



**December 2018**

USACE. 2018. Whittier Narrows Dam Safety Modification Study—Draft Environmental Impact Statement. Los Angeles County, California. U.S. Army Corps of Engineers, Los Angeles District, Los Angeles, California. November.

## COVER SHEET

### **Abstract**

The lead Federal agency responsible for this document is the U. S. Army Corps of Engineers (Corps), Los Angeles District.

Pursuant to the National Environmental Policy Act of 1969, as amended, the Corps has prepared this Draft Environmental Impact Statement (Draft EIS) for the Federal action proposed to remediate internal erosion and potential overtopping issues at Whittier Narrows Dam. The Whittier Narrows Flood Control Project is located in Los Angeles County, California, approximately 11 miles east of downtown Los Angeles,

This Draft EIS identifies, evaluates, and documents the environmental effects of an array of remedial actions as Risk Management Plans (RMP) that have been deemed necessary to prevent loss of life, extensive environmental and economic damages downstream, functional loss of the project, and the loss of all project benefits. Implementing the proposed project is a large and complex modification that will involve altering the Whittier Narrows Dam, constructing new structures and facilities, and performing numerous associated support actions over an anticipated multi-year construction period. This Draft EIS provides agencies and the public the opportunity to review and comment on the proposed RMP so that decision makers can take agency and public views into consideration when approving a RMP for implementation. Following public and agency review and comment of this Draft EIS, a Final EIS will be prepared and considered before a decision is made whether to approve the project for construction.

A 45-day comment period on the Draft EIS began with the publication of the Environmental Protection Agency's Notice of Availability in the Federal Register on December 14, 2018. All comments received during the comment period will be considered in the preparation of the Final EIS. Comment letters received during the public review period along with responses, will be included in the Final EIS.

### **For Information, Contact:**

Deborah Lamb  
Environmental Coordinator  
USACE-SPL-PD-RL  
915 Wilshire Blvd  
Los Angeles, California 90017-3402  
[Deborah.L.Lamb@usace.army.mil](mailto:Deborah.L.Lamb@usace.army.mil)  
213.452.3798

OR

[Whittier\\_Narrows\\_DSMS\\_EIS@usace.army.mil](mailto:Whittier_Narrows_DSMS_EIS@usace.army.mil)

*This page left intentionally blank.*





**US Army Corps  
of Engineers®**

**Los Angeles County Drainage Area**

# **Whittier Narrows Dam Flood Control Project**

## **Dam Safety Modification Study**

### **Draft Environmental Impact Statement**

**U.S. Army Corps of Engineers  
Los Angeles District  
915 Wilshire Blvd.  
Los Angeles, CA 90017-3401**

**December 2018**

*This page left intentionally blank.*

---

## TABLE OF CONTENTS

EXECUTIVE SUMMARY .....	XI
CHAPTER 1 INTRODUCTION .....	1-1
1.1 INTRODUCTION .....	1-1
1.2 PROJECT LOCATION .....	1-2
1.3 HISTORY OF THE WHITTIER NARROWS DAM AREA.....	1-4
1.4 PURPOSE AND NEED FOR ACTION.....	1-10
1.5 NATIONAL ENVIRONMENTAL POLICY ACT COMPLIANCE.....	1-11
1.6 OTHER PUBLIC AGENCY ACTIONS .....	1-12
1.7 PREVIOUS REPORTS .....	1-12
CHAPTER 2 BACKGROUND .....	2-1
2.1 OVERVIEW .....	2-1
2.2 WHITTIER NARROWS DAM PROJECT .....	2-1
2.3 PROJECT AUTHORIZATION.....	2-1
2.3.1 Flood Control Act of 1936.....	2-1
2.3.2 Flood Control Act of 1938.....	2-1
2.3.3 Flood Control Act of 1941 .....	2-2
2.3.4 Flood Control Act of 1944.....	2-2
2.4 DESCRIPTION OF WHITTIER NARROWS DAM AND RESERVOIR.....	2-4
2.5 OPERATION OF WHITTIER NARROWS DAM .....	2-4
2.6 THE BENEFITS OF THE PROJECT .....	2-6
2.7 DAM SAFETY MODIFICATION AUTHORITY .....	2-6
2.7.1 Introduction.....	2-6
2.7.2 Definition of Risk .....	2-7
2.7.3 Non-Breach Risk: High Spillway Flows Resulting in Downstream Flooding .	2-7
2.7.4 Breach Risk: Dam Failure Modes Resulting in Downstream Flooding .....	2-9
2.8 POTENTIAL FAILURE MODES (PFMs) .....	2-10
2.8.1 Backward Erosion Piping in the Foundation .....	2-10
2.8.2 Overtopping .....	2-11
2.8.3 Premature Opening of the Automatic Spillway Gates.....	2-13
2.9 CONSEQUENCES OF DAM BREACH .....	2-14
2.9.1 Evaluation of Risk.....	2-15

---

CHAPTER 3 ALTERNATIVE RISK MANAGEMENT PLANS TO ADDRESS POTENTIAL FAILURE MODES .....	3-1
3.1 PLAN FORMULATION PROCESS.....	3-1
3.2 EVALUATION CRITERIA .....	3-2
3.3 RISK MANAGEMENT MEASURES .....	3-2
3.3.1 Summary of Risk Management Measures and Rationale for Screening .....	3-2
3.3.2 Nonstructural Risk Management Measures .....	3-7
3.3.3 Structural Risk Management Measures to Address Backward Erosion Piping .....	3-8
3.3.4 Structural Risk Management Measures to Address Overtopping .....	3-10
3.4 ALTERNATIVE RISK MANAGEMENT PLANS .....	3-13
3.4.1 RMP 1: No Action .....	3-14
3.4.2 RMP 2: Auxiliary Fuseplug Spillway .....	3-15
3.4.3 RMP 3: Auxiliary Spillway with Seepage Control .....	3-15
3.4.4 RMP 4: New Spillway .....	3-15
3.4.5 RMP 5: Protected Overtopping with Seepage Control .....	3-15
3.4.6 RMP 6: Dam Replacement .....	3-16
3.4.7 RMP 7: Dam Removal .....	3-16
3.4.8 RMP 8: Nonstructural Measures Only .....	3-17
3.5 RISK MANAGEMENT PLAN EVALUATION .....	3-17
3.5.1 Risk Management Plans Screening Criteria .....	3-17
3.5.2 Effectiveness .....	3-17
3.5.3 Efficiency .....	3-17
3.5.4 “Do No Harm” .....	3-18
3.6 RISK MANAGEMENT PLANS NOT CARRIED FORWARD .....	3-18
3.6.1 RMPs 2, 3A, 3B, 3C, 3D, and 4.....	3-18
3.6.2 RMP 6: Dam Replacement .....	3-18
3.6.3 RMP 7: Remove Whittier Narrows Dam.....	3-19
3.6.4 RMP 8: Nonstructural Measures.....	3-19
3.7 RISK MANAGEMENT PLANS CARRIED FORWARD .....	3-19
3.7.1 RMP 1: No Action .....	3-19
3.7.2 RMP 3E: Labyrinth Auxiliary Spillway and Seepage Control .....	3-20
3.7.3 RMP 5: Protected Overtopping with Seepage Control .....	3-28
3.8 RISK MANAGEMENT PLAN CONSTRUCTION ASSUMPTION.....	3-34
3.9 COMPARISON OF ALTERNATIVE RISK MANAGEMENT PLANS.....	3-34

---

---

3.10	PREFERRED ALTERNATIVE .....	3-35
CHAPTER 4 AFFECTED ENVIRONMENT .....		4-1
4.1	EARTH RESOURCES .....	4-1
4.1.1	Existing Conditions.....	4-1
4.2	WATER RESOURCES .....	4-6
4.2.1	Existing Conditions.....	4-6
4.2.2	Surface Water.....	4-12
4.2.3	Groundwater .....	4-14
4.2.4	Jurisdictional Waters of the US .....	4-14
4.3	AIR QUALITY .....	4-16
4.3.1	Existing Conditions.....	4-16
4.3.2	General Meteorological Conditions .....	4-16
4.3.3	Regional Air Quality .....	4-17
4.3.4	Local Air Quality .....	4-20
4.3.5	Greenhouse Gases and Climate Change .....	4-21
4.4	NOISE AND VIBRATION .....	4-24
4.4.1	Noise Measurements .....	4-25
4.4.2	Sensitive Receptors .....	4-27
4.4.3	Existing Environment .....	4-28
4.4.4	Ground-borne Vibration.....	4-29
4.5	BIOLOGICAL RESOURCES .....	4-31
4.5.1	Methodology .....	4-31
4.5.2	Regional Setting.....	4-31
4.5.3	Existing Conditions.....	4-33
4.6	CULTURAL RESOURCES .....	4-51
4.6.1	Affected Environment.....	4-52
4.6.2	Study Area History .....	4-52
4.6.3	Archival and Records Search Results .....	4-59
4.7	SOCIOECONOMICS AND ENVIRONMENTAL JUSTICE .....	4-62
4.7.1	General Socioeconomic Conditions.....	4-62
4.7.2	Environmental Justice.....	4-67
4.8	HAZARDOUS, TOXIC, AND RADIOACTIVE WASTE.....	4-69
4.8.1	Existing Conditions.....	4-69
4.8.2	Downstream of Whittier Narrows Dam.....	4-74

---

---

4.9	LAND USE .....	4-75
4.9.1	Existing Conditions.....	4-75
4.10	TRAFFIC AND TRANSPORTATION.....	4-80
4.10.1	Existing Conditions.....	4-80
4.11	ESTHETICS .....	4-84
4.11.1	Existing Conditions.....	4-84
4.12	RECREATION RESOURCES .....	4-91
4.12.1	Existing Conditions.....	4-91
4.13	UTILITIES.....	4-98
4.13.1	Existing Conditions.....	4-98
4.14	PUBLIC HEALTH and SAFETY .....	4-104
4.14.1	Existing Conditions.....	4-104
4.14.2	Downstream of Dam .....	4-106
4.15	PUBLIC SERVICES .....	4-109
4.15.1	Existing Conditions.....	4-110
CHAPTER 5 ENVIRONMENTAL CONSEQUENCES .....		5-1
5.1	EARTH RESOURCES .....	5-3
5.1.2	Thresholds of Significance .....	5-3
5.1.3	Alternative RMP Analysis .....	5-4
5.1.4	Environmental Commitments .....	5-13
5.2	WATER RESOURCES .....	5-13
5.2.1	Regulatory Framework .....	5-14
5.2.2	Thresholds of Significance .....	5-15
5.2.3	RMP Analysis and Comparison.....	5-15
5.2.4	ENVIRONMENTAL COMMITMENTS .....	5-26
5.3	AIR QUALITY .....	5-27
5.4	NOISE AND VIBRATION .....	5-36
5.5	BIOLOGICAL RESOURCES .....	5-48
5.6	CULTURAL RESOURCES .....	5-65
5.7	SOCIOECONOMICS AND ENVIRONMENTAL JUSTICE .....	5-84
5.8	HAZARDOUS, TOXIC, AND RADIOACTIVE WASTE.....	5-92
5.9	LAND USE.....	5-102
5.10	TRAFFIC AND TRANSPORTATION.....	5-106
5.11	ESTHETICS .....	5-116

---

---

5.12	RECREATION RESOURCES .....	5-125
5.13	UTILITIES.....	5-136
5.14	PUBLIC HEALTH AND SAFETY.....	5-139
5.15	PUBLIC SERVICES .....	5-150
CHAPTER 6 CUMULATIVE IMPACTS, IRREVERSIBLE AND IRRETRIEVABLE ENVIRONMENTAL COMMITMENT OF RESOURCES, RELATIONSHIP BETWEEN LOCAL SHORT-TERM USES OF THE ENVIRONMENT AND MAINTENANCE AND ENHANCEMENT OF LONG-TERM PRODUCTIVITY .....		
		6-1
6.1	Cumulative Impacts .....	6-1
6.1.1	Past Development .....	6-2
6.1.2	Present.....	6-10
6.1.3	Future .....	6-11
6.2	SUMMARY OF CUMULATIVE IMPACTS BY RESOURCE.....	6-12
6.2.1	Earth Resources .....	6-12
6.2.2	Water Quality.....	6-13
6.2.3	Air Quality .....	6-14
6.2.4	Noise and Vibration .....	6-14
6.2.5	Cultural Resources .....	6-17
6.2.6	Socioeconomics and Environmental Justice.....	6-18
6.2.7	HTRW.....	6-19
6.2.8	Land Use .....	6-19
6.2.9	Traffic and Transportation .....	6-19
6.2.10	Esthetic Resources .....	6-19
6.2.11	Recreation .....	6-20
6.2.12	Utilities.....	6-20
6.2.13	Public Health and Safety.....	6-20
6.2.14	Public Services.....	6-20
6.3	GROWTH INDUCING IMPACTS.....	6-21
6.4	RELATIONSHIP BETWEEN LOCAL SHORT-TERM USES OF THE ENVIRONMENT AND MAINTENANCE AND ENHANCEMENT OF LONG- TERM PRODUCTIVITY .....	6-21
6.5	IRREVERSIBLE AND IRRETRIEVABLE ENVIRONMENTAL COMMITMENT OF RESOURCES .....	6-22
CHAPTER 7 SUMMARY AND COMPARISON OF RISK MANAGEMENT PLANS (RMPS).....		
		7-1

---



---

CHAPTER 8 COORDINATION, CONSULTATION, AND COMPLIANCE WITH ENVIRONMENTAL LAWS .....	8-1
8.1 PUBLIC INVOLVEMENT PROGRAM .....	8-1
8.1.1 Public Scoping Process .....	8-1
8.1.2 Public Scoping Meeting.....	8-2
8.1.3 Stakeholder Meeting .....	8-3
8.1.4 Emergency Managers Meeting .....	8-3
8.1.5 Review of Draft Environmental Impact Statement.....	8-3
8.1.6 Public Review Meeting.....	8-4
8.1.7 Final EIS Review Period.....	8-4
8.2 AGENCY COORDINATION .....	8-4
8.2.1 U.S. Fish and Wildlife Service (USFWS) .....	8-4
8.2.2 California State Historic Preservation Officer (SHPO) .....	8-4
8.3 ENVIRONMENTAL LAWS AND EXECUTIVE ORDERS.....	8-5
8.3.1 National Environmental Policy Act (NEPA) of 1969 (Public Law 91-190), as amended .....	8-5
8.3.2 Clean Water Act (33 U.S. C. 1251 et seq.) .....	8-5
8.3.3 Clean Air Act of 1970 (42 U.S.C. 7401 et seq.) .....	8-7
8.3.4 Noise Control Act of 1972, as amended (42 U.S.C. 4901 et seq.) .....	8-8
8.3.5 Endangered Species Act, as amended (16 U. S. C. 1531 et seq.) .....	8-8
8.3.6 Migratory Bird Treaty Act (MBTA) (16 U. S. C. 715- 715s) .....	8-9
8.3.7 National Historic Preservation Act (Public Law 89-665; as amended by Public Law 113-287, 54 U.S.C. 300101 et seq.).....	8-9
8.3.8 Native American Graves Protection and Repatriation Act (25 U.S.C. § 3001, et seq.).....	8-10
8.3.9 Federal Water Project Recreation Act of 1965, as amended .....	8-10
8.3.10 National Trails System Act.....	8-10
8.3.11 Occupational Safety and Health Act (29 U.S.C. § 651, et seq.) .....	8-10
8.3.12 Comprehensive Environmental Response, Compensation, and Liability Act .....	8-10
8.3.13 Executive Order (EO) 11514, Protection and Enhancement of Environmental Quality, amended by Executive Order 11991, Relating to Protection and Enhancement of Environmental Quality.....	8-11
8.3.14 Executive Order 11593, Protection and Enhancement of the Cultural Environment.....	8-11
8.3.15 Executive Order 11988, Floodplain Management .....	8-11

---

---

8.3.16	Executive Order 12088, Federal Compliance with Pollution Control Standards	8-14
8.3.17	Executive Order 12898, Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations .....	8-15
8.3.18	Executive Order 13045, Protection of Children From Environmental Health Risks and Safety Risks.....	8-15
8.3.19	Executive Order 13112, Invasive Species and Landscaping .....	8-15
8.3.20	Executive Order 13148, Greening the Government through Leadership in Environmental Management .....	8-16
8.3.21	Executive Order 13175, Consultation and Coordination with Indian Tribal Governments .....	8-16
8.3.22	Executive Order 13186, Responsibilities of Federal Agencies to Protect Migratory Birds.....	8-16
8.3.23	Executive Order 13195, Trails for America in the 21 <sup>st</sup> Century .....	8-16
8.4	CORPS REGULATIONS .....	8-16
8.4.1	Engineer Regulation 200-2-2, <i>Procedures for Implementing NEPA</i> , published at 33 C.F.R. part 230.....	8-16
8.4.2	Engineer Regulation 1105-2-100, <i>Planning Guidance Notebook</i> , .....	8-17
CHAPTER 9 LIST OF PREPARERS .....		9-1
CHAPTER 10 REFERENCES .....		10-1
CHAPTER 11 INDEX.....		11-1

## LIST OF FIGURES

Figure ES-1	Regional Setting .....	xiii
Figure ES-2	Conceptual Layout of Elements for New Labyrinth Auxiliary Spillway .....	xxi
Figure ES-3	Roller Compacted Concrete .....	xxii
Figure ES-4	Conceptual Layout of Elements for RMP 5 Rolled Compacted Concrete.....	xxiii
Figure 1.1-1	Aerial View of Whittier Narrows Dam Project (1957) .....	1-1
Figure 1.2-1	Whittier Narrows Reservoir Topography.....	1-3
Figure 1.2-2	Whittier Narrows Dam Project.....	1-5
Figure 2.3-1	Los Angeles County Drainage Area (LACDA) .....	2-2
Figure 2.4-1	Project Overview.....	2-5
Figure 2.8-1	Schematic of Backward Erosion Piping in Foundation (van Beek, 2010).....	2-11
Figure 2.8-2	Schematic of Overtopping Failure .....	2-12
Figure 2.8-3	Potential Locations of Overtopping .....	2-13
Figure 3.3-1	Typical Trench Drain Section .....	3-9
Figure 3.3-2	Typical Relief Well Section .....	3-9
Figure 3.3-3	Typical Section – Filter/Drainage Blanket.....	3-10

Figure 3.3-4 Fuse Plug Profile .....	3-11
Figure 3.3-5 Fuse Plug Cross Section .....	3-11
Figure 3.3-6 Labyrinth Spillway Photo and Diagram .....	3-12
Figure 3.3-7 Tainter Gate Spillway .....	3-12
Figure 3.3-8 RCC for Overtopping Protection, Blue Diamond Dam, Las Vegas .....	3-13
Figure 3.7-1 Conceptual Layout of Elements for New Labyrinth Auxiliary Spillway .....	3-21
Figure 3.7-2 Rooks Road to be Raised 12 Feet .....	3-24
Figure 3.7-3 Conceptual Layout of Elements for RMP 5 Roller Compacted Concrete .....	3-31
Figure 4.1-1 Local Faults and Earthquakes .....	4-4
Figure 4.1-2 Major Southern California Faults .....	4-4
Figure 4.1-3 Newport Inglewood Fault .....	4-5
Figure 4.2-1 San Gabriel and Los Angeles Rivers Watersheds .....	4-7
Figure 4.2-2 Showing Location of the San Gabriel River and Rio Hondo .....	4-9
Figure 4.2-3 Whittier Narrows Dam Reservoir Features .....	4-11
Figure 4.2-4 Flood Frequency Contours .....	4-15
Figure 4.5-1 California Gnatcatcher Designated Critical Habitat Map (USFWS 2007) .....	4-44
Figure 4.5-2 California Gnatcatcher Critical Habitat within the Whittier Narrows Dam Reservoir .....	4-47
Figure 4.5-3 Least Bell's Vireo 2014 and 2015 Nesting Territories at Whittier Narrows .....	4-50
Figure 4.5-4 Least Bell's Vireo 2017 Nesting Territories at Whittier Narrows .....	4-51
Figure 4.7-1 County of Los Angeles Service Planning Area 7 .....	4-67
Figure 4.8-1 San Gabriel Valley Superfund Groundwater Contamination Site .....	4-71
Figure 4.8-2 EPA Wells .....	4-73
Figure 4.9-1 Land Use Classification for Whittier Narrows Dam Reservoir .....	4-77
Figure 4.9-2 Land Ownership and Areas Leased for Recreation and Other Uses within Whittier Narrows .....	4-78
Figure 4.10-1 Whittier Narrows Dam Reservoir Transportation and Trails .....	4-83
Figure 4.12-1 Recreation at Whittier Narrows Reservoir .....	4-94
Figure 4.12-2 Bicentennial Park, Sports Area, and Stables .....	4-96
Figure 4.12-3 Streamland Park and Pico Rivera Golf Course .....	4-97
Figure 4.13-1 Utility Relocations (West Embankment) .....	4-101
Figure 4.13-2 Utility Relocations (Central and East Embankments) .....	4-102
Figure 4.13-3 High Power Transmission Lines through Whittier Narrows Dam Reservoir .....	4-103

## LIST OF TABLES

Table ES-1 Key Components to Address Failure Modes .....	xviii
Table ES-2 Four Criteria Evaluation and Comparison .....	xxiv
Table 2.7-1 Pool Elevation, Return Period, and Discharge for Example Flood: Non- Breach .....	2-8

---

Table 2.7-2 Estimated Flood Depths (feet) in Cities as a Result of Spillway Discharge .....	2-8
Table 2.9-1 Pool Elevation, Return Period, and Discharge for Example Flood: Breach .....	2-14
Table 2.9-2 Range Of Depths (feet) For Example Floods In The Downstream Communities Affected By Flooding Due To Dam Breach .....	2-14
Table 3.3-1 Summary of Risk Management Measures.....	3-2
Table 3.5-1 Summary of Plan Cost for Plans Meeting Efficiency Requirements .....	3-18
Table 3.7-1 Key Components to Address Failure Modes.....	3-19
Table 3.9-1 Final Array Comparison Summary .....	3-35
Table 4.3-1 National Ambient Air Quality Standards .....	4-18
Table 4.3-2 Federal Attainment Status Designation for the South Coast Air Basin.....	4-20
Table 4.3-3 Ambient Air Quality at Pico Rivera and Los Angeles North Main Street Monitoring Station .....	4-21
Table 4.3-4 Global Warming Potentials and Atmospheric Lifetimes of Select Greenhouse Gases .....	4-23
Table 4.3-5 Global, National, and State GHG Emissions Inventories.....	4-23
Table 4.4-1 Weighted Decibel Scale .....	4-26
Table 4.4-2 Typical Outdoor Noise Levels.....	4-27
Table 4.4-3 Summary of Highest dBA in Project Area .....	4-29
Table 4.4-4 Human and Structural Response to Typical Levels of Vibration.....	4-30
Table 4.5-5 Typical VdB and PPV of Some Construction Equipment.....	4-30
Table 4.5-1 Threatened or Endangered Species .....	4-42
Table 4.6-1 Recorded Sites within 0.25 Miles of the Proposed Project Areas .....	4-60
Table 4.6-2 Previously Recorded Cultural Resources within the Proposed Project Area .....	4-61
Table 4.7.1 Ethnicity of Cities Upstream of Whittier Narrows Dam Project .....	4-63
Table 4.7.2 Education of Population Upstream of Whittier Narrows Dam Project .....	4-63
Table 4.7.3 Income for Population Upstream of Whittier Narrows Dam Project .....	4-63
Table 4.7-4 Ethnicity by Percent .....	4-64
Table 4.7-5 Education by Percent.....	4-65
Table 4.7-6 Income by Percent .....	4-65
Table 4.7-7 Percentile Values for Demographic Indicators.....	4-68
Table 4.7-8 Percentile Values for Selected Environmental Indicators .....	4-69
Table 4.10-1 Average Annual Traffic Volumes .....	4-81
Table 4.10-2 Average Traffic Volumes on Nearby Roadways.....	4-82
Table 4.12-1 Golf Course Users .....	4-98
Table 4.14-1 Summary Of The Emergency Preparedness Plans (Communities Downstream of the Dam) .....	4-108
Table 4.14-2 Current Emergency Preparedness Plans (Communities Upstream of the Dam) .....	4-109
Table 4.15-1 Whittier Narrows Dam Project Area Public Services .....	4-110

---

---

Table 5.3-1: NAAQS Attainment Designations for the South Coast Air Basin (SCAB) and Applicable General Conformity Applicability Rates.....	5-28
Table 5.3-2 RMP 1 No Action: Estimated Annual Emissions from Routine Operations and Maintenance.....	5-29
Table 5.3-3 RMP 1 No Action: Estimated GHG Emissions from Routine Operations and Maintenance.....	5-29
Table 5.3-4 RMP 1 No Action: Estimated Annual Emissions from Construction .....	5-30
Table 5.3-5 RMP 1 No Action: Estimated GHG Emissions from Construction .....	5-30
Table 5.3-6 RMP 1: No Action: Total (Combined Construction and O&M) Estimated Annual Emissions .....	5-31
Table 5.3-7 RMP 1: No Action: Total Estimated GHG Emissions .....	5-31
Table 5.3-8 RMP 3E: Labyrinth Auxiliary Spillway and Seepage Control Estimated Annual Emissions from Construction.....	5-32
Table 5.3-9 RMP 3E: Labyrinth Auxiliary Spillway and Seepage Control Estimated GHG Emissions from Construction.....	5-32
Table 5.3-10 RMP 3E: Labyrinth Auxiliary Spillway and Seepage Control Total (Construction and O&M) Estimated Annual Emissions.....	5-33
Table 5.3-8 RMP 3E: Labyrinth Auxiliary Spillway and Seepage Control Total (Construction and O&M) Estimated GHG Emissions.....	5-33
Table 5.3-9 RMP 5: Protected Overtopping and Seepage Control Estimated Annual Emissions from Construction .....	5-34
Table 5.3-10 RMP 5: Protected Overtopping and Seepage Control Estimated GHG Emissions from Construction .....	5-34
Table 5.3-11 RMP 5: Protected Overtopping and Seepage Control Total (Construction and O&M) Estimated Annual Emissions .....	5-35
Table 5.3-12 RMP 5: Protected Overtopping and Seepage Control Total (Construction and O&M) Estimated GHG Emissions.....	5-35
Table 5.5-1 Typical Construction Equipment and Modeled Attenuation at Various Distances from Sources .....	5-38
Table 5.6-1. Previously Recorded Cultural Resources within 100 Feet of Each RMP .....	5-67
Table 7-1 Final Array Comparison Summary .....	7-2

## **EXECUTIVE SUMMARY**

### **INTRODUCTION**

This Draft Environmental Impact Statement (Draft EIS) has been prepared by the U.S. Army Corps of Engineers (Corps). The Draft EIS evaluates the environmental, cultural, and socioeconomic impacts of implementing the proposed Whittier Narrows Dam Safety Modification Project (Whittier Narrows DSM Project) to remediate potential internal erosion and potential overtopping concerns at Whittier Narrows Dam during very rare flood events. The Corps is the lead Federal agency and there are no cooperating agencies for this Project. This analysis was carried out to meet requirements of the National Environmental Policy Act of 1969 (NEPA), other Federal laws, Executive Orders, and Corps' policies and guidelines. Following public and agency review and comment on this Draft EIS, a Final EIS will be prepared for consideration by decision makers before a determination is made whether to approve the project for construction.

This Draft EIS is developed in integration with the Whittier Narrows Dam Draft Dam Safety Modification Report (DSMR), which was developed pursuant to the Corps Dam Safety program's Whittier Narrows Dam Safety Modification Study (DSMS). The Dam Safety program operates under the guidance of ER 1110-2-1156, Safety of Dams – Policy and Procedures. These procedures require a restricted distribution of the DSMR for safety and security reasons. Notwithstanding the limited distribution of the DSMR, this Draft EIS provides a full and fair discussion of the environmental impacts of the reasonable alternatives that would avoid or minimize adverse impacts or enhance the quality of the human environment.

### **PROJECT DESCRIPTION AND LOCATION**

The Whittier Narrows Dam Flood Control Project is located at a natural gap (the "Whittier Narrows") between the Montebello Hills and the Puente Hills that form the southern boundary of the San Gabriel Valley in South El Monte, Los Angeles County, California. The Dam is located on the San Gabriel River and Rio Hondo approximately 11 miles east of downtown Los Angeles, approximately 7.5 miles downstream from the Santa Fe Dam Flood Control Project (Figure ES-1).

The zoned earth dam consists of three embankments with a combined crest length of 16,960 ft. (5,230 ft., 5,352 ft., and 6,378 ft., for the west, central, and east, respectively.) The design elevation of the crest is 239.0 ft., with a maximum height of 55 ft. above the Rio Hondo streambed. The capacity of the reservoir at elevation 229.0 ft. is 37,491 acre-feet. The area surrounding the Reservoir is densely populated. The Reservoir is surrounded by South El Monte (to the north), the City of Industry (east), Pico Rivera (south), and Montebello (south) (Figure ES-1). The Pomona Freeway (State Route 60 [SR-60]) and the San Gabriel River Freeway (Interstate 605 [I-605]) intersect near the northeastern corner of the Basin.

The combined drainage area of the San Gabriel River watershed and the Rio Hondo sub-watershed is 556 square miles. The San Gabriel River originates in the canyons of the southern slopes of the San Gabriel Mountains. The Rio Hondo headwaters are in the Los Angeles River watershed to the west of the San Gabriel River watershed. Both rivers flow through the typically empty reservoir and

flood flows are constrained by the Dam. At the Dam, the outlet works discharge into the Rio Hondo while the spillway discharges into the San Gabriel River. The confluence of the Rio Hondo and Los Angeles River is approximately 8 miles downstream of Whittier Narrows Dam. The combined flows discharge into the Pacific Ocean approximately 20 miles downstream of the dam. The San Gabriel River discharges into the Pacific Ocean approximately 21 miles downstream of the dam. (Figure ES-1).

## **PROJECT PURPOSE AND NEED**

The Corps is proposing risk management plans to reduce the potential for and consequences of catastrophic flooding resulting from failure of the Whittier Narrows Dam during very rare flood events. These risk management plans include structural modifications to the dam to eliminate or minimize potential modes of dam failure, and non-structural measures to reduce the consequences of rare flood events. Risk is defined as a measure of the probability and severity of undesirable consequences or outcomes. The purpose of the Whittier Narrows DSM Project is to reduce the incremental risk—the difference between consequences associated with dam failure and the consequences associated with extreme discharges in which the dam did not fail—to the downstream public to tolerable levels.

While incremental risk can be evaluated in terms of economic, environmental, or societal life safety risk, life safety is of paramount in the Corps' dam safety program. Through the DSMS process conducted pursuant to *Dam Safety-Policies and Procedures*, Engineer Regulation (ER) 1110-2-1156, the Corps determined that Whittier Narrows Dam does not meet the agency's tolerable risk guidelines (TRG) with respect to the annual probability of failure and the societal incremental life safety risk. The TRG are exceeded due to the Dam's anticipated performance during very large, very infrequent floods. The DSMS process also led to the determination that structural modifications are required to reduce the risk to below the TRG. The findings of the DSMS resulted in the Dam being classified as Dam Safety Action Classification (DSAC 1) (very high risk). USACE considers this level of life or life safety risk to be unacceptable and warranting of federal action.

Incremental risk includes the difference between consequences associated with dam failure whether that failure be as a result of a dam breach, malfunction, or misoperation and the consequences associated with extreme discharges in which the dam did not fail. Dam failure as a result of malfunction and misoperation is being addressed through ongoing O&M and interim risk reduction measures (e.g. spillway gate repair, remote monitoring, inspection, pre-positioning of materials, etc.). The purpose of the Whittier Narrows DSM Project is to reduce incremental risk associated with dam failure due to dam breach to below the Corps' TRG. The Corps has an urgent need to act to reduce the likelihood and consequences of dam failure resulting from potential dam breach.



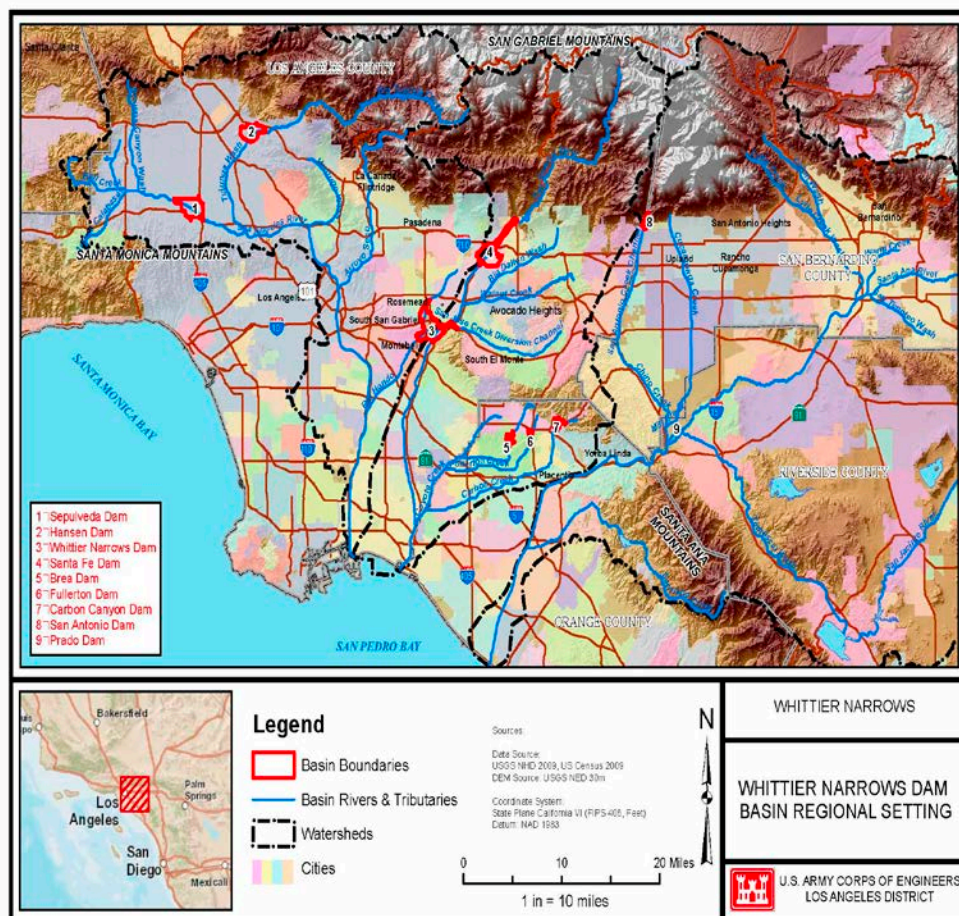


Figure ES-1 Regional Setting

## **PROJECT AUTHORITIES**

### **Flood Control Act of 1936 (Public Law [P.L.] 74-738)**

The Flood Control Act of 1936 authorized civil works projects for flood risk management measures through the Corps and other Federal agencies.

### **Flood Control Act of 1938 (P.L. 75-761)**

The Flood Control Act amended the 1936 Act by authorizing the acquisition of land, easements, and right-of-way by the United States for flood risk management projects, channel improvements, and channel rectification for flood control in the Los Angeles County Drainage Area.

### **Flood Control Act of 1941 (P.L. 77-228)**

The Flood Control Act of 1941 authorized construction of the Whittier Narrows and Santa Fe Dams. Initial funds for construction of Whittier Narrows Dam were provided in the 1949 Appropriations Bill. Construction began in March 1950 and the final major contract was completed in March 1957. Construction of Santa Fe Dam was completed in 1949.

*Dam Safety-Policies and Procedures*, the Corps' Engineer Regulation (ER) 1110-2-1156 prescribes the guiding principles, policy, organization, responsibilities, and procedures for implementation of risk-informed dam safety program activities and a dam safety portfolio risk management process within the Corps. The purposes of the dam safety program are to protect life, property, and the environment by ensuring that all dams are designed, constructed, operated, and maintained as safely and effectively as is reasonably practicable. Prudent stewardship of available resources is essential to preserve the existing infrastructure. When unusual circumstances threaten the integrity of a structure and the safety of the public, the Corps has the authority to take expedient actions, require personnel to evaluate the threat, and design and construct a solution.

## **ALTERNATIVE FORMULATION PROCESS**

The formulation of Risk Management Plans (RMP's) began in 2012 and follows the integrated planning process presented ER 1110-2-1156, to identify and address dam safety issues. First, dam safety issues and opportunities were identified and the baseline risk condition was estimated. Subsequently, the Corps went through a process of formulation, evaluation, and comparison. As part of the comparison effort, the Corps refined quantities and costs, and developed potential construction efforts and associated timelines. Utilizing this information, a number of measures were eliminated, resulting in the final set of alternative RMPs to be considered for detailed analysis in this Draft EIS. A more detailed description of the RMP formulation process is presented in Chapter 3 of this Draft EIS.

### **Identification of Dam Safety Issues and Potential Failure Modes**

The first step of the alternative formulation process is to identify dam safety issues and a baseline risk condition on which to begin to develop risk-reduction opportunities. Potential Failure Modes (PFMs) are used to describe the manner in which the dam could fail. As summarized in Chapter 2, two PFM's dominate the risk at Whittier Narrows Dam and set the basis for plan formulation. They consist of backward erosion piping in the foundation and overtopping. A third PFM, premature opening of the automatic spillway gates, is currently being addressed through operations and maintenance actions, and, accordingly, the RMP's developed for the Whittier Narrows DSM Project address only the first two PFM's.

A comprehensive list of PFM modes was reviewed in the DSMS, and the initial numerical labels for the two applicable PFM's were retained. This first is backward erosion piping (BEP), or PFM 4, which can occur when water leaks through the foundation with enough pressure to carry particles. The resulting gradients and lack of filtering would result in an increased amount of water and sand being discharged until the dam fails through eventual breach.

The second PFM is overtopping in which dam failure through overtopping would occur if a very rare and very large storm exceeds the capacity of the outlet works and spillway to pass the inflow of water. In this case, the reservoir pool rises until water flows over the top of the Dam. Although the crest is paved with asphalt, the downstream slope contains no slope protection and the embankment shells are comprised of highly erodible materials. Too much inflow could result in water going over the top of the Dam, resulting in erosion and eventual dam breach. These two PFM's represent the technical problem that the proposals would need to address.

Plan formulation began with the development of risk management measures which are building blocks used to create risk management plans. Some measures can stand alone as independent measures to address the incremental risk associated with dam failure, and others need to be combined with additional measures to form risk management plans (also referred to as alternatives). Generally, measures were broken into two different categories: structural and non-structural measures. Structural measures are developed to address incremental risks by structurally modifying the dam (e.g., modify existing spillway to increase discharge capacity) and usually address the likelihood of failure. Non-structural measures (e.g., develop and implement communication and education strategies to develop, maintain public awareness of flood risk) are developed to address incremental risks by reducing the potential consequences of a dam failure, without structurally modifying the dam.

The Corps used a set of opportunities and constraints to develop risk management measures. Through several iterations of formulation, plans were identified, evaluated, compared, and screened using key criteria: effectiveness (Does the measure result in risk reduction? Does it reduce the incremental risk to below tolerable risk guidelines?); efficiency (Is the measure cost effective?); and feasibility (Given the engineering considerations, is it reasonable to assume the measure can be constructed?). Measures were also evaluated for acceptability (Is it consistent with existing laws, regulations, and policy?) and completeness (Does the plan accounts for all necessary investments to ensure the realization of the objectives?). During screening, it was also noted whether the measure would be likely to have substantial environmental effects.

Constraints were also identified. A constraint is a restriction whose violation would result in the elimination of a measure. A key constraint used in the formulation process was the “do no harm” principle. Specifically, that the population downstream of the dam should not be at greater risk as a result of the modification unless there are reasonable and prudent measures to mitigate that risk and there is a significant risk reduction to the broader population. The risk management measures were then arranged into RMPs.

ER 1110-2-1156, *Safety of Dams – Policy and Procedures*, requires consideration of the following plans at minimum: no action, a plan that meets all tolerable risk and applicable Corps guidelines, a plan that achieves only tolerable risk limit for life safety, a plan for dam removal, and a plan for dam replacement. Eight RMPs were developed at a conceptual level and evaluated on whether they met the objectives and criteria.

The term “risk management plan” or “RMP” used throughout this Draft EIS is equivalent to the term “alternative” under the NEPA EIS process (40 CFR 1502 et seq.)

### **RMP 1: No Action**

ER 1110-2-1156, *Safety of Dams – Policy and Procedures*, as well as NEPA, requires consideration of the No Action alternative. This plan assumes no remediation will be implemented to address the risk driving failure modes and the Dam remains with a high likelihood of failure and associated consequences from the two PFMs. While this alternative does not include modification to address the two PFMs, restoration of the Dam’s design crest elevation (which has settled as much as 1.8 feet) is anticipated to occur in the next 50 years.

The No Action RMP is one of the alternatives brought forward in the EIS for further consideration.

### **RMP 2: Auxiliary Fuseplug Spillway**

Overtopping would be addressed through providing additional spillway capacity via an auxiliary fuse plug spillway and raising the dam four feet using parapet walls. Backward erosion piping would be addressed through the additional seepage control features that would include trench drains, relief wells, and graded filter/drainage blankets. Analysis showed that this plan would fail the “do no harm” principle. Specifically, consequences at two peak pool elevations (236 feet and 239 feet) would be significantly greater with the modification than without the modification. Accordingly, this plans were screened from further consideration.

### **RMP 3: Auxiliary Spillway with Seepage Control**

Overtopping would be addressed by providing additional spillway capacity via an auxiliary spillway and raising the dam by using parapet walls. Backward erosion piping would be addressed through the additional seepage control features that would include trench drains, relief wells, and graded filter/drainage blankets. RMP 3 was subdivided into several related plans:

**Plan 3A** would address overtopping using a passive (labyrinth) spillway and a four-foot crest raise; it would address backward erosion piping with a trench drain. Analysis showed that this plan would fail the “do no harm” principle. Specifically, consequences at two peak pool elevations (236 feet and 239 feet) would be significantly greater with the modification than without the modification. Accordingly, this plans were screened from further consideration.

**Plan 3B** would be identical to 3A except that it addresses overtopping using a gated spillway. Analysis showed that this plan would fail the “do no harm” principle. Specifically, consequences at two peak pool elevations (236 feet and 239 feet) would be significantly greater with the modification than without the modification. Accordingly, this plans were screened from further consideration.

**Plan 3C** would address overtopping using a passive (labyrinth) spillway and an eight-foot crest raise; it would address backward erosion piping with a downstream filter/drainage blanket. An effectiveness evaluation was performed to assess the with-project risk to determine if it falls below the TRG guidelines. Effectiveness (whether and how well alternatives meet the objectives is primarily assessed using the annual probability of failure (APF) and societal incremental life safety flood risk, expressed as average annual life loss (AALL) due to dam breach and a probability distribution of potential life loss due to dam breach. The guideline for APF is 0.0001 failures per year. The guideline for AALL is 0.001 estimated lives lost per year. Plan 3C did not meet those objectives.

**Plan 3D** would address overtopping using a passive (labyrinth) spillway and a 12-foot crest raise; it would address backward erosion piping with a downstream filter/drainage blanket in conjunction with relief wells. An effectiveness evaluation was performed to assess the with-project risk to determine if it falls below the TRG guidelines identified above. Plan 3C did not meet those objectives.

**Plan 3E** would address overtopping using a passive (labyrinth) spillway and a 12-foot crest raise; it would address backward erosion piping with a trench drain. It has been carried forward for further analysis.

#### **RMP 4: New Spillway**

Overtopping would be addressed through replacing the existing spillway with a passive spillway, and raising the dam four (4) feet using a combination of fill and parapet walls. Backward erosion piping would be addressed through the additional seepage control features that would include trench drains and graded filter/drainage blankets. Analysis showed that this plan would fail the “do no harm” principle. Specifically, consequences at two peak pool elevations (236 feet and 239 feet) would be significantly greater with the modification than without the modification. Accordingly, this plans were screened from further consideration.

#### **RMP 5: Protected Overtopping with Seepage Control**

RMP 5 was formulated to address overtopping through hardening the crest and downstream slope of the embankment east of the Rio Hondo Outlet. Backward erosion piping would be addressed through the additional seepage control features that would include trench drains and graded filter/drainage blankets. It has been carried forward for further analysis in this EIS.

#### **RMP 6: Dam Replacement**

The Corps’ ER 1110-2-1156 requires the development of one RMP to consider replacement of the existing dam. Under this RMP, a new Dam would be built immediately upstream of the existing Dam within the Reservoir to current design criteria with increased spillway capacity to route new PMF (new inflow design flood) without increasing the Dam crest elevation. There would be a small increase in risk due to the loss of capacity (recall that the new dam would be constructed upstream of the existing). RMP 6 would meet or exceed the P&G guidelines for completeness, effectiveness, and acceptability, but not for efficiency. Replacement of the Dam would also be anticipated to cause significant environmental impacts. The costs would be excessive.

#### **RMP 7: Dam Removal**

The Corps’ ER 1110-2-1156 requires one RMP to address removal of the existing Dam. This RMP would effectively remove enough of the existing structure to perform as if there is no Dam as to not impact flood flows. This would include removal of the Rio Hondo outlet works, San Gabriel River spillway gates, and appurtenant structures. The base width of both channels immediately upstream of the Dam would be widened by 100 feet to allow flows through the remaining embankment into the downstream channel. The concrete sill invert of the structure would be left in place.

The San Gabriel River is one of the most productive rivers in southern California, but also has a very small channel capacity to convey flood waters. Under this RMP, the downstream communities would no longer be provided flood risk management benefits from the Project. The population at risk (PAR), 1.25 million people living in municipalities downstream of the Dam extending approximately 19.6 miles to the Pacific Ocean. An estimated 683,121 to 967,480 people who would be directly affected by a peak maximum flood inundation

depending on the time of day. This RMP does not meet the objectives of the project, and has been removed from further consideration in this Draft EIS.

### **RMP 8: Nonstructural Measures Only**

Specific nonstructural measures were formulated as a part of a Nonstructural Only Plan very early in the study. This includes measures for sheltering-in-place, improved risk communication with locals, and an improved flood warning system. These non-structural measures reduce the consequence of dam breach, but do not address the risk driving PFMs and do not reduce incremental risk of dam breach to below TRGs. This RMP does not meet the objectives of the project, and has been removed from further consideration in this Draft EIS.

## **RISK MANAGEMENT PLANS CARRIED FORWARD**

Three Risk Management Plans (RMPs) are carried forward for detailed analysis in this Draft EIS. RMP 1, the No Action RMP, does not prevent or address the occurrence of the two PFMs but is required for comparison purposes. The two action RMPs carried forward, RMP 3E, New Labyrinth Auxiliary Spillway and Seepage Control, and RMP 5, Protected Overtopping with Seepage Control, are both responsive to the objectives.

Table ES-1 identifies the key components of the various plans to address the failure modes.

<b>Table ES-1 Key Components to Address Failure Modes</b>		
<b>Plan</b>	<b>Means to Address Failure Mode</b>	
	<b>BEP</b>	<b>Overtopping</b>
Plan 1	No action	No action
Plan 3E	Trench drain	Auxiliary spillway, dam raise
Plan 5	Trench drain	Protected overtopping

### **RMP 1: No Action/Future without Project with Interim Risk Reduction Measures**

This represents the future without Federal action to address the risk condition. This plan assumes no structural modification beyond restoration of the crest elevation will be implemented to address the risk driving failure modes and the Dam would remain with a high likelihood of failure and associated consequences as described in Section 2.8. It is assumed that a set of interim risk reduction measures (IRRM; including addressing potential premature opening of the spillway gates and other measures such as remote monitoring, inspection and monitoring, pre-positioning of material, flood mapping and emergency action plan updates; see Chapter 3) have been addressed and are or will be implemented. The **No-Action RMP** is the basis for comparison with all other alternatives, as advantages and disadvantages of each alternative may be assessed.

Under the No Action Alternative, it is reasonably anticipated the Dam's crest elevation will be restored to its original design elevation (239.0 ft.) within the next 50 years. IRRM and Operations and Maintenance (O&M) activities would continue as currently implemented by the Corps.

Because of the potential consequences of dam failure that have a higher likelihood of occurring under the No-Action Alternative, the Dam Safety Modification Study has determined that this plan is not acceptable under the Corps' TRGs. This is primarily due to the life safety risk presented by the dam in its current state. In addition to the unacceptable risks to life safety, the environmental effects of a dam breach are expected to be high and adverse across nearly all resource areas. Because the environmental impacts of dam failure cannot be reasonably isolated from general storm impacts, beyond the consequence of unacceptable life safety risk, the environmental effects of dam failure are not described in specific detail as an operations effect under the no action RMP in this Draft EIS.

### **RMP 3E: New Labyrinth Auxiliary Spillway, Dam Raise, and Seepage Control**

RMP 3E addresses the two PFMs. Backward erosion piping would be addressed through trench drains and a graded filter/drainage blanket adjacent to Rosemead Blvd. Overtopping would be addressed through providing additional spillway capacity via an auxiliary labyrinth spillway and constructing a 12-foot Dam embankment raise using parapet walls. This alternative would require modification of the Water Control Plan for the operations of the Dam. A summary of the alternative is provided below:

A 240-foot wide passive weir auxiliary spillway would be constructed in-line with the existing embankment and immediately west of the existing spillway to increase the spillway capacity. The auxiliary spillway would become active when the Reservoir reaches elevation 234.0 ft. after the San Gabriel River spillway gates are fully open.

The spillway subsurface would include foundation improvements to prevent liquefaction during extreme earthquakes. Upstream of the Dam, an approach channel would be graded to improve flow characteristics to the auxiliary spillway. Downstream of the Dam, a runout channel would extend an average length of approximately 500 ft. between downstream limit of the labyrinth and the San Gabriel River through the existing Pico Rivera Municipal Golf Course. Along the existing embankment, parapet walls would raise the dam crest raise 12 ft. (to elevation 251 ft.).

The other failure mode addressed by Plan 3E is backward erosion piping in the foundation. The measures incorporated in this plan allow seepage to safely pass through the foundation without eroding the foundation of the dam.

Improvements to the seepage control system, consisting primarily of a trench drain with a graded filter/drainage blanket would extend from the surface to a depth of approximately 20 ft.; it would extend approximately 90 ft. downstream from the existing toe of the Dam.

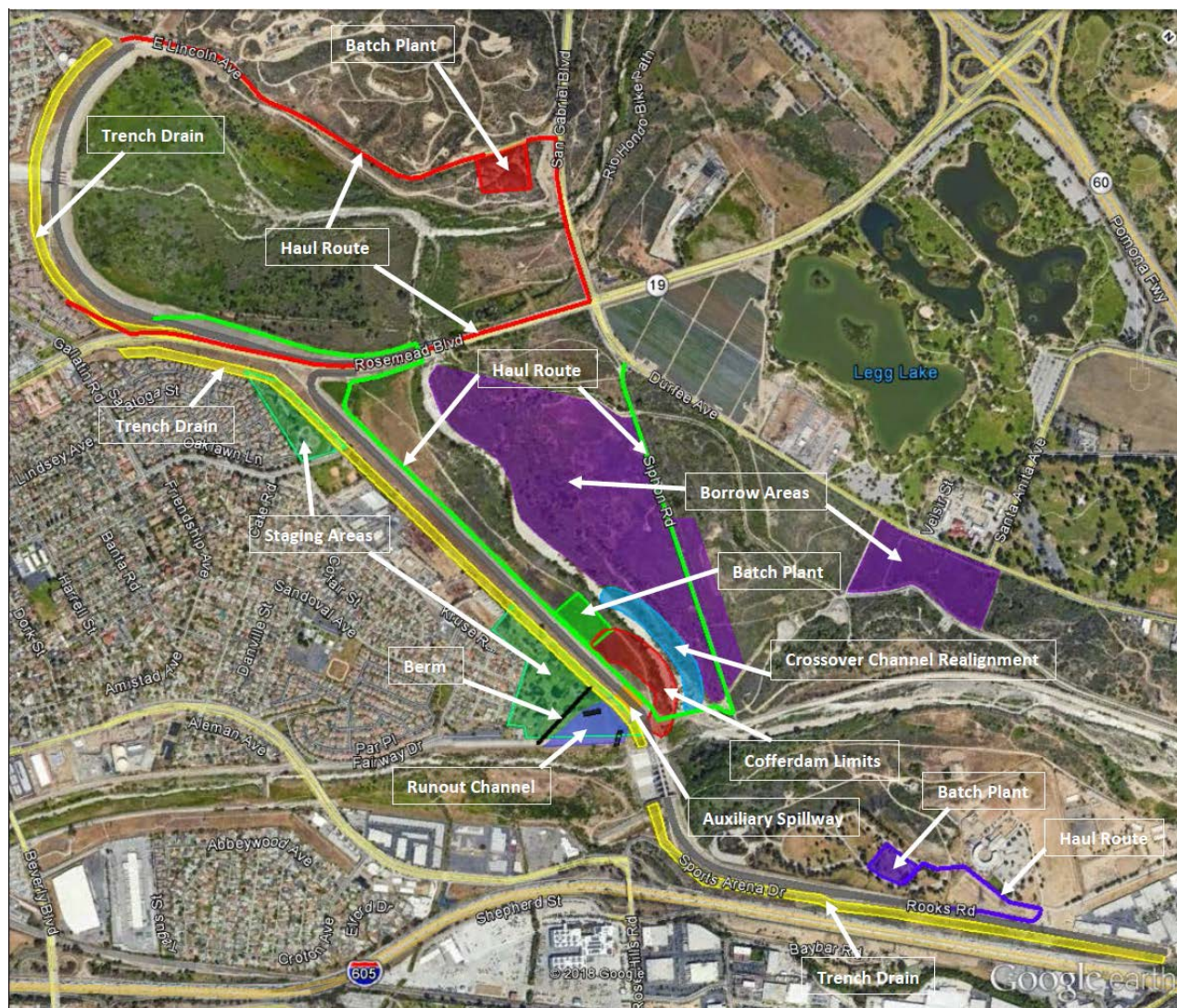
RMP 3E would require construction of a temporary cofferdam to prevent water from passing through the opening in the embankment while the auxiliary spillway is being constructed. To provide an adequate footprint for the cofferdam, the existing crossover channel and crossover weir would be relocated upstream (Figure ES-1). Once the crossover channel realignment and new crossover weir are in place, the existing crossover channel would be backfilled. Upon completion, the cofferdam would be removed and material returned to the borrow area and the borrow area re-graded. The borrow area would be graded to restore as close as possible existing site conditions.



Staging areas are those areas used for preparation to do the actual construction. Uses include construction offices and laboratories, parking for workers, equipment parking and maintenance, and access roads. The areas would also be used for stockpiling excavated and imported materials. Land owned by the United States and managed by the Corps which is currently outgranted to the City of Pico Rivera used for the Pico Rivera Municipal Golf Course and portions of Streamland Park, would be required as staging areas. Land owned by the United States and currently leased by the City of Pico Rivera along the central embankment of the Dam would also be required for the construction of the trench drain and filter blanket.

The RMP would require borrow for construction. A borrow area has been identified south of Siphon Road and north of the crossover channel. A potential second borrow area has been identified north of Siphon Road in the area known as the “Nature Area.” Batch plants would be established inside the basin and haul roads would either be created or utilize existing roads within the basin, particularly Siphon Road.

The west embankment batch plant site would be located near the southeast corner of San Gabriel Boulevard and Lincoln Ave. The central embankment batch plant site is located immediately upstream of the central embankment. The east embankment batch plant site is located in Bicentennial Park, east of the San Gabriel River.



**Figure ES-2 RMP 3E Conceptual Layout of Elements for New Labyrinth Auxiliary Spillway**

#### **RMP 5: Protected Overtopping with Seepage Control**

RMP 5 addresses the two actionable PFMs. As in Plan 3E, backward erosion piping would be addressed through trench drains and a graded filter/drainage blanket adjacent to Rosemead Blvd. Overtopping would be addressed through hardening the crest so as to prevent erosion and failure of the Dam from events large enough to cause overtopping of the Dam.

Roller compacted concrete (RCC) would be placed on the entire crest and downstream slope of the earthen embankment (the crest would be restored to the original design elevation of 239.0 ft.). The RCC is resistant to erosion, preventing dam failure during overtopping. The RCC would be placed in lifts approximately 10-feet wide and one foot high, resulting in a stepped appearance (see Figure below). This stepped face would help dissipate energy from overtopping flows. Upon completion of the RCC, the slope would be buried and hydroseeded.





**Figure ES-3 Roller Compacted Concrete**

A five-foot high parapet wall would be constructed over several short lengths where overtopping protection is not feasible or efficient.

RMP 5 addresses backward erosion piping in the foundation in the same manner as RMP 3E. These improvements would consist primarily of a trench drain with a graded filter/drainage blanket. The trench drain would be integrated with the system to dissipate the energy of the overtopping flows discussed above. No cofferdam or borrow areas are anticipated to be required for this RMP.

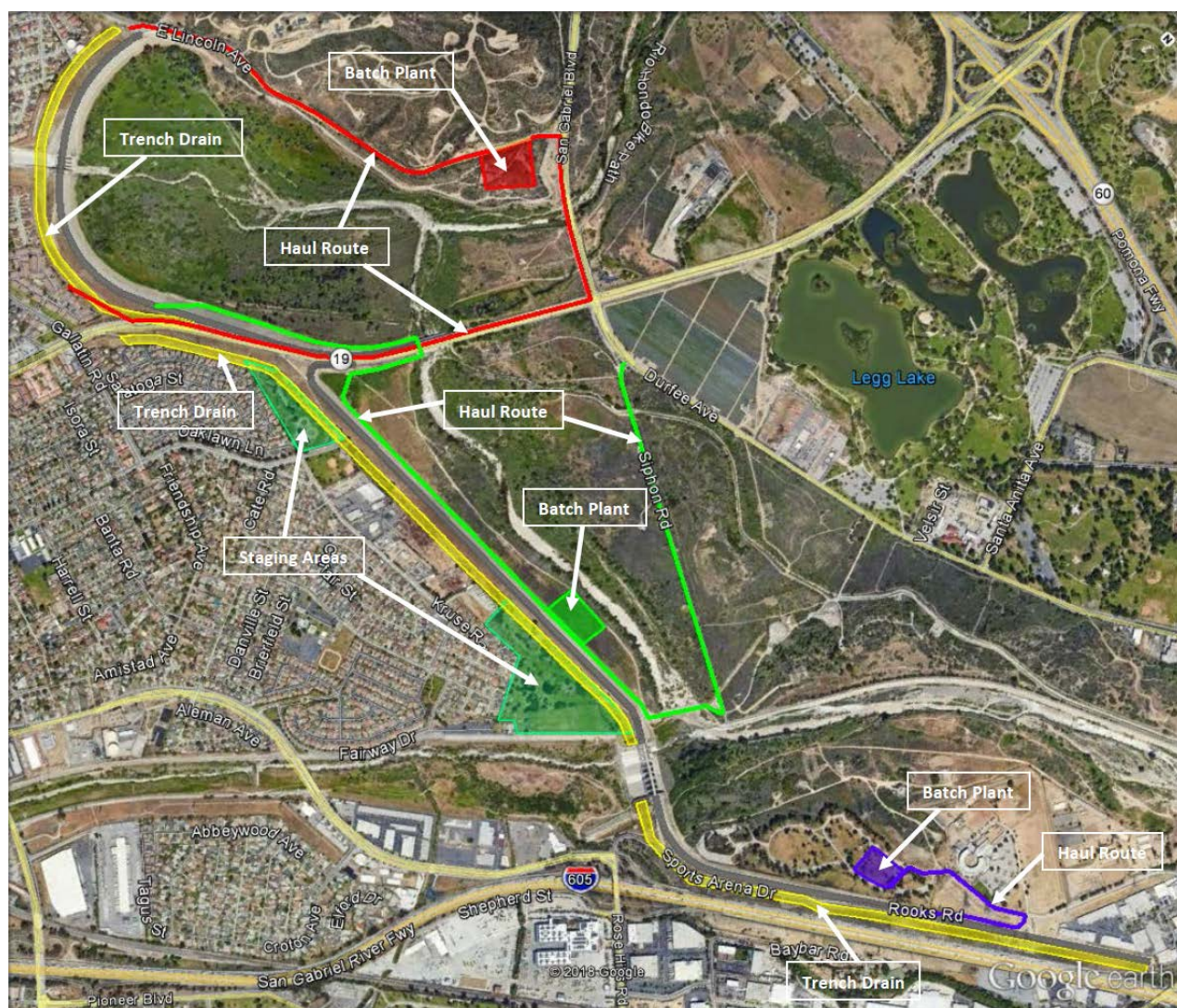
Staging areas are those areas used for preparation to do the actual construction. Uses include construction offices and laboratories, parking for workers, equipment parking and maintenance, and access roads. The areas would also be used for stockpiling excavated and imported materials. Land owned by the United States and managed by the Corps which is currently outgranted to the City of Pico Rivera used for the Pico Rivera Municipal Golf Course and portions of Streamland Park, would be required as staging areas. Land owned by the United States and currently leased by the City of Pico Rivera along the central embankment of the Dam would also be required for the construction of the trench drain and filter blanket.

Batch plants would be established inside the basin and haul roads would either be created or utilize existing roads within the basin, particularly Siphon Road.

The west embankment batch plant site would be located near the southeast corner of San Gabriel Boulevard and Lincoln Ave. The central embankment batch plant site is located



immediately upstream of the central embankment. The east embankment batch plant site is located in Bicentennial Park, east of the San Gabriel River.



**Figure ES-4 Conceptual Layout of Elements for RMP 5 Rolled Compacted Concrete**

## **COMPARISON OF ALTERNATIVE RISK MANAGEMENT PLANS**

The objective of the plans is to reduce the life safety risk to tolerable levels. RMP 1, identified as the Future without Action, does not comply with agency guidelines. RMPs 3E and 5 both comply with agency guidelines and have very similar results. Slightly higher average incremental life loss indicated for RMP 3E results from pools that exceed elevation 239.0 ft. as the increased pool elevations result in higher life loss potential.

Table ES-2 compares RMPs 1, 3E and 5 with respect to other relevant concerns. Also included below are evaluations of RMP's robustness, resiliency, and redundancy:

- **Robustness** is the ability of a system to continue to operate correctly across a wide range of operational conditions, with minimal damage, alteration or loss of functionality, and to fail gracefully outside of that range. The wider the range of conditions included, the more robust the system.
- **Resiliency** is the ability to avoid, minimize, withstand, and recover from the effects of adversity, whether natural or manmade, under all circumstances of use.
- **Redundancy** is the duplication of critical components of a system with the intention of increasing reliability of the system, usually in the case of a backup or fail-safe.

<b>Table ES-2 Four Criteria Evaluation and Comparison</b>			
<b>Criteria</b>	<b>RMP 1</b> (No Action)	<b>RMP 3E</b> (Auxiliary Labyrinth Spillway, 12-ft Crest Raise, Trench Drain)	<b>RMP 5</b> (Protected Overtopping, Trench Drain)
<b>Effectiveness</b> (High, Medium, Low)	<b>Low.</b> This plan does not meet study objectives and does not reduce incremental risk associated with PFM 4 and 21.	<b>High.</b> This plan is effective at reducing risk below Tolerable Risk Guidelines.	<b>High.</b> This plan effectively reduces the risk below Tolerable Risk Guidelines.
<b>Efficiency</b> 1= Most efficient 3 = Least efficient	<b>Efficiency: 3</b> While minimal costs are associated with this plan, it does not reduce risk below Tolerable Risk Guidelines.	<b>Efficiency: 2</b> This plan is effective, but is not as efficient as Plan 5 due to high project costs.	<b>Efficiency: 1</b> Due to the lower project costs, this is the most efficient plan for risk reduction.
<b>Acceptability</b> (High, Medium, Low)	<b>Low.</b> This plan does nothing to reduce the incremental risk and is unacceptable in terms of USACE policy.	<b>Medium.</b> This plan is acceptable in terms of applicable laws, regulations, and policies. It is expected to have a greater impact than Plan 5 on biological and other environmental resources.	<b>High.</b> This plan is acceptable in terms of applicable laws, regulations and policies due to minimal environmental impacts.
<b>Completeness</b> (Yes / No)	<b>No.</b> This plan does not account for all necessary investments to realize the study objectives.	<b>Yes.</b> This plan accounts for all necessary investments to realize the study objectives.	<b>Yes.</b> This plan accounts for all necessary investments to realize the study objectives.

The two action RMPs in the Final Array have a similar order of magnitude risk reduction for both Annual Probability of Failure (APF, failures/year) and Average Annual Life Loss (AALL, lives/year). However, RMP 5 meets the objectives for a much lower cost than RMP 3E, with

significantly less environmental, real estate, and surrounding infrastructure impacts. The conclusion of the evaluation and comparison process indicates RMP 5 is the Corps' Preferred Alternative.

### **MAJOR ENVIRONMENTAL IMPACTS**

<b>Resource</b>	<b>No Action RMP 1</b>	<b>RMP 3E</b>	<b>RMP 5</b>
<b>EARTH RESOURCES</b>	<p><b><i>IRRM</i>s:</b> None</p> <p><b><i>Construction Impacts:</i></b> Crest Elevation Restoration is anticipated to have a direct and temporary impact on earth resources through the use of a borrow area but would not permanently alter the topography to the extent that it would impact operation of the Dam. Impacts are expected to be <b><i>less than significant</i></b>.</p> <p><b><i>Operation and Maintenance:</i></b> Regular and recurring operations do not include more than incidental earth movement, excavation, or grading. Impacts would be direct, temporary, and <b><i>less than significant</i></b>. No indirect impacts are anticipated.</p>	<p><b><i>IRRM</i>s:</b> Same as RMP 1</p> <p><b><i>Construction Impacts:</i></b> Soil erosion resulting from heavy equipment use would be controlled through environmental commitments and would be temporary. Components of the RMP would have direct, permanent impacts to topography, but these impacts would be related to addressing the PFMs and/or at the Dam structure itself. Impacts would be <b><i>less than significant</i></b>.</p> <p><b><i>Operation and Maintenance:</i></b> Impacts would be direct, temporary, and <b><i>less than significant</i></b>.</p>	<p><b><i>IRRM</i>s:</b> Same as RMP 1</p> <p><b><i>Construction Impacts:</i></b> Soil erosion resulting from heavy equipment use would be controlled through environmental commitments and would be temporary. Components of the RMP would have direct, permanent impacts to topography, but these impacts would be related to addressing the PFMs and/or at the Dam structure itself. Impacts would be <b><i>less than significant</i></b>.</p> <p><b><i>Operation and Maintenance:</i></b> Impacts would be direct, temporary, and <b><i>less than significant</i></b>.</p>



Resource	No Action RMP 1	RMP 3E	RMP 5
<b>AIR QUALITY, GREEN-HOUSE GASES, AND CLIMATE CHANGE</b>	<p><b>IRRM:</b> None</p> <p><b>Construction:</b> Estimated emissions for the crest elevation restoration are not expected to exceed General Conformity <i>de Minimus</i>. Impacts would be <i>less than significant</i>.</p> <p><b>Operation and Maintenance:</b> Emissions from maintenance activities are exempt from the CAA General Conformity Rule per 40 C.F.R. 153(c)(2)(iv). Impacts would be <i>less than significant</i>.</p>	<p><b>IRRM:</b> Same as RMP 1</p> <p><b>Construction:</b> Estimated emissions from RMP 3E would not exceed General Conformity <i>de Minimus</i> thresholds. Impacts would be <i>less than significant</i>.</p> <p><b>Operation and Maintenance:</b> Emissions from maintenance activities are exempt from the CAA General Conformity Rule per 40 C.F.R. 153(c)(2)(iv). Impacts would be <i>less than significant</i>.</p>	<p><b>IRRM:</b> Same as RMP 1</p> <p><b>Construction Impacts:</b> Estimated emissions from RMP 5 would not exceed General Conformity <i>de Minimus</i> Thresholds. Impacts would be <i>less than significant</i>.</p> <p><b>Operation and Maintenance:</b> Emissions from maintenance activities are exempt from the CAA General Conformity Rule per 40 C.F.R. 153(c)(2)(iv). Impacts would be <i>less than significant</i>.</p>



Resource	No Action RMP 1	RMP 3E	RMP 5
<b>WATER QUALITY</b>	<p><b>IRRM:</b> None</p> <p><b>Construction Impacts:</b> Crest Elevation Restoration is anticipated to have both direct and indirect, temporary impacts to water quality. With implementation of environmental commitments as well as implementation the terms and conditions of the Clean Water Act Section 401 certification, water quality standards would be maintained and there would be no degradation of surface water quality. Impacts are expected to be <i>less than significant</i>.</p> <p><b>Operation and Maintenance:</b> Impacts would be direct, temporary, and <i>less than significant</i>.</p>	<p><b>IRRM:</b> Same as RMP 1.</p> <p><b>Construction Impacts:</b> Components of RMP 3E are expected to have direct and indirect, temporary impacts to water quality. With implementation of environmental commitments as well as implementation the terms and conditions of the Clean Water Act Section 401 certification, water quality standards would be maintained and there would be no degradation of surface water quality. Impacts are expected to be <i>less than significant</i>.</p> <p><b>Operation and Maintenance:</b> Impacts would be direct, temporary, and <i>less than significant</i>.</p>	<p><b>IRRM:</b> Same as RMP 1.</p> <p><b>Construction Impacts:</b> Components of RMP 3E are expected to have direct and indirect, temporary impacts to water quality. With implementation of environmental commitments as well as implementation the terms and conditions of the Clean Water Act Section 401 certification, water quality standards would be maintained and there would be no degradation of surface water quality. Impacts are expected to be <i>less than significant</i>.</p> <p><b>Operation and Maintenance:</b> Impacts would be direct, temporary, and <i>less than significant</i>.</p>

Resource	No Action RMP 1	RMP 3E	RMP 5
<b>NOISE AND VIBRATION</b>	<p><b>IRRM:</b> Largely administrative or technical exercises that are not expected to result in noise-producing activities. May include minor equipment use. Impacts would be direct, temporary, and <i>less than significant</i>.</p> <p><b>Construction:</b> Noise associated with crest raise elevation is expected to attenuate to approximately ambient conditions before reaching sensitive receptors. Impacts would be direct, temporary, and <i>less than significant</i>.</p> <p><b>Operation and Maintenance:</b> Regular/Recurring Operations and Maintenance activities are expected to have only minor temporary, direct impact on noise and vibration. Impacts would be <i>less than significant</i>.</p>	<p><b>IRRM:</b> Same as RMP 1.</p> <p><b>Construction:</b> Components such as the development of staging areas at Streamland Park and the Pico Rivera Golf Course and the construction of the runout channel, including the sheetpile placement that has the potential for significant noise impacts will be reduced to a level of <i>less than significant</i> with Environmental Commitments (ECs) N-1 through N-13.</p> <p><b>Operation and Maintenance:</b> Same as RMP 1.</p>	<p><b>IRRM:</b> Same as RMP 1.</p> <p><b>Construction:</b> Components such as the development of staging areas at Streamland Park and the Pico Rivera Golf Course, as well as the roller compacted concrete placement that has the potential for significant noise impacts will be reduced to a level of <i>less than significant</i> with Environmental Commitments (ECs) N-1 through N-13.</p> <p><b>Operation and Maintenance:</b> Same as RMP 1.</p>

Resource	No Action RMP 1	RMP 3E	RMP 5
<b>BIOLOGICAL RESOURCES</b>	<p><b>IRRM:</b> Minor temporary, direct impacts that are <i>less than significant</i>.</p> <p><b>Construction:</b> Crest Elevation Restoration impacts expected to be similar to, but less than, the impacts described under RMP 3E. The activity may result in an effect to the federally endangered least Bell's vireo, the federally threatened California gnatcatcher and designated critical habitat for the gnatcatcher. Consultation with the USFWS under Section 7 of the Endangered Species Act would be undertaken prior to implementation.</p> <p><b>Operation and Maintenance:</b> No impacts to general biological resources or threatened and endangered species.</p>	<p><b>IRRM:</b> Same as RMP 1.</p> <p><b>Construction:</b> Development and use of the borrow area(s) in combination with the batch plant development and haul route use is expected to have direct and indirect, though temporary impacts on general wildlife in the basin for the period of active construction that are expected to be <i>less than significant</i>.</p> <p>The activity may result in a direct effect to the federally endangered least Bell's vireo, the federally threatened California gnatcatcher and designated critical habitat for the gnatcatcher. Consultation with the USFWS under Section 7 of the Endangered Species Act would be undertaken prior to implementation.</p> <p><b>Operation and Maintenance:</b> Same as RMP 1.</p>	<p><b>IRRM:</b> Same as RMP 1.</p> <p><b>Construction:</b> Development and use of batch plants and haul routes is expected to have direct and indirect, though temporary, impacts on general wildlife. Impacts would be <i>less than significant</i>.</p> <p>The activity may result in an indirect effect to the federally endangered least Bell's vireo and the federally threatened California gnatcatcher and a direct effect to designated critical habitat for the gnatcatcher. Consultation with the USFWS under Section 7 of the Endangered Species Act would be undertaken prior to implementation.</p> <p><b>Operation and Maintenance:</b> Same as RMP 1.</p>

Resource	No Action RMP 1	RMP 3E	RMP 5
<b>CULTURAL RESOURCES</b>	<p><b>IRRM:</b> None. As currently described, IRRM would have no effect to historic properties.</p> <p><b>Construction:</b> Crest Elevation Restoration would not have a direct or indirect effect to historic properties as the Whittier Narrows Dam structure has been determined and concurred to be NOT eligible for listing on the National Register of Historic Places. Other project components including use of borrow area could potentially have an effect to currently unidentified historic properties and would be subject to consultation under the NHPA at prior to implementation.</p> <p><b>Operation and Maintenance:</b> None. As currently described, IRRM would have no effect to historic properties.</p>	<p><b>IRRM:</b> Same as RMP 1.</p> <p><b>Construction:</b> RMP 3E has the potential to affect cultural resources known to be in the Project area. Improvements to the Dam itself would not have a direct or indirect effect to historic properties as the Whittier Narrows Dam structure has been determined and concurred to be NOT eligible for listing on the National Register of Historic Places.</p> <p><b>Operation and Maintenance:</b> Same as RMP 1.</p>	<p><b>IRRM:</b> Same as RMP 1.</p> <p><b>Construction:</b> Same as RMP 3E. Consultation with the State Historic Preservation Office is ongoing.</p> <p><b>Operation and Maintenance:</b> Same as RMP 1.</p>

<p><b>SOCIO-ECONOMICS AND ENVIRONMENTAL JUSTICE</b></p>	<p><b>IRRM:</b> IRRMs are composed of technical studies and administrative coordination and would not result in construction activities. There would be <b>no disproportionate adverse impacts</b> to minority and low-income populations. <b>No direct or indirect impacts</b> to socioeconomics are expected to occur.</p> <p><b>Construction:</b> The crest restoration and other construction activities would have <b>no direct or indirect impact on population, housing, and employment.</b> No direct or indirect impacts are anticipated. No staging areas atop Streamland Park or Pico River Golf Course would be required. <b>No disproportionate adverse impacts</b> such as would occur under RMP 3E for recreation or noise. Other Construction related impacts would be similar to those characterized for RMP 3E</p> <p><b>Operation and Maintenance:</b> Regular and recurring O&amp;M activities would be limited in extent. <b>No direct or indirect impacts</b> are anticipated for socioeconomics. <b>No disproportionate adverse impacts</b> to minority and low-income populations.</p>	<p><b>IRRM:</b> Same as RMP 1.</p> <p><b>Construction:</b> Development and use of the borrow area(s), batch plants, haul routes, and components of the auxiliary spillway would not have a direct or indirect impact on housing or community cohesion. Use of staging areas and other construction for the dam safety modification is not expected to affect population or housing. The use of the Streamland Park and the Pico Rivera Municipal Golf Course as staging areas could have an impact on community cohesion and result in adverse business impacts that may entail a potential permanent reduction in workforce. The overall construction activity is not expected to displace a substantial number of residents, businesses or employees. Effects would be direct and indirect, could be permanent, and would be <b>less than significant</b> for socioeconomics.</p> <p>Impacts associated with recreation could represent high and adverse disproportionate affects to minority or low-income populations in Pico Rivera. Environmental justice impacts could therefore be <b>significant</b>.</p> <p><b>Operation and Maintenance:</b> Same as RMP 1.</p>	<p><b>IRRM:</b> Same as RMP 1.</p> <p><b>Construction:</b> Development of the staging areas and other construction for the dam safety modification is not expected to affect population or housing. The use of the Streamland Park and the Pico Rivera Municipal Golf Course as staging areas could have an impact on overall community cohesion and could result in adverse business impacts that may entail a potential permanent reduction in workforce. The overall construction activity is not expected to displace a substantial number of residents, businesses or employees. Effects would be direct and indirect, could be permanent, and would be <b>less than significant</b> for socioeconomics.</p> <p>Impacts associated with recreation could represent high and adverse disproportionate affects to minority or low-income populations in Pico Rivera. Environmental justice impacts could therefore be <b>significant</b>.</p> <p><b>Operation and Maintenance:</b> Same as RMP 1.</p>
---	--	--	--

Resource	No Action RMP 1	RMP 3E	RMP 5
<b>HAZARDOUS, TOXIC, AND RADIO-ACTIVE WASTE</b>	<i><b>IRRM</b>s:</i> None <i><b>Construction:</b></i> Similar to RMP 3E  <i><b>Operation and Maintenance:</b></i> None	<i><b>IRRM</b>s:</i> Same as RMP 1  <i><b>Construction:</b></i> None  <i><b>Operation and Maintenance:</b></i> Same as RMP 1	<i><b>IRRM</b>s:</i> Same as RMP 1  <i><b>Construction:</b></i> None  <i><b>Operation and Maintenance:</b></i> Same as RMP 1

Resource	No Action RMP 1	RMP 3E	RMP 5
LAND USE	<p><b>IRRM:</b> None</p> <p><b>Construction:</b> The land use classification upstream of the central embankment would not change. Impacts are <i>less than significant</i>. No indirect impacts anticipated.</p> <p><b>Operation and Maintenance:</b> None</p>	<p><b>IRRM:</b> Same as RMP 1.</p> <p><b>Construction:</b> A majority of the proposed project will occur on property owned in fee by the United States and managed by the Corps. Some of the necessary lands owned by the United States are currently under lease or easement to non-federal entities for recreation and other purposes. While no permanent acquisition of land is expected to be required, real estate agreements within the proposed RMP action area may require modification. Land leased to LACDP&amp;R and land leased to the City of Pico Rivera for recreational purposes, including Pico Rivera Municipal Golf Course, a portion Streamland Park, Bicentennial Park will be needed during construction. Land leased to the City of Pico Rivera and subleased to the Whittier Fertilizer Company and a private parcel at San Gabriel Blvd. and Lincoln Ave. may also be required. Impacts are direct, may be permanent, and <b>less than significant</b>.</p> <p><b>Operation and Maintenance:</b> Same as RMP 1</p>	<p><b>IRRM:</b> Same as RMP 1</p> <p><b>Construction:</b> Same as RMP 3E.</p> <p><b>Operation and Maintenance:</b> Same as RMP 1</p>

Resource	No Action RMP 1	RMP 3E	RMP 5
<b>TRAFFIC AND TRANSPORTATION</b>	<p><b>IRRM:</b> None</p> <p><b>Construction:</b> Traffic generated by employees or contractors during crest elevation activities would result in a negligible increase in traffic in the area. Impacts would be direct, temporary, and <i>less than significant</i>.</p> <p><b>Operation and Maintenance:</b> Impacts would be direct, temporary, and <i>less than significant</i>.</p>	<p><b>IRRM:</b> Same as RMP 1</p> <p><b>Construction:</b> Delivery or removal of materials from the interior of the Reservoir are expected to result in only a negligible increase in traffic in the vicinity of the Project. Impacts would be direct, temporary, and <i>less than significant</i>. No indirect impacts are anticipated.</p> <p><b>Operation and Maintenance:</b> Same as RMP 1</p>	<p><b>IRRM:</b> Same as RMP 1</p> <p><b>Construction:</b> Delivery or removal of materials from the interior of the Reservoir are expected to result in only a negligible increase in traffic in the vicinity of the Project. Impacts would be direct, temporary, and <i>less than significant</i>. No indirect impacts are anticipated.</p> <p><b>Operation and Maintenance:</b> Same as RMP 1</p>
<b>ESTHETICS</b>	<p><b>IRRM:</b> None</p> <p><b>Construction:</b> Although the Dam crest would be raised to its design elevation by restoring 1.8 ft. of material on top of the crest, the overall appearance of the Dam would not change as this increase in Dam elevation would be unnoticeable close up or from a difference compared to the overall height of the Dam. Therefore, the long-term visual impacts would be direct, permanent, and <i>less than significant</i>.</p> <p><b>IRRM:</b> None</p>	<p><b>IRRM:</b> None</p> <p><b>Construction:</b> The 12 foot high wall on top of the embankment crest would block views of the San Gabriel Mountains as well as the Nature Area and views of the Whittier Narrows Recreation Area in the Reservoir. This would be considered a direct, permanent, <i>significant and unavoidable</i> visual impact. No indirect impacts are anticipated.</p> <p><b>IRRM:</b> Same as RMP 1</p>	<p><b>IRRM:</b> None</p> <p><b>Construction:</b> The 5 foot high parapet wall between Lincoln Ave, and the Montebello Hills would not be visible from the surrounding area. Impacts would be direct, temporary, and <i>less than significant</i>.</p> <p><b>IRRM:</b> Same as RMP 1.</p>



Resource	No Action RMP 1	RMP 3E	RMP 5
<b>RECRE- ATION</b>	<p><b>IRRM:</b> None</p> <p><b>Construction:</b> For the crest elevation restoration, Bicentennial Park would be used as a batch plant for the crest elevation restoration. Upon completion of construction the Park would be left cleared and graded to be ready for development. Since the area is not used as designed, impacts would not result in construction or operational activities that permanently conflict with recreational uses. Impacts would be direct, temporary, and <i>less than significant</i>. No indirect impacts are anticipated.</p> <p><b>Operation and Maintenance:</b> None</p>	<p><b>IRRM:</b> None</p> <p>Construction; Pico Rivera Golf Course and Streamland Park are leased to the City of Pico Rivera for Recreational Purposes. These lands will be used as temporary construction areas. Upon completion of construction, the area of Streamland Park would remain Recreation, though the footprint of the area would be reduced. Impacts would be direct, permanent, and <i>less than significant</i>. The area of the Pico Rivera Golf Course would be developed as the runoff channel and a portion of the area re-classified as Operations. Impacts would be direct and permanent, <i>significant and unavoidable</i>.</p> <p><b>Operation and Maintenance:</b> Same as RMP 1.</p>	<p><b>IRRM:</b> None</p> <p>Construction; Pico Rivera Golf Course and Streamland Park are leased to the City of Pico Rivera for Recreational Purposes. These lands will be used as temporary construction areas. Upon completion of construction, the area of Streamland Park would remain Recreation, though the footprint of the area would be reduced. Impacts would be direct, permanent, and <i>less than significant</i>. The Pico Rivera Golf Course would be closed during construction. At completion of construction, the Golf Course would be left cleared for future development. <i>Impacts would be direct, temporary and less than significant.</i></p> <p><b>Operation and Maintenance:</b> Same as RMP 1.</p>

Resource	No Action RMP 1	RMP 3E	RMP 5
UTILITIES	<p><b>IRRM:</b> None</p> <p><b>Construction:</b> None</p> <p><b>Operation and Maintenance:</b> None</p>	<p><b>IRRM:</b> Same as RMP 1</p> <p><b>Construction:</b> Short term interruption due to disconnect and reconnections of the utilities. Impacts are direct, temporary, and <i>less than significant</i>. No indirect impacts are anticipated.</p> <p><b>Operation and Maintenance:</b> Same as RMP 1</p>	<p><b>IRRM:</b> Same as RMP 1</p> <p><b>Construction:</b> Same as RMP 3E.</p> <p><b>Operation and Maintenance:</b> Same as RMP 1.</p>

Resource	No Action RMP 1	RMP 3E	RMP 5
<b>PUBLIC HEALTH AND SAFETY</b>	<p><b>IRRM:</b> No direct impact on public health and safety as they are mainly administrative or technical exercises and no construction activity is anticipated. The IRRMs could have beneficial indirect effects, however, as they may aid in the reduction of risk as a result of Dam failure from Dam breach.</p> <p><b>Construction:</b> Impacts for the crest elevation restoration would be direct, temporary and <i>less than significant</i>. No indirect impacts are anticipated. Because this alternative does not address the PFMs, the risk of Dam failure through Dam breach would remain higher than under RMP 3E or RMP 5.</p> <p><b>Operation and Maintenance:</b> Impacts for operations and maintenance activities would be direct, temporary and <i>less than significant</i>. No indirect impacts are anticipated.</p>	<p><b>IRRM:</b> Same as RMP 1</p> <p><b>Construction:</b> The construction of an auxiliary spillway is a means to increase spillway capacity so as to prevent failure of the dam due to overtopping during extreme storms; it is possible that under extreme conditions, this would result in an earlier increase of flow into the San Gabriel River over existing conditions. The increase release in water from behind the Dam is not expected to significantly add to downstream inundation. The addition of the parapet walls on top of the Dam crest would raise the elevation of the Dam crest from 239.0 ft. to 251.0 ft. Water impoundment upstream of the Dam could be increased to this higher elevation. Elevation 251.0 ft. would also expand the upstream water inundation boundary beyond the current upstream, probable maximum flood line. These impacts are direct, permanent, and <i>less than significant</i>.</p> <p><b>Operation and Maintenance:</b> Same as RMP 1.</p>	<p><b>IRRM:</b> Same as RMP 1</p> <p><b>Construction:</b> Impacts involved in adding RCC and other components of RMP 5 would be direct, permanent, and <i>less than significant</i>.</p> <p><b>Operation and Maintenance:</b> Same as RMP 1</p>

Resource	No Action RMP 1	RMP 3E	RMP 5
<b>PUBLIC SERVICES</b>	<p><b>IRRM:</b> No direct impacts are anticipated. Indirect impacts could entail a need for additional emergency services or reallocation of existing services due to Emergency Action Plan planning and coordination activities. Indirect impacts would be temporary and <i>less than significant</i>.</p> <p><b>Construction:</b> None</p> <p><b>Operation and Maintenance:</b> None</p>	<p><b>IRRM:</b> Same as RMP 1.</p> <p><b>Construction:</b> Indirect effects of the construction and operation of RMP 3E could include the need to reallocate emergency services including police and fire protection to areas above the Reservoir and below the auxiliary spillway that may be subject to changes in inundation. No direct effects are anticipated. Indirect effects are expected to be temporary and <i>less than significant</i>.</p> <p><b>Operation and Maintenance:</b> Same as RMP 1</p>	<p><b>IRRM:</b> Same as RMP 1</p> <p><b>Construction:</b> None</p> <p><b>Operation and Maintenance:</b> Same as RMP 1.</p>

Under the No Action RMP, the project would continue to operate in its current state, with ongoing maintenance and the foreseeable restoration of the dam's crest to its original elevation. Regular and recurring maintenance activities are expected to have only minor impacts on human health and the environment. The dam crest restoration would have temporary construction impacts similar to those described under RMP 3E. However, under the No Action RMP, the Whittier Narrows Dam will continue to present an unacceptable risk to downstream populations, as well as the environmental and economic conditions in the area. The No-Action RMP includes an elevated risk of dam failure because it does not decrease the likelihood of dam failure through breach caused by overtopping or backward erosion piping. Because of the potential consequences of dam failure that have a higher likelihood of occurring under the No-Action Alternative, the Dam Safety Modification Study has determined that this plan is not acceptable under the Corps' TRGs. This is primarily due to the life safety risk presented by the dam in its current state. In addition to the unacceptable risks to life safety, the environmental effects of a dam breach are expected to be high and adverse across nearly all resource areas. Because the environmental impacts of dam failure cannot be reasonably isolated from general storm impacts, beyond the consequence of unacceptable life safety risk, the environmental effects of dam failure are not described in specific detail under the no action RMP in this Draft EIS.

RMP 3E and 5 each involve major structural modifications to the Dam and are expected to have many similar construction impacts on the environment across the 15 resource areas that were reviewed in the Draft EIS. Similar construction impacts between 3E and 5 are related to the development of temporary batch plants, haul routes, and staging areas during the construction periods of both RMP's. Concrete is the primary construction material to be used these proposals, and is made out of aggregate, water, and cement and mixed, or "batched," at a batch plant and typically needs to be placed within 90 minutes of being batched. As a result, on site batch plants were deemed necessary. Three batch plant locations are designated upstream of the Dam within the Reservoir as shown on Figure ES-1. The construction of batch plants and attendant haul routes is described in section 3.7.2. Areas would be, cleared, grubbed, and leveled as necessary and then dismantled, regarded and hydroseeded. The construction impacts and the use of these areas.

One temporary source of potential impacts under both RMP's is the development of the two staging areas using Corps-managed federal lands that are currently occupied by Streamland Park and Pico Rivera Golf course. This element of the construction plan represents the source of some temporary impacts to recreation, environmental justice, and socioeconomics due to the disruption of the use of lands currently leased for recreational or light industrial uses as shown in Figure 3.7-1. The use of these sites is necessary because the staging areas cannot be safely constructed in the reservoir or in any other area within the Project. For example, there is not sufficient room along the downstream toe of the dam to locate all of the facilities for the staging area. Placement of the staging areas within the reservoir was also not feasible because the areas were either too low an elevation to safely locate offices (western portion), or they did not provide sufficient access to and from the construction areas (central and eastern portions). Further, any further use of the reservoir area beyond the borrow areas, batch plants and haul roads would have further increased the potential effects to critical habitat for listed species. The Corps intends to take steps to mitigate for these impacts through communication with the local community and minimizing effects to the greatest extent practicable. However, there are certain unavoidable effects that will arise from the temporary staging areas. A notable and permanent impact will arise under RMP 3E with the installation of the auxiliary spillway runout channel causing the permanent reclassification of a portion of the current Pico Rivera golf course from recreation to operations. For both RMP 3E and 5, the installation of the Trench Drain will require permanent use of a narrow portion of the land along the embankment for operations purposes, which may have permanent impacts to the existing fertilizer company adjacent to the central embankment.

### **ENVIRONMENTALLY PREFERRED ALTERNATIVE**

Both action alternatives RMP 3E and RMP 5 meet the purpose and need statement articulated in Section 1.4. RMP 1, the No Action Alternative, does not.

RMP 3E and RMP 5 have similar outcomes per NEPA significance thresholds across most environmental resources (see Table ES-3 on Environmental Impacts Comparison Summary), above. Both alternatives would result in less than significant impacts to Earth Resources; Air Quality and Greenhouse Gases; Water Quality; Cultural Resources; Noise; Hazardous, Toxic and Radioactive Waste; Land Use, Traffic and Transportation; Utilities; Public Health &

Safety; Socioeconomics; Recreation (Streamland Park); and Public Services. Likewise, both action alternatives would result in potentially significant impacts to Recreation (Pico Rivera Golf Course). Impacts to biological resources could also be significant and unavoidable under RMP 3E, because of potential impacts to CAGN designated critical habitat, and LBVI. Under RMP 5, potential impacts to CAGN designated critical habitat and indirect impacts to LBVI could likely be minimized to a level of less-than-significant. Coordination with the USFWS is ongoing. From an environmental justice standpoint, both RMP 3E and RMP 5 could disproportionately, and therefore significantly, impact low-income and minority communities in Pico Rivera. Because the Dam location is fixed in place, it is not possible to completely avoid these impacts. This represents an environmental justice consideration, and the Corps is developing plans with environmental commitments to avoid or minimize these effects to the greatest extent practicable while performing the Dam modification.

There are differences between RMP 3E and RMP 5. Under Esthetics, RMP 5 would result in lesser impacts compared to RMP 3E due to the shorter height of the parapet wall under RMP 5. Likewise, RMP 5 would result in smaller construction footprint and lesser land disturbance compared to RMP 3E. Thus, RMP 3E would result in significant impacts whereas RMP 5 would result in less than significant impacts for both resources. Where both RMP 3E and RMP 5 result in less than significant impacts, RMP 5 would result in lesser impacts. For example, RMP 5 would result in lesser air quality impacts compared to RMP 3E due to a smaller amount of earthwork required. In a similar manner, RMP 5 would have a smaller probability of potential impacts to cultural resources due to the absence of a borrow area. Likewise, RMP 5 would have a smaller probability of potential impacts to water quality due to the smaller construction footprint and earthwork. Last, Rosemead Boulevard, a major artery, would not need to be modified under RMP 5 due to the shorter parapet wall; in contrast, Rosemead Boulevard would need to be raised under RMP 3E leading to temporary road closure.

A summary of each RMP's impacts by resource area follows.

**Earth Resources:** RMP 5 would not require construction of a coffer dam or raising of the roadways, so no borrow area is required compared to the need for the approximately 55-acre borrow area (and possible second borrow area) for RMP 3E. More impacts to earth resources result from the borrow area under RMP 3E, which increases the potential for adverse impacts.

**Water Resources:** Since RMP 5 would not require borrow material, the crossover channel would not need to be realigned, culverts in the crossover channel would not be needed, and a portion of the San Gabriel River levee would not be removed for the runout channel. This results in less potential impacts to water resources from RMP 5.

**Air Quality and Greenhouse Gases:** Since RMP 5 would require less hauling of borrow or fill material, there would be less pollutant emissions than RMP 3E. Similarly, neither alternative is expected to have an impact on climate change.

**Noise and Vibration** Construction impacts associated with both noise and vibration for the No Action RMP, RMP 3E, and RMP 5 could be significant, but are expected to reduce to a less-than-significant level with the implementation of environmental commitments.

**Biological Resources:** RMP 5 is expected to have direct, though temporary, impact on 21 acres (including batch plants and haul routes on the Central and Western Embankments) of designated critical habitat for CAGN within the Reservoir. RMP 3E is estimated to have direct, though temporary, impact on 117 acres of DCH for CAGN within the Reservoir. Under RMP 3E, there is expected to be a direct loss of 4 current vireo territories due to the activities associated with the construction of the crossover weir/crossover channel, the potential loss of 1 current vireo territory in the San Gabriel River as the result of construction of the auxiliary spillway, and the potential loss of an additional 4 territories along Siphon Road due to the continual traffic along the haul routes and the operation of the batch plants, as well as activity in the borrow area. Under RMP 5, no LBVI territories will be directly affected by project construction activities. Eight current LBVI nesting territories along Siphon Road may be indirectly effected due to impacts from noise of truck and other vehicle traffic along Siphon Road and the cross over weir over as well as noise from the batch plants over the 2.5-year construction period inside the Reservoir.

**Cultural Resources:** RMP 3E is likely to have a greater impact than RMP 5 because of the proposed borrow area's disturbance on known and unknown sites.

**Socioeconomics and Environmental Justice:** Both RMP 3E and RMP 5 are not expected to displace substantial number of residents, businesses, or employees. Both RMP 3E and 5 may contribute to the local economy through buying power of construction workers. Neither RMP is expected to displace important community institutions.

For site specific resources such as recreation, however, RMP 3E would result in significant and unavoidable impacts because the runout channel would be constructed over the area of the current Pico Rivera Golf Course and a portion of the area would be re-classified as an O&M area. The area of Streamland Park to be used as a staging area would also be removed, but would likely be available for recreation development following construction closeout. Nonetheless, impacts to recreation would likely be long term. This would result in a disproportionate impact to residents in the city of Pico Rivera that may utilize the golf course and park. RMP 5 would not result in a reclassification of the Pico Rivera Golf Course area as an O&M area, but the disruption to recreation activities in this area would be similar.

Impacts associated with recreation resources could disproportionately affect residential developments in Pico Rivera, east of Rosemead Boulevard and the San Gabriel River which are immediately adjacent to the construction.

**Hazardous, Toxic and Radioactive Waste:** The borrow area(s) in RMP 3E would be designed to avoid excavation to depths that would encounter contaminated groundwater and the location of the site would not interfere with on-going groundwater extraction and treatment operations. Because of the need for borrow, however, RMP 3E has a greater potential for exposure of contaminants than RMP 5.

**Land Use:** RMP 3E would require changes to land use classifications of the Federal Project due to the change from Recreation-Low Density to Operations with the construction of the runout channel over the Pico Rivera Golf Course.

**Traffic and Transportation:** Rosemead Blvd., a major artery, would not need to be modified under RMP 5 due to no significant Dam crest raise; in contrast, Rosemead Blvd., Lincoln Ave., and Rooks Road would need to be raised under RMP 3E leading to road closure.

**Esthetics:** RMP 5 would result in lesser impacts compared to RMP 3E as RMP 5 would not require the 12 foot high parapet wall on the Dam crest. Impacts to esthetics are expected to be significant while, because of the limited height of the parapet wall and other factors, the impacts from RMP 5 are expected to be less than significant.

**Recreation:** While both RMP 3E and RMP 5 would result in closure and dismantling of Streamland Park, the Pico Rivera Golf Course for staging areas and a permanent loss of 90 ft. for the trench drain, and closure of the San Gabriel River and LARio Trails, RMP 3E would result in the permanent loss of the Pico Rivera Golf Course in this location.

**Utilities:** Temporary relocation and restoration of utilities under both RMP 3E and RMP 5 would have similar impacts, except under RMP 3E one high power transmission tower located in the Pico Rivera Golf Course would be relocated.

**Public Health and Safety:** Impacts would be similar under both RMP 3E and RMP 5.

**Public Services:** Impacts would be similar under RNP 3E and RMP 5.

### **Summary of Environmental Impacts**

Under the No Action RMP, the project would continue to operate in its current state, with ongoing maintenance and the foreseeable restoration of the dam's crest to its original elevation. Regular and recurring maintenance activities are expected to have only minor impacts on human health and the environment. The dam crest restoration is expected to have temporary construction impacts similar to those described in Chapter 3. These construction impacts would not be as extensive as those under either RMP 5 or 3E. However, under the No Action RMP, the Whittier Narrows Dam will continue to present an unacceptable risk to downstream populations, and the incremental risk associated with dam failure through dam breach would not be addressed, endangering economic and environmental conditions in the area.

RMP 3E and 5 each involve major structural modifications to the Dam and are expected to have many similar construction impacts on the environment across the 15 resource areas that were reviewed in the Draft EIS. Similar construction impacts between 3E and 5 are related to the development of temporary batch plants, haul routes, and staging areas during the construction periods of both RMP's. Concrete is the primary construction material to be used these proposals, and is made out of aggregate, water, and cement and mixed, or "batched," at a batch plant and typically needs to be placed within 90 minutes of being batched. As a result, on site batch plants were deemed necessary. Three batch plant locations are designated upstream of the Dam within the Reservoir as shown on Figure 3.7-1. The construction of batch plants and attendant haul routes is described in section 3.7.2. Areas would be, cleared, grubbed, and leveled as necessary and then dismantled, re-graded and hydroseeded. The construction impacts associated with batch plants and haul roads is similar under both RMP 3E and RMP 5. RMP 5 would not require development of "new" haul roads to access the borrow areas.



One temporary source of potential impacts under both RMP's is the development of the two staging areas using Corps-managed federal lands that are currently occupied by Streamland Park and Pico Rivera Golf course. This element of the construction plan represents the source of some temporary impacts to recreation, with attendant environmental justice consideration due to the disruption of the use of lands currently leased for recreational or light industrial uses as shown in Figure 3.7-1. The use of these sites is necessary because the staging areas cannot be safely constructed in the reservoir or in any other area within the Project. For example, there is not sufficient room along the downstream toe of the dam to locate all of the facilities for the staging area. Placement of the staging areas within the reservoir was also not feasible because the areas were either too low an elevation to safely locate offices (western portion), or they did not provide sufficient access to and from the construction areas (central and eastern portions). Also, any further use of the reservoir area beyond the borrow areas, batch plants and haul roads would have added potential effects to critical habitat for listed species. The Corps intends to take steps to mitigate for these impacts through communication with the local community and minimizing effects to the greatest extent practicable. However, there are certain unavoidable effects that will arise. A notable and permanent impact will arise under RMP 3E with the installation of the auxiliary spillway causing the permanent reclassification of a portion of the current Pico Rivera golf course from recreation to operations. Under RMP 5 and 3E, the installation of the Trench Drain will require permanent use of a narrow portion of the land along the embankment, which may have permanent impacts to the existing fertilizer company adjacent to the central embankment and will reduce the footprint of the golf course and Streamland park.

Under all alternatives on-going operations and maintenance activities as well as IRRMs would be implemented. Impacts would be less than significant for these activities under all alternatives.

Taking into account the balance of impacts summarized above, the Corps has determined that RMP 5 is the environmentally preferable alternative.

### **ISSUES TO BE RESOLVED**

The Council on Environmental Quality (CEQ) regulations implementing NEPA require that related or connected actions (actions with a common purpose, timing, effects, or location) be analyzed in a single document (40 C.F.R. 1502.4(c) and 1508.25) to avoid segmenting or the splitting a proposed action into several smaller actions and analyzing them individually. Segmentation is generally discouraged because the significance of the action as a whole might not be apparent if parts are analyzed separately. However, when complete information is lacking upfront, the CEQ encourages the use of incremental decision making through tiering and/or sequencing of impact analyses to ensure continued progress toward the critical path of meeting the overall project purpose and need (40 C.F.R. 1508.28).

In this Draft EIS, the anticipated construction-related activities associated with implementing the proposed Action RMPs are addressed at a level considered appropriate, given the current status of project planning and design and available information and data. As planning proceeds, the Corps is continuing to refine remediation measures, construction methods, equipment

types, and construction schedules with the intention of further reducing impacts beyond the BMPs and environmental commitments proposed.

### **Real Estate Actions**

Real estate actions associated with implementing the Action Alternatives involve private landowners in the vicinity of the proposed construction site. The Corps is presently developing data prior to initiating discussions with private entities regarding potential real estate actions. The Corps is endeavoring to minimize potential impacts from construction that may require acquisitions. For the purpose of the impact analysis in the Draft EIS, the potential for these actions is assumed, but details on which properties may be affected and measures that the Corps may take are still being determined, and therefore cannot be fully analyzed in this Draft EIS.

### **Ongoing Dam Operations and Maintenance**

The planning process and the proposed construction of the Whittier Narrows DSM Project have a long duration. During this time, ongoing dam operations and maintenance (O&M) actions would continue independently of the actions in this Draft EIS. O&M activities would include projects that are considered separate actions, which may or may not require further NEPA analysis, even if they do occur in the same location or time frame as the Whittier Narrows DSM project.

### **Mitigation Actions**

In developing the array of construction activities necessary to implement the Action Alternatives, the Corps has incorporated proactive actions including Environmental Commitments (EC's) to avoid or minimize anticipated impacts to the extent practicable. However, in some cases, appropriate mitigation for anticipated impacts would likely need to be further defined and analyzed in detail through subsequent planning, agency coordination, public involvement and the NEPA process.

Also, the temporary and permanent construction impacts on recreation sites, especially Streamland Park, the Pico Rivera Golf Course, and Bicentennial Park are important issues to the public. A communications plan will be developed prior to construction.

Finally, a separate analysis in cooperation with the U.S. Fish and Wildlife Service is currently being conducted to evaluate potential habitat impacts and to determine if avoidance or compensation measures may be needed resulting from implementation of the proposed Action Alternatives. Endangered Species Act Section 7 consultation will be completed prior to the Final EIS. Consultations with the U.S. Fish and Wildlife Service concerning potential impacts to threatened and endangered species and with the State Historic Preservation Office concerning impacts to historic properties are ongoing. Utility relocations will be refined and coordinated with the appropriate entities.

*This page left intentionally blank.*

## CHAPTER 1 INTRODUCTION

### 1.1 INTRODUCTION

The Whittier Narrows Dam Flood Control Project (Project) is a Federal flood risk management project authorized by the Flood Control Acts of 1936 and 1941. Construction of the Project was initiated in 1950 and completed in 1957 by the U.S. Army Corps of Engineers (Corps). The Project consists of an almost 17,000-foot-long earthen embankment and two outlets or control structures (located on the San Gabriel River and Rio Hondo), which constitute the Whittier Narrows Dam (Dam), and the upstream Reservoir area behind the embankment that is inundated during storm events (Reservoir). During flood events, the Dam protects, more than one million people and reduces economic damages to the communities downstream. The Reservoir is also utilized for water conservation pursuant to an existing agreement with the Los Angeles County Department of Public Works (LACDPW). A large portion of the property, owned by the Federal government and operated and maintained by the Corps as this Project, is leased to the County of Los Angeles Department of Parks and Recreation (LACDP&R) and other entities for recreational purposes. The Corps operates the Project in accordance with the Whittier Narrows Water Control Manual (1957).



Figure 1.1-1 Aerial View of Whittier Narrows Dam Project (1957)

These modifications would not change the normal operating procedures for the Dam, nor would the modifications enhance the present flood control capabilities of the Dam. The modifications would, however, reduce the incremental risk of catastrophic dam failure during extreme flooding. This supports the goal of having a safe facility that meets Corps' risk reduction guidelines for existing dams.

The primary objective of this Draft Environmental Impact Statement (EIS) is to evaluate the potential impacts resulting from the proposed Dam modifications. The Draft EIS also discloses the impacts associated with the prolonged construction duration of modification features.

This Draft EIS also represents an important step in the process by including public and agency review and comment of the evaluation of potential impacts associated with the alternative Risk Management Plans (RMPs). All comments and input received from public and agency reviews will be considered in recommending a Preferred RMP that will be included in the Final EIS and Record of Decision (ROD). The Final EIS and ROD will become part of the Dam Safety Modification Report (DSMR) for the Whittier Narrows Dam Safety Modification Study (DSMS). Implementation of the Preferred RMP requires an approved DSMR including the Final EIS with a ROD signed by the Assistant Secretary of the Army for Civil Works (ASA (CW)). The ROD will be signed in conjunction with DSMR approval.

## **1.2 PROJECT LOCATION**

The Project is located at a natural gap, the “Whittier Narrows” (Figure 1.2-1) between the Montebello Hills and the La Puente Hills that form the southern boundary of the San Gabriel Valley in South El Monte, Los Angeles County, California (Figure 1.2-2). The Dam is located on the San Gabriel River and the Rio Hondo approximately 11 miles east of downtown Los Angeles, approximately 7.5 miles downstream from the Santa Fe Dam Flood Control Project, and 17 miles upstream of the Pacific Ocean. The Rio Hondo and the San Gabriel River flow through the “Whittier Narrows” and flood flows are constrained by the Dam. The outlet works discharge into the Rio Hondo and the spillway discharges into the San Gabriel River. The Reservoir is normally empty and a “crossover weir” allows flows that reach an elevation higher than 208.0 feet<sup>1</sup> to crossover from the San Gabriel River to the Rio Hondo, as the Rio Hondo has a larger conveyance capacity downstream of the Dam. Thus, the natural flow of each river normally passes through the Dam without creating a pool, except when held for water conservation.

The combined drainage area of the San Gabriel River watershed and the Rio Hondo sub-watershed is 556 square miles. The San Gabriel River originates in the canyons of the southern slopes of the San Gabriel Mountains, and the Rio Hondo headwaters are in the Los Angeles River watershed to the west of the San Gabriel River watershed.

---

<sup>1</sup> All elevations cited in this document are in feet, NGVD, 1929.



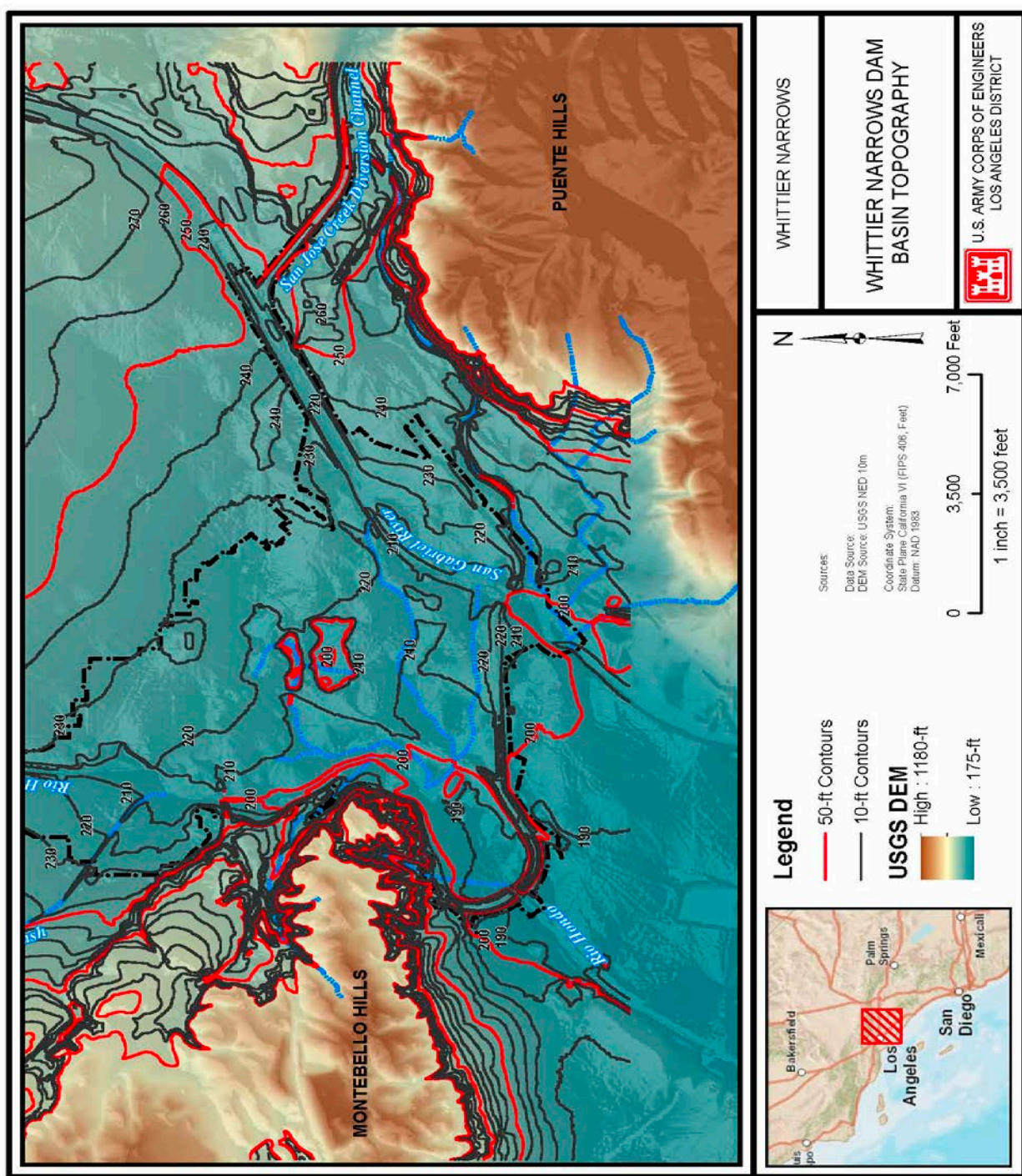


Figure 1.2-1 Whittier Narrows Reservoir Topography

The area surrounding the Reservoir is a densely populated suburban area within and adjacent to the communities of South El Monte, Rosemead, Industry, Pico Rivera, and Montebello. The Pomona Freeway (State Route 60 [SR-60]) and the San Gabriel River Freeway (Interstate 605 [I-605]) intersect near the northeastern corner of the Reservoir. Rosemead Boulevard (SR-19) and the Pomona Freeway (SR-60) intersect within the Reservoir. The San Bernardino Freeway (I-10) parallels SR-60 several miles to the north of the Reservoir (Figure 1.2-2).

The area downstream of Whittier Narrows Dam stretches southward from the Dam to the Pacific Ocean. The area is generally bound on the west by the Long Beach Freeway (I-710) and on the east in the upper half by the San Gabriel River Freeway (I-605) and in the lower or southern half by the Los Angeles-Orange County border.

**Project** refers to the area and built features including the Dam, the land, and easement lands designated as part of the Reservoir for flood risk management purposes under operation and management by the Corps.

**Dam** refers to the earthen embankments, the Rio Hondo outlet, and San Gabriel spillway.

**Embankment** refers to the actual earth-fill structure created to hold back flood waters from inundating areas downstream.

**Reservoir** refers to the area upstream or behind the Dam that is inundated during a storm when water is held for flood risk management.

### 1.3 HISTORY OF THE WHITTIER NARROWS DAM AREA

Before the arrival of the Spaniards, the land along the Rio Hondo was populated by the Tongva, part of the Uto-Aztecan family of Native Americans. The Tongva living in the Whittier Narrows area called themselves the *Kichireños* and occupied small settlements called *Iisanchanga* and *Wiichinga*. The first Europeans to reach the area were the members of the 1769 Portolà expedition, which traveled north by land after establishing the first Spanish settlement in today's San Diego. On July 30, the expedition crossed the San Gabriel River by building a rough bridge, which gave the name La Puente, to today's San Gabriel Valley city, and hills to the south are called the La Puente Hills. A few years later, a mission was established near the river crossing. The language of the Tongva was different from the neighboring Indian tribes and it was called Gabrielino by the Spanish.

The Mission San Gabriel Arcángel was founded by Franciscan Father Junipero Serra, first head of the Spanish missions in California, on September 8, 1771. Its original location was near where San Gabriel Blvd. now crosses the Rio Hondo. The Mission San Gabriel Arcángel did well in establishing cattle ranching and farming, but six years after its founding a destructive flood led the mission fathers to relocate the establishment to its current location farther north in the present-day city of San Gabriel. The original mission site is now marked by a California Historical Landmark.



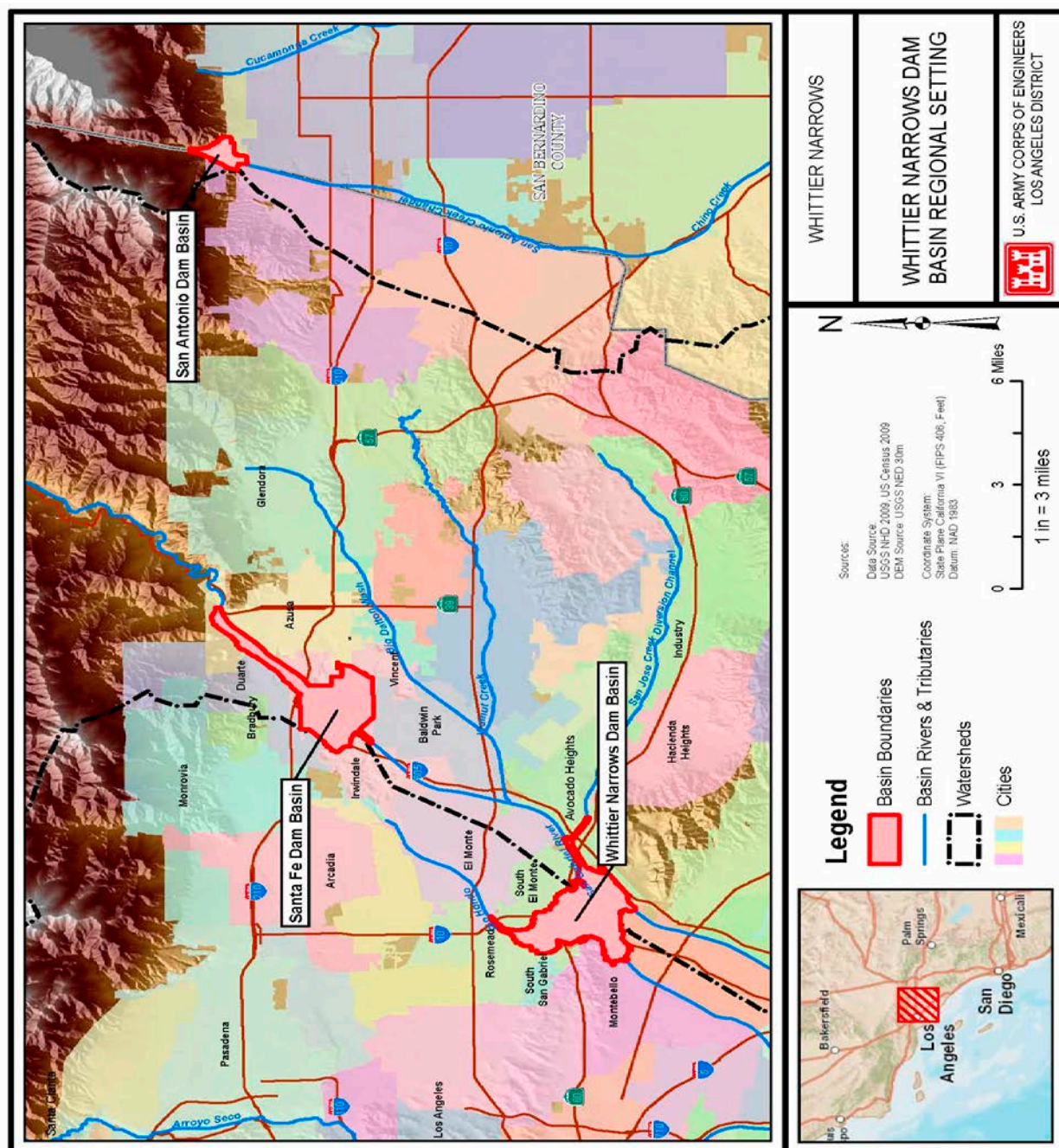


Figure 1.2-2 Whittier Narrows Dam Project



During the early years of the mission, the region operated under a Rancho system. The lands of the San Gabriel Valley were originally parts of Rancho San Antonio, Rancho La Merced, and Rancho Paso de Bartolo. Mission San Gabriel Arcángel served a central role in Spanish colonial society, with many of the area's first Mexican settlers being baptized at the mission, including Pio Pico, who was born and baptized at the mission in 1801. He became governor of California twice, in 1832 and in 1845. The city of Pico Rivera was named to honor Governor Pico as the last Mexican governor of California.

The Battle of Rio San Gabriel took place in Montebello on January 8, 1847, on the banks of the Rio Hondo. This battle was a decisive battle in the Mexican-American War and gave control of Los Angeles and Alta California to the United States. Two days later, after several battle losses and defeats, Mexico was forced to cede Alta California to the United States. Most Mexican land grants were confirmed to the original grantees by U.S. courts, but usually with more restricted boundaries that were surveyed by the U.S. Surveyor General. Land that was not part of a land grant was owned by the U.S. government until it was acquired by individuals through purchase from the General Land Office or homesteading.

In 1853, with a contingent of U.S. Army Corps of Engineers passing through the area searching for the best route to build a railroad, geologist William P. Blake observed that the once-extensive vineyards were falling to decay, with broken fences and animals roaming freely. Asian immigrants came to the San Gabriel Valley in the mid-19th century to work in the fields and to pick the grapes and citrus fruit as the railroad made shipping fresh produce east a thriving industry.

Floods and drought in the 1860s greatly reduced the cattle herds on the ranchos, making it difficult to pay the new American taxes on the thousands of acres owned by Mexican-American cattle ranchers who borrowed money at usurious rates from newly arrived Anglo-Americans. The resulting foreclosures and land sales opened the way for sub-divisions of small ranches and farms throughout the area.

In 1915, oil was discovered in the Whittier Narrows and Montebello Hills. The Montebello Oil Field was developed by Standard Oil on land owned by the Baldwin and Temple families. The discovery of oil brought about a revolutionary change to the area. The agricultural hills soon became a major contributor to oil production. By 1920, its oil fields were producing one-eighth of California's crude oil.



**Photo 1.3-1 The San Gabriel River and Rio Hondo flooded in 1938, washing away buildings, roads, and animals. (Photo by Ethel Schultheis, courtesy of Los Angeles Public Library Photo Collection)**

Substantial flooding in January and February of 1914 gave impetus to the formation of the Los Angeles County Flood Control District (LACFCD) in 1915, which was created by “The Los Angeles County Flood Control Act” and was adopted by the California State Legislature.



Los Angeles Times Archive/UCLA

**Photo 1.3-2 San Gabriel River Bridge washed out by 1921 storm (front page of the Los Angeles Times, Dec. 21, 1921)**

Significant flooding in 1921, 1924, and the disastrous flood of January 1, 1934, emphasized the need for major flood risk management projects in southern California. The Depression era Federal Relief Jobs Programs provided the financial vehicle for comprehensive construction programs in the region.

In 1935 and 1936, the Corps and the LACFCD became partners in a large Works Progress Administration (WPA) contract to design a comprehensive flood risk management plan for Los Angeles County. This became known as the Los Angeles County Drainage Area (LACDA). The severe storms and floods of February and March of 1938 exacerbated the need for a comprehensive flood risk management program in metropolitan southern California.



**Photo 1.3-3 Five people drowned when this car at the Rush Avenue Bridge was swept away near the present-day Whittier Narrows Recreation Area** (Photos: Vintage Everyday)



**Photo 1.3-5 Hog barn located between the Rio Hondo and San Gabriel River, washed out in 1938**



**Photo 1.3-4 Jan. 1, 1934 – a milk truck is almost completely submerged under the Union Pacific Railroad Bridge near Whittier Boulevard**



**Photo 1.3-6 Rio Hondo, 1938**



**Photo 1.3-7 Road washed out in El Monte, 1938 (Photo: Vintage Everyday)**



**Photo 1.3-8 Aerial looking northeast taken May 3, 1933, with the Montebello oil fields left of the words Whittier Narrows (Photo: Vintage Everyday)**

Following World War II, the housing boom forced newly returned veterans to find modest housing further and further from downtown Los Angeles, creating the suburban communities of today. Significant flooding over the years gave impetus to the construction of the Whittier Narrows Dam in the 1950s as open agriculture fields gave way to more and more development. Today, approximately 1.25 million people live in communities in floodplain of the San Gabriel River and Rio Hondo downstream of the Dam. Though the Dam continues to provide flood risk reduction benefits, the potential for flooding in the downstream areas still exists. A failure at the Dam would increase the risk associated with flooding, as well as the potential risk of loss of life.

## **1.4 PURPOSE AND NEED FOR ACTION**

The Corps is proposing risk management plans to reduce the potential for and consequences of catastrophic flooding resulting from failure of the Whittier Narrows Dam during very rare flood events. These risk management plans include structural modifications to the dam to eliminate or minimize potential modes of dam failure, and non-structural measures to reduce the consequences of rare flood events. Risk is defined as a measure of the probability and severity of undesirable consequences or outcomes. The purpose of the Whittier Narrows DSM Project is to reduce the incremental risk—the difference between consequences associated with dam failure and the consequences associated with extreme discharges in which the dam did not fail—to the downstream public to tolerable levels.

While incremental risk can be evaluated in terms of economic, environmental, or societal life safety risk, life safety is of paramount in the Corps' dam safety program. Through the DSMS process conducted pursuant to *Dam Safety-Policy and Procedures, Engineer Regulation (ER) 1110-2-1156*, the Corps determined that Whittier Narrows Dam does not meet the agency's tolerable risk guidelines (TRG) with respect to the annual probability of failure and the societal incremental life safety risk. The TRG are exceeded due to the Dam's anticipated performance during very large, very infrequent floods. The DSMS process also lead to the determination that structural modifications are required to reduce the risk to below the TRG. The DSMS revealed that the Dam is classified as Dam Safety Action Classification (DSAC 1) (very high risk). The Corps considers this level of life or life safety risk to be unacceptable and warranting of federal action.

Incremental risk includes the difference between consequences associated with dam failure whether that failure be as a result of a dam breach or malfunction, or misoperation and the consequences associated with extreme discharges in which the dam did not fail. Dam failure as a result of malfunction and misoperation is being addressed through ongoing O&M and interim risk reduction measures (e.g. spillway gate repair, remote monitoring, inspection, pre-positioning of materials, flood mapping, etc.). The purpose of the Whittier Narrows DSM Project is to reduce incremental risk associated with dam failure due to dam breach to below the Corps' TRG. The Corps has an urgent need to act to reduce the likelihood and consequences of dam failure resulting from potential dam breach.

## 1.5 NATIONAL ENVIRONMENTAL POLICY ACT COMPLIANCE

This Draft EIS has been prepared by the Corps to comply with the National Environmental Policy Act (NEPA) (42 U.S.C. § 4321, *et seq.*), Council on Environmental Quality regulations (42 C.F.R. § 1500, other environmental laws, Executive Orders, and Corps' regulations).

NEPA established a national environmental policy and goals for the protection, maintenance, and enhancement of the environment. It requires all Federal agencies to incorporate environmental considerations into planning and decision-making. NEPA also established the Council on Environmental Quality (CEQ) and empowered the CEQ to develop regulations by which all Federal agencies would comply.

These regulations are published in the Code of Federal Regulations at 40 C.F.R. §§ 1500-1508. The Corps has also published its own *Procedures for Implementing NEPA*, Engineer Regulation (ER) 200-2-2 (33 C.F.R. § 230) to provide guidance for the procedural provisions of NEPA and to be used in conjunction with CEQ regulations. Compliance with NEPA is triggered by a discretionary Federal action. For those actions with the potential to create significant environmental effects, the consideration of the proposed action and alternatives are presented in an EIS.

The Corps is the sole Federal agency responsible for the preparation of this report as identified in NEPA (40 C.F.R. § 1501.5). No other Federal agency has been designated as a cooperating agency (40 C.F.R. § 1501.6).

The purpose of the Draft EIS is to provide a full and fair discussion of the significant environmental impacts and to inform decision makers and the public of reasonable alternatives that would avoid or minimize adverse impacts or enhance the quality of the human or natural environment. This Draft EIS evaluates the potential impacts the proposed RMPs for the Whittier Narrows Dam Safety Modification Project would have on the natural and human environmental, cultural, and socio-economic resources. Prior studies, reports, and existing information, updated and augmented as necessary, have been used to the maximum extent possible when preparing this Draft EIS. Minimization, avoidance, and compensation measures for identified impacts and compliance with Federal laws, Executive Orders and Corps' policies and guidance are also included as applicable.

This Draft EIS serves to ensure that the policies and goals defined in NEPA are integrated into the Proposed Action (also referred to as the RMP). The Corps' decision makers will use the Final EIS in conjunction with the Dam Safety Modification Report (DSMR) and other documents developed under the Corps' dam safety program (conducted under the guidance of *Safety of Dams – Policy and Procedures*, ER 1110-2-1156) in considering all environmental impacts before issuing a ROD. The distribution of the DSMR is restricted from public release due to security and safety considerations. The Dam Safety Action Decision Summary is publicly available and represents the basic information on which the Corps dam safety decisions are based, as well as the criteria and constraints upon which the alternatives were developed for the purposes of this Draft EIS.

For the purposes of this document and pursuant to guidelines for implementing NEPA, the baseline used for the impact analysis reflects conditions at the time of the preparation of this report.

The CEQ regulations implementing NEPA require that related or connected actions (actions with a common purpose, timing, effects, or location) be analyzed in a single document (40 C.F.R. § 1502.4(c) and § 1508.25) to avoid the splitting of a proposed action into several smaller actions and analyzing them individually. This is generally discouraged because the significance of the action as a whole might not be apparent if parts are analyzed separately. When information is not available or incomplete, the CEQ encourages the use of incremental decision making through tiering and/or sequencing of impact analyses to ensure continued progress toward the critical path of meeting the overall project purpose and need (40 C.F.R.1508.28). Tiering provides for potentially complex actions (such as this Whittier Narrows Dam DSM Project) to have several subsequent NEPA documents (Supplemental EIS or Environmental Assessment [EA]) that analyze subsequent actions and decisions. These would incorporate this EIS by reference and concentrate on the issues specific to the subsequent actions.

The anticipated construction-related activities associated with implementing the proposed RMPs are addressed based on available information, current project planning, and engineering criteria. As design, plans, and specifications are completed and refined, additional impact analysis may be warranted and subsequent NEPA documents will be developed to describe and analyze the effects of these activities if necessary.

## **1.6 OTHER PUBLIC AGENCY ACTIONS**

Compliance with applicable Federal laws, Executive Orders, and Corps' regulations is summarized in Chapter 8.

## **1.7 PREVIOUS REPORTS**

The following section provides a list of the reports prepared by the Corps in the past, and which were utilized during preparation of this Draft EIS. These include:

U.S. Army Corps of Engineers, Los Angeles District, Analysis of Design, 57'x10' Crest Gates for Whittier Narrows Dam, 1937

U.S. Army Corps of Engineers, Los Angeles District, Flood Control in the Los Angeles County Drainage Area, 1938

U.S. Army Corps of Engineers, Los Angeles District, Analysis of Design, Whittier Narrows Dam Vol. I. (Revised 1941)

U.S. Army Corps of Engineers, Los Angeles District, Flood Control in the Los Angeles County Drainage Area, 1939

- U.S. Army Corps of Engineers, Los Angeles District, Hydrology in the Los Angeles County Drainage Area, 1939
- U.S. Army Corps of Engineers, Los Angeles District, Preliminary Report, Recreation Development, Whittier Narrows Flood Control Basin, 1947
- U.S. Army Corps of Engineers, Los Angeles District, Report, Master Recreation Plan Whittier Narrows Flood Control Reservoir, 1953
- U.S. Army Corps of Engineers, Los Angeles District, Administration and Development of Project Land and Water Areas, 1956
- US Army Corps of Engineers, Los Angeles District, Reservoir Regulation Manual for Whittier Narrows Flood Control Reservoir, Los Angeles River, California, 1957
- U.S. Army Corps of Engineers, Los Angeles District, Whittier Narrows Dam and Reservoir, Periodic Inspection and Continuing Evaluation Report No. 1, 1970
- U.S. Army Corps of Engineers, Los Angeles District, Operation and Maintenance Manual for Whittier Narrows Dam, Los Angeles River Improvement, Los Angeles County Drainage Area, California, 1970
- U.S. Army Corps of Engineers, Los Angeles District, Revised Recreation Master Plan for Whittier Narrows Flood Control Reservoir, Los Angeles River Feature Design Memorandum No. 4, 1973
- U.S. Army Corps of Engineers, Los Angeles District, Final Environmental Impact Report for Whittier Narrows Water Reclamation Plant, Bureau of Engineering, City of Los Angeles, 1975
- U.S. Army Corps of Engineers, Los Angeles District, Operations and Maintenance Manual, Los Angeles County Drainage Area, 1975
- U.S. Army Corps of Engineers, Los Angeles District, Plan of Study, Review Report for Flood Control and Allied Purposes, Los Angeles County Drainage Area, 1976
- U.S. Army Corps of Engineers, Los Angeles District, Supplement No. 2 to Feature Design Memorandum/Proposal Fiscal Year 1978, Recreation Development, 1978
- U.S. Army Corps of Engineers, Los Angeles District, Interim Report on Hydrology and Hydraulic Review of Design Features of Existing Dams for LACDA Dams, 1978
- U.S. Army Corps of Engineers, Los Angeles District, Whittier Narrows Basin Master Plan and Final Environmental Impact Report/Statement, Los Angeles, California, 1981



- U.S. Army Corps of Engineers, Los Angeles District, Whittier Narrows Dam, Seismic Evaluation of Embankment and Foundation, 1982
- U.S. Army Corps of Engineers, Los Angeles District, Final Report, Review of Water Resources within the Los Angeles County Drainage Area, 1985
- U.S. Army Corps of Engineers, Los Angeles District, Conceptual Design Material Whittier Narrows Basin Recreation Lake Water Supply and Discharge Amenities, 1986
- U.S. Army Corps of Engineers, Los Angeles District, *An Evaluation Report, Whittier Narrows Recreation Lake*, 1986
- U.S. Army Corps of Engineers, Los Angeles District, Final Environmental Assessment Whittier Narrows Recreation Lake and Wildlife Area Los Angeles County, California, 1987
- U.S. Army Corps of Engineers, Los Angeles District, Whittier Narrows Basin Recreation Lake Feature Design Memorandum, 1987
- U.S. Army Corps of Engineers, Los Angeles District, *Los Angeles County Drainage Area, Recreation Review*, 1988
- U.S. Army Corps of Engineers, Los Angeles District Supplemental Environmental Assessment for the Design Refinements to the Whittier Narrows Recreation Lake, Los Angeles County, California, 1988
- U.S. Army Corps of Engineers, Los Angeles District, Los Angeles County Drainage Area Review, Final Feasibility Report, 1991
- U.S. Army Corps of Engineers, Los Angeles District, Conceptual Management Plan for the Whittier Narrows Basin Wildlife Area, 1994
- U.S. Army Corps of Engineers, Los Angeles District, Supplement 1 to the 1981 Whittier Narrows Basin Master Plan, Including Environmental Assessment, 1995
- U.S. Army Corps of Engineers, Los Angeles District, Environmental Assessment for Whittier Narrows Master Plan, Los Angeles County Drainage Area, California San Gabriel River, 1996
- U.S. Army Corps of Engineers, Los Angeles District, Whittier Narrows Dam Master Plan, Los Angeles County Drainage Area, California, San Gabriel River, 1996
- U.S. Army Corps of Engineers, Los Angeles District, Whittier Narrows Dam, Dam Safety Assurance Program, Phase I Special Study Report, Seismic Evaluation, 1997
- U.S. Army Corps of Engineers, Los Angeles District, Los Angeles County Drainage Area (LACDA), Water Conservation and Supply, Santa Fe-Whittier Narrows Dams,

Feasibility Study, Final Report with Environmental Impact Statement and Environmental Impact Report, 1999

U.S. Army Corps of Engineers, Los Angeles District, Whittier Narrows Dam Basin Master Plan and Environmental Assessment, 2011

U.S. Army Corps of Engineers, Los Angeles District, Whittier Narrows Dam Issue Evaluation Study, 2011

## **1.8 DOCUMENTS INCORPORATED BY REFERENCE**

The U.S. Army Corps of Engineers, Los Angeles District, *Whittier Narrows Dam Basin Master Plan and Environmental Assessment* (Corp 2011) is incorporated by reference in accordance with CEQ regulation 40 C.F.R. 1502.21.

## **CHAPTER 2 BACKGROUND**

### **2.1 OVERVIEW**

This chapter describes the Whittier Narrows Dam (Project), operation of the Dam, the benefits the Dam provides, and the risks that are associated with it. The U.S. Army Corps of Engineers' (Corps) goal is to identify, based on Corps' tolerable risk guideline (TRG; *Safety of Dams – Policy & Procedures, ER 1110-2-1156*) (See Section 2.9), what the problems are that need to be addressed in order to lay the groundwork for discussion of alternative plans in Chapter 3.

Specifically, Chapter 2.2 and 2.3 describe the Project and how it got here (Authorization and Construction). Chapter 2.4 provides key components and Chapter 2.5 provides highlights of its operation. Chapter 2.6 describes the benefits the Project provides. Chapter 2.7 describes the risks that are associated with the Dam and the additional incremental risk associated with Dam failure. Chapter 2.8 describes the "Potential Failure Modes," and 2.9 the consequences of Dam failure due to dam breach.

### **2.2 WHITTIER NARROWS DAM PROJECT**

Whittier Narrows Dam is owned by the Federal Government and operated and maintained by the Corps. The areas both upstream and downstream are highly urbanized with approximately 10 cities located between the Santa Fe and Whittier Narrows Dams and 25 cities between the Dam and the Pacific Ocean. The Los Angeles County Drainage Area (LACDA) is the overall system that provides flood risk management to the metropolitan Los Angeles area (Figure 2.3-1).

### **2.3 PROJECT AUTHORIZATION**

#### **2.3.1 Flood Control Act of 1936**

The Flood Control Act of 1936 (Pub. L. No. 74-738, § 5 (1936)) authorized Federal civil works flood risk management projects for Los Angeles County, California. The Act authorized construction of flood control structures for the Los Angeles County Drainage Area (LACDA), including Whittier Narrows and Santa Fe Flood Control Projects, and the improvement of the San Gabriel River for the protection of metropolitan Los Angeles County, California.

#### **2.3.2 Flood Control Act of 1938**

The Flood Control Act of 1938 (Pub. L. No. 75-761, § 2 (1938)) authorized Federal acquisition of land for the previously authorized flood control projects, channel improvements, and channel rectification for flood control in the LACDA.

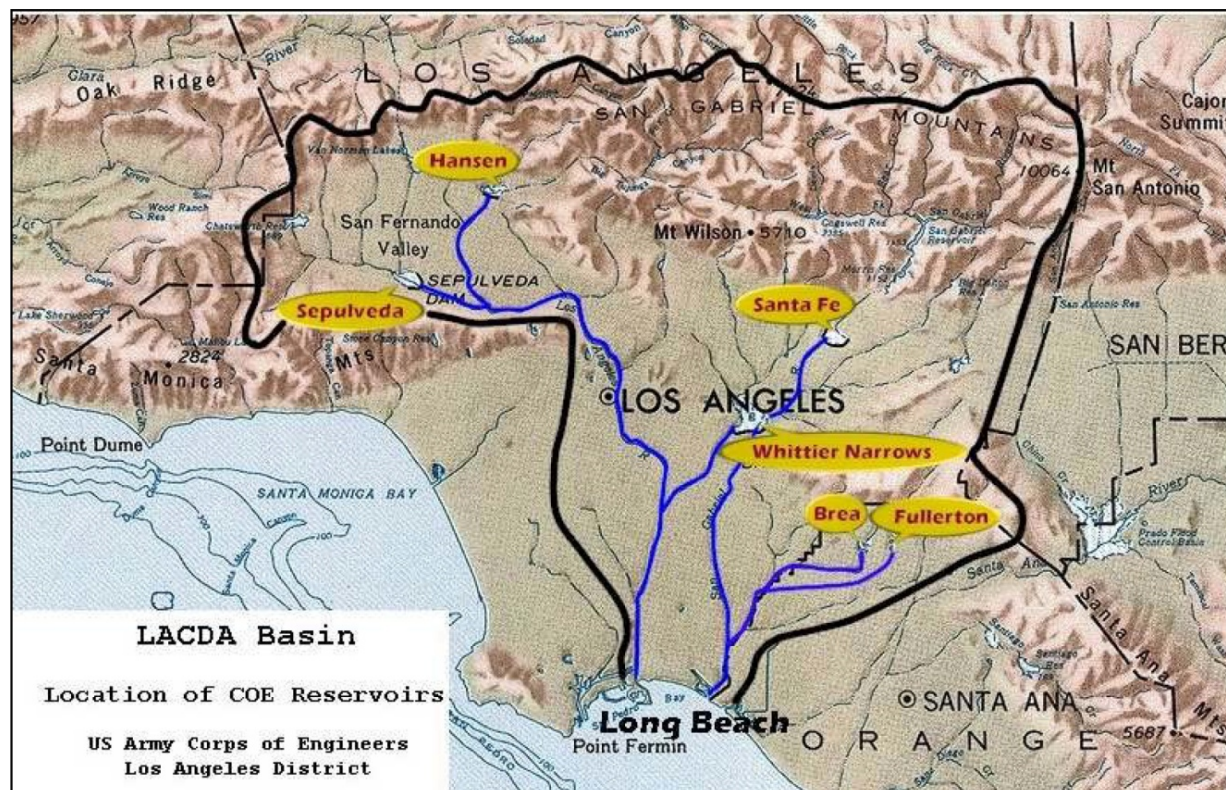


Figure 2.3-1 Los Angeles County Drainage Area (LACDA)

### 2.3.3 Flood Control Act of 1941

The Flood Control Act of 1941 (Pub. L. No. 77-228, § 3 (1941)) specifically authorized construction of the Whittier Narrows and Santa Fe Dams. Construction began in March 1950, and the final major contract was completed in March 1957.

### 2.3.4 Flood Control Act of 1944

The Flood Control Act of 1944 (Pub. L. No. 78-534, § 4 (1944)) authorized the Corps to construct, maintain, and operate public park and recreation amenities at water resource development projects. This authority is codified, as amended, at 16 U.S.C. § 460d. Pursuant to this authority, the Corps issued an initial 50-year outgrant in 1975. The outgrant was increased to 1,283 acres following the transfer of the Audubon Society's Nature Area to the Los Angeles County Department of Parks and Recreation (LACDP&R). Significant recreation facilities have since been developed throughout the Reservoir primarily on land leased to the LACDP&R as well as the City of Pico Rivera.



**Photo 2.3-1 and 2.3-2 Engineers from the Corps create model of proposed San Gabriel River Project to determine how to construct the dam and channel**



**Photo 2.3-3 and 2.3-4 Once design was completed, construction began in mid-1950s**



## **2.4 DESCRIPTION OF WHITTIER NARROWS DAM AND RESERVOIR**

The Dam is a zoned earth dam consisting of three embankments – west, central, and east – with a combined crest length of 16,960 ft. (5,230 ft., 5,352 ft., and 6,378 ft., respectively). The design elevation of the crest is 239.0 ft., with a maximum height of 55 feet above the Rio Hondo streambed. The capacity of the Reservoir at elevation 229.0 ft. (top of spillway gates when closed) is 37,479 acre-feet (ac-ft.). At top of the Dam, the capacity is 67,695 ac-ft. (an acre-foot is roughly the amount of water required to fill an Olympic-sized swimming pool; an average California household uses between one-half and one acre-foot of water per year). An overview of the Dam is shown in Figure 2.4-1. Relief wells, spaced 50- and 100-ft. on-center along the west and central/east embankments, respectively, provide uplift pressure relief at the downstream toe from water seeping underneath the Dam.

The outlet works are located on the Rio Hondo between Rosemead Blvd. and Lincoln Ave. and consist of four (4)-30ft. wide by 20-ft. high Tainter gates. The gate sill was originally at elevation 184.0 ft. but has settled to approximately 183.0 ft. Maximum discharge capacity at Reservoir elevation 229.0 ft. is approximately 75,000 cubic feet per second (cfs). The record pool elevation on the Rio Hondo side of the Dam is 213.55 ft. (January 25, 1969).

The spillway structure is located to the east on the San Gabriel River and consists of nine (9)50-ft. wide by 29-ft. high Tainter gates. The gate sill is at elevation 200.0 ft. The gates are operated manually when the pool is below elevation 228.5 and automatically for higher elevations.

## **2.5 OPERATION OF WHITTIER NARROWS DAM**

The Dam is a flood control dam and retains less than two (2) feet of water more than 80 percent of the time. Flows come into the Dam from both the San Gabriel River and the Rio Hondo. There is a weir on the San Gabriel River levee immediately north of the spillway (a weir is a section of levee designed to allow flow over the top of it without failing). When the water exceeds elevation 208.0 feet in the San Gabriel River, it flows over the weir into the crossover channel and into the Rio Hondo side of the Reservoir (behind the west embankment). The Rio Hondo and San Gabriel sides operate as one reservoir when the pool exceeds elevation 221.0 feet.

On the Rio Hondo side of the Reservoir, there is no dedicated space for water conservation, but if conditions are favorable (*i.e.*, no storms anticipated, inflows are manageable, and systems are operating as designed) and pool is below elevation 201.6 feet, releases are limited to the diversion capacity of Los Angeles County's downstream Rio Hondo Coastal Basin Spreading Grounds. When the pool is at approximately elevation 201.6 feet, or during storm periods, releases are increased to match inflow without exceeding the Rio Hondo channel capacity (40,000 cfs). This maximum regulated release is reached when the gates are fully opened at elevation 208.0 feet.

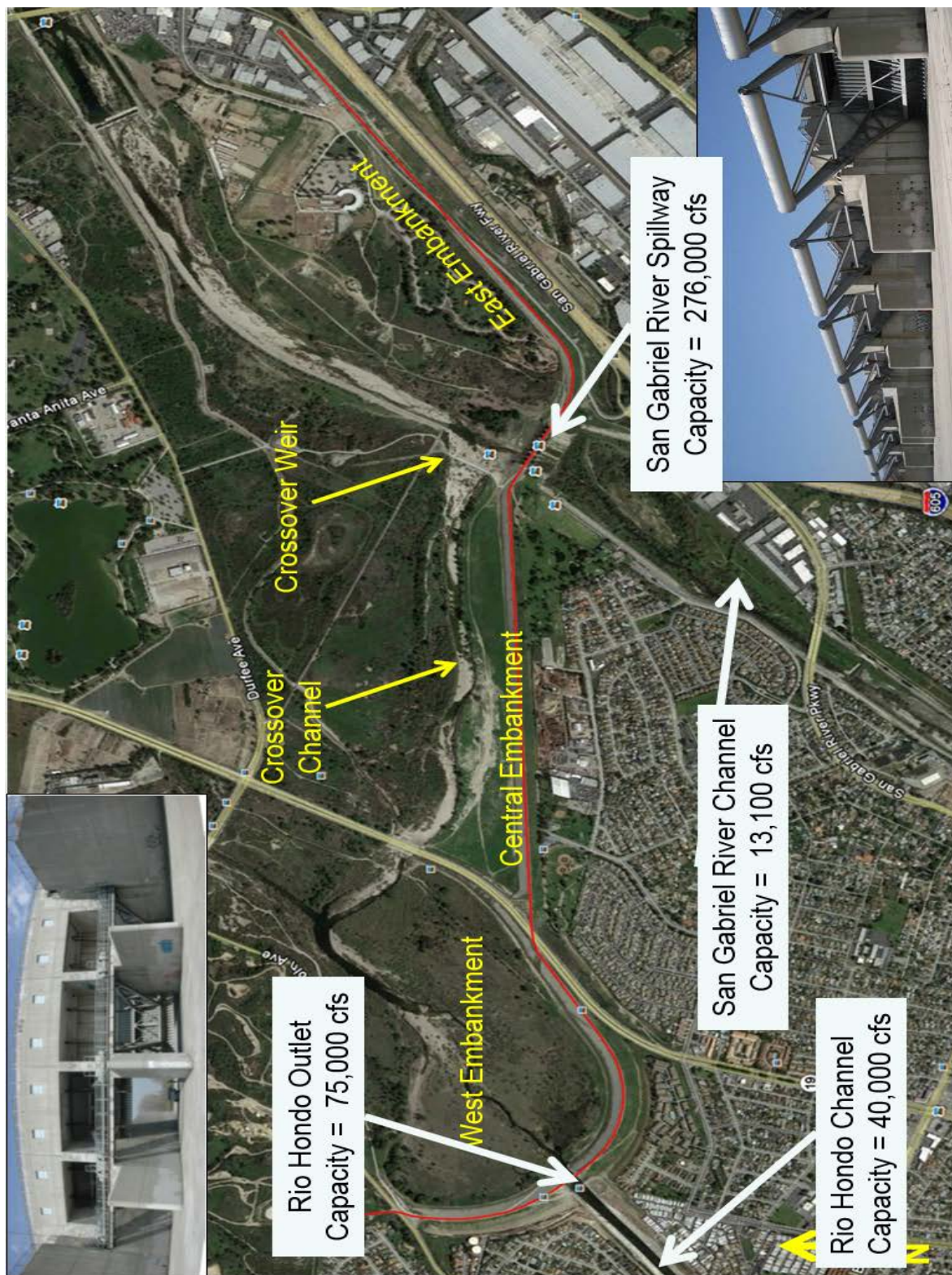


Figure 2.4-1 Project Overview

On the San Gabriel River side of the Reservoir, when the pool is below elevation 228.5 feet, the spillway gates are operated so that discharges will stay within the San Gabriel River channel downstream of the Dam. Releases are normally limited to 500 cfs, though during storms releases up to 5,000 cfs through the spillway are common. However, should a large storm result in the pool reaching elevation 228.5 feet, flooding upstream of the Dam could result as the area of the reservoir pool grows. Accordingly, when the pool elevation reaches 228.5 feet the spillway gates are designed to begin opening automatically, increasing the discharges through the spillway to prevent the incoming storm runoff from completely overwhelming and overtopping the Dam. By the time the pool reaches elevation 229.0 feet, discharges through the spillway will exceed the capacity of the San Gabriel River channel (13,100 cfs), and downstream communities will begin to flood. Should the inflows be so large that the pool reaches the top of the Dam (elevation 239.0 feet), discharges through the spillway will approach 20 times the channel capacity, resulting in significant flooding all the way down to the Pacific Ocean, with maximum depths exceeding 10 feet in some areas.

## **2.6 THE BENEFITS OF THE PROJECT**

The Project continues to provide flood risk management and recreation. The Dam serves an important life safety function through the flood risk management purpose, protecting an estimated population at risk (PAR) of 1.25 million with a population density of 2,645 people per square mile in the 25 downstream communities as of the 2010 Census. The total estimated flood damages prevented from Fiscal Year (FY) 1982 to FY 2009 are \$4.7 billion, with average annual benefits of \$169 million (FY 2009 price level) provided by the Project. The recreation area has an estimated visitation of 2.1 million people per year. Given the substantial flood risk and recreation benefits provided by the Project, in addition to the significant life-safety benefits associated with the Project, continued Federal investment to address the Dam safety issues is warranted. There are no proposed changes to the authorized Project purposes.

## **2.7 DAM SAFETY MODIFICATION AUTHORITY**

### **2.7.1 Introduction**

Following devastating flooding resulting from the levee breaches in New Orleans in 2005 during Hurricane Katrina, the Corps initiated an aggressive dam and levee safety program. Given a limited funding stream, the objective of the program is to identify, evaluate, and prioritize modifications to the structures within the agency's portfolio within a risk-based context. The program is operated under the guidance of *Safety of Dams – Policy and Procedures*, ER 1110-2-1156.

The Corps' dams are assigned a Dam Safety Action Classification (DSAC), informed by the probability of failure and the consequences associated with failure, ranging from a rank of 1 to 5. A DSAC 1 classification applies to a dam in which the likelihood of failure in combination with the consequences of failure is very high, requiring immediate actions to reduce risk. A DSAC 5 dam is one in which the risk and probability of failure are very low, in which only routine activities and maintenance are necessary. The DSAC classification is a tool used by the Corps to help set priority for further action.



The Corps' dams are evaluated through routine (periodic) assessments and through special evaluations. The results of those assessments and evaluations are provided to senior leaders who assign DSAC classifications and set dam safety priorities for the national portfolio of Corps dams. Additional studies are conducted when necessary to further define issues and prioritize projects for agency action. The most detailed type of study is a Dam Safety Modification Study (DSMS), in which dam safety issues are defined and effective solutions are formulated.

The Whittier Narrows DSMS was initiated in 2012. Detailed hydrologic, hydraulic, geotechnical, structural, mechanical, and consequence studies were conducted. Potential Failure Modes (PFMs) were identified and evaluated, and the associated consequences of dam failure determined. The study found that the authorized project purposes of flood risk management and recreation continue to be fulfilled. However, this study also revealed that the potential failure modes and the likelihood of occurrence, as well as the consequences associated with them, was greater than understood in previous studies. As a result of these findings, the Dam was reclassified as DSAC 1, very high risk. The combination of probability of failure and consequences results in Whittier Narrows Dam being one of the highest risk dams in the Corps' portfolio. The remainder of this section provides an overview of those findings.

### **2.7.2 Definition of Risk**

Risk is a measure of the probability and severity of undesirable consequences or outcomes. With respect to engineered structures, it is defined as the probability of something happening multiplied by the resulting consequence. There is risk associated with all dams because there is some probability, albeit small, that a discharge would result in undesirable consequences. That discharge could be intended (*e.g.*, an emergency release through the dam's spillway) or it may be unintended (*e.g.*, a dam failure). These consequences could be, for example, economic, environmental, or loss of life. The Corps holds life safety paramount.

### **2.7.3 Non-Breach Risk: High Spillway Flows Resulting in Downstream Flooding**

Although the spillway on the San Gabriel River is operated as one of two outlets (the other being on the Rio Hondo) to safely discharge inflows to the Reservoir, the spillway also acts as the emergency spillway and may (under certain conditions) discharge more than the downstream channel is able to contain. As originally designed and built in the 1950s, the spillway may discharge more than 276,000 cfs. The San Gabriel River channel capacity in certain locations is less than 1/20 of that (13,100 cfs). Note that flows have never exceeded the San Gabriel River channel capacity since construction of the Dam. A discharge requiring the spillway on the San Gabriel River to operate as an emergency spillway is an extremely rare event, and has not occurred since construction of the Dam. At the time of Dam construction, the assumption was that the downstream communities would be prepared to evacuate should such an event approach.

As described in Chapter 2.5, very rare storms could cause the spillway gates to automatically open. This will result in spillway discharges that will quickly exceed the capacity of the San Gabriel River channel downstream of the Dam, resulting in significant flooding of the surrounding communities. Table 2.7-1 shows the peak pool elevation, the return period, and the associated peak discharge from the Dam for three example events.

Note that a return period (sometimes called a recurrence interval) is an estimate of the likelihood that the reservoir pool would reach the given peak pool elevation. A 100-year pool elevation has a 1/100, or 1 percent, chance of occurring in a given year. That, however, does not mean that it will happen once every 100 years or that it cannot happen two years in a row. A 900-year pool elevation has a 1/900, or 0.11 percent, chance of occurring in a given year. The spillway gates begin to open at roughly a 150-year return period; it would take an approximate 200-year return period event for the discharge to begin to exceed the San Gabriel River channel capacity. For reference, the flooding associated with Hurricane Harvey in Texas in 2017 has been estimated to be an approximate 500-year event (Harris County Flood Control District).

<b>Table 2.7-1 Pool Elevation, Return Period, and Discharge for Example Flood: Non-Breach</b>			
Peak Pool Elevation (NGVD29, feet)	231.2	234.0	239.0
Return Period of Pool Elevation (years)	900	7,500	18,000
Peak Discharge (cubic feet per second)	146,000	291,000	320,000

Table 2.7-2 shows the estimated flood depths (in feet) for the 25 cities located downstream of Whittier Narrows Reservoir. In general, the distributions of the depths are such that they are greater closer to the river than they are farther away, and the depths are greater at the north end of each community than they are in the south.

<b>Table 2.7-2 Estimated Flood Depths (feet) in Cities as a Result of Spillway Discharge</b>				
	<b>CITY</b>	<b>Peak Pool Elevation</b>		
		<b>231.2</b>	<b>234.0</b>	<b>239.0</b>
<b>Above I-5</b>	Commerce, CA	N/A	N/A	N/A
	Montebello, CA	N/A	N/A	N/A
	Pico Rivera, CA	0-10	0-20	0-20
	Santa Fe Springs, CA	0-6	0-10	0-10
	South Whittier, CA	0-4	0-6	0-6
	West Whittier-Los Nietos, CA	0-4	0-4	0-6
<b>Below I-5</b>	Artesia, CA	0-4	0-8	0-8
	Bell Gardens, CA	N/A	N/A	N/A
	Bellflower, CA	0-4	0-8	0-8
	Carson, CA	N/A	N/A	N/A
	Cerritos, CA	0-8	0-8	0-8
	Compton, CA	N/A	N/A	N/A
	Downey, CA	0-6	0-15	0-15
	Hawaiian Gardens, CA	0-6	0-15	0-15
	Lakewood, CA	0-4	0-6	0-6
	Long Beach, CA	N/A	N/A	0-4

	CITY	Peak Pool Elevation		
		231.2	234.0	239.0
	Lynwood, CA	N/A	N/A	N/A
	Norwalk, CA	0-4	0-6	0-6
	Paramount, CA	N/A	0-8	0-10
	South Gate, CA	N/A	0-8	0-8
	Cypress, CA	N/A	N/A	0-2
<b>Orange County</b>	La Palma, CA	N/A	N/A	N/A
	Los Alamitos, CA	N/A	0-2	0-2
	Rossmoor, CA	N/A	0-6	0-10
	Seal Beach, CA	N/A	0-4	0-8

To estimate the potential life loss associated with the various storm events, flood maps were developed to assess the estimated maximum depth of flooding at each location within the affected area. Using those maximum depths and factors such as the time of day the warning would be issued (i.e., night or day), how much warning time people would have to evacuate, how much time it takes people to mobilize, and the time required to safely evacuate, life loss consequences were estimated for each scenario.

As discussed above, the spillway gates begin to open automatically and downstream flooding initiates when the pool reaches elevation 229.0 feet. The results of the modeling demonstrate that non-breach life loss initiates as discharges from the dam exceed the channel capacity and that the magnitude of the estimated life loss generally increases as the amount of water released increases. This represents the baseline condition against which incremental risk of dam failure was evaluated.

#### **2.7.4 Breach Risk: Dam Failure Modes Resulting in Downstream Flooding**

The previous discussion focused on the risk to the downstream communities as a result of the Dam operating as designed. At a certain point, life loss can occur simply because the San Gabriel River Watershed can generate more flow in the rivers than the various dams can hold back. These large floods will result in spillway flows and consequent flooding. However, the various hydrologic, hydraulic, geotechnical, structural, mechanical, and consequence studies conducted as part of the Dam Safety Modification Study have revealed that there are also ways that the Dam could fail. Even after the recommended plan is fully implemented, the communities downstream of the dam will remain at significant risk due spillway discharges which exceed the channel capacity. The major ways in which the Dam could fail and the related consequences are presented in sections 2.8 and 2.9.

## 2.8 POTENTIAL FAILURE MODES (PFMs)

Three PFM's dominate the risk at Whittier Narrows Dam: Backward Erosion Piping in the Foundation, Overtopping, and Premature Opening of the Automatic Spillway Gates. These are summarized below.

### 2.8.1 Backward Erosion Piping in the Foundation

Higher Reservoir levels can result in high subsurface pressures in the foundation downstream of the Dam. In turn, these pressures can result in erosion of the subsurface sand layer as water “boils” up out of the ground, carrying the Dam foundation material with it. A “pipe” begins to form under the Dam, growing larger as increasing amounts of water erode out more and more material from underneath the dam. When the “pipe” reaches the upstream reservoir, the size of the opening and the volume of the pipe grow rapidly, which can lead to significant loss of strength in the Dam embankment and then eventually failing of the Dam from the high pressures of the Reservoir.

Given the sandy, cohesionless nature of the foundation materials, and the relative uniformity of the sand sizes all along the entire dam, this PFM will need to be addressed wherever the embankment height is greater than about 25 feet. These conditions extend from west of Lincoln Ave. to 800 ft. east of the San Gabriel River Spillway. Figure 2.8-1 below illustrates the process of backward erosion piping.

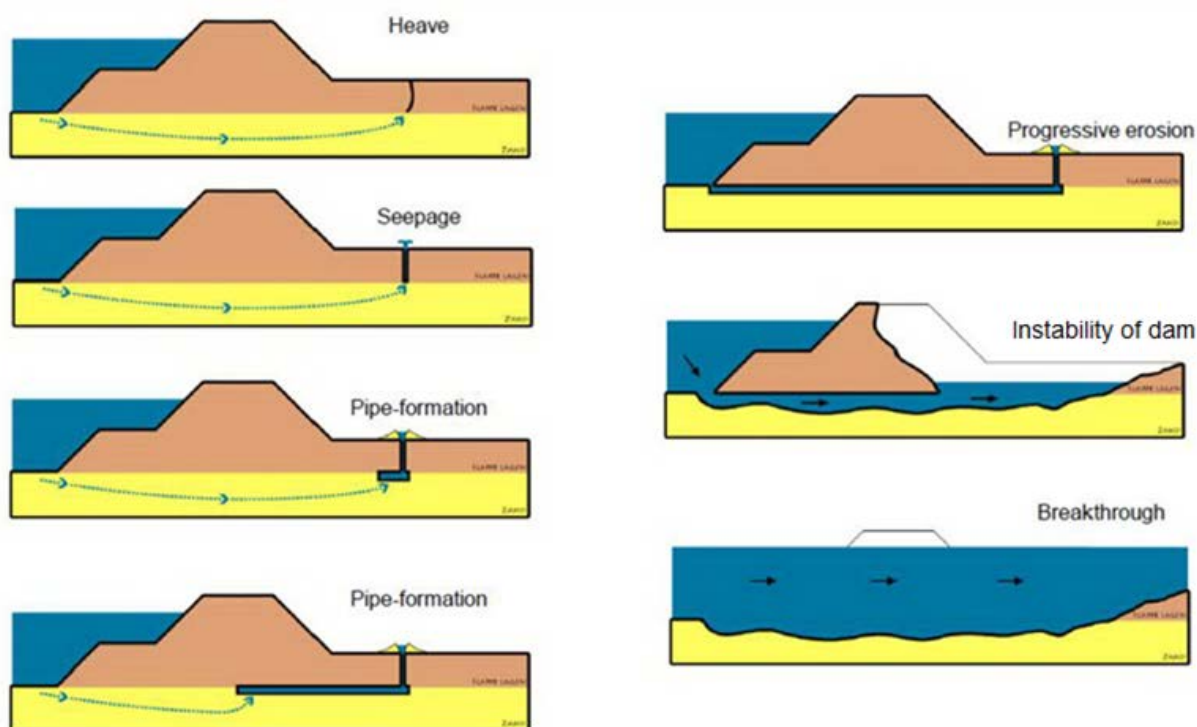
***Dam Failure.*** Failure is characterized by the sudden, rapid, and uncontrolled release of impounded water. It is recognized that there are lesser degrees of failure and that any malfunction or abnormality outside the design assumptions and parameters that adversely affect a dam's primary function of impounding water is properly considered a failure. These lesser degrees of failure can lead to loss of services and progressively lead to or heighten the risk of a catastrophic failure.

***Failure Mode*** A way that failure can occur, described by the means by which element or component failures must occur to cause loss of the sub-system or system function of a dam that could result in failure.

***Potential Failure Mode (PFM)*** The chain of events leading to dam failure or a portion thereof that could lead to dam failure. The dam does not have to completely fail in the sense of a complete release of the impounded water.

***Breach*** An opening through a dam that allows the uncontrolled draining of a reservoir. A controlled breach is a constructed opening. An uncontrolled breach is an unintentional opening caused by discharge from the reservoir. A breach is generally associated with the partial or total failure of the dam.

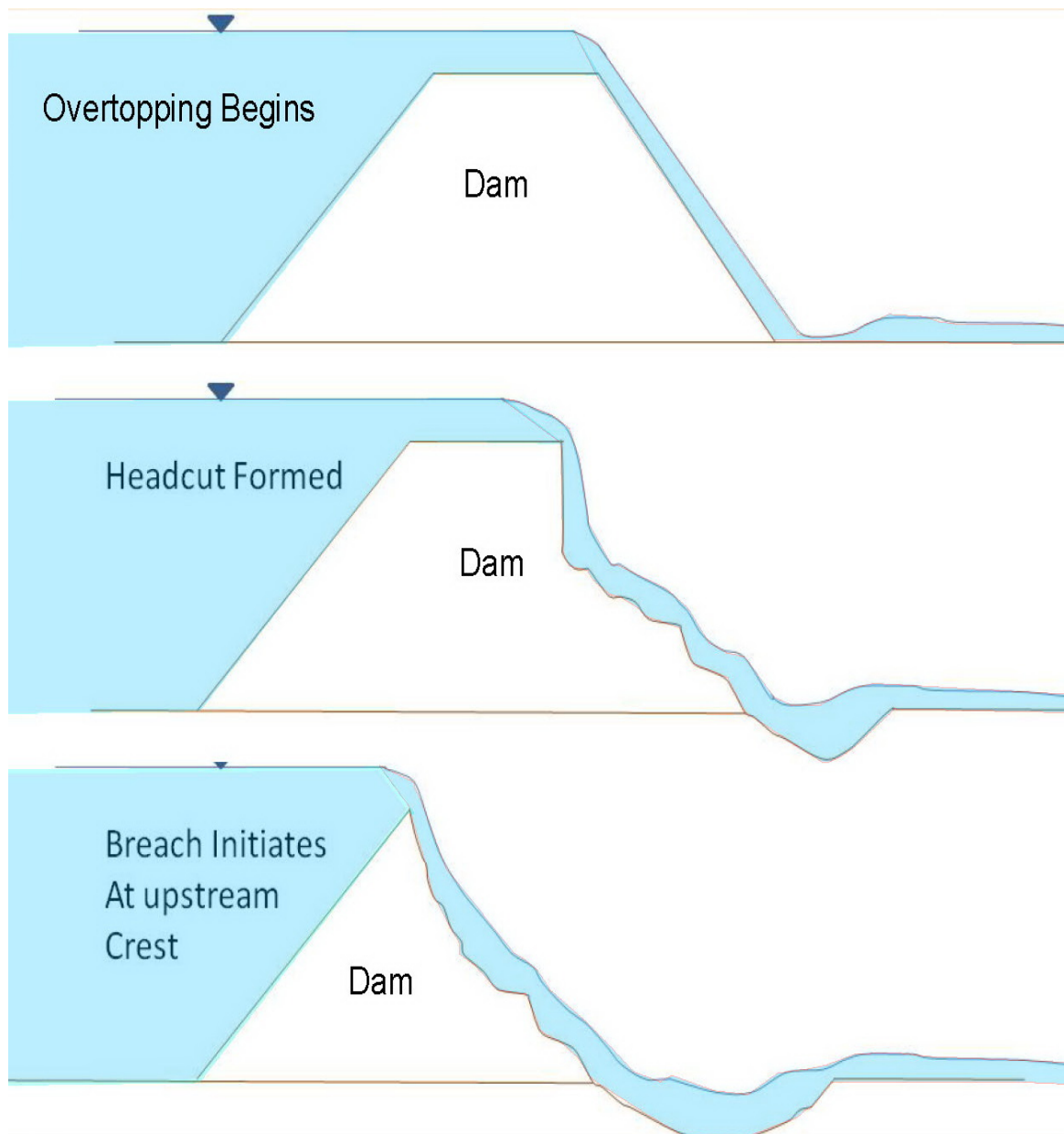
***Emergency Action Plan (EAP)*** An action plan that provides detailed instructions for agencies and individuals for responding to emergencies such as a potential dam failure. Plans typically include threat recognition, emergency action message formulation, message dissemination to authorities and the public, provisions for search and rescue, and early stages of recovery.



**Figure 2.8-1 Schematic of Backward Erosion Piping in Foundation (van Beek, 2010)**

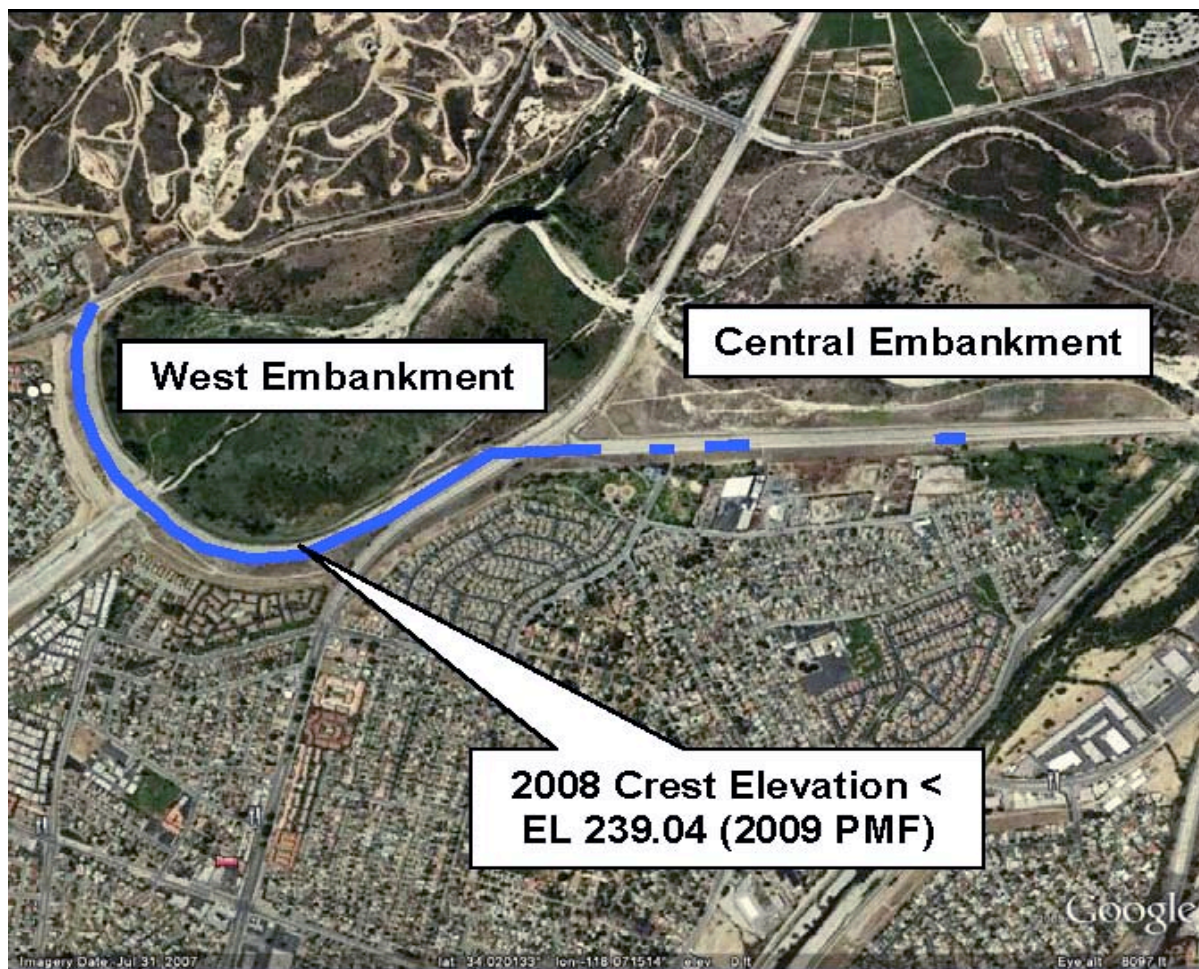
### **2.8.2 Overtopping**

Hydrologic studies indicate that the inflow design flood for the dam is larger than when the Dam was designed, primarily due to refined precipitation modeling. These studies show that the dam could be overtopped under an extreme storm event by as much as 3.8 feet, in spite of large spillway discharges. Should the Reservoir rise until water flows over the top of the dam, the sandy erodible material of which the Dam is constructed would quickly wash out and the dam would fail. This failure would result in a breach of the Dam and catastrophic flooding downstream. Figure 2.8-2 graphically depicts the process, and Figure 2.8-3 shows the most likely areas that would be overtopped due to settling of the crest, i.e., where the crest is lower than originally designed and constructed.



**Figure 2.8-2 Schematic of Overtopping Failure**





**Figure 2.8-3 Potential Locations of Overtopping**

### **2.8.3 Premature Opening of the Automatic Spillway Gates**

As discussed in Chapter 2.4, the spillway gates on the San Gabriel River are manually operated when the pool is below elevation 228.5 ft., but will begin to open automatically when the pool exceeds that elevation. This opening involves a complex system of weights, floats, cables, and pulleys. The complexity of the system means that there are a number of components that could malfunction. Should one or more gates open prematurely, spillway discharges would quickly exceed the downstream channel capacity, resulting in flooding and consequences during more frequent storm events that would not have occurred had the gates functioned as designed.

The Corps is currently implementing a modification to address premature opening of the spillway gates that will be completed in 2019. NEPA compliance for this activity is complete. Accordingly, the alternatives analyzed in this EIS do not include elements to address this failure mode.

## 2.9 CONSEQUENCES OF DAM BREACH

It was previously stated that risk is defined as a measure of the probability and severity of undesirable consequences or outcomes. The potential failure modes increase the flood risk to the downstream communities. The magnitude of the consequences (life loss, economic, and environmental impacts) would depend upon where along the embankment the failure occurred and the amount of water released, which is a function of the magnitude of the storm event and size of the breach.

The process to assess life loss described in Section 2.7.3, Non-breach Risk was repeated for Breach Risk. Table 2.9-1 shows the same example floods shown in Table 2.7-1 above, except that the peak discharge has been modified to account for a Dam breach and these discharges would be if the Dam were to breach on the west embankment (west of Rosemead Blvd.) or the central embankment (east of Rosemead Blvd.).

<b>Table 2.9-1 Pool Elevation, Return Period, and Discharge for Example Flood: Breach</b>			
Peak Pool Elevation (NGVD29; feet)	231.2	234.0	239.0
Return Period of Pool Elevation (years)	900	7,500	18,000
Peak Discharge – West Breach (cubic feet per second)	339,000	505,000	570,000
Peak Discharge – Central Breach (cubic feet per second)	277,000	436,000	468,000

Table 2.9-2 presents the range of depths in the downstream communities affected by flooding as a result of dam breach for example storm events varying in magnitude and frequency.

The DSMS modeling simulations have shown that the estimated life loss is higher for the breach compared to the non-breach case. As explained below, the estimates represent an unacceptable risk.

<b>Table 2.9-2 Range Of Depths (feet) For Example Floods In The Downstream Communities Affected By Flooding Due To Dam Breach</b>							
	CITY	Peak Pool Elevation (NGVD29), West Embankment Breach			Peak Pool Elevation (NGVD29), Central Embankment Breach		
		231.2	234.0	239.0	231.2	234.0	239.0
<b>Above I-5</b>	Commerce, CA	0-15	2-15	2-15	N/A	N/A	N/A
	Montebello, CA	0-4	0-8	0-8	N/A	N/A	N/A
	Pico Rivera, CA	NA	0-8	0-10	0-15	2-15	2-15
	Santa Fe Springs, CA	0-4	0-10	0-10	0-2	0-6	0-6
	South Whittier, CA	0-4	0-8	0-8	N/A	N/A	N/A
	West Whittier-Los Nietos, CA	0-4	0-6	0-8	N/A	0-4	0-4
<b>Below I-5</b>	Artesia, CA	0-6	0-8	0-10	0-4	0-6	0-8



	Bell Gardens, CA	NA	NA	NA	N/A	N/A	N/A
	Bellflower, CA	0-6	0-8	0-8	0-4	0-6	0-6
	Carson, CA	NA	NA	NA	N/A	N/A	N/A
	Cerritos, CA	0-8	0-10	0-15	0-4	0-6	0-8
	Compton, CA	0-6	0-15	0-15	N/A	N/A	N/A
	Downey, CA	0-8	0-10	0-15	0-6	0-8	0-10
	Hawaiian Gardens, CA	NA	0-4	0-15	0-4	0-6	0-8
	Lakewood, CA	NA	NA	NA	0-4	0-6	0-6
	Long Beach, CA	0-2	0-6	0-6	N/A	N/A	0-6
	Lynwood, CA	0-8	0-10	0-15	N/A	N/A	N/A
	Norwalk, CA	0-4	0-6	0-8	0-4	0-6	0-6
	Paramount, CA	NA	NA	0-6	0-6	0-8	0-10
	South Gate, CA	NA	NA	0-2	N/A	N/A	N/A
<b>Orange County</b>	Cypress, CA	NA	NA	0-2	N/A	N/A	0-4
	La Palma, CA	NA	0-6	0-8	N/A	N/A	N/A
	Los Alamitos, CA	N/A	0-2	0-2	N/A	N/A	0-4
	Rossmoor, CA	N/A	0-6	0-10	N/A	0-6	0-8
	Seal Beach, CA	N/A	0-4	0-20	N/A	0-2	0-8

### 2.9.1 Evaluation of Risk

It was previously stated that risk is defined as a measure of the probability and severity of undesirable consequences or outcomes.

While multiple measures of risk can be used, two measures are paramount in the dam safety program: the annual probability of failure (APF) and societal incremental life safety flood risk, expressed as average annual life loss (AALL) due to dam breach and a probability distribution of potential life loss due to dam breach. Both measures of risk are exceeded by the Dam in its present condition.

Modification of the Dam is proposed here because the APF and the AALL associated with Whittier Narrows Dam exceed the Tolerable Risk Guidelines.

## **CHAPTER 3 ALTERNATIVE RISK MANAGEMENT PLANS TO ADDRESS POTENTIAL FAILURE MODES**

As discussed in Chapter 1, the purpose of the Proposed Action is to reduce the incremental risk associated with dam failure to below Corps' tolerable risk guidelines. In Chapter 2 it was shown that incremental risk results from two primary potential failure modes (PFMs): backward erosion piping in the foundation, and overtopping of the dam leading to failure during an extreme storm. This chapter summarizes the various Risk Management Plans (RMPs) considered to address those PFMs. The chapter provides an overview of the Corps' process for developing the plans (3.1); identifies and describes various component pieces – “measures” – to reduce the risk associated with the PFMs (3.2); describes the various RMPs made up of the various measures (3.3); summarizes and applies the Corps' criteria for evaluation of the various plans (3.4); provides detailed descriptions of those RMPs that merit further consideration and provides the rationale for those dismissed from further consideration (3.5); and compares the final array of RMPs against key metrics, leading to the recommendation of a preferred RMP (3.6).

### **3.1 PLAN FORMULATION PROCESS**

*Safety of Dams-Policy and Procedures*, Engineer Regulation (ER) 1110-2-1156 provides policy and procedures for Dam Safety Modification Studies. The Whittier Narrows Dam Safety Modification Study (DSMS) was undertaken following the six step framework of civil works planning presented in the Corps' *Planning Guidance Notebook*, ER 1105-2-100, as adapted in *Safety of Dams-Policy and Procedures*, ER 1110-2-1156, to address dam safety issues. The adapted six step process is as follows:

1. Identification of dam safety issues and opportunities;
2. Estimating baseline risk condition;
3. Formulation of alternative risk management plans;
4. Evaluation of alternative risk management plans;
5. Comparison of alternative risk management plans; and
6. Recommendation of a risk management plan for implementation.

The six planning steps occurred iteratively as the dam safety risks were assessed. The first two steps, where the dam safety issues and opportunities were identified (step 1) and the baseline risk condition was estimated (step 2), were summarized in Chapter 2. This Chapter focuses on steps three through four – the formulation, screening, and evaluation of alternative risk management plans (RMPs). Steps five and six, the comparison and recommendation of RMPs, begins at the conclusion of this Chapter with a focus on the Corps dam safety requirements, and continues through Chapters 4, 5, 6, and 7 with the evaluation and comparison of potential environmental impacts.

### 3.2 EVALUATION CRITERIA

Through several iterations of formulation, plans were identified, evaluated, compared, and screened using key criteria: effectiveness (Does the measure result in risk reduction? Does it reduce the incremental risk to below tolerable risk guidelines?); efficiency (Is the measure cost effective?); and feasibility (Given the engineering considerations, is it reasonable to assume the measure can be constructed?). Measures were also evaluated for acceptability (Is it consistent with existing laws, regulations, and policy?) and completeness (Does the plan accounts for all necessary investments to ensure the realization of the objectives?). During screening, it was also noted whether the measure would be likely to have substantial environmental effects.

Constraints were also identified. A constraint is a restriction whose violation would result in the elimination of a measure. A key constraint used in the formulation process was the “do no harm” principle. Specifically, that the population downstream of the dam should not be at greater risk as a result of the modification unless there are reasonable and prudent measures to mitigate that risk and there is a significant risk reduction to the broader population.

### 3.3 RISK MANAGEMENT MEASURES

Step 3 in the six-step planning process is to formulate alternative risk management plans. A risk management plan is built from one or more risk management measures: measures are the building blocks of plans. A risk management measure is a feature or activity that can be implemented at a specific geographic location to address one or more objectives. Structural and nonstructural risk management measures were developed to address each of the two actionable PFMs. This section will first briefly summarize the measures initially identified and the screening process (3.3.1) and then discuss in more detail the nonstructural measures (3.3.2) and structural measures (3.3.3 and 3.3.4) carried forward for further evaluation.

#### 3.3.1 Summary of Risk Management Measures and Rationale for Screening

Table 3.3-1 lists, describes, and evaluates the various risk management measures and then identifies those that will be carried forward for further analysis. Consistent with the Corps’ *Planning Guidance Notebook*, the table identifies both structural measures and nonstructural measures. Although structural measures focus on reducing the probability of flooding as well as the consequences associated with the PFMs, nonstructural measures primarily reduce risk by focusing on reduction of the consequences of floods.

Table 3.3-1 Summary of Risk Management Measures			
Measure	Description	Evaluation/Rationale	Screening Result
<b>Measures to Address Backward Erosion Piping PFM</b>			
Trench Drain	A trench is excavated downstream of dam and backfill with sand and	Effective. Some operations and maintenance cost. Reduces recreation area.	Carry Forward

Measure	Description	Evaluation/Rationale	Screening Result
	gravel to dissipate groundwater pressure.	Requires modification to some existing utilities.	
Additional Relief Wells	Adding or replacing relief well capacity provides a means to dissipate downstream groundwater pressures.	Effective. Highest O&M costs of all BEP measures. Real estate available for implementation. Minor impacts to recreation and avoids existing utilities.	Carry Forward
Downstream Filter and Drainage Blanket	Sands and gravels are placed on the downstream surface to provide a filtered exit to subsurface seepage.	Not effective in most reaches. Lowest cost BEP measure. Minor impacts to recreation and avoids existing utilities.	Carry Forward
Upstream Impervious Blanket	Impervious materials are placed upstream of the dam to reduce the amount of water entering the subsurface.	Not effective at interrupting any continuous path of erodible sands nor preventing formation of a roof over a developing pipe. Requires aggressive preventative removal of vegetation, through significant maintenance. Minor impacts to recreation and avoids existing utilities.	Eliminated
Cutoff Wall	A deep trench is dug underneath the dam and backfilled with impervious materials to prevent seepage under the dam.	Least effective at reducing the likelihood of initiation of BEP, and alluvium is too deep (40 feet) to secure a cost-effective positive cutoff. Excessive in cost. Extensive numerical modeling would be required to address impacts to groundwater.	Eliminated
<b>Measures to Address Overtopping PFM</b>			
Increase maximum discharges from the Rio Hondo Outlet Works	The outlet works have the capacity to pass more than 75,000 cfs though maximum discharge is currently operated to prevent discharges from exceeding the 40,000 cfs channel capacity.	Partially effective when paired with other measures. No environmental or real estate impacts due to construction.	Carry Forward

Measure	Description	Evaluation/Rationale	Screening Result
San Gabriel River Spillway, Revise Water Control Plan	Increase discharges earlier in a major storm in order to prevent overtopping	Not effective at addressing design storm, would increase consequences during more frequent events.	Eliminated
Increase Downstream River Capacity	Make the San Gabriel River wider and deeper (raise sides with levees or walls)	Not efficient – high cost – as it would require huge amounts of real estate and impact existing infrastructure.	Eliminated
Excavate Whittier Pool Area	Increase the capacity of the dam by additional excavation of the reservoir.	Not efficient – high cost. Would require removal of 1,000,000 cubic yards of material, significant environmental and groundwater impacts.	Eliminated
Increase Storage at Gravel Pits	Use the upstream gravel quarries as storage.	Not effective. Design flood study already shows gravel pits fill up during antecedent events.	Eliminated
Santa Fe Dam Re-Operation	Change how Santa Fe Dam is operated so as to pass more water sooner and/or retain more water later.	Not effective. Insufficient capacity to reduce Whittier Narrows design flood. Early releases increase downstream consequences over the FWAC.	Eliminated
Santa Fe Dam Raise	Increase storage capacity at Santa Fe Dam by raising the crest of the dam.	Not efficient and not effective as it would not prevent overtopping at Whittier Narrows Dam.	Eliminated
Santa Fe Dam Excavation to increase storage capacity	Increase the capacity of the dam by additional excavation of the reservoir.	Not effective; not enough capacity at Santa Fe to adequately address safely passing the design flood. Significant environmental impacts.	Eliminated
Increase upstream storage capacity at existing upstream dams	Increase storage capacity by raising the crest of dams upstream of Santa Fe.	Ineffective within limits of technical and logistical feasibility– the storage capacity of those dams is relatively small and would require excessively large modifications to these structures.	Eliminated

Measure	Description	Evaluation/Rationale	Screening Result
New Upstream Dam	Build a new dam upstream.	Not efficient. Requires significant real estate acquisition with significant environmental impacts.	Eliminated
Lower and modify the east embankment to work as an auxiliary spillway	The east embankment (or a portion of it) would be modified to be a spillway.	Not effective. Hydraulic inefficiencies would preclude effectiveness (east embankment elevation too low to be effective as spillway). Increases consequences in areas minimally affected under FWAC.	Eliminated
Modify existing spillway to increase discharge capacity	Add additional spillway bays and gates to increase discharge capacity.	May be partially effective when combined with other measures. Could be used during PED as design consideration to increase efficiencies for plans with new/auxiliary spillway and would be included in updates to the water control manual.	Carried Forward (as possible future design consideration)
Use flood gates or portable dams at road crossings	Gates could be imbedded in the road or stockpiled near the road for placement during major storm.	May be partially effective when combined with other measures for overtopping and could be used during PED as design consideration/value engineering.	Carried Forward (as possible future design consideration)
Dam raise to retain design flood	Raise the height of the dam to prevent water from overtopping during design flood.	Not efficient. Dam raise of 12-17 ft required to retain design flood. Would require new outlet works and spillway to account for additional loading. Increases upstream consequences. Higher dam results in greater downstream risk.	Eliminated
Partial dam raise	Raise part or all of the crest a small amount to increase storage capacity and spillway efficiency.	Partially effective when combined with other measures to address overtopping (e.g., parapet walls at limited areas).	Carry Forward
Protected overtopping	Harden crest, downstream slope to	Effective. Minor to no direct impacts to environmental	Carry Forward

Measure	Description	Evaluation/Rationale	Screening Result
	prevent overtopping from eroding, failing the dam.	resources and existing real estate.	
New spillway	Demolish and replace existing with larger, more efficient spillway	Effective, but may not be efficient. Moderate environmental and real estate impacts.	Carry Forward
Auxiliary spillway	Add an additional spillway to supplement the existing spillway.	Effective. Minor impacts to environmental resources and existing real estate.	Carry Forward
<b>Non-Structural Measures</b>			
Buyout/ Acquisition	Purchase structures so as to remove population from harm's way.	Partially effective (does not address those caught in transit) and not efficient. Extremely high cost.	Eliminated
Elevation of Structures	Raise high risk structures so as to reduce risk to the occupants.	Not efficient to raise 275,000 structures. Extremely high cost.	Eliminated
Relocation	Relocate entire communities out of the floodplain.	Infeasible and inefficient to relocate 275,000 structures.	Eliminated
Flood-proofing	Modify structures so as to reduce the risk to occupants.	Partially effective (does not address those caught in transit) but not efficient.	Eliminated
Floodplain Regulation	Utilize regulation to restrict development within the floodplain.	Partially effective. Most of the downstream floodplain is built out, but future development could be regulated to reduce life safety and economic flood risk.	Carry Forward
Reservoir Signage	Place signage along major traffic arteries (e.g., Rosemead Boulevard, Pomona Freeway) denoting the limits of the potential pool so as to increase community awareness of flood risk.	Partially effective. Increases community awareness of flood risk when traversing an otherwise dry flood control reservoir.	Carry Forward
Risk Communication	Develop and implement communication and education strategies to	Partially effective. Leads to decreased response times to evacuation orders. Helps get people out of harm's way.	Carry Forward



Measure	Description	Evaluation/Rationale	Screening Result
	develop, maintain public awareness of flood risk.		
Flood Warning Preparedness	Improve those systems which disseminate flood warnings.	Partially effective. Improves warning dissemination. Helps get people out of harm's way.	Carry Forward
Detailed Floodplain Mapping	Develop detailed floodplain maps to assist communities in evacuation planning.	Partially effective. Assist community planning. Helps get people out of harm's way.	Carry Forward
Emergency Evacuation Planning	Develop plans to evacuate the at-risk population.	Partially effective. Assist community leaders in executing an evacuation. Helps get people out of harm's way.	Carry Forward

### 3.3.2 Nonstructural Risk Management Measures

For the purpose of the risk evaluation, it is assumed that the Corps and other agencies would be taking reasonable steps to reduce non-failure risk associated with the project. These include:

- Floodplain Regulation. Assumed to be in place. Though the areas downstream a largely built out, communities would be responsible to evaluate when additional regulation is appropriate.
- Reservoir Signage. Signs around the perimeter of the flood control reservoir would increase awareness of the dam and could be installed as part of the dam modification project. The location and number of signs necessary has not yet been determined. Details about this feature have not yet been determined for any of the RMPs carried forward, and are not analyzed in this EIS. The effects of this activity are, however, expected to be negligible.
- Risk Communication. Assumed to be in place. Communities could consider additional communication/education strategies to maintain and improve public awareness of the flood risk.
- Flood Warning Preparedness. Assumed to be in place. Communities could consider improvements to warning systems.
- Detailed Floodplain Mapping. In place. Developed and updated by Corps, this mapping resides in the Whittier Narrows Dam Emergency Action Plan and has been made available to the downstream communities.
- Emergency Evacuation Planning. Assumed to be in place. The Corps' Silver Jackets program is currently assisting several communities in the development of flood-specific evacuation plans. A tool used in evacuation planning is "sheltering in place," in which the responsible agencies advise certain areas to not evacuate, thus freeing up resources (e.g., roads) for those who must evacuate.

Although non-structural measures are required to be considered by both the Corps' *Planning Guidance Notebook* (ER 1105-2-100) and *Safety of Dams – Policy & Procedures* (ER 1110-2-1156), non-structural measures themselves do not address the two primary failure modes of concern and would not reduce the incremental risk associated with dam failure to below Corps' TRG. Therefore, by themselves, non-structural risk management measures do not meet the purpose and need for action.

### **3.3.3 Structural Risk Management Measures to Address Backward Erosion Piping**

As summarized above, the criteria for evaluation were effectiveness at reducing potential for backward erosion piping (BEP), cost (efficiency), and feasibility. Three primary measures to address BEP were carried forward for additional evaluation: trench drains, relief wells, and filter/drainage blankets.

**Trench Drain.** A trench would be excavated downstream of the Dam embankment to approximately 20 feet below ground surface and backfilled with sand and gravel to dissipate subsurface pressures while preventing the erosion of fine sand from the foundation. Depending on the final alternative selected, a raised berm may be incorporated into the downstream toe. Riprap would be placed at the downstream end where flows would discharge to the surface. The sand, gravel, and riprap would be imported from offsite quarries. The compacted fill would provide a buffer to the filter/drain system at the ground surface; borrow from that fill would be from the required excavation. Figure 3.3-1 shows a typical section.

**Additional Relief Wells.** Additional relief wells would supplement or replace the existing relief wells downstream of the dam. Relief wells provide a means to dissipate pressures under the less pervious near surface (the approximate upper 20 feet) materials downstream of the dam. Currently, 50-foot deep, 8-inch diameter wells constructed of corrugated metal pipe are spaced every 100 feet downstream of the dam between Rosemead Boulevard the San Gabriel River spillway. The proposed wells would be approximately 100-foot deep (final depths would be determined during design), also 8-inch diameter, constructed of stainless steel, and spaced at roughly 50 feet on center. As a result, the deeper, more closely spaced wells would discharge more flow and reduce more pressure than the existing system. The wells would either discharge into a collection system (as shown in the figure below) or discharge to the surface. Figure 3.3-2 shows a typical section.

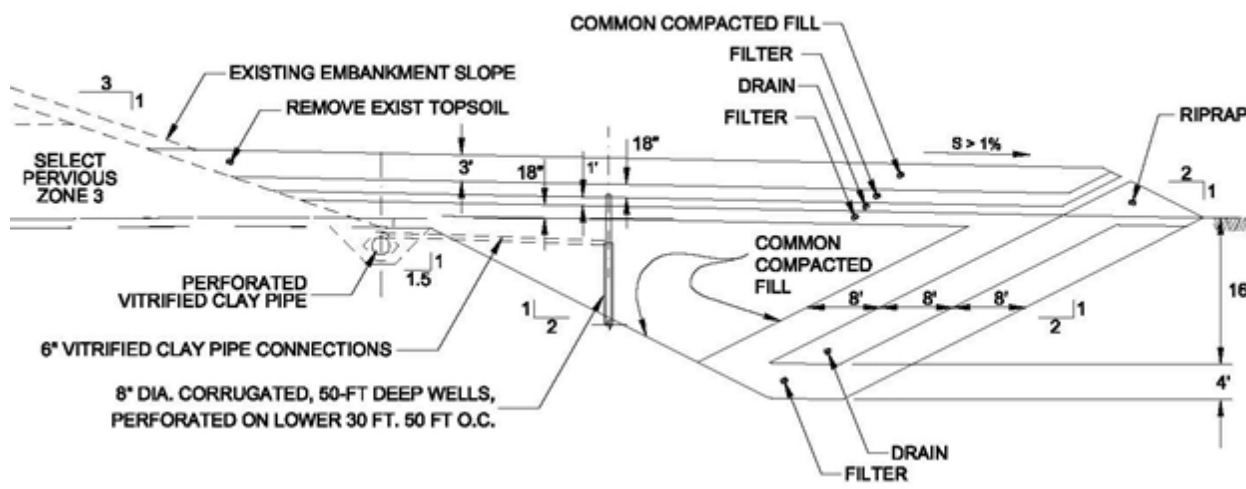


Figure 3.3-1 Typical Trench Drain Section

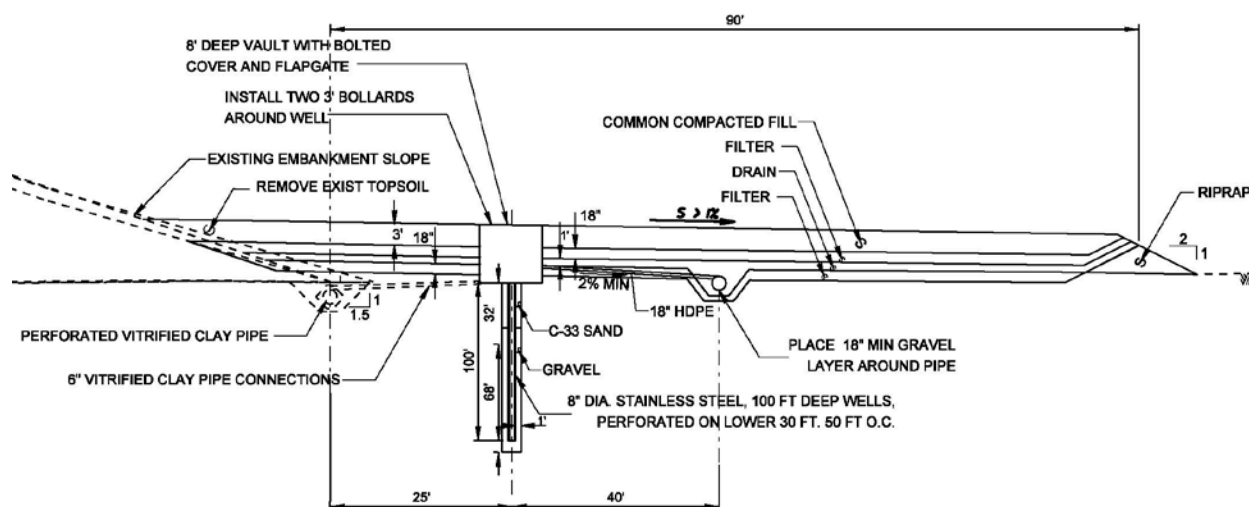
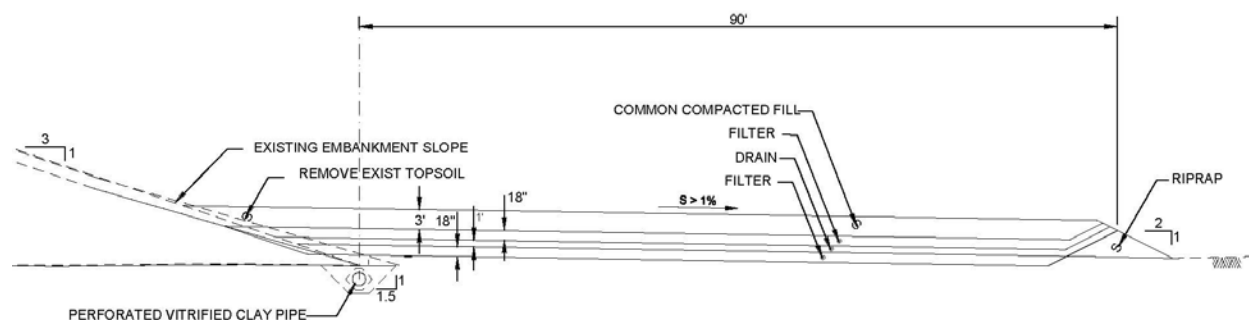


Figure 3.3-2 Typical Relief Well Section

**Downstream Filter and Drainage Blanket.** A downstream filter and drainage blanket provides a filtered exit and lengthens the seepage path to an unfiltered discharge location. The blanket is typically constructed with a graded gravel drain sandwiched between a graded filter and covered by a protective layer of common fill (Figure 3.3-3). Under certain conditions, the measure is effective at reducing potential for backward erosion piping as it allows seepage to dissipate pressure while preventing the transportation (erosion) of subsurface materials. This measure typically demands substantial amounts of land area to be effective. At Whittier Narrows, this measure would only be effective, by itself, at the downstream toe of the Dam adjacent to Rosemead Blvd. where the current road width effectively increases the width of the Dam to a dimension that could support this measure.



**Figure 3.3-3 Typical Section – Filter/Drainage Blanket**

### 3.3.4 Structural Risk Management Measures to Address Overtopping

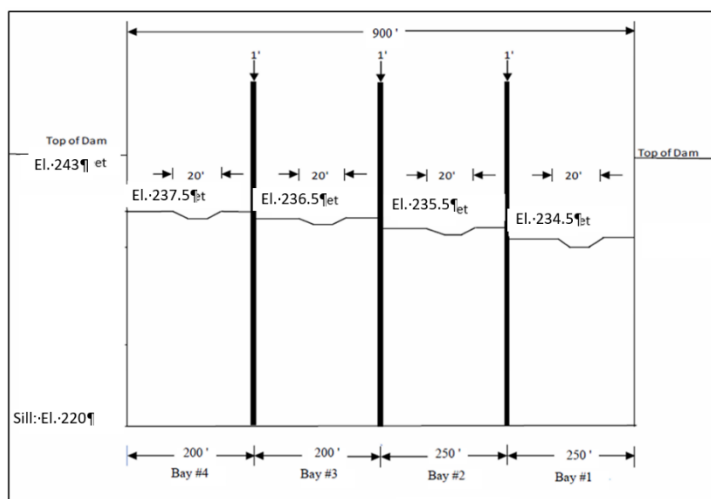
Earthen embankments will erode and fail if the elevation of the water within the reservoir exceeds the crest elevation of the embankment. To prevent this, virtually all earthen embankments include spillways (sometimes called “emergency spillways”). Spillways provide a means of safely passing rare floods, thus preventing overtopping failures. However, as discussed in Chapter 2, the spillway at Whittier Narrows Dam does not have adequate capacity to safely pass the design flood. Because the dam embankment is constructed of erodible earthen fill, a very rare flood (one with an annual chance of exceedance of less than 1 in 1,000) could result in the reservoir elevation exceeding the embankment crest elevation and thus result in failure of the dam. As a result of the failure, the amount of flow through the community would greatly increase, resulting in increased consequences.

Three general approaches for addressing overtopping were carried forward for consideration:

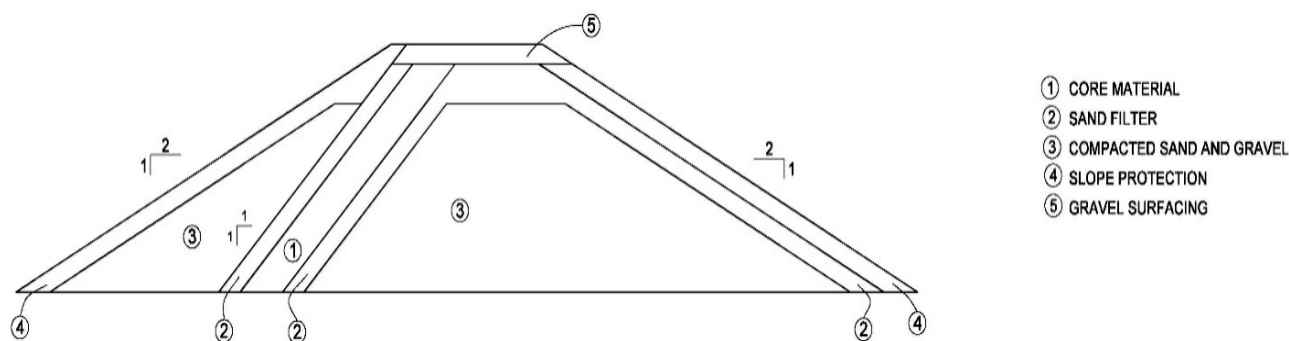
- **Auxiliary Spillway.** Under this measure an additional spillway would be constructed in line with the existing embankment to provide additional spillway capacity. Relevant methods included fuse plug, passive weir, and gated spillways.
- **New Spillway.** The approach would involve complete replacement of the existing spillway in order to provide additional spillway capacity. The analysis assumes that the existing spillway would be replaced with a passive weir spillway.
- **Protected Overtopping.** This would harden the crest and downstream slope to allow the embankment to safely overtop.

A more detailed discussion of the methods to increase spillway capacity is presented below. Other measures to address overtopping identified in Table 3.3-1 (*e.g.*, increase the maximum discharges from the Rio Hondo or a partial dam raise) may supplement or refine these general approaches but will not provide a sufficient increase in the capacity to function as standalone features. Accordingly, these other measures are incorporated into the RMPs described in Section 3.4 below.

**Fuse Plug Spillway.** A fuse plug spillway is a type of auxiliary spillway that provides additional capacity through controlled erosion of a specified fill. As considered, a portion of the embankment would be excavated out and concrete walls and sill (floor) would be constructed, essentially dividing this spillway into multiple bays (or channels). Each bay would then be filled with zoned, earthen fill. A small pilot channel would extend across the top of the fill to direct the initial overtopping flows. As shown in Figure 3.3-4, the top of the fill and pilot channels are at a different elevations in each bay. Activation (erosion of the fill in the bay) occurs when the reservoir rises to an elevation that would result in flow through the bay's pilot channel. This flow then erodes all earthen fill down to the concrete sill, greatly increasing the discharge through the auxiliary spillway. If the pool elevation continues to rise, additional bays would be activated. Figures 3.3-4 and 3.3-5 present assumed profile and cross sections, respectively, along with conceptual elevations and dimensions.

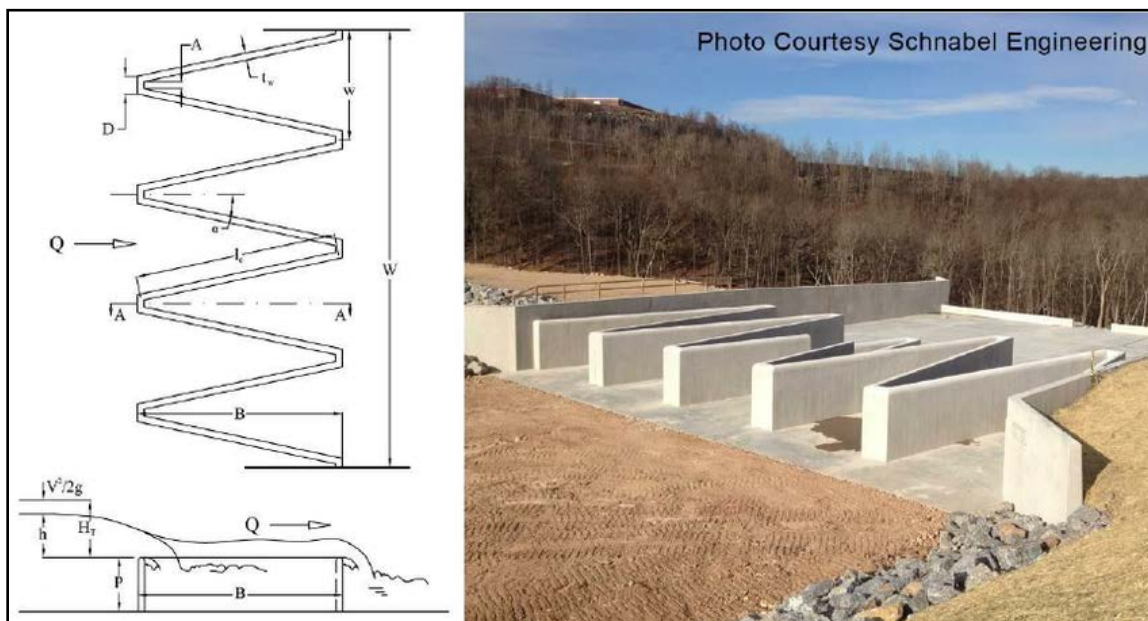


**Figure 3.3-4 Fuse Plug Profile**



**Figure 3.3-5 Fuse Plug Cross Section**

**Passive Weir (Labyrinth or Piano Key Spillway).** A passive weir spillway is a means to increase spillway capacity so as to prevent failure of the dam due to overtopping during extreme storms. It could be either an auxiliary spillway or a completely new spillway. The passive weir spillway would be either a labyrinth or piano key weir, both of which utilize a longer weir length compressed over a shorter distance. The DSMS-level design assumes a labyrinth; the specific layout of the structure would be determined in subsequent studies. An example labyrinth spillway is shown in Figure 3.3-6.



**Figure 3.3-6 Labyrinth Spillway Photo and Diagram**

**Gated Spillway.** A gated spillway is a means to increase spillway capacity so as to prevent failure of the dam due to overtopping during extreme storms. It would be an auxiliary spillway. A Tainter gated auxiliary spillway (Figure 3.3-7) would resemble the existing spillway shown below (but without the counterweights). The structure would be operated by staff at the dam.



**Figure 3.3-7 Tainter Gate Spillway**



**Protected Overtopping.** This measure is different from the others in that it does not prevent overtopping of the dam during extreme storms but instead is designed so as to prevent failure due to that overtopping. Roller compacted concrete (RCC) would be placed on the crest and downstream slope of the embankment (Figure 3.3-8) to prevent erosion during overtopping. The stepped RCC face would help dissipate energy from overtopping flows; in addition, the design would include a splash pad or flip bucket at the downstream toe.



**Figure 3.3-8 RCC for Overtopping Protection, Blue Diamond Dam, Las Vegas**

### 3.4 ALTERNATIVE RISK MANAGEMENT PLANS

Step 3 in the six-step planning process is to formulate alternative risk management plans (RMPs). In Section 3.3, measures were identified and screened. In this section, the measures previously recommended to be carried forward were combined into alternative RMPs in order to meet the dam safety criteria outlined in Section 3.2. Interim risk reduction measures (IRRM), described under Section 3.4.1, below, are included in all alternative RMPs.

ER 1110-2-1156, *Safety of Dams – Policy and Procedures*, requires consideration of the following plans at minimum: no action, a plan that meets all tolerable risk and applicable Corps guidelines, a plan that achieves only tolerable risk limit for life safety, a plan for dam removal, and a plan for dam replacement. Eight RMPs were developed at a conceptual level and evaluated on whether they met the objectives and criteria.

The term “risk management plan” or RMP used throughout this Draft EIS is equivalent to the term “alternative” as defined by NEPA.



### 3.4.1 RMP 1: No Action

This plan assumes no remediation will be implemented to address the risk driving failure modes and the Dam remains with a high likelihood of failure and associated consequences as described in Section 2.8 from the two PFMs. While this alternative does not include modification to address the two PFMs, restoration of the Dam's design crest elevation is anticipated to occur in the next 50 years.

Several interim risk reduction measures (IRRM) have been implemented to reduce risk to downstream communities from dam breach while the study and design of permanent modifications are undertaken. These IRRMs are described below. It is assumed that all Interim Risk Reduction Measures (IRRM) have been or would be implemented.

**Spillway Gates.** As described in Section 2.8.3, premature opening of the spillway gates occurs when mechanical components within the automatic opening system malfunction resulting in premature filling of a float well. An IRRM has been implemented which would allow operators some control of the water level within the float well should this failure occur. However, the pool range over which this measure would be effective is limited and proper operation of this procedure during a major flood would be difficult. Accordingly, a more effective approach has been designed and a contract awarded to replace the existing hydraulic gate control system with an electronically actuated butterfly valve and programmable controls to regulate float well inlet discharge. This modification will be complete before spring 2019 and will be a permanent solution (*i.e.*, it will no longer be considered an IRRM). Therefore, premature opening of the spillway gates is no longer a risk driver in the No Action RMP. Environmental compliance for this IRRM was covered separately.

**Remote Monitoring.** Piezometers provide real time data to District staff online in order to expedite monitoring of the groundwater elevation and assist decision makers in the scheduling of on-site inspections and other potential actions that increase the likelihood of successful detection and intervention of the backward erosion piping potential failure modes.

**Inspection and Monitoring.** This measure is executed in conjunction with remote monitoring. Inspections to monitor the downstream toe for potential seepage and groundwater conditions are conducted when groundwater data indicates that seepage is possible. The frequency of field inspections increases proportionally to the increase in the pool elevation and monitored groundwater elevation.

**Pre-Positioning of Materials.** The Corps has stockpiled materials (600 cy gravel and 600 cy sand) adjacent to Rosemead Boulevard on the central embankment to be used in flood fighting. This IRRM is in place.

**Flood Mapping.** The Corps has prepared and delivered flood maps for non-breach and breach inundation scenarios to the Emergency Managers of the affected communities downstream of the Dam to facilitate evacuations in case of an emergency. This IRRM is in place.

**Emergency Action Plan Update.** The Emergency Action Plan (EAP) describes what to do in case of an emergency. The EAP has been updated to contain notification lists and special inspections for investigating seepage at the central embankment. This IRRM is in place.

**Annual Coordination.** The Corps generally conducts coordination with downstream Emergency Management Agencies annually. This IRRM is in place.

### **3.4.2 RMP 2: Auxiliary Fuseplug Spillway**

Overtopping would be addressed through providing additional spillway capacity via an auxiliary fuse plug spillway and raising the dam four feet using parapet walls. Backward erosion piping would be addressed through the additional seepage control features that would include trench drains, relief wells, and graded filter/drainage blankets.

### **3.4.3 RMP 3: Auxiliary Spillway with Seepage Control**

Overtopping would be addressed by providing additional spillway capacity via an auxiliary spillway and raising the dam by using parapet walls. Backward erosion piping would be addressed through the additional seepage control features that would include trench drains, relief wells, and graded filter/drainage blankets. RMP 3 was subdivided into several related plans:

- **Plan 3A** would address overtopping using a passive (labyrinth) spillway and a four-foot crest raise; it would address backward erosion piping with a trench drain.
- **Plan 3B** would be identical to 3A except that it addresses overtopping using a gated spillway.
- **Plan 3C** would address overtopping using a passive (labyrinth) spillway and an eight-foot crest raise; it would address backward erosion piping with a downstream filter/drainage blanket.
- **Plan 3D** would address overtopping using a passive (labyrinth) spillway and a 12-foot crest raise; it would address backward erosion piping with a downstream filter/drainage blanket in conjunction with relief wells.
- **Plan 3E** would address overtopping using a passive (labyrinth) spillway and a 12-foot crest raise; it would address backward erosion piping with a trench drain.

### **3.4.4 RMP 4: New Spillway**

Overtopping would be addressed through replacing the existing spillway with a passive spillway, and raising the dam four (4) feet using a combination of fill and parapet walls. Backward erosion piping would be addressed through the additional seepage control features that would include trench drains and graded filter/drainage blankets.

### **3.4.5 RMP 5: Protected Overtopping with Seepage Control**

RMP 5 was formulated to address overtopping through hardening the crest and downstream slope of the embankment east of the Rio Hondo Outlet. Backward erosion piping would be

addressed through the additional seepage control features that would include trench drains and graded filter/drainage blankets.

### **3.4.6 RMP 6: Dam Replacement**

The Corps' ER 1110-2-1156 requires the development of one RMP to consider replacement of the existing dam. Under this RMP, a new Dam would be built immediately upstream of the existing Dam within the Reservoir to current design criteria with increased spillway capacity to route new PMF (new inflow design flood) without increasing the Dam crest elevation. There would be a small increase in risk due to the loss of capacity (recall that the new dam would be constructed upstream of the existing). The Dam would be designed to comply with all essential Corps guidelines relevant to the Project as identified previously, including meeting all hydraulic, seepage, and seismic criteria. The Dam would be located immediately upstream of the existing structure in order to maximize available Reservoir capacity, facilitate dam safety during construction and transition, and provide a readily available borrow source.

The majority of the flow would be diverted to the Rio Hondo via the cross over channel. A new cross over weir would be constructed upstream of the spillway. It is assumed that the new Rio Hondo outlet works would resemble the existing Tainter gate structure and it is assumed that the existing control structures would be left in-place until the new structures can be built.

In order to preclude flanking of the east embankment during the PMF, the eastern end of the embankment would be extended along Rooks Road and tie into the left levee of the San Gabriel River to approximately Peck Road. Existing utilities would be restored to their original alignments and would cross the embankment in galleries with designed filter systems.

Construction would be phased to allow borrow from the original structure to be used with additional borrow material from within the Reservoir. The new Dam would be built to elevation 239.0 ft., the outlet works would be the same and the spillway outlet capacity would be increased with four (4) additional gates.

### **3.4.7 RMP 7: Dam Removal**

The Corps' ER 1110-2-1156 requires one RMP to address removal of the existing Dam. This RMP would effectively remove enough of the existing structure to perform as if there is no Dam as to not impact flood flows. This would include removal of the Rio Hondo outlet works, San Gabriel River spillway gates, and appurtenant structures. The base width of both channels immediately upstream of the Dam would be widened by 100 feet to allow flows through the remaining embankment into the downstream channel. The concrete sill invert of the structure would be left in place.

The San Gabriel River is one of the most productive rivers in southern California, but also has a very small channel capacity to convey flood waters. Under this RMP, the downstream communities would no longer be provided flood risk management benefits from the Project. The population at risk (PAR), 1.25 million people living in municipalities downstream of the Dam extending approximately 19.6 miles to the Pacific Ocean. An estimated 683,121 to 967,480

people who would be directly affected by a peak maximum flood inundation depending on the time of day. The Whittier Narrows Project prevented an estimated \$4.7 billion (FY 2009 price level) from FY 1982 to FY 2009. The average annual benefits provided by the project for this time period is estimated at \$169 million (FY 2009 price level).

### **3.4.8 RMP 8: Nonstructural Measures Only**

Specific nonstructural measures were formulated as a part of a Nonstructural Only Plan very early in the study. This includes measures for sheltering-in-place, improved risk communication with locals, and an improved flood warning system.

## **3.5 RISK MANAGEMENT PLAN EVALUATION**

### **3.5.1 Risk Management Plans Screening Criteria**

Step 4 in the six-step planning process is to evaluate the risk management plans. The risk management plans were formulated to comply with the criteria identified in Section 3.2 and those which did not were screened from further consideration. The evaluation of the plans is discussed below. Plans 6, 7, and 8, which were screened early on, were not submitted to the same level of quantitative analysis as the other measures. They are discussed in Section 3.6. The plans carried forward are discussed in Section 3.7.

### **3.5.2 Effectiveness**

ER 1110-2-1156 presents the Corps' method of evaluating and prioritizing modifications to dams. In that guidance, effectiveness (whether and how well alternatives meet the objectives) is primarily assessed using the annual probability of failure (APF) and societal incremental life safety flood risk, expressed as average annual life loss (AALL) due to dam breach and a probability distribution of potential life loss due to dam breach. The guideline for APF is 0.0001 failures per year. The guideline for AALL is 0.001 estimated lives lost per year.

An effectiveness evaluation was performed to assess the with-project risk to determine if it falls below the guidelines identified above. Plans 1, 3C, and 3D do not meet the objectives.

### **3.5.3 Efficiency**

Efficiency is the amount of risk reduction for the cost of the measure. It is the extent to which an alternative risk management plan is the most cost-effective means of achieving the objectives. RMP 6 would be to build a new dam immediately upstream. While this new structure would be technically feasible and could be effective, the costs would be excessive. This plan was dismissed from further consideration prior to the Risk Management Plan Milestone in January 2015 based on the excessive cost. Cost estimates were developed for planning purposes only to compare RMPs 1 through 5. Table 3.5-1 displays the summary of estimated costs per plan for the remaining plans. These plans were considered to meet efficiency requirements. Costs will be further refined.

<b>Table 3.5-1 Summary of Plan Cost for Plans Meeting Efficiency Requirements</b>	
<b>RMP</b>	<b>Total Cost (\$M)</b>
1A	N/A
2	\$315.9
3A	\$460.8
3B	\$420.4
3C	\$375.6
3D	\$447.5
3E	\$440.7
4	\$621.3
5	\$329.9

#### **3.5.4 “Do No Harm”**

Each of the different plans was analyzed for a wide range of storms. This means that the inflows and resulting peak pools were estimated and the anticipated performance evaluated. An aspect of this evaluation included mapping the depths of flooding and the related consequences, in terms of loss of life downstream of the dam associated with the peak water elevation. The analysis showed that five of the plans developed would fail the “do no harm” principle. Specifically, consequences at two peak pool elevations (236 feet and 239 feet) would be significantly greater with the modification than without the modification. Accordingly, these plans were screened from further consideration. The screened plans were RMPs 2, 3A, 3B, 3C, and 4.

### **3.6 RISK MANAGEMENT PLANS NOT CARRIED FORWARD**

Based on the analyses summarized above, the following plans have been screened from further consideration.

#### **3.6.1 RMPs 2, 3A, 3B, 3C, 3D, and 4**

RMPs 2, 3A, 3B, 3C, 3D, and 4 fail the “do no harm” principle because they result in increased incremental or non-breach risks. As discussed in Section 3.5.3, the population downstream of the Dam would be at greater risk as a result of the modifications proposed in these plans. As these plans violate this key constraint, they were screened from further consideration.

#### **3.6.2 RMP 6: Dam Replacement**

This alternative would reduce risk for all deficiencies identified and achieve the best safety rating applied to Corps dams nationwide. RMP 6 would meet or exceed the P&G guidelines for completeness, effectiveness, and acceptability, but not for efficiency. Replacement of the Dam would also be anticipated to cause significant environmental impacts. The costs would be excessive.

### 3.6.3 RMP 7: Remove Whittier Narrows Dam

This RMP is not effective at reducing incremental risk and has been removed from further consideration.

### 3.6.4 RMP 8: Nonstructural Measures

This RMP is not effective at reducing incremental risk and has been removed from further consideration.

## 3.7 RISK MANAGEMENT PLANS CARRIED FORWARD

Three RMPs are carried forward for detailed analysis in this Draft EIS. RMP 1, the No Action RMP, does not prevent or address the occurrence of the two PFMs but is required for comparison purposes. The two action RMPs carried forward, RMP 3E, New Labyrinth Auxiliary Spillway and Seepage Control, and RMP 5, Protected Overtopping with Seepage Control, are both responsive to the objectives.

Table 3.7-1 identifies the key components of the various plans to address the failure modes.

<b>Table 3.7-1 Key Components to Address Failure Modes</b>		
<b>RMP</b>	<b>Means to Address Failure Mode</b>	
	<b>BEP</b>	<b>Overtopping</b>
Plan 1	No action	No action
Plan 3E	Trench drain	Auxiliary spillway, dam raise
Plan 5	Trench drain	Protected overtopping

### 3.7.1 RMP 1: No Action

As prescribed by NEPA guidelines, the No-Action RMP is to be considered for all proposed Federal actions. This represents the future without Federal action to address the risk condition. This plan assumes no remediation will be implemented to address the risk driving failure modes and the Dam would remain with a high likelihood of failure and associated consequences as described in Section 2.8. It is assumed that all IRRMs have been or will implemented. The No-Action RMP is the basis for comparison with all other alternatives, as advantages and disadvantages of each alternative may be assessed.

Because of the potential consequences of dam failure that have a higher likelihood of occurring under the No-Action Alternative, the Dam Safety Modification Study has determined that this plan is not acceptable under the Corps' TRGs. This is primarily due to the life safety risk presented by the dam in its current state. In addition to the unacceptable risks to life safety, the environmental effects of a dam breach are expected to be high and adverse across nearly all resource areas. Because the environmental impacts of dam failure cannot be reasonably isolated from general storm impacts, beyond the consequence of unacceptable life safety risk, the



environmental effects of dam failure are not described in specific detail as an operations effect under the no action RMP in this Draft EIS.

### **IRRM**s

Interim risk reduction measures (IRRM)s, described under section 3.4.1, above, are included in the No-Action RMP.

### **Crest Elevation Restoration**

Under the No-Action RMP, it is reasonably anticipated the Dam's crest elevation will be restored to its original design elevation (239.0 ft.) within the next 50 years.

### **Regular/Recurring Operations and Maintenance**

Operations and Maintenance (O&M) activities would continue as currently implemented by the Corps. Regular and recurring operations and maintenance annual activities include mechanical and electrical repair of the gates, vegetation management on the Dam and its appurtenant structures, including the downstream slope of the embankment, mowing of vegetation upstream in the operations area immediately adjacent to the central embankment, removal of debris and sediment that accumulates at the upstream concrete apron of the outlet on the Rio Hondo and other structures, graffiti removal, and cleaning the relief wells. Other maintenance that is performed as needed includes repair of the concrete crossover weir, levee repair, filling pot-holes on the Dam crest road, and repairing gates and fences.

## **3.7.2 RMP 3E: Labyrinth Auxiliary Spillway and Seepage Control**

RMP 3E addresses the two PFMs. Overtopping is addressed through adding spillway capacity to pass the design flood and raising the Dam using parapet walls to reduce the amount of water required to be passed during that flood. Backward erosion piping would be addressed through trench drains and a graded filter/drainage blanket adjacent to Rosemead Blvd.

Interim risk reduction measures (IRRM)s, described under section 3.4.1, above, are included in RMP 3E.

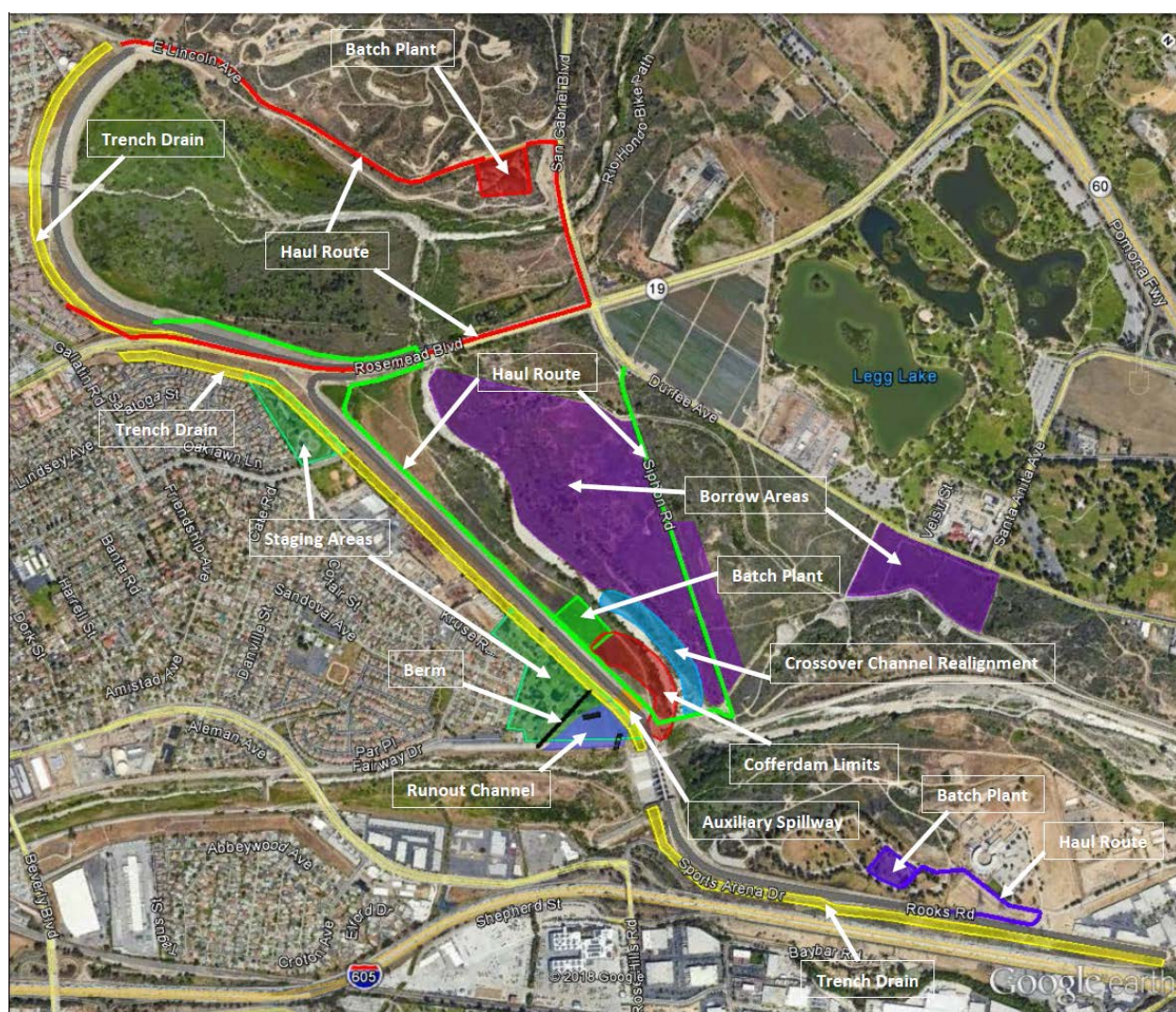
### **3.7.2.1 Auxiliary Labyrinth Spillway**

A 240-foot wide passive weir auxiliary spillway would be constructed in-line with the existing embankment and immediately west of the existing spillway to increase the spillway capacity. The feasibility level analysis assumed that this would be a labyrinth spillway. The auxiliary spillway would become active when the Reservoir reaches elevation 234.0 ft. after the San Gabriel River spillway gates are fully open.

A bridge across the auxiliary spillway would be required to provide access to the San Gabriel River spillway during extreme events. The existing utility gallery near the right abutment of the San Gabriel River spillway would be relocated to cross the embankment in the new spillway structure.

The spillway subsurface would include foundation improvements to prevent liquefaction during extreme earthquakes. Also, sheetpile is assumed to extend 40 ft. below the foundation slab and encircle the spillway. Some dewatering of the foundation during construction is anticipated to allow the work to proceed in the dry season.

Upstream of the Dam, an approach channel would be graded to improve flow characteristics to the auxiliary spillway. The approach channel would be 240 ft. wide and have an average distance of roughly 450 ft. extending from the upstream limit of the labyrinth to the crossover channel. Downstream of the Dam, a 240-foot wide runout channel would extend an average length of approximately 500 ft. between downstream limit of the labyrinth and the San Gabriel River through the existing Pico Rivera Municipal Golf Course. Both channels would be constructed during the dry season so as to minimize the risk of flooding the work area due to river flows.



**Figure 3.7-1 Conceptual Layout of Elements for New Labyrinth Auxiliary Spillway**

### **3.7.2.2 Parapet Walls**

An additional measure to address overtopping would be the construction of a parapet wall. The parapet wall would raise the crest of the Dam to increase the storage capacity and reduce the peak discharge that would need to pass through the spillway. Along the existing embankment, the crest would be raised 12 ft. (to elevation 251 ft.) by constructing concrete “parapet walls” on the upstream side of the existing dam crest. Parapet walls will also be used over the existing outlet works and spillway.

Three roads cross the dam and the embankments associated with these roads act as part of the dam:

- Rooks Road/Sports Arena Drive will be raised approximately the full 12 feet to match the embankment crest elevation. The analysis assumes that the road will be closed throughout construction of the road modifications.
- Lincoln Avenue would be raised approximately 8 feet. The lower elevation allows for some chance that overtopping would occur during the most extreme floods. Accordingly, the downstream slopes would be hardened to prevent failure due to that overtopping. The analysis assumes that the road will be closed throughout construction of the road modifications.
- Rosemead Boulevard would be raised approximately 8 feet. As at Lincoln, the downstream slopes would be hardened to prevent failure due to overtopping. The analysis assumes that the road construction will be staged so as to maintain at least one way open in each direction throughout the road modifications.

### **3.7.2.2 Trench Drain/Filter Blanket**

The other failure mode addressed by Plan 3E is backward erosion piping in the foundation. The measures incorporated in this plan allow seepage to safely pass through the foundation without eroding the foundation of the dam.

Improvements to the seepage control system would extend from approximate stations 14+00 (Lincoln Ave.) to 22+50; from 44+00 to 47+00 (the terminus of the existing trench and the west side of Rosemead Boulevard, respectively); from 50+00 to 117+80 (east side of Rosemead Blvd. and the right side of the San Gabriel River, respectively); and from 123+20 to 130+00 (the left side of the San Gabriel River and Rooks Road (Figure 3.7- 1), respectively). These improvements would consist primarily of a trench drain with a graded filter/drainage blanket. Adjacent to Rosemead Blvd. (Stations 50+00 to 59+00), the trench component of the trench drain would not be excavated; due to the additional width (115 ft.) of the embankment in this reach, the graded filter/drainage blanket alone (with the existing relief wells) would be adequate. The trench drain would extend from the surface to a depth of approximately 20 ft.; it would extend approximately 90 ft. downstream from the existing toe of the Dam. Some dewatering of the foundation during construction is anticipated to allow the work to proceed in the dry.

### **3.7.2.3 Staging and Construction Considerations**

#### **Cofferdam/Crossover Weir**

As discussed under the discussion of the Auxiliary Labyrinth Spillway (see above), a temporary cofferdam would be required to prevent water from passing through the opening in the embankment while the auxiliary spillway is being constructed. An approximate footprint of that temporary structure is shown in Figure 3.7-1 above. As the cofferdam would be as critical as the rest of the dam would be during construction, the Corps' guidelines for construction of dams would be followed to assure Dam safety during construction. Temporary seepage control measures, likely relief wells, would be required at the downstream toe of the cofferdam. The cofferdam would be constructed prior to excavation of the existing embankment. The fill excavated from the embankment would be separated by fill type and stockpiled within the designated borrow area upstream of the central embankment. The excavated fill would be reused as backfill between the embankment and the new spillway structure, and would supplement the fill required from borrow to raise the roads.

To provide an adequate footprint for the cofferdam, the existing crossover channel and crossover weir would be relocated approximately 200 feet upstream (Figure 3.7-1). Once the crossover channel realignment and new crossover weir are in place, the existing crossover channel would be backfilled.

Upon completion, the cofferdam would be removed and material returned to the borrow area and the borrow area re-graded. The borrow area would be graded to restore as close as possible existing site conditions.

#### **Staging Areas**

Staging areas are those areas used for preparation to do the actual construction. Uses include construction offices and laboratories, parking for workers, equipment parking and maintenance, and access roads. The areas would also be used for stockpiling excavated and imported materials. The Federal land which is currently outgranted to the City of Pico Rivera and used for the Pico Rivera Municipal Golf Course (Figure 3.7-1) and portions of Streamland Park (Figure 3.7-1) will be utilized as staging areas for the Dam Safety Modification RMP.

Both the golf course and the park would be cleared, grubbed, and graded. Recreational facilities (e.g., basketball courts, baseball diamonds, tee boxes, greens) and infrastructure (e.g., electrical lines, light fixtures, sprinkler systems, drinking fountains, restrooms) would be removed as needed. Vegetation would be disposed at a local landfill that accepts green waste, and construction material may be salvaged or disposed at a landfill that accepts construction material waste.

Depending on the final configuration, it is anticipated that at least one high tension tower would be within the new channel and would be permanently relocated prior to construction, as would other infrastructure at the site.



### **Borrow Areas**

Earthen fill (borrow) for the cofferdam and road raises would come from the designated borrow areas, supplemented by the material excavated from the embankment for the auxiliary spillway construction as described previously. Borrow sources were selected based upon adequacy of the material for engineering purposes and suitability of the location for construction (not where it would be frequently inundated or subjected to high groundwater) while attempting to minimize impacts to critical habitat. The area designated as the primary borrow area is east of Rosemead Blvd. and south of Siphon Road, north of both the central embankment and the current crossover channel. The area designated as the secondary borrow site, to be used if the primary borrow site does not provide sufficient material of appropriate quality, is located north of north of Siphon Road, and south of Durfee Ave, generally south of the intersection of Durfee Ave. and Santa Anita Ave. Concept locations are shown on Figure 3.7-1. Filter sand, gravel, bedding, and riprap would be imported from local producers, as would aggregate, cement, and other concrete components as these materials are not available at the site.



**Figure 3.7-2 Rooks Road to be Raised 12 Feet**

### **Batch Plants and Haul Roads**

Concrete is made out of aggregate, water, and cement and mixed, or “batched,” at a batch plant and typically needs to be placed within 90 minutes of being batched. Since the parapet walls and spillways will require significant quantities of concrete, the analysis assumes that on-site batch plants will be utilized. Three batch plant locations are designated upstream of the Dam within the Reservoir as shown on Figure 3.7-1.

The analysis assumed that all three batch plant sites will be used and that deliveries from those locations to the Dam will be via truck. It is assumed that the west, central, and east site would support construction at the west, central, and east parapet walls, respectively. However, off road access would be provided between the different locations, as discussed below. All three batch plant locations are above the 10-year flood elevation; however, due to its lower elevation (and thus greater potential exposure to flooding), it is assumed that a cofferdam may be constructed

around the batch plant at the central embankment, using stockpiles of fill material from excavations.

The west embankment batch plant site would be located near the southeast corner of San Gabriel Boulevard and Lincoln Ave. Material deliveries to the approximately 5 acre west batch plant site would be made via existing roads (Lincoln Ave. and Rosemead Blvd.), as would delivery of the concrete to the Dam. An example plant is show below.



**Photo 3.7-1 Typical Batch Plant**

The central embankment batch plant site is located immediately upstream of the central embankment. Supply deliveries to the approximately 3.5 acre central embankment batch plant would generally be via Siphon Road.

A suitable temporary roadway would be constructed to the plant where the road terminates at the central embankment. This access route would require modification/replacement of the bridge where Siphon Road crosses the Zone 1 “ditch” channel. Existing unpaved ‘maintenance roads’ (Siphon Road is not considered a ‘maintenance road’ in this definition) would be widened to a width of 40 ft. to accommodate two-way traffic. In addition, it is anticipated that the truck loads would exceed the capacity of the road and that the road surface would be replaced at the completion of the job. It is assumed that a truck ramp will be constructed on the Reservoir side of the central embankment to enable exiting truck traffic to directly enter northbound Rosemead Blvd. Traffic controls on Rosemead Ave. would be required.

When the crossover weir between Siphon Road and the central embankment has flow over it, delivery traffic would enter the central site from Rosemead Blvd. to the central embankment. Trucks would then utilize the temporary embankment ramp to access the batch plant. Due to the angle of the Rosemead Ave. /embankment intersection, modification of the existing median will be required. Traffic control will also be required.



For the delivery of the concrete product to the Dam crest/downstream face, access locations would be at either end of the central embankment and toward the center of the embankment. Ramps would need to be built at all access locations; though the size would need to be increased to support the construction equipment, where possible these ramps would utilize existing ramps.

The east embankment batch plant site is located in Bicentennial Park, east of the San Gabriel River. Supply deliveries to the approximately 3-acre east batch plant site would be made via existing roads. Sports Arena Road would be closed to through traffic during work hours due to work on or adjacent to the road. For the delivery of the concrete product to the Dam crest/downstream face, access locations would be at either end of the east embankment and toward the center of the embankment (near where Sports Arena Drive crosses). Ramps may need to be built at all access locations.

Figure 3.7-1 shows haul routes to and from the embankment for each of the assumed batch plant locations. The west plant (red) near Lincoln Ave. and San Gabriel Blvd. is assumed to serve the west embankment; the east plant (purple) in Bicentennial Park is assumed to serve the east embankment; the central plant (green) is assumed to serve primarily the central embankment but may serve the others as well. The green line shows potential haul road access to Rosemead Ave. from which the western portion of the west embankment as well as the east embankment would be accessed.

### **Equipment and Vehicle Fueling and Maintenance**

To minimize delays and keep on schedule with the variability of the local storm season, fueling of the variety of construction equipment and vehicles would be at the two staging areas downstream of the Dam at the Streamland Park and Pico Rivera Golf Course staging areas. Construction equipment would be kept operational in accordance with manufacturer's and pollution-control specifications. Fueling and maintenance would require the establishment and operation of a secured central fuel and equipment storage and vehicle maintenance yard. The yard would serve as a fuel and lubricant depot for the on-site mobile fueling and equipment maintenance trucks, as well as a location for vehicle and equipment repairs and maintenance activities that could not be accomplished at the various work sites.

### **Solid and Hazardous Waste Management**

Construction activities over the multi-year construction period associated with the Action RMPs are anticipated to generate a variety of solid wastes. Some construction activities would involve the use, handling, storage, and disposal of hazardous materials such as fuel, solvents, oil and other lubricants. It is anticipated that the collection, storage, and disposal of solid and hazardous materials and wastes would be done in accordance with a Solid and Hazardous Materials and Waste Management Plan that would be developed by the Corps or a designated contractor prior to the initiation of construction activities. A secure central storage and handling depot for hazardous materials (e.g., fuels, lubricants, and solvents) would be established in the Streamland Park and Golf Course staging areas.

### **Site Electric Power**

It is anticipated that temporary three-phase, 220-volt electric power would be provided during the multi-year construction period to run some of the construction equipment, including the

Batch Plant. To supply the necessary electrical power, a small temporary substation-switching station would be set up as necessary, in any of the Batch Plant areas. If conveyor belts for transferring concrete is used rather than trucks to move concrete for either RMP 3E or 5, the conveyor belt system would also be run by electricity.

### **3.7.2.3 Sequence of Construction Activities**

The approximate activities sequence and duration for construction of RMP 3E are summarized below. Two distinct phases are planned: Phase 1 would focus on utility modifications and occur entirely downstream of the Dam. Its anticipated duration is approximately 1.5 years. Phase 2 would focus on the Dam modification and would require approximately 2.5 years. The discussion in Chapter 5, which describes potential impacts as a result of these activities, generally follows the construction phasing described in this section.

#### **Phase 1**

1. Develop staging areas: clearing the sites, installing infrastructure and offices.
2. Clear and provide for construction access to existing subsurface utilities which pass through the embankment. Affected areas would be downstream of the dam.
3. Temporarily reroute the existing subsurface utilities downstream of the Dam.
4. Modify the foundation, pipes, and galleries along the affected alignment downstream of the Dam.
5. Return the utilities to the modified structures.
6. Close site.

The combined estimated duration for items 1 and 2 is four to six months. Items 3 through 5 are assumed to take 10 months to one year. Item 6 would last roughly a month.

#### **Phase 2**

1. Expand and modify the staging areas developed in Phase 1.
2. Close bike paths and dam crest to public access.
3. Construct batch plants, access roads, and haul roads including embankment ramps; modify Siphon Road Bridge.
4. Clear and grub borrow area.
5. Auxiliary Spillway Construction
  - a) Relocate cross over channel and weir
  - b) Prepare cofferdam foundation, including seepage control measures.
  - c) Construct cofferdam.
  - d) Excavate the embankment and construct Auxiliary Spillway.
  - e) Upon completion of the Auxiliary Spillway, remove the cofferdam, returning the material to the borrow area.
  - f) Construct approach and runout channels.
6. Road Modifications
  - a) Raise Lincoln Avenue, Rosemead Boulevard, and Rooks Road/Sports Arena Drive.
  - b) Harden the downstream embankments of Lincoln Avenue and Rosemead Boulevard to prevent erosion.

7. Construct parapet walls; structurally modify outlet works and spillway to account for increased loads.
8. Trench Drain
  - a) Clear and grub those areas downstream of toe of Dam which were not done previously.
  - b) Construct trench drain and other seepage control features.
9. Re-contour, restore, hydroseed the borrow areas; remove temporary access roads.
10. Restore crest road, permanent access roads (including Siphon Road) and bike paths; open bike paths.
11. Dismantle batch plants and restore batch plant areas.
12. Dismantle, re-grade, and hydroseed disturbed areas.

The second phase will require some modifications in the staging area and establishment of facilities not previously required; Item 1 is estimated to last roughly three months. Item 2 will occur toward the end of Item 1. Item 3 will take two to three months; Item 4 will take a couple of weeks and occur toward the end of Item 3. Items 5 and 6 are the two largest overall tasks for the project. They will be conducted in parallel, and each will last roughly 1.5 years. Item 7 and 8 will all take less than 1.5 years and would be done in parallel. Items 9 through 13 combined will take roughly six to eight months.

#### **3.7.2.4 Operation and Maintenance Activities**

Operations and maintenance activities as described under RMP 1: No Action would continue. Due to the increased area of the concrete surfaces, the amount of graffiti removal would be expected to increase. The majority of the relief wells would be removed, decreasing the associated maintenance effort. Dam structures, including trench drain/filter blanket and relief wells would be kept clear of vegetation.

#### **3.7.3 RMP 5: Protected Overtopping with Seepage Control**

RMP 5 addresses the two actionable PFMs. As in RMP 3E, backward erosion piping would be addressed through trench drains and a graded filter/drainage blanket adjacent to Rosemead Boulevard. Overtopping would be addressed through hardening the crest to prevent erosion and failure of the Dam from events large enough to cause overtopping of the Dam.

#### **IRRM**s

Interim risk reduction measures (IRRM)s, described under section 3.4.1, above, are included in this alternative.

#### **3.7.3.1 Roller Compacted Concrete**

##### **Overtopping**

This discussion summarizes the major components of RMP 5 to prevent failure of the dam as a result of overtopping. Roller compacted concrete (RCC) would be placed on the entire crest and downstream slope of the earthen embankment (the crest would be restored to the original design elevation of 239.0 feet). The RCC is resistant to erosion, preventing dam failure during

overtopping. The RCC would be placed in lifts, approximately 10 feet wide and one foot high, resulting in a stepped appearance (see Photo 3.7-2). This stepped face would help dissipate energy from overtopping flows. The design would include an RCC splash pad or flip bucket or some other feature at the downstream toe to dissipate energy of the overtopping flows and prevent erosion. Upon completion of the RCC, the slope would be buried and hydroseeded.

RCC material is anticipated to require aggregates from commercial sites. The use of existing embankment material for use in the RCC may be further reviewed during preconstruction engineering and design (PED) phase.



**Photo 3.7-2 Typical Roller Compacted Concrete (prior to topsoil replacement)**

### **3.7.3.2 Parapet Wall**

Five-foot high parapet walls would be over several short lengths where overtopping protection is not feasible or efficient. It will be more cost effective to install a parapet wall between the west side of Lincoln Avenue and the northwestern terminus of the embankment in the Montebello Hills. Also, overtopping of the outlet works and spillway gates could damage those structures. Accordingly, parapet walls would also be constructed on and near the bridges of those structures to prevent direct overtopping. Similarly, Lincoln Avenue would be raised five feet. The analysis assumes that both Rosemead Boulevard and Rooks Road would be hardened with RCC so as to prevent erosion during overtopping.

### **3.7.3.3 Trench Drain/Filter Blanket**

RMP 5 addresses backward erosion piping in the foundation in the same manner as RMP 3E. These improvements would consist primarily of a trench drain with a graded filter/drainage

blanket. Improvements to the seepage control system would extend from approximate stations 14+00 (Lincoln Ave.) to 22+50; from 44+00 to 47+00 (the terminus of the existing trench and the west side of Rosemead Boulevard, respectively); from 50+00 to 117+80 (east side of Rosemead Blvd. and the right side of the San Gabriel River, respectively); and from 123+20 to 130+00 (the left side of the San Gabriel River and Rooks Road (Figure 3.7-1), respectively). Adjacent to Rosemead Blvd. (Stations 50+00 to 59+00), the trench component of the trench drain would not be excavated; due to the additional width (115 ft.) of the embankment in this reach, the graded filter/drainage blanket alone (with the existing relief wells) would be adequate. The trench drain would be integrated with the system to dissipate the energy of the overtopping flows discussed above. As in RMP 3E, some dewatering of the foundation during construction is anticipated to allow the work to proceed in the dry.

The dewatering requirements for the trench drain in RMP 5 are the same as those of RMP 3E. However, as no spillway is being constructed, less dewatering will be required.

#### **3.7.3.4 Staging and Construction Considerations**

##### **Cofferdam**

Since RMP 5 does not include an auxiliary spillway, no cofferdam is required.

##### **Staging Areas**

The need for and requirements of staging areas are the same as those for RMP 3E.

##### **Borrow Area**

There is no dedicated borrow area. Required borrow would come from embankment. Materials for construction of the RCC would come from both offsite quarries and the Dam embankment itself. Instead of adding the RCC to the directly to the existing downstream surface of the Dam, the embankment would be temporary narrowed approximately 10 feet (measured horizontally) through excavation. The excavated material would be transported to the batch plants (via the concept haul road locations shown in Figure 3.7-3) and utilized in the mix of the RCC.

As in RMP 3E, filter sand, gravel, bedding, and riprap would be imported from local producers, as would aggregate, cement, and other concrete components.

##### **Batch Plants and Haul Routes**

Though the details of the mix are somewhat different, the purpose and requirements for the batch plants for the production of RCC are the same as for the batch plants under RMP 3E. The analysis assumes the same locations and requirements as in RMP 3E. An example plant is shown below. Haul routes are also expected to be similar to RMP 3E.

##### **Diversion and Control of Water**

RMP 5 is not expected to include construction in the channels upstream nor downstream of the Dam.





**Figure 3.7-3 Conceptual Layout of Elements for RMP 5 Roller Compacted Concrete**

### **Equipment and Vehicle Fueling and Maintenance**

Similar to RMP 3E, fueling of the variety of construction equipment and vehicles would be at the two (2) staging areas downstream of the Dam at the Streamland Park and Pico Rivera Golf Course staging areas. Construction equipment would be kept operational in accordance with manufacturer's and pollution-control specifications. Fueling and maintenance would require the establishment and operation of a secured central fuel and equipment storage and vehicle maintenance yard. The yard would serve as a fuel and lubricant depot for the on-site mobile fueling and equipment maintenance trucks, as well as a location for vehicle and equipment repairs and maintenance activities that could not be accomplished at the various work sites.

### **Solid and Hazardous Waste Management**

Construction activities over the multi-year construction period associated with the Action RMPs are anticipated to generate a variety of solid wastes. Some construction activities would involve the use, handling, storage, and disposal of hazardous materials such as fuel,



solvents, oil and other lubricants. It is anticipated that the collection, storage, and disposal of solid and hazardous materials and wastes would be done in accordance with a Solid and Hazardous Materials and Waste Management Plan that would be developed by the Corps or a designated contractor prior to the initiation of construction activities. A secure central storage and handling depot for hazardous materials (e.g., fuels, lubricants, and solvents) would be established in the Streamland Park and Golf Course staging areas.

### **Site Electric Power**

It is anticipated that temporary 3-phase 220-volt electric power would be provided during the multi-year construction period to run some of the construction equipment, including the Batch Plant. To supply the necessary electrical power, a small temporary substation-switching station would be set up as necessary, in any of the Batch Plant areas. If conveyor belts for transferring concrete is used rather than trucks to move concrete for either RMP 3E or 5, the conveyor belt system would also be run by electricity.

### **3.7.3.5 Sequence of Construction Activities**

The approximate activities sequence and duration for construction of RMP 5 are summarized below. Two distinct phases are planned: Phase 1 would focus on utility modifications and occur entirely downstream of the dam. Its anticipated duration is approximately 1.5 years. Phase 2 would focus on the dam modification and would require approximately 2.5 years. The discussion in Chapter 5, which describes potential impacts as a result of these activities, generally follows the construction phasing described in this section.

#### **Phase 1**

1. Develop staging areas: clearing the sites, installing infrastructure and offices.
2. Clear and provide for construction access to existing subsurface utilities which pass through the embankment. Affected areas would be downstream of the dam.
3. Temporarily reroute the existing subsurface utilities downstream of the dam.
4. Modify the foundation, pipes, and galleries along the affected alignment downstream of the dam.
5. Return the utilities to the modified structures.
6. Close site.

The combined estimated duration for items 1 and 2 is four to six months. Items 3 through 5 are assumed to take 10 months to one year. Item 6 will last roughly a month.

#### **Phase 2**

1. Re-develop staging areas.
2. Close bike paths and dam crest to public access.
3. Construct batch plants, access roads, and haul roads including embankment ramps; modify Siphon Road Bridge.
4. Trench Drain
  - a) Clear and grub those areas downstream of toe of dam, which were not done previously.
  - b) Construct trench drain and other seepage control features.

5. Construct Overtopping Protection
  - a) Remove topsoil from embankment face. Stockpile for later use.
  - b) Prepare embankment surface; place bedding and drainage features.
  - c) Place roller compacted concrete on downstream slope.
  - d) Return stockpiled topsoil to embankment face.
6. Road Modifications
  - a) Raise Lincoln Avenue.
  - b) Harden Rosemead Boulevard and Rooks Road/Sports Arena Drive to prevent erosion.
7. Construct parapet walls.
8. Remove temporary access roads; restore affected locations.
9. Restore crest road, permanent access roads (including Siphon Road) and bike paths. Open bike paths.
10. Dismantle batch plants and restore batch plant areas.
11. Dismantle, re-grade, and hydroseed disturbed areas.
12. Construct upstream mitigation features. The mitigation efforts would approximately parallel the modifications.

The second phase would require some modifications in the staging area and establishment of facilities not previously required. Item 1 is estimated to last roughly three months. Item 2 will occur toward the end of Item 1. Item 3 will take two to three months.

In RMP 5, the trench drain (Item 4) and overtopping protection (Item 5) construction will be intertwined: initially, the trench drain will be excavated, and the filter and drain materials installed. The overtopping protection modifications to the embankment toe (over the trench drain) will then be completed, and as the roller compacted concrete placement continues up the embankment slope, final details of the trench drain will be installed. The estimated duration is roughly 18 months.

Item 6, the road modifications, will be concurrent with both Items 4 and 5. Fill for the Lincoln Avenue raise would come from the required excavation for the toe drain, and the other two roads would be protected with the roller compacted concrete. Both Items 6 and 7 will take less than 1.5 years and would be done concurrent with Items 4 and 5. Items 8 through 12 combined would take roughly six to eight months.

### **3.7.3.6 Operation and Maintenance Activities**

Operations and maintenance activities for RMP 5 would be essentially the same as those for RMP 1. The RCC would be buried under topsoil; some additional maintenance to restore eroded topsoil is anticipated. Dam structures, including trench drain and relief wells, would be kept free of vegetation.

The IRRMs (see Section 3.4.1) will continue following completion of the modification. The nonstructural measure **Reservoir Signage** would be implemented. Signs would be posted around the perimeter of the Reservoir at entrance points and at various locations that would increase awareness of the purpose of the Dam.

### 3.8 RISK MANAGEMENT PLAN CONSTRUCTION ASSUMPTION

As noted in Chapter 1 and as used in this Draft EIS, the term “Project” refers to the Whittier Narrows Dam Flood Control Project (i.e., the area and built features, including the Dam and the land and easement lands designated as part of the Reservoir for flood risk management purposes, that are under operation and management by the Corps). The majority of the construction work activities and support actions comprising the RMPs analyzed in this EIS will occur in a portion of the Reservoir, termed the “RMP Action Area”.

The RMP Action Area is the area within the Reservoir that is south of San Gabriel Blvd. and Durfee Ave. on the north, Siphon Road through the Nature Area to the northeast, the Pico Rivera Municipal Golf Course and Streamland Park on the south downstream of the Dam, Lincoln Ave. on the west, and Bicentennial Park on the east. The secondary borrow area, if utilized, would be north of Siphon Road and south of Durfee Ave.

### 3.9 COMPARISON OF ALTERNATIVE RISK MANAGEMENT PLANS

Step 5 of the dam safety plan formulation process is to compare the RMPs, including the **No Action RMP** with one another. The focus of this evaluation is to highlight the outputs and effects of each RMP that would have the most influence on selecting a Tentatively Selected Plan (TSP) or Preferred Risk Management Plan.

In Chapter 2 it was shown that incremental risk exceeds the tolerable risk guidelines as a result of two PFMs: backward erosion piping in the foundation, and overtopping of the dam. The objective of the plans considered in this chapter is to reduce the life safety risk to tolerable levels. RMP 1, identified as the Future without Action, does not comply with agency guidelines. RMPs 3E and 5 both comply with agency guidelines and have very similar results. Slightly higher average incremental life loss indicated for RMP 3E results from pools that exceed elevation 239.0 ft. as the increased pool elevations result in higher life loss potential.

Table 3.9-1 compares RMPs 1, 3E and 5 with respect to other relevant concerns. Also included below are evaluations of RMP’s robustness, resiliency, and redundancy:

- **Robustness** is the ability of a system to continue to operate correctly across a wide range of operational conditions, with minimal damage, alteration or loss of functionality, and to fail gracefully outside of that range. The wider the range of conditions included, the more robust the system.
- **Resiliency** is the ability to avoid, minimize, withstand, and recover from the effects of adversity, whether natural or manmade, under all circumstances of use.
- **Redundancy** is the duplication of critical components of a system with the intention of increasing reliability of the system, usually in the case of a backup or fail-safe.

<b>Table 3.9-1 Final Array Comparison Summary</b>			
<b>Criteria</b>	<b>RMP 1</b>	<b>RMP 3E</b>	<b>RMP 5</b>
Total Project Cost (FY17)	N/A	\$440.7M	\$330.0M
O&M Costs (annual)	0	\$1,006K	\$611K
Contingency	N/A	41% (\$127.4M)	35% (\$86.4M)
Incremental risk	Exceeds threshold	Below threshold	Below threshold
Robustness	Low	Medium	High
Redundancy	Low	Medium	High
Resilience	Low	Medium	High
Completeness	No	Yes	Yes
Effectiveness	Low	High	High
Efficiency	3	2	1
Acceptability	N/A	Medium	High

\*TRG=Tolerable Risk Guidelines

### 3.10 PREFERRED ALTERNATIVE

The two action RMPs in the Final Array have a similar order of magnitude risk reduction for both APF and AALL. However, RMP 5 meets the objectives more efficiently than RMP 3E from a cost perspective, with significantly less environmental, real estate, and surrounding infrastructure impacts. The conclusion of the evaluation and comparison process of the engineering and costs indicates RMP 5 would be the Preferred RMP based on dam safety requirements. .

In addition to dam safety requirements addressed in this chapter, the two Action RMPs and the No Action RMP must be evaluated and compared for their environmental impacts under NEPA. As noted in Chapter 1, this Draft EIS also has been prepared by the Corps to comply with NEPA and other environmental laws, Executive Orders, and Corps' regulations. Compliance with NEPA is triggered by a discretionary Federal action such as this one. For those actions with the potential to create significant environmental effects, the consideration of the proposed action and alternatives are presented in an EIS in the following chapters. The current status of the potentially affected environment is described in Chapter 4. The environmental impacts of each alternative are described in Chapter 5 and compared in Chapter 7 based on the best available information, along with a description of the environmentally preferred alternative.

## **CHAPTER 4    AFFECTED ENVIRONMENT**

This chapter describes the existing conditions within the potentially affected environment for a suite of environmental resources. This provides a baseline to compare the potential impacts that may result from implementation of the RMPs. General descriptions are provided first, followed by conditions more specific to the Project area, where applicable.

As noted in Chapter 3 and as used in this EIS, the term “Project” refers to the Whittier Narrows Dam Flood Control Project (i.e., the area and built features, including the Dam and the land and easement lands designated as part of the Reservoir for flood risk management purposes that are under operation and management by the Corps). This includes the area adjacent to the downstream side of the Dam and embankments and specifically, the areas known as Streamland Park and the Pico Rivera Golf Course.

The majority of the construction work activities and support actions comprising the RMPs analyzed in this EIS will occur in a portion of the Reservoir, termed the “RMP Action Area”. The RMP Action Area is the area within the Reservoir south of San Gabriel Boulevard and Durfee Avenue on the north, Siphon Road through the Nature Area to the northeast, the Pico Rivera Municipal Golf Course and Streamland Park on the south downstream of the Dam, Lincoln Avenue on the west, and Bicentennial Park on the east. The secondary borrow area, if utilized, would be north of Siphon Road and south of Durfee Avenue (see Figure 3.7-1)

Certain resources may be directly or indirectly affected in a broader geographic area and have been so identified at the beginning of each resource subsection.

### **4.1    EARTH RESOURCES**

This section describes the topography, geology, seismology, and mineral and agricultural resources applicable to the area surrounding the Whittier Narrows Dam and Reservoir. The area potentially affected by the proposed RMPs for this resource is the area immediately underlying the Whittier Narrows Dam and Reservoir, as well as the area immediately downstream within the footprint of the Project.

#### **4.1.1    Existing Conditions**

The Los Angeles Basin lies between the east-west-trending Transverse Ranges and northwest-trending Peninsular Ranges Provinces of coastal southern California. This Basin is an elongated, roughly northwest-trending structural basin approximately 50 miles long by 20 miles wide. The Basin is underlain by a sequence of late Quaternary non-marine sediments and late Cretaceous to late Pleistocene age marine sediments and sedimentary rocks, which rest un-conformably on metamorphic and igneous rocks of Jurassic age. The surrounding ranges expose Mesozoic and older igneous basement rocks, and typically characterized by fault-bounded structural blocks. These ranges have been undergoing tectonic uplift since Pleistocene time.

#### **4.1.1.1 Topography**

The Whittier Narrows Dam (Project) was built and named for the natural constriction where the San Gabriel River and Rio Hondo pass between the Puente Hills to the southeast and the Montebello Hills to the west. The drainage area above the Reservoir is formed by the steep San Gabriel Mountains and the upper San Gabriel Valley to the north. Elevations in the drainage area vary from 10,064 feet at San Antonio Peak (Mt. Baldy) on the northeast boundary of the watershed to the lowest point at the foot of the Dam at approximately 190.0 feet to sea level where the San Gabriel River reaches the Pacific Ocean.

From the Whittier Narrows Dam, the elevation slopes down from just under 200 feet in elevation to sea level at the Pacific Ocean. Signal Hill, north of downtown Long Beach, is the only disturbance in the coastal plain.

#### **4.1.1.2 Geology**

The “Whittier Narrows” is a structurally controlled erosional gap. The Whittier Narrows is a two-mile wide gap in the topographic divide that separates the San Gabriel Valley on the north from the Coastal Plain on the south. Plunging folds from both the La Puente and Montebello Hills meet to form a synclinal structure which has been the depositional site for thousands of feet of Tertiary and Quaternary sediments. The gap is filled with approximately 800 feet of Quaternary marine and non-marine sediments. The lower 650 feet of these sediments are Lower Pleistocene sediments of the San Pedro Formation. The uppermost aquifer, the Holocene Gaspur Aquifer is comprised of boulders cobbles and gravely sands that were deposited roughly 15,000 to 10,000 years ago. Roughly 7,000 to 5,000 years ago the climate became dryer and warmer and the Rio Hondo and San Gabriel River became ephemeral streams that meandered across a broad floodplain approximately two miles wide depositing fine grained sands, silty sands, and silts.

Superimposed within the braided deposits are randomly distributed coarse sand and gravel stringers and cut and scour fills that were deposited during flood events that occur during periods of prolonged and heavy rainfall. The thickness of these recent sediments varies from 0 feet adjacent to the hills, to approximately 120 feet in the center. The upper 50 feet of the foundation materials at the Dam have a basal coarse grained section (the upper portion of the Gaspur) overlain by a variable thickness (generally 30 to 35 feet) of more heterogeneous sediments that include relatively thinner lenses of fine to coarse-grained sands, silty sands, and silts. These sediments are not horizontally continuous over large areas and are indicative of a stream system that was variously meandering, braiding, eroding and aggrading.

Bedrock of the Puente Hills and the Montebello Hills includes crystalline rocks of Mesozoic and pre-Mesozoic age overlain by sedimentary and volcanic rocks that range in age from the Eocene to Pliocene. The Pliocene Fernando Formation is the bedrock immediately underlying the Pleistocene and Holocene sediments in the Whittier Narrows. Although the recent sediments are over 1,000 feet thick in the Narrows and over 2,500 feet thick elsewhere, they are about 800 feet thick in the area of the Dam.

The Holocene deposits which form most of the foundation under the Whittier Narrows Dam have a basal coarse-grained section of variable thickness which is hydraulically continuous with the somewhat



finer grained alluvial which overlays it. The thickness of the Holocene alluvium varies from zero at the margins of the basin to approximately 120 feet towards the center. The most recent alluvium consist of sand and gravel within layers of partially cemented fine sand, silty sand, sandy silt, silt and clayey silt. Organic matter exists in a few of the silt layers. The fine sand and silt layers are considered to be neither widespread nor horizontally continuous, but probably are more lenticular and inter spaced with coarser and more pervious materials. Medium to medium density silty sand, sand, gravelly sand, and sandy gravel are the predominant foundation soils. Well compacted Pleistocene silty sands underlie the Holocene deposits that form the foundation of the right abutment.

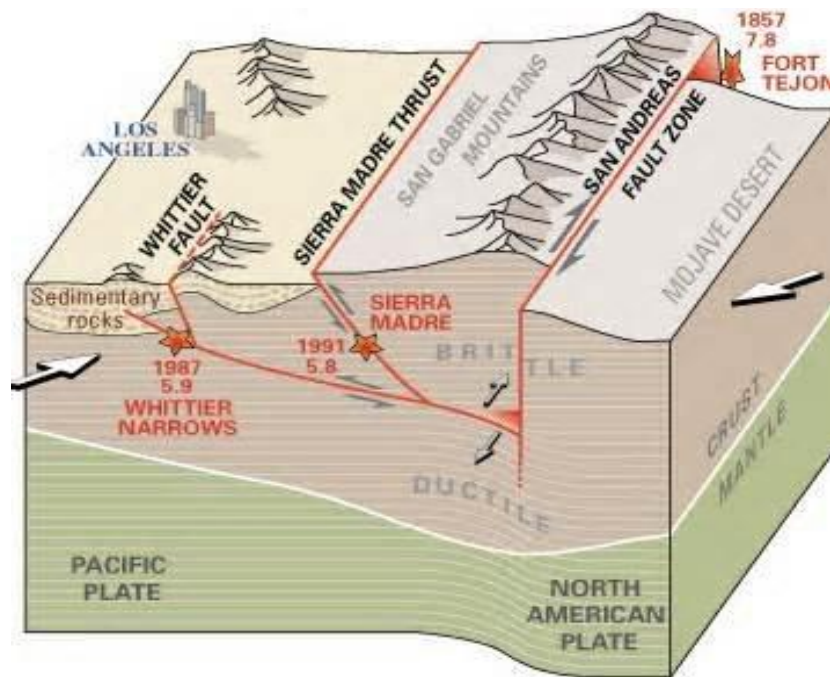
#### **4.1.1.3     Faults and Earthquakes**

The Project lies within the state of California's designated Seismic Zone; these are areas that, based on historic occurrences of liquefaction, or local geological, geotechnical, and groundwater conditions, have the potential for permanent ground displacements (CDCDMG 1999). Tectonic activity in the Los Angeles Basin is dominated by uplift along reverse (thrust) faults and translation along right-lateral strike slip faults. Earthquakes occur on faults exposed at the surface and on buried, or blind, faults that are not exposed at the surface. Two distinct systems of faults characterize the region: northwest-trending strike-slip faults of the Peninsular Ranges geomorphic province; and east-west-trending reverse faults of the Transverse Ranges geomorphic province (Figure 4.1-1). These ranges have been undergoing tectonic uplift since Pleistocene time. The major fault in the region downstream of the Dam is the Newport Inglewood fault, which transverses the area northwest to southeast just north of the Long Beach area (Figure 4.1-3).

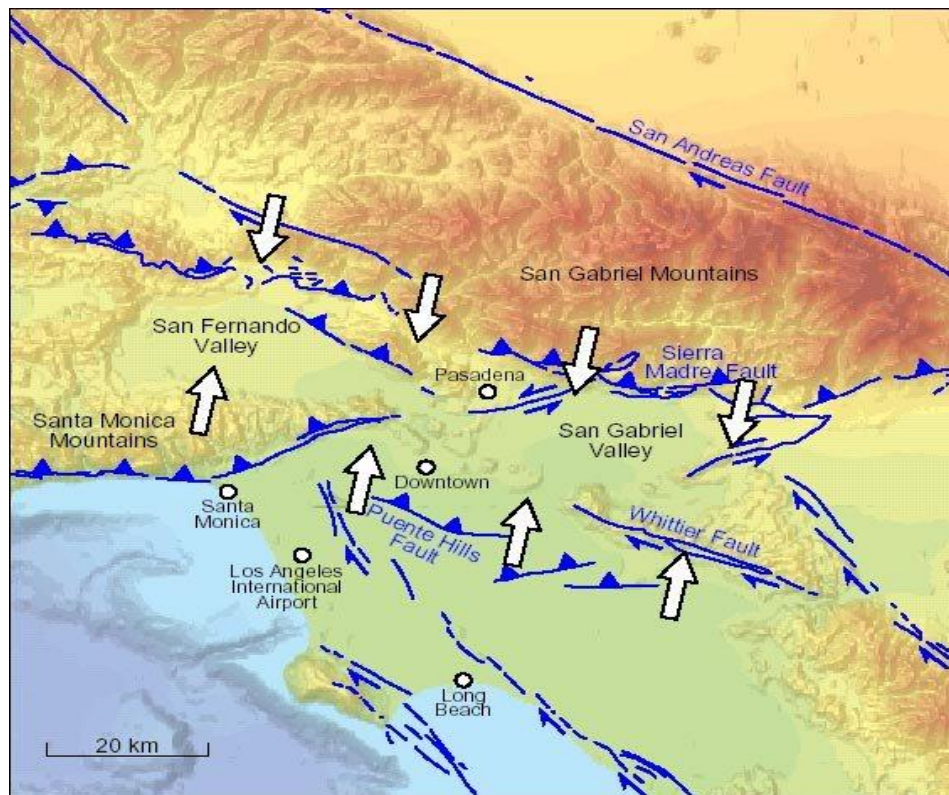
Several major property-damaging earthquakes have occurred along faults in the Los Angeles region in the last 45 years. The most recent include the 1971 ML 6.7 San Fernando earthquake that resulted in significant damage across the northern San Fernando Valley; the October 1987 Mw 5.9 Whittier Narrows earthquake that caused \$358 million in property damage; the 1992 Landers Mw 7.3 earthquake in the Mojave Desert, the largest earthquake to strike the contiguous United States in the last 50 years; and the 1994 Mw 6.7 Northridge earthquake that caused about \$20 billion in property damage.

#### **4.1.1.4     Liquefaction**

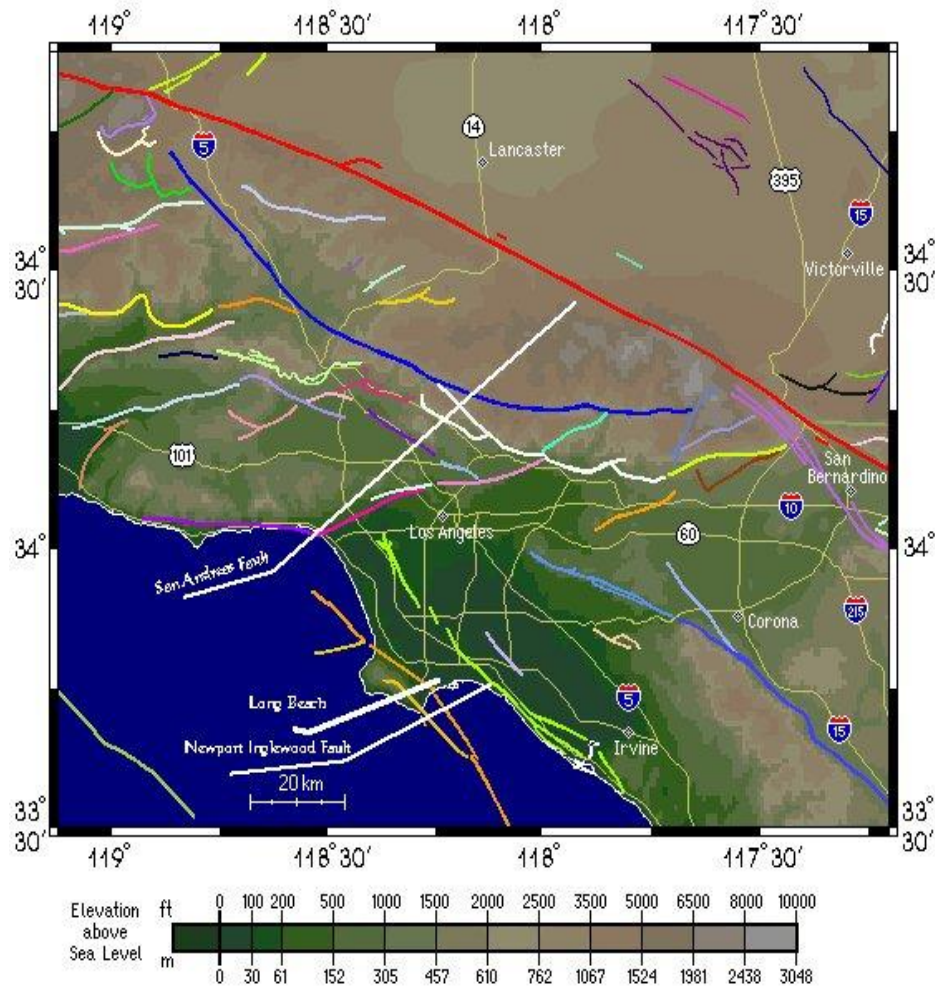
The upper 25 to 30 feet of the sandy alluvium immediately underlying Whittier Narrows Dam has the potential to liquefy during a seismic event if it is saturated. Due to the density of the Dam embankment itself, liquefaction would not be anticipated under any loading, even if it were saturated. Evidence of liquefaction was not observed following the 1987 Whittier Narrows earthquake.



**Figure 4.1-1 Local Faults and Earthquakes**



**Figure 4.1-2 Major Southern California Faults**



**Figure 4.1-3 Newport Inglewood Fault**

#### **4.1.1.5 Mineral Resources**

The Montebello Oil Field originally included the Montebello Hills to the west of the Reservoir and the area between the Montebello Hills and the Puente Hills, including most of the current Reservoir. The Montebello Oil Field was discovered in 1915 and developed during the oil boom of the 1930s. The oil field is still a significant producing oil field, producing about 55,000 barrels of oil annually according to the California Department of Conservation. The Los Angeles County Department of Public Works (LACDPW), as part of its preparation to implement increased water conservation within the Reservoir bought out the existing production leases from the private owners, and closed down and capped the wells. An unknown number of capped oil pipes are buried between Lincoln Avenue and Rosemead Boulevard south of San Gabriel Boulevard.

Downstream of the Dam, several oil fields including the Signal Hill Oil Field in Long Beach have historically been significant oil producing sources.

#### **4.1.1.6 Agricultural Resources**

The San Gabriel Valley has a short, rich agricultural history with a large range of products produced over the last 150 years. Within the Reservoir, two areas are currently under lease for agricultural purposes; a strawberry field and a currently barren area. The former is located on the northeast corner of the intersection of Rosemead Boulevard and Durfee Avenue and the latter is located north of San Gabriel Boulevard between Rosemead Boulevard and the Whittier Narrows Water Treatment Plant. These areas are not considered farmland as defined by the California Resources Agency (<https://maps.conservation.ca.gov/dlrp/ciff/>). No significant agricultural resources occur downstream of the Dam.

## **4.2 WATER RESOURCES**

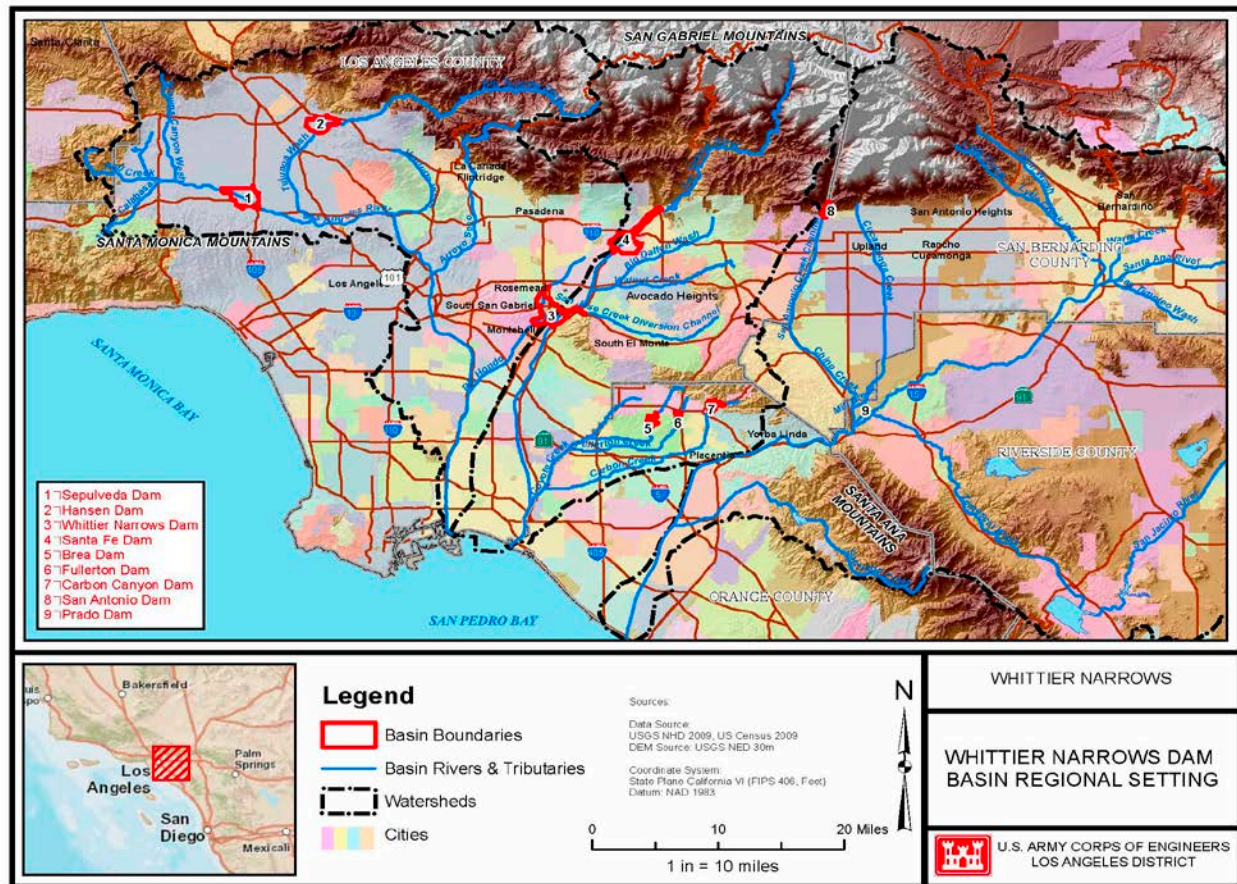
This section describes the San Gabriel and Rio Hondo watersheds as they pertain to the Los Angeles County Drainage Area (LACDA) and the system of flood risk management facilities of which the Project is a part. Generalized stream course and other hydrologic information relevant to this area is described below. Those areas potentially affected by the proposed RMPs under this resource generally include the portion of the Whittier Narrows Dam Reservoir, south of Durfee Ave, as well as the area of the San Gabriel River to approximately 0.5 miles downstream of the existing spillway.

### **4.2.1 Existing Conditions**

#### **4.2.1.1 The LACDA and San Gabriel Watersheds**

The LACDA, which includes the Whittier Narrows Dam watershed, lies mostly in Los Angeles County, California (Figure 4.2-1), although portions lie in Ventura, San Bernardino, and Orange counties. The LACDA watershed is abutted on the east by the Santa Ana River watershed, on the north by the Antelope Valley and Santa Clara River watersheds, and on the west by the Calleguas Creek watershed. The Los Angeles and San Gabriel Rivers drain to the Pacific Ocean to the southwest.





**Figure 4.2-1 San Gabriel and Los Angeles Rivers Watersheds**

Principal streams in LACDA are the Los Angeles River, which has a drainage area of 824 square miles at the mouth (including the Rio Hondo above Whittier Narrows Dam and its tributaries), and the San Gabriel River, which has a drainage area of 635 square miles at the mouth. The San Gabriel River is approximately 58 miles long, and its tributaries total about 76 miles in length. The Rio Hondo, although tributary to the Los Angeles River, connects with the San Gabriel River within Whittier Narrows Dam Reservoir when the San Gabriel River “crosses over” to the Rio Hondo. The Rio Hondo carries water from the Upper Rio Hondo and the San Gabriel River system to the Los Angeles River and effectively increases the drainage area of the Los Angeles River during periods of high runoff. While the Rio Hondo diverts much of the San Gabriel River runoff to the Los Angeles River, it also drains the adjacent area to the north and northwest. The tributary area of the Rio Hondo is 137 square miles or about nine percent of the total LACDA watershed. Its length is approximately 20 miles, and the aggregate length of its tributaries is about 60 miles.

In the mountains, runoff concentrates quickly from the steep slopes; hydrographs show that the stream flow increases rapidly in response to effective rainfall. High rainfall rates, in combination with the effects of shallow surface soils, impervious bedrock, fan-shaped stream systems, steep gradients, and occasional denudation of the area by fire, result in intense debris laden floods. However, flood and debris flows are regulated at existing dams and debris basins. Runoff from urban watersheds is characterized by high flood peaks of short duration that result from high-

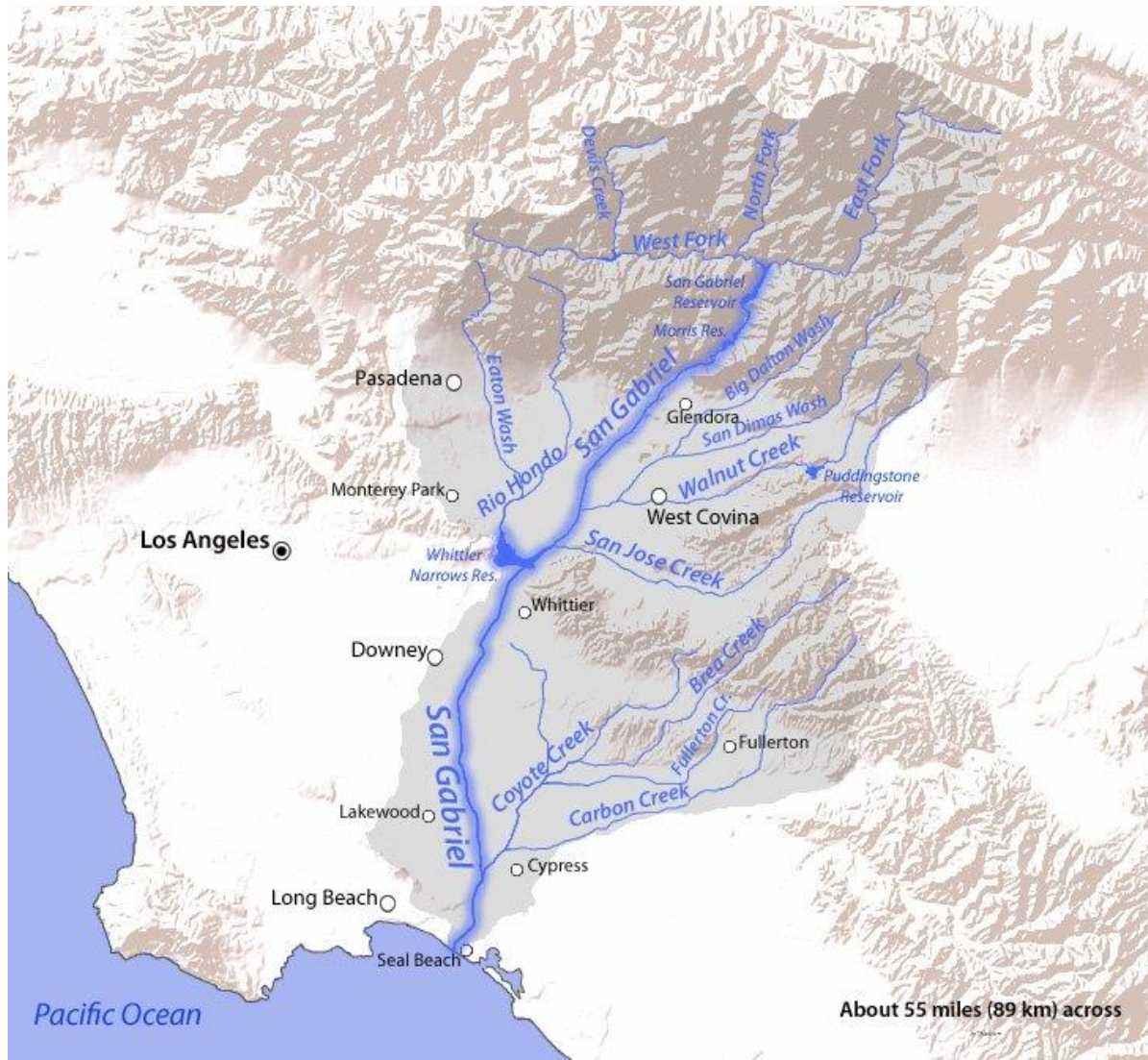
intensity rainfall on watersheds that have a high percentage of impervious cover. Runoff from single storm events is typically of less than 12-hour duration and is almost always less than 48-hour duration.

The San Gabriel River watershed stretches from the top of the south facing peaks of the San Gabriel Mountains across the San Gabriel Valley to the Pacific Ocean (Figure 4.2-2). The drainage divide on the north is formed by the ridge between Little and Big Rock Creeks and the upper San Gabriel River, on the west by the ridge between the Big Tujunga watershed, and the West Fork of the San Gabriel River, and in the east by the ridge between Lytle and San Antonio Creeks and the East Fork of the San Gabriel River. The San Gabriel River flows through the cities of Irwindale, Baldwin Park, El Monte, Pico Rivera, Downey, Bellflower, Hawaiian Gardens, and Long Beach before reaching the Pacific Ocean.

The San Gabriel River (Figure 4.2-2) that flows through the Whittier Narrows Dam Reservoir from the northeast is formed by three forks of the river converging in the San Gabriel Mountains; the West Fork, the North Fork, and the East Fork. There are four multi-purpose dams in the drainage area above Whittier Narrows Dam; Cogswell Dam on the West Fork of the San Gabriel River, San Gabriel and Morris Dams on the San Gabriel River, and Puddingstone Reservoir on upper Walnut Creek. LACDPW operates these reservoirs primarily for water conservation, but they can also have a significant effect on flood control. Morris Dam is primarily a water supply reservoir, but it can provide some incidental flood control benefits. Puddingstone Reservoir, somewhat smaller, is also operated for flood control and conservation as well as recreation.

The Rio Hondo and San Gabriel River initiate in separate watersheds; however, both flow through the Whittier Narrows within the Whittier Narrows Reservoir. Also, within the Reservoir three recreation lakes have been developed. The water from North Lake and Legg Lake drain to Center Lake which drains via Mission Creek to the Rio Hondo (see Figure 4.2-3). Flow in Mission Creek usually either percolates or evaporates prior to reaching the Rio Hondo. Discharges through the Dam are discussed in Operations section below.





**Figure 4.2-2 Showing Location of the San Gabriel River and Rio Hondo**

#### **4.2.1.2 Hydrology**

Runoff from the drainage area is characterized by unusually high flood peaks of short duration. Flood hydrographs are typically of less than 24-hour duration and are usually less than 48-hour duration, with inflow rates dropping rapidly between storms.

#### **4.2.1.3 Sediment**

No allowance was made in the Whittier Narrows Dam and Reservoir original water storage design for sediment deposition. The rate of sediment inflow and deposition was expected to be small because debris flows from the mountain and foothill areas are largely controlled by the Santa Fe Dam and numerous other upstream flood management and debris basins. Only 178 square miles of low sediment-producing valley area contributes sediment to Whittier Narrows Dam Reservoir (Corps 1957). Based on the topographic survey of the Reservoir in August 1995, the flood storage

capacity at elevation 229 feet (top of spillway gates in the closed position) was 34,596 ac-ft versus the original storage capacity of 36,160 ac-ft. The relatively small loss of storage space (1,564 ac-ft) over a period of 38 years confirms the original design assumption of a low sedimentation rate.

#### **4.2.1.4 Other Structures Affecting Runoff**

There are numerous reservoirs and diversion structures in the drainage area tributary to Whittier Narrows Dam. The only other major structure operated solely for flood control is Santa Fe Dam. This structure, completed in 1949, is under the jurisdiction of the Corps with a capacity of 32,130 ac-ft at spillway crest. The operation plan for Santa Fe Dam is designed to control the Reservoir design flood. The current operation schedule for Santa Fe Dam establishes a debris pool with releases up to 130 cfs until the water surface elevation reaches 456.0 feet. At a water surface elevation of 456.0 feet, flood control operations commence. In the flood control pool, the outflow ranges from 3,000 cfs to 41,000 cfs when the water surface reaches spillway crest.

#### **4.2.1.5 Whittier Narrows Dam Operations**

The primary authorized purpose of the Whittier Narrows Dam is flood risk reduction. The Reservoir is normally dry; there is less than two feet of water 80 percent and 50 percent of the time at the Rio Hondo and San Gabriel River sides, respectively. There is essentially no Reservoir storage at these depths.

Flows come into the Dam from both the San Gabriel River and the Rio Hondo. The crossover channel (see Figure 4.2-4) provides connection between the two sides of the Dam for lower flows. Pools above elevation 208 feet on the San Gabriel river will result in flow over the cross-weir (see figure below) and into the Rio Hondo side. The two pools become one when the water surface exceeds elevation 221 ft.





Figure 4.2-3 Whittier Narrows Dam Reservoir Features

On the San Gabriel side, releases are normally limited to 500 cfs. During storms, releases up to 5,000 cfs through the spillway are typical, though temporary releases of up to 12,000 cfs are permitted provided downstream capacity will not be exceeded. When the pool exceeds elevation 228.5 feet, the spillway gates begin automatic operation; channel capacity (approximately 13,100 cfs) would be exceeded before pool elevation 229.0 feet, and downstream flooding would begin. The spillway discharges will approach 300,000 cfs as the pool elevation approaches the top of the Dam. The gates have never opened automatically due to a flood. The automatic system is operated every five (5) years during periodic inspections.

On the Rio Hondo side, there is no dedicated space for water conservation, but if conditions are favorable (e.g., no storms anticipated) and pool is below elevation 201.6 feet, releases are limited to the diversion capacity of Los Angeles County's downstream Rio Hondo Coastal Basin Spreading Grounds. When the pool is above elevation 201.6 feet or during storm periods, releases are increased to match inflow without exceeding downstream channel capacity (40,000 cfs). This maximum regulated release is reached when the gates are fully opened at elevation 208.0 feet. The outlet works is capable of discharging up to approximately 75,000 cfs (at Reservoir elevation 229.0 feet), though such flows would overtop the levees and may hamper evacuation that would be necessary as a result of the San Gabriel River discharge.

#### **4.2.2 Surface Water**

##### **4.2.2.1 Surface Water Quality-Beneficial Uses**

Water quality throughout the state of California is protected by the State Water Resources Control Board's (SWRCB) water quality objectives. Water quality objectives are designed to protect Beneficial Uses, which determine the degree of water quality protection needed to support current and future human and wildlife utilization. The Los Angeles Regional Water Quality Control Board (LARWQCB), Region 4, has designated Beneficial Uses for streams in the Reservoir and vicinity. The LARWQCB, Region 4, has designated Beneficial Uses for streams in the Reservoir and vicinity.

**Municipal (MUN)** – Water used for military, municipal, individual water systems, and may include drinking water.

**Industrial Process Supply (PROC)** – Uses of water for industrial activities that depend primarily on water quality.

**Industrial Service Supply (IND)** – Water supply for industrial uses that do not depend on water quality.

**Agricultural (AG)** – Uses of water for farming, horticulture, or ranching including, but not limited to, irrigation, stock watering, or support of vegetation for range grazing.

**Ground Water Recharge (GWR)** – Natural or artificial Ground Water Recharge for future extraction, to balance natural hydrologic processes, and to maintain navigable channels.



**Recreation Contact 1 (REC1)** – Recreation Contact 1 is protective of activities where body with water contact or possible ingestion may occur. Examples of these activities include wading, swimming, diving, surfing, white water rafting, etc.

**Recreation Contact 2 (REC2)** – Recreation Contact 2 is protective of activities near water, but not occurring in water. Examples of these activities include picnicking, sunbathing, hiking, beach-combing, camping, boating, tide pool exploration, etc.

**Warmwater Habitat (WARM)** – Water used for the support of warm water ecosystems for the preservation and maintenance of aquatic habitat and wildlife species (flora and fauna).

**Coldwater Habitat (COLD)** – Uses of water that support cold water ecosystems for the preservation and maintenance of aquatic habitat and wildlife species (flora and fauna).

**Wildlife Habitat (WILD)** – Waters that support wildlife habitats that may include, but are not limited to, the preservation and enhancement of vegetation and prey species used by waterfowl and other wildlife.

**Rare, Threatened or Endangered Species (RARE)** – Habitat types that are necessary for the survival and livelihood of plant and animal species listed by the state/Federally as rare, threatened, or endangered.

**Wetlands (WET)** – Water used for the support of wetland ecosystems and habitat for the preservation of species of flora and fauna. WET beneficial uses also include flood and erosion control, natural treatment of impaired water quality, and stream bank restoration.

#### **4.2.2.2 Surface Water Quality Impairments**

Baseline water quality monitoring assessments conducted by watershed stakeholders and the state have characterized Legg Lake as the only water body within the Reservoir boundaries that is not in compliance with state water quality objectives established to protect designated Beneficial Uses. Legg Lake has been listed as impaired on the Clean Water Act (CWA) 303(d) list for Ammonia (EPA approved 2012), Trash (EPA approved 2008), PCBs (EPA approved 2014), and Odors (EPA approved 2012). Under the CWA, water quality issues must be reported on the 303(d) list of water quality impairments. Legg Lake does not discharge into the Action Area of the Proposed RMPs under normal flow conditions, and is not discussed further.

The CWA also requires that jurisdictions responsible for CWA 303(d) listed waters develop a Total Maximum Daily Load (TMDL) plan for each impairment. A TMDL quantifies the amount of the impairment that a water body can receive and still safely meet water quality standards. The LARWQCB issued TMDL for trash for Legg Lake (collectively North, Center, and Legg Lakes) in 1999 to be implemented within 13 years (2012). The current status is unknown.

### **4.2.3 Groundwater**

The Whittier Narrows Dam Reservoir is located on top of the San Gabriel Valley Groundwater Basin (SGVGB) in eastern Los Angeles County, which includes a portion of the upper Santa Gabriel Valley. The groundwater basin is confined and bounded in the north by the Raymond Fault and the San Gabriel Mountain consolidated basement rocks. To the south and the west the groundwater basin is bounded by consolidated rocks of the Repetto, Merced, and La Puente Hills. The Chino and the San Jose fault form the eastern boundary of the groundwater basin.

The SGVGB is 170 square miles and underlies the San Gabriel River floodplain. There are two sub-basins in the SGVGB: the lower San Gabriel Canyon Basin (northernmost) and the San Gabriel Basin (southernmost). In addition to natural infiltration of rainfall and runoff, the SGVGB is recharged with fresh water by the Metropolitan Water District of Southern California (MWD) to Morris Dam and Santa Fe Dam. Groundwater quality is under the jurisdiction of the LARWQCB.

#### **4.2.3.1 Groundwater Quality**

Water quality assessment by the LARWQCB classifies 70 square miles of the SGVGB as “Impaired” and 100 square miles as “Unknown”. The quality of water used to recharge the Reservoir is classified as “Good,” and the water quality of the upper 42 miles of the San Gabriel River is classified as “Intermediate”. Currently, the hydrocarbons (VOCs) and SVOCs constituent group is not listed as a 303(d) impairment for the Reservoir, nor for adjoining drainages.

The SGVGB has been severely impaired due to past and present human activities and as a result has been listed as a Superfund Site by the EPA. Groundwater contaminants identified within SGVGB include trichloroethylene (TCE), perchloroethylene (PCE), and carbon tetrachloride.

The U.S. Environmental Protection Agency (EPA) implemented the Whittier Narrows Operable Unit within the Reservoir in 2003. The unit was turned over to the State of California in 2013. The unit pumps contaminated groundwater and runs it through the unit filtering system before being conveyed for local use or replenishing the local groundwater. Wells are located throughout the Reservoir. Additional information regarding the Whittier Narrows Operable Unit is in Section 4.8.

### **4.2.4 Jurisdictional Waters of the US**

The extent of jurisdictional waters was estimated for planning purposes as a field delineation was not conducted to verify the presence/absence of jurisdictional field indicators. As such, the findings are only intended to be utilized in association with the current study. Refined delineations of Waters of the US including adjacent wetland boundaries will be determined as needed during the engineering and design phase of the project.



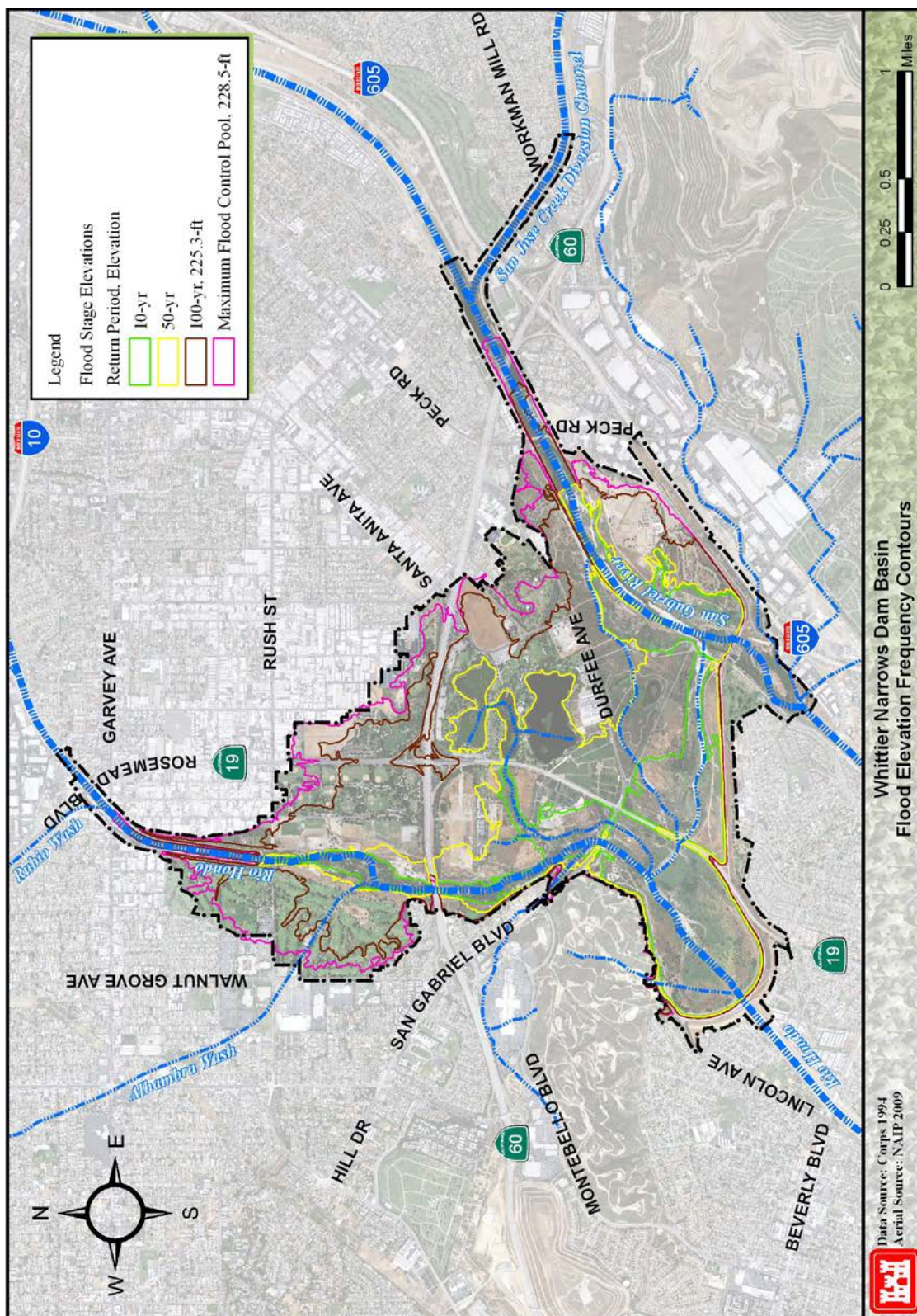


Figure 4.2-4 Flood Frequency Contours

### **Whittier Narrows Dam Reservoir**

Both the San Gabriel River and the Rio Hondo flow into the Whittier Narrows Dam Reservoir. During storm flows, a flood pool forms upstream of the Dam. For this jurisdictional determination, the 10-year flood pool elevation of 206.0 feet was deemed to be the extent of Waters of the US for areas within the Reservoir (Figure 4.2-5).

### **Downstream of the Dam**

Water resources downstream of Whittier Narrows Dam include the San Gabriel River channel, the Rio Hondo channel, created detention/recharge basins operated by LACDPW, storm drains feeding into these channels, and man-made lakes at various recreation sites including golf courses. As stated above, the San Gabriel River is a direct tributary to the Pacific Ocean, a TNW, thus, it is a relatively permanent non-navigable tributary of a TNW. The Rio Hondo is an indirect direct tributary to the Pacific Ocean via the Los Angeles River, thus, it is a relatively permanent non-navigable tributary of a TNW.

## **4.3 AIR QUALITY**

### **4.3.1 Existing Conditions**

The relevant airshed for the proposed RMPs is the South Coast Air Basin (SCAB). The SCAB which is bordered by the Pacific Ocean to the west and by San Gabriel, San Bernardino, and Santa Susana Mountains to the north and northeast, includes all of Orange County, Riverside County, Los Angeles County except for Antelope Valley, and the non-desert portion of San Bernardino County. Emissions from construction and operation of the RMPs would affect air quality in the Whittier Narrows Dam basin and the surrounding area.

### **4.3.2 General Meteorological Conditions**

The SCAB lies within the semi-permanent high-pressure zone of the eastern Pacific Ocean. The climate of the region is classified as Mediterranean; the climate is generally characterized by warm, dry summers and mild winters with moderate rainfall. Prevailing daily winds in the region are westerly, with a nighttime return flow. This pattern is typically broken five to ten days a year when strong northeasterly winds, commonly known as “Santa Ana Winds,” sweep down from the desert.

The SCAB’s climate and topography are conducive to the formation of ozone (O<sub>3</sub>). The heaviest concentrations of O<sub>3</sub> occur during the summer months when there are warm temperatures, stagnant wind conditions, high solar radiation, and an inversion layer at lower elevations. An inversion layer forms when cooler, denser air is trapped by warmer, lighter air. Sea breezes transport air pollutants to adjacent air basins, such as the Mojave Desert Air Basin and the SSAB. Carbon monoxide (CO) concentrations are highest during the winter, when relatively stagnant air conditions result in an accumulation of this pollutant. Highest CO concentrations are found near heavily traveled and congested roadways. However, in the case of particulate matter, maximum concentrations may occur during high wind events or near man-made ground-disturbing activities, such as vehicular activities on roads and earth moving during construction activities.

Winds across the study area are an important meteorological parameter as they control both the initial rate of dilution and direction of pollutant dispersion. Winds blowing from the west are dominant during February and April, and the prevailing winds during March and summer (May through July) blows from the south. During August through January, dominant winds blow from the west-northwest.

### **4.3.3 Regional Air Quality**

Air pollutant emissions in the SCAB are generated from stationary, mobile, and natural sources. Stationary sources can be divided into two major subcategories: point and area sources. Point sources occur at an identified location and usually are associated with manufacturing and industry. Examples are boilers or combustion equipment that produce electricity or generate heat. Area sources are distributed widely and produce many small emissions. Examples of area sources include residential and commercial water heaters, painting operations, portable generators, lawn mowers, agricultural fields, landfills, and consumer products such as barbecue lighter fluid and hair spray. Construction activities that create fugitive dust such as excavation and grading also contribute to area source emissions. Mobile sources refer to emissions from on- and off-road motor vehicles, including tailpipe and evaporative emissions. On-road sources may be operated legally on roadways and highways. Off-road sources include aircraft, trains, and construction equipment. Mobile sources account for the majority of the air pollutant emissions within the air basin. Air pollutants also can be generated by the natural environment such as when fine dust particles are pulled off the ground surface and suspended in the air during high winds.

To protect the public health and welfare, the Federal government has identified five criteria air pollutants and a list of air toxics and have established ambient air quality standards through the Federal Clean Air Act and the California Clean Air Act. The air pollutants for which Federal standards have been promulgated and that are most relevant to air quality planning and regulation in the air basins include ozone ( $O_3$ ), carbon monoxide (CO), suspended particulate matter (PM), sulfur dioxide ( $SO_2$ ), nitrogen dioxide ( $NO_2$ ), and lead (Pb). PM comes in a range of sizes. PM emissions are regulated in two size classes: Particulates up to 10 microns in diameter ( $PM_{10}$ ) and particulates up to 2.5 microns in diameter ( $PM_{2.5}$ ).  $PM_{10}$  and  $PM_{2.5}$  are so small that they can enter the lungs and cause serious health problems.

Ozone ( $O_3$ ) is a problematic air contaminant in the SCAB.  $O_3$  is formed from the precursor pollutants volatile organic compounds (VOC) and nitrogen oxides ( $NO_x$ ). VOC and  $NO_x$  react to form  $O_3$  in the presence of sunlight through a complex series of photochemical reactions. As a result, unlike inert pollutants,  $O_3$  levels usually peak several hours after the precursors are emitted and many miles downwind of the source.

Nitrogen dioxide ( $NO_2$ ) is a byproduct of combustion, such as fuel combustion in power plants and internal combustion engines. Carbon monoxide (CO) is a product of inefficient combustion, principally from automobiles and other mobile sources of pollution. In many areas of California, CO emissions from sources such as wood-burning stoves and fireplaces also can be measurable contributors during cold-weather months. Industrial sources of pollution generally contribute less than 10 percent of ambient CO levels. Peak CO levels occur typically during winter months

because of a combination of seasonal contributions from home heating devices and stagnant weather conditions. Sulfur dioxide (SO<sub>2</sub>) is produced when any sulfur-containing fuel is burned. Chemical plants that treat or refine sulfur or sulfur-containing chemicals also emit SO<sub>2</sub>. Because of the complexity of the chemical reactions that convert SO<sub>2</sub> to other compounds (such as sulfates), peak concentrations of SO<sub>2</sub> occur at different times of the year in different parts of the state, depending on local fuel characteristics, weather, and topography. In moist environments, SO<sub>2</sub> may combine with water to form sulfuric acid, a component of acid rain.

Particulate matter in the air is composed of windblown fugitive dust; particles emitted from combustion sources (usually carbon particles); and organic, sulfate, and nitrate aerosols formed in the air from emitted hydrocarbons, sulfur oxides, and oxides of nitrogen. Lead is found in old paints and coatings, plumbing, and various other materials.

Typically, air pollutants are classified as primary or secondary pollutants. Carbon monoxide, nitrogen dioxide, particulate matter, sulfur dioxide, and lead are considered primary pollutants because they are emitted directly into the atmosphere. Ozone is considered a secondary pollutant because it is formed through a photochemical reaction in the atmosphere with VOCs and NO<sub>x</sub> in the presence of sunlight.

The Federal government has established ambient air quality standards for outdoor concentrations of various pollutants to protect public health. These standards have been set at levels whose concentrations could be generally harmful to human health and welfare and that protect the most sensitive persons from illness or discomfort with a margin of safety.

While ambient air quality standards have been developed specifically for O<sub>3</sub> and NO<sub>x</sub>, there is no National Ambient Air Quality Standard (NAAQS) for VOCs. VOCs include many compounds of carbon. There are certain classes of carbon compounds that are not VOCs, including: carbon monoxide, carbon dioxide, carbonic acid, metallic carbides or carbonates, ammonium carbonate, and methane, among others. While the Federal government has not established ambient attainment levels for VOCs, they have for O<sub>3</sub>. Because VOCs react with NO<sub>x</sub> through photochemical reactions to form ozone, air districts, including SCAQMD, have provided VOC significance thresholds for study level analysis in order to further limit the levels of VOCs in the atmosphere that could be converted to ozone.

**Table 4.3-1 National Ambient Air Quality Standards**

Pollutant	Averaging Time	Federal Standards <sup>2</sup>		
		Primary <sup>3,5</sup>	Secondary <sup>3,6</sup>	Measurement Method <sup>7</sup>
Ozone (O <sub>3</sub> )	1 Hour	—	Same as Primary Standard	Ultraviolet Photometry
	8 Hours	0.075 ppm (147 µg/m <sup>3</sup> )		
Respirable Particulate Matter (PM <sub>10</sub> )	24 Hours	150 µg/m <sup>3</sup>	Same as Primary Standard	Inertial Separation and Gravimetric Analysis
	Annual Arithmetic Mean	—		
	24 Hours	35 µg/m <sup>3</sup>	35 µg/m <sup>3</sup>	Inertial Separation and Gravimetric Analysis



Pollutant	Averaging Time	Federal Standards <sup>2</sup>		
		Primary <sup>3,5</sup>	Secondary <sup>3,6</sup>	Measurement Method <sup>7</sup>
Fine Particulate Matter (PM <sub>2.5</sub> )	Annual Arithmetic Mean	12 µg/m <sup>3</sup>	15 µg/m <sup>3</sup>	
Carbon Monoxide (CO)	8 Hours	9 ppm (10 mg/m <sup>3</sup> )	None	Non-Dispersive Infrared Photometry (NDIR)
	1 Hours	35 ppm (40 mg/m <sup>3</sup> )		
Nitrogen Dioxide (NO <sub>2</sub> )	Annual Arithmetic Mean	0.053 ppm (100 µg/m <sup>3</sup> )	Same as Primary Standard	Gas Phase Chemiluminescence
	1 Hour	100 ppb (188 µg/m <sup>3</sup> )	None	
Sulfur Dioxide (SO <sub>2</sub> )	24 Hours	0.14 ppm (for certain areas)	—	Ultraviolet Fluorescence; Spectrophotometry (Pararosaniline Method) <sup>9</sup>
	3 Hours	—	0.5 ppm (1300 µg/m <sup>3</sup> )	
	1 Hour	75 ppb (196 µg/m <sup>3</sup> )	—	
	Annual Arithmetic Mean	0.030 ppm	-	
Lead (Pb) <sup>8</sup>	30 Days Average	—	—	—
	Calendar Quarter	1.5 µg/m <sup>3</sup> (for certain areas)	Same as Primary Standard	High Volume Sampler and Atomic Absorption
	Rolling 3-Month Average	0.15 µg/m <sup>3</sup>		
Visibility Reducing Particles	8 Hours	No Federal Standards		
Sulfates (SO <sub>4</sub> )	24 Hours			
Hydrogen Sulfide	1 Hour			

<sup>2</sup>National standards (other than ozone, particulate matter, and those based on annual averages or annual arithmetic mean) are not to be exceeded more than once a year. The ozone standard is attained when the fourth highest eight-hour concentration in a year, averaged over three years, is equal to or less than the standard. For PM<sub>10</sub>, the 24-hour standard is attained when the expected number of days per calendar year with a 24-hour average concentration above 150 µg/m<sup>3</sup> is equal to or less than one. For PM<sub>2.5</sub>, the 24-hour standard is attained when 98% of the daily concentrations, averaged over three years, are equal to or less than the standard.

<sup>3</sup>Concentration expressed first in units in which it was promulgated. Equivalent units given in parentheses are based upon a reference temperature of 25°C and a reference pressure of 760 torr (760 torr equals to 1 atmospheric pressure). Most measurements of air quality are to be corrected to a reference temperature of 25°C and a reference pressure of 760 torr; ppm in this table refers to ppm by volume, or micromoles of pollutant per mole of gas.

<sup>5</sup>National Primary Standards: The levels of air quality necessary, with an adequate margin of safety to protect the public health.

<sup>6</sup>National Secondary Standards: The levels of air quality necessary to protect the public welfare from any known or anticipated adverse effects of a pollutant.

<sup>7</sup>Reference method as described by the EPA. An “equivalent method” of measurement may be used but must have a “consistent relationship to the reference method” and must be approved by the EPA.

A state or region is given the status of "attainment" or "unclassified" if ambient air quality standards have not been exceeded. A status of "nonattainment" for particular criteria pollutants is assigned if the ambient air quality standard for that pollutant has been exceeded. Once

designated as nonattainment, attainment status may be achieved after three years of data showing non-exceedance of the standard. When an area is reclassified from nonattainment to attainment, it is designated as a “maintenance area,” indicating the requirement to establish and enforce a plan to maintain attainment of the standard.

Federal attainment status designations for the SCAB are summarized in Table 4.3-2.

Air quality problems in the SCAB include periodic violations of Federal air quality standards for ozone, PM<sub>10</sub>, and PM<sub>2.5</sub>. The frequency with which ozone standards have been exceeded has declined significantly over recent decades.

<b>Table 4.3-2 Federal Attainment Status Designation for the South Coast Air Basin</b>	
<b>Air Pollutants</b>	<b>Federal</b>
Ozone (1-Hour)	-
Ozone (8-Hour)	Nonattainment - extreme
PM <sub>2.5</sub>	Nonattainment
PM <sub>10</sub> (24-Hour)	Attainment/Maintenance
PM <sub>10</sub> (Annual)	Unclassified
NO <sub>2</sub>	Attainment/Maintenance
CO	Attainment/Maintenance
SO <sub>2</sub>	Attainment
Lead	Nonattainment

#### **4.3.4 Local Air Quality**

Air monitoring stations closest to Whittier Narrows Dam include: (1) Pico Rivera No. 2 Air Monitoring Station located at 4144 San Gabriel River Parkway in Pico Rivera which monitors and collects data for Ozone (O<sub>3</sub>), 8-hour CO, PM<sub>2.5</sub>, and NO<sub>2</sub>; (2) Central Los Angeles North Main Street Monitoring Station which monitors and collects data for PM<sub>10</sub> and SO<sub>2</sub>. In general, the ambient air quality measurements from these stations are representative of the air quality in the vicinity of the Reservoir.

Table 4.3-3 summarizes the latest available annual air quality data from 2011, 2012, and 2013. In general, the levels of criteria pollutants within the vicinity of Whittier Narrows Dam are below NAAQS standards.



<b>Table 4.3-3 Ambient Air Quality at Pico Rivera and Los Angeles North Main Street Monitoring Station</b>				
<b>Pollutant</b>	<b>National Standard</b>	<b>2011</b>	<b>2012</b>	<b>2013</b>
O <sub>3</sub> (8 hour)	0.075 ppm	.061	.071	.063
PM <sub>10</sub> (24 hour)	150 µg/m <sup>3</sup>	53	80	57
PM <sub>2.5</sub> (24 hour)	35 µg/m <sup>3</sup>	27	29	29
PM <sub>2.5</sub> (AAM <sup>b</sup> )	15.0 µg/m <sup>3</sup>			
NO <sub>2</sub> (AAM)	0.053 ppm			
CO (1 hour)	35 ppm	2.7	2.7	3.6
CO (8 hour)	9 ppm	2.4	2.2	2.0
SO <sub>2</sub> (AAM)	0.030 ppm			
SO <sub>2</sub> ** (24 hour)	0.14 ppm	.002	.002	.002
SO <sub>2</sub> (1 hour)	0.075 ppm	.009	.005	.006
Pb (Calendar quarter)	1.5 µg/m <sup>3</sup>	*	N/A	*
µg/m <sup>3</sup> : micrograms per cubic meter; ppm: parts per million N/A indicates that there is no applicable standard. b Annual Arithmetic Mean * Data Not Reported or insufficient data available to determine the value. **Los Angeles Monitoring Station, no data for Pico Rivera Station Source: CARB 2018				

#### 4.3.5 Greenhouse Gases and Climate Change

Gases that trap heat in the atmosphere are often called greenhouse gases (GHGs). GHGs are emitted by natural processes and human activities. Examples of GHGs that are produced both by natural processes and industry include carbon dioxide (CO<sub>2</sub>), methane (CH<sub>4</sub>), and nitrous oxide (N<sub>2</sub>O). Examples of GHGs created and emitted primarily through human activities include fluorinated gases (hydrofluorocarbons [HFCs] and perfluorocarbons [PFCs]) and sulfur hexafluoride (SF<sub>6</sub>).

The accumulation of GHGs in the atmosphere regulates the earth's temperature. Without these natural GHGs, the earth's surface would be about 61°F cooler (AEP 2007). However, emissions from fossil fuel combustion for activities such as electricity production and vehicular transportation have elevated the concentration of GHGs in the atmosphere above natural levels. According to the Intergovernmental Panel on Climate Change (IPCC 2007), the atmospheric concentration of CO<sub>2</sub> in 2005 was 379 ppm compared to the pre-industrial levels of 280 ppm. In addition, the Fourth U.S. Climate Action Report concluded, in assessing current trends, that CO<sub>2</sub> emissions increased by 20 percent from 1990 to 2004, while methane and nitrous oxide emissions decreased by 10 percent and 2 percent, respectively.

There appears to be a close relationship between the increased concentration of GHGs in the atmosphere and global temperatures. Scientific evidence indicates a trend of increasing global temperatures near the earth's surface over the past century due to increased human-induced levels of GHGs.

GHGs differ from criteria pollutants in that GHG emissions do not cause direct adverse human health effects. Rather, the direct environmental effect of GHG emissions is the increase and/or change in global temperatures, which in turn has numerous indirect effects on the environment and humans. For example, some observed changes include shrinking glaciers, thawing permafrost, later freezing and earlier break-up of ice on rivers and lakes, a lengthened growing season, shifts in plant and animal ranges, and earlier flowering of trees (IPCC 2001). Other, longer term environmental impacts of global warming may include sea level rise, changing weather patterns with increases in the severity of storms and droughts, changes to local and regional ecosystems including the potential loss of species, and a significant reduction in winter snow pack (for example, estimates include a 30 to 90 percent reduction in snow pack in the Sierra Nevada mountain range). Current data suggest that in the next 25 years, in every season of the year, California could experience unprecedented heat, longer and more extreme heat waves, greater intensity and frequency of heat waves, and longer dry periods. More specifically, the California Climate Change Center (Roland-Holst 2006) predicted that California could witness the following events:

- Temperature rises between 3 to 10.5°F
- 6 to 20 inches or more of sea level rise
- 2 to 4 times as many heat-wave days in major urban centers
- 2 to 6 times as many heat-related deaths in major urban centers
- 1 to 1.5 times more critically dry years
- 10 to 55 percent increase in the risk of wildfires

Methods have been set forth to describe emissions of GHGs in terms of a single gas to simplify analysis. The most commonly accepted method to compare GHG emissions is the global warming potential (GWP) methodology defined in the IPCC reference documents (IPCC 2007). The IPCC defines the GWP of various GHG emissions on a normalized scale that recasts all GHG emissions in terms of CO<sub>2</sub>e, which compares the gas in question to that of the same mass of CO<sub>2</sub> (CO<sub>2</sub> has a global warming potential of 1 by definition). Table 4.3-4 lists the global warming potential of select GHGs their lifetimes.

<b>Table 4.3-4 Global Warming Potentials and Atmospheric Lifetimes of Select Greenhouse Gases</b>		
<b>Gas</b>	<b>Atmospheric Lifetime (Years)</b>	<b>Global Warming Potential (100 Year Time Horizon)</b>
Carbon Dioxide	50 – 200	1
Methane	12 ± 3	21
Nitrous Oxide	120	310
HFC-23	264	11,700
HFC-134a	14.6	1,300
HFC-152a	1.5	140
PFC: Tetrafluoromethane (CF <sub>4</sub> )	50,000	6,500
PFC: Hexafluoroethane (C <sub>2</sub> F <sub>6</sub> )	10,000	9,200
Sulfur Hexafluoride (SF <sub>6</sub> )	3,200	23,900

Source: EPA, 2006.

A GHG inventory is a quantification of all GHG emissions and sinks within a selected physical and/or economic boundary. GHG inventories can be performed on a large scale (i.e., for global and national entities) or on a small scale (i.e., for a particular building or person). Although many processes are difficult to evaluate, several agencies have developed tools to quantify emissions from certain sources. **Table 4.3-5** outlines recent global, national, and statewide GHG inventories to help contextualize the magnitude of potential Project-related emissions.

<b>Table 4.3-5 Global, National, and State GHG Emissions Inventories</b>	
<b>Emissions Inventory</b>	<b>CO<sub>2</sub>e<sup>a</sup> (metric tons)</b>
2004 IPCC Global GHG Emissions Inventory	49,000,000,000
2011 USEPA National GHG Emissions Inventory	6,702,300,000
2012 CARB State Emissions Inventory	458,680,000
NOTE: a CO <sub>2</sub> e = carbon dioxide equivalents	
SOURCES: IPCC 2007, USEPA 2013, CARB 2014a.	

### Corps Policy on Climate Change

The Corps policy is to integrate climate change adaption planning and actions into its missions, operations, programs, and projects (USACE 2014). The Corps continues to develop its climate change adaption planning and implements results of the planning using best available and actionable climate science and climate change information. Simultaneously, the Corps continues to work with other agencies to develop the necessary science and engineering research on climate change into actions to address climate change impacts in the Corps' missions. Effective climate change preparedness and resilience is especially important for the Corps because the

hydrologic processes underlying water resources management are very sensitive to changes in climate and weather, and because those same changes affect water resources infrastructure.

#### **NEPA Greenhouse Gas Statement**

On August 5, 2016, the Council on Environmental Quality (CEQ) released the “Final Guidance for Federal Departments and Agencies on Consideration of Greenhouse Gas Emissions and the Effects of Climate Change in National Environmental Policy Act Reviews.” This guidance states that if a proposed action would be reasonably anticipated to cause direct emissions of 25,000 metric tons or more of CO<sub>2</sub> equivalent (MTCO<sub>2</sub>e) on an annual basis, agencies should consider this an indicator that a quantitative and qualitative assessment may be meaningful to decision makers and the public. Effective April 5, 2017, the CEQ withdrew the guidance.

Therefore, the Corps will not make a NEPA significance impact determination for GHG emissions anticipated to result from any of the RMPs. Rather, in compliance with NEPA implementing regulations, the anticipated GHG emissions will be disclosed for each RMP without expressing a judgment as to their significance.

#### **4.4 NOISE AND VIBRATION**

Noise can be defined as unwanted sound or combination of sounds that may interfere with conversation, work, rest, recreation, and sleep, or in the extreme may produce physiological or psychological damage. Sound has two main components to a human ear; pitch and loudness. Sound travels from a source in the form of wave, which exerts a pressure on a receptor such as a human ear. While the pitch of a sound is generally associated with an annoyance, sound loudness can interfere with activities such as conversation, sleep, and learning, and can even have lasting physiological effects, such as hearing loss.

Human response to noise is subjective and can vary greatly from person to person. Factors that influence individual response include the intensity, frequency, and pattern of noise; the amount of background noise present before the intruding noise; and the nature of work or human activity that is exposed to the noise source.

The preferred unit for measuring sound is the decibel (dB). The amount of pressure a sound wave exerts is referred to as sound level, commonly measured in decibels (dB). As a reference, a sound level of zero dB corresponds roughly to the threshold of human hearing and a sound level in the range of 120 to 140 dB can produce human pain. Those who are more sensitive to noise such as children and the elderly are at higher risk of being adversely affected by excessive noise levels.

This section describes noise measurements, sensitive receptors, ambient noise in the vicinity of the proposed RMPs inside the Project boundaries, and ground borne vibration. The area potentially affected by the proposed RMPs for this resource generally encompasses the RMP action area as well as the area 0.5 miles south of the west, central, and east embankments.

#### **4.4.1 Noise Measurements**

The degree to which noise can affect the human environment range from levels that interfere with speech and sleep (annoyance and nuisance) to levels that cause adverse health effects (hearing loss and psychological effects).

The dB expresses the logarithmic ratio of the amount of energy radiating from a source in the form of an acoustic wave. The typical human ear is not equally sensitive to all frequencies of the audible sound spectrum. Sound intensity is measured in decibels that are A-weighted (dBA) to correct for the relative frequency response of the human ear. The range of human hearing extends from approximately 3 to 140 dBA.

Equivalent noise level (Leq) is the average noise level on an energy (acoustic energy) basis for any specific time period. The Leq for 1 hour is the energy average noise level during the hour. The average noise level is based on the energy content (acoustic energy) of the sound. Leq can be thought of as the level of a continuous noise that has the same energy content as the fluctuating noise level. The equivalent noise level is expressed in units of dBA.

Noise sources are classified in two forms: (1) point sources, such as stationary equipment or a water reclamation plant, or individual motor vehicles; and (2) line sources, such as a roadway with a large number of point sources (such as motor vehicles) (Table 4.4-1). Sound generated by a point source typically diminishes (attenuates) at a rate of 6.0 dBA for each doubling of distance from the source to the receptor at acoustically “hard” sites and 7.5 dBA at acoustically “soft” sites. For example, a 60-dBA-noise level measured at 50 feet from a point source at an acoustically hard site would be 54 dBA at 100 ft. from the source and 48 dBA at 200 ft. from the source. Sound generated by a line source typically attenuates at a rate of 3.0 dBA and 4.5 dBA per doubling of distance from the source to the receptor for hard and soft sites, respectively.

Table 4.4-1 Weighted Decibel Scale				
DECIBELS	EFFECTS	OBSERVATION	SOURCE	
130	Hearing Loss	Pain Threshold	Hard Rock Band	
120		Deafening	Thunder	
110			Jet Take-Off	
100			Loud Auto Horn at 10 feet	
90		Very Loud	Noisy City Street	
85			School Cafeteria	
80				
75				
70	Physiological Effects	Loud	Vacuum Cleaner at 10 Feet	
65			Normal Speech at 3 Feet	
60	Interference with Speech		Moderately Loud	Average Office Dishwasher in Next Room
55				Soft Radio Music Quiet Residential Area
50	Sleep Interruption	Faint		Interior of Average Residence
45				Average Whisper at 6 Feet
40				Rustle of Leaves in Wind
35		Sleep Disturbance		Very Faint
30				
20	Audibility Threshold			
10				
5				
0				

Source: Los Angeles County 2008



**Table 4.4-2 Typical Outdoor Noise Levels**

Land Use	Community Noise Equivalent Level, dBA						
	50	55	60	65	70	75	80
Residential Single Family, Duplex, Mobile Home	A	C	C	C	N	U	U
Residential Multifamily	A	A	C	C	N	U	U
Transient Lodging, Motel, Hotel	A	A	C	C	N	U	U
School, Library, Church, Hospital, Nursing Home	A	A	C	C	N	N	U
Auditorium, Concert Hall, Amphitheater	C	C	C	C/N	U	U	U
Sports Arena, Outdoor Spectator Sports	C	C	C	C	C/U	U	U
Playground, Neighborhood Park	A	A	A	A/N	N	N/U	U
Golf Course, Riding Stable, Water Recreation, Cemetery	A	A	A	A	N	A/N	U
Office Building, Business, Commercial, Professional	A	A	A	A/C	C	C/N	N
Agriculture, Industrial, Manufacturing, Utilities	A	A	A	A	A/C	C/N	N

Notes:

A = *Normally Acceptable*. Specified land use is satisfactory, based upon the assumption that buildings involved are conventional construction, without any special noise insulation.

N = *Normally Unacceptable*. New construction or development generally should be discouraged. A detailed analysis of noise reduction requirements must be made and noise insulation features are included in the design of a project.

C = *Conditionally Acceptable*. New construction or development only after a detailed analysis of noise mitigation is made and needed noise insulation features are included in project design. Conventional construction, but with closed windows and fresh air supply systems or air conditioning normally will suffice.

U = *Clearly Unacceptable*. New construction or development generally should not be undertaken.

Source: California Office of Noise Control, Department of Health Services

#### 4.4.2 Sensitive Receptors

Human response to noise varies considerably from one individual to another. Effects of noise at various levels can include interference with sleep, concentration, and communication, and can cause physiological and psychological stress and hearing loss. Given these effects, some land uses are considered more sensitive to ambient noise levels than others. In general, residences, schools, hotels, hospitals, and nursing homes are considered to be the most sensitive to noise. Places such as churches, libraries, and cemeteries, where people tend to pray, study, and/or contemplate are also sensitive to noise. Commercial and industrial uses are considered the least noise-sensitive.

#### **4.4.3 Existing Environment**

Noise is produced from a variety of urban and sub-urban sources in the general metropolitan Los Angeles area. The major source of continuous noise is roadway traffic and industrial center noise of manufacturing. During summer months, the background hum of air conditioners is often heard in residential areas.

Ambient noise levels within the Whittier Narrows Dam Reservoir are generally low. Major noise sources in the area include traffic on the SR-60 which bisects the Reservoir in an east-west direction, SR-19 which bisects the Reservoir in a north-south direction, and the I-605, also in a north-south direction.

The Whittier Narrows Recreation Area is comprised of low noise level uses such as picnicking, golfing, hiking, and bird watching. Some areas generate a greater level of noise, such as the Pico River Sports Arena, sports fields, Triple B Clays Trap and Skeet Shooting (where participants are required to wear ear protection), Los Angeles Rifle and Revolver Shooting Range, BMX bicycle track, and radio-controlled aircraft landing strip.

Sensitive noise receptors located within one mile from the Reservoir include schools, places of worship, hotels, libraries, and community parks. The Dam embankment attenuates noise from south of the Reservoir to a considerable degree and buffers the residential areas to the south and southwest from noise generated in the Reservoir.

Sound measurement readings were taken on two days, March 2 and March 18, 2018. On March 2<sup>nd</sup>, readings were taken while there was a light rain during much of the morning. On March 18<sup>th</sup>, it was clear and sunny and readings were taken from mid-morning to mid-afternoon (Table 4.4-3). Readings were taken at over 170 points during the two days at various locations on the floor of the Reservoir, on top of the three embankments of the Dam, and along the downstream toe of the embankments. Additional sound readings were taken in Streamland Park, Pico Rivera Golf Course, and along Kruse Rd. near the residential area. A complete listing of sound readings and locations may be found in Appendix D.

**Table 4.4-3 Summary of Highest dBA in Project Area**

<b>Point</b>	<b>dBI Reading</b>	<b>Location</b>
5	72	Downstream toe of Dam, behind fertilizer company
6	74	Downstream toe of Dam, behind fertilizer company
24	70	Kruse Ave. fertilizer company
25	82	Kruse Ave. fertilizer company
30	70	Rosemead Blvd., top of Dam
31	75	Rosemead Blvd., top of Dam
37	71	Lincoln Ave.
67	76	Rio Hondo, near Pomona Freeway
68	73	Rio Hondo, near Pomona Freeway
69	72	Rio Hondo, near Pomona Freeway
70	72	Rio Hondo, near Pomona Freeway
72	71	Rio Hondo, near Pomona Freeway

#### **4.4.4 Ground-borne Vibration**

Ground-borne vibration is a measurement in terms of the velocity of the vibration oscillations. As with noise, a logarithmic decibel scale is used to quantify vibration intensity. When evaluating human response, ground-borne vibration is usually expressed in terms of root mean square (RMS) vibration velocity. RMS is defined as the average of the squared amplitude of the vibration signal. The vibration amplitude is expressed in decibels using a decibel reference of  $1 \times 10^{-6}$  inches/second. To avoid confusion with sound decibels, the abbreviation VdB is used for vibration decibel measurements. Table 4.4.3 shows typical vibration levels from various sources as well as the human and structure response to such levels. The threshold of perception for most people is around 65 VdB. Vibration levels in the 70- to 80-VdB range are often noticeable but acceptable. Typically, vibration levels must exceed 100 VdB before building damage occurs, except for historic structures, which usually have a damage threshold of 95 VdB.

Ground-borne vibration could also be perceived as a second noise source. Ground-borne noise could result in rattling windows or other items and in noise radiated from vibrating room surfaces. Ground-borne vibration levels resulting in ground-borne noise are often experienced as a combination of perceptible vibration and low frequency noise.

Sensitive land uses for ground-borne vibration include residences, schools, churches, and hospitals. Outdoor park facilities such as picnic areas or athletic fields are not considered to be sensitive to ground-borne noise or vibration. Certain industrial buildings that use high-resolution imaging equipment, such as electron microscopes and historic structures are also sensitive to ground-borne noise and vibration.

<b>Table 4.4-4 Human and Structural Response to Typical Levels of Vibration</b>		
<b>Human/Structural Response</b>	<b>Vibration Velocity Level (VdB)<sup>a</sup></b>	<b>Typical Sources</b>
Threshold, minor cosmetic damage to fragile buildings	100	Blasting from construction projects
Difficulty with tasks (e.g., reading a screen)	90	Bulldozers and other heavy tracked construction equipment
Residential annoyance, transient events	80	Commuter rail, upper range
Residential annoyance, continuous events	70	Rapid transit, typical
Human threshold of perception and limit for vibration sensitive equipment	65	Bus or truck, typical
No human response	50	Typical background vibration

Source: FTA 2006.

Note: a Root-mean square vibration velocity level in VdB is equivalent to  $10^{-6}$  inches per second.

Key:

VdB = decibels of vibration velocity

The most common measure used to quantify vibration amplitude is the peak particle velocity (PPV, in in/sec), defined as the maximum instantaneous peak of the vibratory motion. PPV is typically used in monitoring blasting and other types of construction-generated vibration, since it is related to the stresses experienced by building components. Although PPV is appropriate for evaluating building damage, it is less suitable for evaluating human response, which is better related to the average vibration amplitude. In such cases, ground-borne vibration is usually characterized in terms of the “smoothed” root mean square (RMS) vibration velocity level (Lv) in decibels (VdB), with a reference quantity of one micro-inch per second.

<b>Table 4.5-5 Typical VdB and PPV of Some Construction Equipment</b>		
	<b>PPV at 25 ft.</b>	<b>VdB</b>
Pile Driver (Impact)	0.644 to 1.518	112 104
Pile Driver Sonic	0.170 to 0.734	105 93
Large Bulldozer	0.089	87
Caisson Drilling	0.089	87
Loaded Trucks	0.076	86
Jackhammer	0.035	79
Small Bulldozer	0.003	58
Source: FTA, 2006		

## **4.5 BIOLOGICAL RESOURCES**

This section describes general biological resources within the San Gabriel watershed, with more specific discussion on the resources within the Project and the area downstream of the spillway to Beverly Boulevard. For the purposes of the biological resources analysis in Chapter 5, the study area is defined as the Project boundaries with consideration of regional linkages in the Montebello Hills to the west, the La Puente and Chino Hills to the east, and the San Gabriel River and Rio Hondo as they relate to wildlife movement.

### **4.5.1 Methodology**

The information provided on existing conditions in the area of the Proposed RMPs is derived from existing reports, peer reviewed scientific literature, current aerial photographs, and field investigations. Field investigations were conducted various times of the year for several years commencing in 2014 to assess the present composition of biological resources within the Whittier Narrows Dam Project Area.

*Vireo bellii pusillus* (least Bells' vireo) (LBVI) in the Whittier Narrows Dam Project Area was surveyed for presence/absence in 2013 through 2018. The LBVI surveys occurred bi-weekly from mid-April through late July, and the presence of territories was established by detecting vocalizing LBVI males.

*Poliioptila californica californica* (coastal California gnatcatcher) (CAGN) protocol presence-absence surveys were not performed during the baseline investigation.

### **4.5.2 Regional Setting**

This section provides baseline information on the biological setting within the San Gabriel River Watershed (regional environmental setting), the Whittier Narrows Project (Dam and Reservoir area), and downstream of the Whittier Narrows Dam (No Action Alternative).

#### **4.5.2.1 San Gabriel Watershed**

Vegetation types within the San Gabriel River Watershed include, but are not limited to, live oak woodlands, coastal sage scrub, riparian forests/woodlands, and urban non-native landscaping. The majority of wildlife-suitable habitat is located within the San Gabriel Mountains in the upper watershed, and within the following areas of the lower watershed: Montebello Hills, La Puente Hills, Santa Fe Dam Project Area, Whittier Narrows Dam Project Area, Rio Hondo channel, San Gabriel River, and narrow riparian corridors and flood control channels that provide limited habitat connectivity between these areas (Morris *et al.* 2012).

#### **4.5.2.2 Whittier Narrows Dam and Reservoir Area**

The Whittier Narrows Project Area contains riparian habitats along the Rio Hondo, the San Gabriel River, and along connecting channels/ditches. These areas remain in a fairly natural state, supporting both native and non-native riparian vegetation. The area is also characterized by

large landscaped areas dominated by turf grass, ornamental trees/shrubs, invasive plants (such as giant reed) and/or artificial structures such as buildings, parking lots, roads, bike paths, bridges, flood control facilities, and equestrian trails. There are several man-made lakes in the Reservoir that support freshwater marsh and riparian plant alliances. The three man-made recreation lakes located north of Durfee Avenue are maintained with potable water.

The Rio Hondo and San Gabriel River both flow through the Reservoir. Both waterways have areas that retain perennial flows from wastewater treatment effluent and through the regulated releases of water from upstream dams. Water was present in various lakes in the Whittier Narrows Project Area:

- San Gabriel River: pooled water between the drop structure north of the Pico Rivera Sports Arena and drop structure near Fineview Street. The confluence with Coyote Creek is located within this reach.
- San Gabriel River: pooled water behind the Whittier Narrows Dam exists perennially. At the time of the July 2014 survey, there was an estimated 0.10-acre pool of water located approximately 500 feet upstream of the spillway.
- Rio Hondo: treated wastewater is released into the Rio Hondo north of San Gabriel Boulevard. There is approximately a 1,000-1,500-foot stretch of the Rio Hondo in this area that has surface water perennially.

#### **4.5.2.3 Downstream of Whittier Narrows Dam**

The lower reach of the San Gabriel River includes the 17 mile main-channel stretch of the river from the Whittier Narrows Dam to the Pacific Ocean which includes the degraded Los Cerritos wetlands. A tidal influence open water channel extends for four miles from the end of the concrete-lined channel to the Pacific Ocean at Seal Beach.

The lower reaches of the San Gabriel River experience perennial water flows from effluent discharges out of the Los Angeles County Sanitation District's (LACSD) water reclamation and treatment plants at Whittier Narrows, Pomona, San Jose Creek, Los Coyotes and Long Beach. The lower reaches of the San Gabriel River have several spreading basins along the I-605.

The environment surrounding the mainstem of the San Gabriel River is predominately urbanized with constrained and narrow, restricted wildlife habitats occurring only on soft-bottomed portions of the San Gabriel River and its riparian corridor. Vegetated areas within the restricted corridor of the mainstem are characterized by small patches of grasslands with non-native shrubs, ornamental trees/shrubs, ephemeral marshes, few *Salix spp.* (willows) woodland alliances, or *Baccharis salicifolia* (mulefat) shrubland alliances.



### **4.5.3 Existing Conditions**

#### **4.5.3.1 Plant Resources**

The plant resources of the Project Area consist of the Reservoir proper which is upstream (north) of the Dam. Downstream (south) of the Dam is urbanized except for a small a parcel of riparian habitat immediately below the spillway for one-half mile to San Gabriel River Parkway. The plant resources are described using the Alliances the U.S. National Vegetation Classification System (USNVC) using the *Manual of California Vegetation*, 2<sup>nd</sup> edition (Sawyer *et al.* 2009).

##### ***Salix gooddingii* Forest Alliance (black willow)**

*Salix gooddingii* Forest Alliance occurs in the upstream portion of the San Gabriel River within the Reservoir. This area is dominated by large willow trees and irregular large patches of giant reed (*Arundo donax*) distributed in various parcels of the river.

This vegetation alliance also occurs along the Rio Hondo directly north of the Dam. This area is dominated by large willow trees with large stands of gum trees (*Eucalyptus* spp.).

##### ***Salix gooddingii* Forest Alliance/*Salix lasiolepis* Shrubland Alliance (black willow/arroyo willow)**

*Salix gooddingii* Forest Alliance and *Salix lasiolepis* Shrubland Alliance occurs in a small area in the Rio Hondo channel, the northern portion of the San Gabriel River and the lower portion of the San Gabriel River below the Dam to the San Gabriel River Parkway. This alliance also occurs in the portion of the site where the Zone 1 Ditch meets the crossover channel before the crossover channel flows under Rosemead Blvd. Surface water can be present in these areas. This vegetation type consists of a canopy of large willow trees with limited number of non-native species. The dominant plant species present include black willow (*Salix gooddingii*) trees and arroyo willow (*Salix lasiolepis*) shrubs. Other species present include Fremont cottonwood (*Populus fremontii*) and western sycamore (*Platanus racemosa*) in lower densities.

##### ***Salix gooddingii* Woodand Alliance/*Baccharis salicifolia* Shrubland Alliance (black willow/mulefat)**

*Salix gooddingii* Woodand Alliance and *Baccharis salicifolia* Shrubland Alliance occurs along a small treated waste-water tributary that flows from the Whittier Narrows Water Reclamation Plant located on the west side of Rosemead Blvd., east to the Rio Hondo; there is also a patch located east of the Rio Hondo and south of San Gabriel Blvd. These areas are a relatively uniform mix of these two vegetation types, with the co-dominant plant species being willow and mulefat. Many non-native plant species are present in this area.

The co-dominate *Salix gooddingii* Woodand Alliance and *Baccharis salicifolia* Shrubland Alliance also occurs along the Zone 1 Ditch, that flows west toward Rosemead Blvd., east of the Rio Hondo towards the LARio trail. These areas have large willows, scattered mulefat and ornamental species.

A third location with this vegetation alliance occurs in two patches along the San Gabriel River just north of the Equestrian Center. This area is very sandy and is dominated by willows, mulefat, and giant reed.

***Salix gooddingii*./*Populus fremontii* Forest Alliance (black willow/Fremont cottonwood)**

*Salix gooddingii*./*Populus fremontii* Forest Alliance occurs adjacent to river banks within infrequently flooded uplands throughout the Whittier Narrows Project Area. These areas are dominated black willow and Fremont cottonwood trees. Western sycamores are present in lower densities.

The co-dominate *Salix gooddingii*./*Populus fremontii* Forest Alliance also occurs along the upper portion of the Rio Hondo between San Gabriel Blvd and I-60. Open water is present during winter storms and summer water deliveries. This area contains a mixture of native willow species and non-native ornamental and ruderal species that occur directly in and adjacent to the river. The trees form a dense canopy on the site. Species in this vegetation type include arroyo willow, black willow, Fremont cottonwood, fan palm (*Washingtonia robusta*), ash trees (*Fraxinus* sp.), and box elder (*Acer* sp.). The canopy is very dense and covered with California wild grape (*Vitis girdiana*) in many areas. There are also a few patches of giant reed (*Arundo donax*) within the black willow/Fremont cottonwood Alliance.

***Sambucus nigra* Shrubland Alliance (blue elderberry)**

*Sambucus nigra* Shrubland Alliance occurs in a patch directly north of Siphon Road in various parts of the the Nature Area. Plant species in this area include blue elderberry (*Sambucus nigra* ssp. *caerulea*), black walnut (*Juglans californica*), English walnut (*Juglans regia*) and various fruit trees (*Prunus* spp.) with mustard (*Hirschfeldia* and *Brassica* spp.). This shrubland alliance also occurs in two patches on both sides of Siphon Road. This area is dominated by blue elderberry and mustard.

***Baccharis salicifolia* Shrubland Alliance (mulefat)**

*Baccharis salicifolia* Shrubland Alliance, or mulefat scrub, is scattered throughout the Whittier Narrows Reservoir. Most of the areas with this vegetation type are relatively flat with sandy soils; water can be present during winter storms. This vegetation type is dominated by mulefat with few other species present in these areas.

Mulefat scrub occurs in a small patch located east of the LARio trail and north of I-60. This is a relatively flat sandy area outside the flow of the Rio Hondo. This area also contains scattered large western sycamore trees with a dominant mulefat understory. Larger patches occur south of San Gabriel Boulevard on both sides of the LARio trail, west and east of Rosemead Boulevard along the eastern edge of the Zone 1 ditch. These areas are dominated by mulefat with a weedy/non-native plant understory. This relatively flat area appears to receive heavy flows. The southern portions of the Rio Hondo area are also dominated by mulefat scrub, but characterized by densities of giant reed that are 90 percent of the vegetation type.

***Eriogonum fasciculatum* Alliance**

This alliance can be found within in small pockets in the Nature Area as well as other open landscape parcels within the Reservoir. This alliance is dominated by California buckwheat

(*Eriogonum fasciculatum*) and black sage (*Salvia mellifera*), with other native species such as California sagebrush (*Artemisia californica*), coyote bush (*Baccharis pilularis*), bush sunflower (*Encelia californica*), and coast goldenbush (*Isocoma menziesii*) present in the shrub layer as well. Most of this alliance is not well developed and is invaded by non-native grasses and shrubs.

***Isocoma menziesii* Alliance**

A single medium-sized stand of this alliance can be found spread in small pockets in the nature center locale. This stand is heavily dominated by coast goldenbush, with few other shrub species such as California sagebrush and mule fat present. Non-native grasses dominate the herb layer.

***Typha (angustifolia, domingensis, latifolia)* Herbaceous Alliance (cattails and open water)**

*Typha* spp. Herbaceous Alliance occurs in various parcels within the Reservoir especially where water collects after precipitation events. It can be found in small isolated pockets within the reservoir along the Rio Hondo and San Gabriel River. It is most developed at the San Jose Creek confluence with the San Gabriel River.

Plant species include cattails (*Typha* spp.) and rush (*Juncus* sp.)

***Arundo donax* Semi-Natural Herbaceous Stands (giant reed)**

*Arundo donax* Semi-Natural Herbaceous Stands occurs in pure stands and mixed in the riparian vegetation types throughout the site. The areas classified as giant reed large are mono-typical stands in sandy areas associated with the Rio Hondo and the San Gabriel River. Substantial giant reed stands occur throughout the Rio Hondo western embankment operation area (western embankment to San Gabriel Boulevard to the north; Lincoln Avenue east to Rosemead Boulevard). Similarly, the crossover channel east of Rosemead Blvd. and the San Gabriel River channel have large stands of giant reed.

***Brassica (nigra)* and Other Mustards Semi-Natural Herbaceous Stands (black mustard)**

Upland mustard stands occur within the Reservoir: along the Rio Hondo River and the San Gabriel River, barren parcels throughout the designated park areas, along the highly-disturbed flood risk management areas, freeway easements, and south of Siphon Road. Species present in these ruderal areas include non-native species and weedy native species. On the site, these species include tree tobacco (*Nicotiana glauca*), black mustard (*Brassica nigra*), wild radish (*Rhapanus sativus*), horseweed (*Conyza* sp.) annual sunflower, fountain grass (*Pennisetum setaceum*), tumbleweed (*Chenopodium album*), and a few scattered mulefat.

Herbaceous vegetation occurs in three large areas along the Rio Hondo, south of San Gabriel Blvd. The vegetation present consisted of western sunflower (*Helianthus annuus*, dock (*Rumex* sp.), and cocklebur (*Xanthium strumarium*). There are many scattered natives and the area is maintained on a regular basis for flood risk management.

**Urban Non-Native (grass/shrubs/hardwoods), Orchard Agricultural, & Pastures and Crops Agriculture**

Ornamental areas occur along both sides of the SR-60 (in Caltrans easements) and adjacent to the housing development west of the Rio Hondo. The species planted in these areas are typically

for esthetic purposes and erosion control. Plant species present include Canary Island pines (*Pinus canariensis*), Aleppo pines (*Pinus halepensis*), turf grass, white alder (*Alnus rhombifolia*), gum trees, camphor tree (*Cinnamomum camphora*), and elm trees (*Ulmus* sp.).

Ornamental areas also occur at the Bicentennial Park campground. This ornamental area contains large pines and other trees planted for shade over the previously used campsites. Everything in between these areas and under the tree canopies contains weedy grasses and ruderal species that have invaded the campground because the area is no longer used.

The archery range has a combination of ornamental plantings from previous uses and non-native or weedy native species that have invaded the area. Plant species present include mulefat, Peruvian pepper tree (*Schinus molle*), fountain-grass, annual sunflower and telegraph weed (*Heterotheca grandiflora*).

Ornamental/Turfgrass areas occur in the landscaped recreation areas north of Durfee Avenue between Rosemead Blvd. and Santa Anita Ave. These areas include the grass picnic areas, sports fields, and the park surrounding the recreation lakes. These areas are dominated by ornamental trees and turf grass.

The Whittier Narrows Nature Area has numerous native species and ornamental trees including but not limited to large western sycamore trees, coast live oaks, blue elderberry, lemonade berry (*Rhus integrifolia*), Our Lord's candle (*Yucca whipplei*), dutch elm (*Ulmus parvifolia*), smilo grass (*Piptatherum miliaceum*), and tree of heaven (*Ailanthus altissima*). It appears that many native shrubs and trees have been planted as part of recreation management efforts associated with the Nature Area; however, many remnant ornamental plant taxa are also planted in this area.

Agricultural areas occur east of Rosemead Blvd. and north of Durfee Ave. The agricultural areas consist of a commercial crops and a community garden.

#### **General Barren (disturbed)**

Open sand/un-vegetated (barren) areas occur in the Rio Hondo and in the San Gabriel River. These areas consist of barren open sandy areas that are devoid of vegetation other than a few non-native or weedy native species.

Permanent open water areas consist of the North, Center, and Legg Lakes, a few areas along the Rio Hondo, and the San Gabriel River.

#### **4.5.3.2 Animal Resources**

Field investigations of animal resources within the Whittier Narrows occurred on July 9, 10, 23 and August 21-22, 2014. LBVI surveys were bi-weekly from April through August from 2014 to 2018 during vireo nesting season.

#### **Fish**

Whittier Narrows contains perennial water in North, Center, and Legg Lakes and within portions of the Rio Hondo and the San Gabriel Rivers. The lakes are stocked with fish by the California

Department of Fish and Wildlife (CDFW). Fish stocked include bass (*Micropterus* sp.), sunfish (*Lepomis* sp.), catfish (*Ictalurus* sp), and rainbow trout (*Oncorhynchus mykiss*) (MPI 2010). Other than through introductions of fish into the recreation lakes or migrations associated with the regulated outflow from upstream reservoirs, native fish species are not expected to be present within the RMP action areas.

### **Southern California Steelhead**

The federally endangered Southern California steelhead (*Oncorhynchus mykiss mykiss*) are not present in the Whittier Narrows Dam and Reservoir area, nor do they occur on the San Gabriel River in the vicinity of the Whittier Narrows Dam. In the San Gabriel River, climatic influences combined with the reduction of water flow from storage and withdrawal, which result in a low base flow and that impedes Southern California steelhead, both adult and juvenile, from migrating through the Project area. This is major restriction for the San Gabriel River. Reservoirs and water pumping for groundwater reduce the necessary stream flow required for all stages of the steelhead's life. Much of the potential freshwater habitat for Southern California steelhead in the lower San Gabriel River is highly fragmented and unsuitable for passage. In the upper San Gabriel, dams and smaller barriers also impede fish movement. The San Gabriel River is heavily impaired by development and is located in a densely populated floodplain and no longer exhibits habitat conducive for steelhead. There is little, if any connectivity of these habitats that could allow the steelhead to repopulate the San Gabriel River, and would require that these streams receive adequate water. The large human population of San Gabriel River watershed also contributes pollutants to important streams and habitat. Water quality is directly impacted by a variety of sources, such as fine sediments and chemical pollutants. Sediment pollution inputs degrade stream bed quality by filling aggregate that steelhead need for spawning.

### **Amphibians**

Common amphibian species known or expected to occur in or along the drainages of the site include the Pacific treefrog (*Pseudacris* [*Hyla*] *regilla*) and western toad (*Bufo boreas*). The garden slender salamander (*Batrachoseps major major*) is expected to occur in adjacent upland areas of the site and the black-bellied salamander (*Batrachoseps nigriventris*) may occur. The introduced bullfrog (*Rana catesbeiana*) occurs in the drainages of the site.

### **Reptiles**

The western fence lizard (*Sceloporus occidentalis*), side-blotched lizard (*Uta stansburiana*), southern alligator lizard (*Elgaria multicarinata*), and gopher snake (*Pituophis catenifer*) are known or expected to occur on the site. Less common reptile species that may occur on the site include coachwhip (*Masticophis flagellum*), California whipsnake (*Masticophis lateralis*), and western rattlesnake (*Crotalus oreganus*).

### **Birds**

Whittier Narrows has long been known to support well over 300 bird species. Species diversity is highest during spring and fall migration, but many species of birds also winter at this location and some can be especially numerous during the wet-winter season, such as waders and waterfowl. The Whittier Narrows Nature Area is located within the Reservoir near the Proposed RMP sites, and was established as a wildlife sanctuary in 1939 and managed by the National

Audubon Society until approximately 1969. Since that time the Nature Area has been managed by the Los Angeles Department of Parks and Recreation (LACDP&R), Natural Areas Division.

Year-round resident land-birds that inhabit the Reservoir compose a large part of the bird life. Whittier Narrows environs provide snag habitat for woodpeckers, perches used as singing posts for passerine birds, and watch posts from which raptors and certain insectivorous birds locate prey. Open habitat areas provide an important habitat component for dispersal through the natural habitat. These open vegetation types/edge (ecotone) effect increases use of tree/shrub stands by assorted bird guilds.

Various vegetation types and habitat communities provide different assemblages of resident and migrant birds.

Neotropical bird species migrate into the region and are typically present during the spring and fall migration and often breed in the area. Winter residents include a wide variety of land-birds, but also water-birds including waders, waterfowl, and shorebirds.

Whittier Narrows Dam Reservoir encompasses a variety of fragmented habitats in an urban environment. Species richness (diversity) and relative abundance peak inside these fragments. Although the fragments may attract a wide diversity of birds, these habitat remnants also function as ecological refugia by providing suitable nesting conditions. However, open habitats increase predation and competition along fragment edges.

### **Mammals**

A variety of small, ground dwelling mammals are known or expected to occur throughout the Whittier Narrows habitats. These include taxa such as the broadfooted mole (*Scapanus latimanus*), desert cottontail (*Sylvilagus audubonii*), California ground squirrel (*Spermophilus beecheyi*), Botta's pocket gopher (*Thomomys bottae*), California vole (*Microtus californicus*), black rat (*Rattus rattus*), and long-tailed weasel (*Mustela frenata*). Others that may occur include the Pacific kangaroo rat (*Dipodomys agilis*) western harvest mouse (*Reithrodontomys megalotis*), and California pocket mouse (*Perognathus californicus*).

The site provides suitable foraging and roosting habitats for many bat species. Many of the bats expected to occur on site are either inactive during the winter (hibernate) or migrate south to warmer climates. Bats expected to forage on site include California myotis (*Myotis californicus*), western pipistrelle (*Pipistrellus hesperus*), big brown bat (*Eptesicus fuscus*), and pallid bat (*Anthrozous pallidus*).

In general, larger mammals need large areas of natural open space and are often the first species to be eliminated by urban development. Medium-sized mammals known or expected to occur on site include Virginia opossums (*Didelphis virginiana*), raccoons (*Procyon lotor*), and striped skunks (*Mephitis mephitis*). These three species are well-adapted to urban habitats and are expected to be present at high densities at the interface between urban and natural habitats. Coyotes (*Canis latrans*) are present and other predators, such as bobcats (*Lynx rufus*), and mountain lion (*Puma concolor*) occur within the Whittier Narrows Reservoir area. A mountain lion was photographed and video-recorded immediately adjacent to Whittier Narrows Nature



Area by the Los Angeles County Sheriff's helicopter. Lion tracks had been observed prior to the videography and recorded by the Whittier Narrows Nature Area staff (Colleen MacKay, Regional Park Superintendent, personal communication June 2017).

#### **4.5.3.3 Downstream of Whittier Narrows Dam: Plant and Animal Resources**

Plant communities within the San Gabriel River channel are highly influenced by successional vegetation processes that result from seasonal storm flow inundation, perennial effluence flows, ephemeral ponding from water releases, vegetation management activities such as mowing, and human and equestrian disturbance. Therefore, the abundance and distribution of plant resources within the river channel are dynamic and variable. Scattered non-natives occur throughout the San Gabriel River, and include species such as Mexican fan palm (*Washingtonia robusta*), giant reed (*Arundo donax*), castor bean (*Ricinus communis*), tree tobacco (*Nicotiana glauca*), Italian thistle (*Carduus pycnocephalus*), pampas grass (*Cortaderia jubata*), perennial pepperweed (*Lepidium latifolium*) and mustard (*Brassica* spp.). Animal species expected to occur are similar to those listed in Section 4.5.4.2 or the Whittier Narrows Project Area.

#### **Whittier Narrows Dam Spillway to Beverly Boulevard**

The center of the San Gabriel River's dry channel is dominated by grasslands and herbaceous vegetation, and the river's edge and transition areas (drop structures, bridge pylons, etc.) are largely comprised of willow (*Salix* spp.) forestland alliance with a co-dominate mulefat scrub (*Baccharis salicifolia*) shrubland alliance. *Eucalyptus* spp., giant reed (*Arundo donax*), black mustard (*Brassica nigra*), Fremont cottonwood (*Populus fremontii*), and several species of non-native herbaceous and woody vegetation occur in scattered distributions in the willow forest and mulefat scrub areas. The grassland includes sedges (*Carex* spp.), purple needlegrass (*Nassella pulchra*), pampas grass (*Cortaderia jubata*), and scattered non-native herbaceous vegetation.

#### **4.5.3.4 Habitat Connectivity in the Project Area**

Whittier Narrows Dam Reservoir provides approximately 1,500 acres of open space habitat of varying quality for wildlife in the near center of Los Angeles County. The site is an important regional link for wildlife movement between the Montebello Hills to the west with the open spaces of the La Puente and Chino Hills to the east. Direct connectivity to the La Puente Hills ranges from 500 feet to 3,500 feet so the separation is not large. Some wildlife species are able to successfully move between these two regionally important open space areas utilizing the San Gabriel River.

The San Gabriel River and the Rio Hondo are also of regional importance for wildlife movement, providing connections north to the Angeles National Forest in the San Gabriel Mountains. As with the connection to the La Puente Hills, wildlife movement west and east from the site has been obstructed by development and channelization of these two rivers and highly fragmented habitat patches that are separated by roads and urban development. Some wildlife species, however, are still able to move successfully along these two rivers and both serve as regionally important wildlife movement corridors. The San Gabriel River, although

highly channelized and surrounded by dense urban development, provides a habitat corridor between the Santa Fe Dam and the Whittier Narrows Dam Reservoir.

In general, smaller ground-dwelling species, such as amphibians, reptiles, and small mammals, are more reluctant to pass over barriers or through filters, and are therefore less mobile than other species. Large mammals and birds are less sensitive to barriers. Fish barriers include low or no stream-flow, large grade control (drop) structures, culverts, dams, concrete channels, felled trees and other natural and man-made obstacles.

Barriers such as fences and roads are present throughout the Reservoir, which limits habitat connectivity within the Reservoir and on a broader scale. Roadways, as mentioned above, discourage movement through and within the Reservoir for most species, excepting birds and bats, and cosmopolitan coyote. Areas of development and high-intensity recreation are also significant barriers. Even where areas of native habitat still remain, their small size, disturbance level, and disconnection from the adjacent La Puente Hills result in few, if any, ground-dwelling and small mammal taxa being able to disperse to the La Puente Hills. Aquatic passage within the Rio Hondo and San Gabriel River is precluded by the presence of the outlet structure, spillway, and flood risk management grade control structures. The San Gabriel Boulevard Bridge over the Rio Hondo provides passage between the natural areas on either side of the road along the Rio Hondo. The Rosemead Boulevard Bridge over the crossover channel provides connectivity from habitats to the east with the Rio Hondo.

Overall, connectivity within and through the Whittier Narrows Reservoir is limited for some megafauna, such as deer, and black bear; nonetheless, black bear are known to use the San Gabriel River to disperse and move to the urban interface. Migrating or resident songbirds, waterfowl, shorebirds, and wading birds can easily move between habitats within the Reservoir and readily disperse to outside habitats.

#### **4.5.3.5 General Impacts of Flooding on Vegetation Types and Wildlife**

The Project is a flood risk management facility that has experienced periodic inundation for the purpose of flood risk management since the completion of facility construction in the 1950s. Most frequently, inundation occurs in the lower elevations. Since 1977, the project has been periodically inundated to elevation 201.6 feet for water conservation purposes. Disturbance regimes are a natural part of ecosystem dynamics and species are adapted to varying magnitudes of disturbance at varying intervals.

Under normal operations, any of the general wildlife inhabiting the area are expected to move away from the inundated area. Potential damage caused to plants by recurring flooding depend on the time of the year and the age of the plants as well as on the depth and duration of inundation. During winter most trees and shrubs are not actively growing and so they are more tolerant to flooding. Established healthy plants are generally more tolerant than young or very old plants. The longer excessive water is present the more likely that damage to plants will occur.

Occasionally, however, biological communities experience disturbances so extreme that the consequences may be severe. Such disturbances may include wildfires, floods, and droughts,

which cause drastic alterations in community composition and diversity, and extirpation of sensitive species (Poff 2002, McKenzie et al. 2004). Such perturbations are, by definition, rare. Historically, large-river floodplains were very dynamic systems (Junk et al. 1989) and local extinction and re-colonization of floodplain species were probably regular processes of varying magnitudes. Effects of floods on plant communities include decreased species richness and diversity (Bornette and Amoros 1996). Even intermediate levels of flooding disturbance could have severe effects on most invertebrates and vertebrates because of their mobility, life history, or ability to emigrate from surrounding areas (Crandall et al. 2003).

The Project is currently designed to generally accommodate a flood pool to an elevation of 239 feet. This elevation encompasses all areas of the current Reservoir. Under an extreme event, which would precede a Dam failure scenario, significant flooding in the Reservoir can be expected. Most tree die-offs during major floods are a combination of excessive water for extended periods of time and large sediment deposits. Willow and cottonwood seedlings completely under water for several weeks or longer may die. The negative impacts on mature trees and saplings will vary across the Whittier Narrows area. If water levels in flooded areas remain high for more than two to three weeks, and oxygen levels begin to drop, the trees will begin to show signs of stress. High water conditions for extended periods of time during late spring and summer usually cause large die-offs to all species of trees except for those that are better adapted to such conditions. High levels of sedimentation are harmful to all species except for those that have performed root initials in the bark such as cottonwood and willow. Hard and soft mast production will be negatively impacted in some areas.

Disturbances of the magnitude described often lead to an increase in invasive species, particularly invasive plants. Invasive species disrupt natural communities and ecological processes. This causes harm to the native species into ecosystems because they are suddenly competing with a new species for the same resources (food, water, shelter, etc.). Even if the native species are not completely eliminated, the ecosystem often becomes much less diverse. A less diverse ecosystem is more susceptible to further disturbances such as diseases and natural disasters. Invasive species can:

1. Displace native plant communities and/or radically change the nature of the habitats they invade.
2. Compete for the same natural resources and life requirements as native species and degrades the local ecology.
3. Can be a causative reason of the extinction of native species.
4. Increase soil erosion and fire hazard.
5. Decrease the quality of understory habitat in woodlands and forests and facilitate the spread of other invasive species.
6. Decrease the quality and amount of range for wildlife, such as mountain lion and bobcat.
7. Degrade aquatic habitats and clog waterways.

The Rio Hondo, north of the west embankment, is the most frequently inundated area of the Reservoir. It currently exhibits a significant amount of the invasive plant, *Arundo donax* (giant reed), which is indicative of repeated disturbance.

Similarly, inundation that occurs to higher elevations could cause wildlife in the area to seek shelter in locations outside the Reservoir. Ground dwelling animals, such as small mammals, reptiles, and amphibians could be impacted or killed by rising water. Birds are expected to move away from the inundated areas, especially in the non-nesting season. Nestlings and some fledging birds could succumb to high flood waters in early spring. Currently, there is no way to estimate the rate of mortality that would occur during a flood event, and it will likely vary from location to location within the Reservoir as well as downstream of the Project area, depending on conditions. The amount of wildlife mortality would depend on the spatial extent, duration, and timing of the inundation.

#### 4.5.3.6 Special Status Species

Two federally listed special status animal species are present in the Whittier Narrows Dam Reservoir: the Federal and state threatened California gnatcatcher (CAGN; *Poliptila californica californica*) and the endangered least Bell's vireo, (LBVI; *Vireo bellii pusillus*). As noted in Section 4.5.4.2, the federally endangered Southern California steelhead is not present in the vicinity of the Whittier Narrows Dam and Reservoir or the proposed RMP areas and is not considered further in this analysis. One federally listed endangered plant species is present within the Whittier Narrows Dam Reservoir: *Berberis nevinii* (Nevin's barberry) (Figure 3.6-2).

Field assessments of existing habitat conditions within the Reservoir further informs the potential for a species to be present; if suitable habitat exists within or nearby the project areas, then the potential for a species to occur there increases (Table 4.5-1).

Table 4.5-1 Threatened or Endangered Species Present within the Whittier Narrows Project Area				
Common Name Scientific Name	Federal Status	Critical Habitat <sup>1</sup>	Federal Register	Year Listed
Nevin's barberry <i>Berberis nevinii</i>	Endangered	2007	63:54956	13-Oct-98
Coastal California gnatcatcher <i>Poliptila californica californica</i>	Threatened	2008	58:16757	30-Mar-93
Least Bell's vireo <i>Vireo bellii pusillus</i>	Endangered	1994	51:16482	2-May-86

#### ***Berberis nevinii* (Nevin's barberry)**

*Berberis nevinii* (Nevin's barberry) is a federally endangered rhizomatous evergreen shrub 3 to 12 feet tall (63 FR 54956). It is found in gravelly wash margins in alluvial scrub, and on coarse soils in chaparral (CDFW 2010). This species is typically found between 900 and 2,000 feet elevations. The native range of this barberry currently extends from the San Gabriel Mountains foothills to the Peninsular Ranges of southwestern Riverside County. The total number of individuals is reportedly fewer than 1,000, and possibly fewer than 500 (USFWS 2009).

A field survey for Nevin's barberry on 14 August 2014 indicated three well established plants, and one plant with inhibited growth due to the overgrowth of surrounding vegetation. Two of the plants exhibited signs of reproduction in the form of fruits with seeds, and two of the plants did not have reproductive growth. The three plants with adequate exposure to sunlight were approximately 10 feet tall, and the shaded plant was approximately 4 feet tall with vegetative growth limited to the branches that extended out of the dense understory. None of the plants had nearby seedlings that would demonstrate active recruitment. Due to increased homeless encampments in the same area there is a high probability that limited extant population of Nevin's barberry may be compromised. Nevin's barberry is not found inside the RMP Action Area.

***Poliophtila californica californica* (California gnatcatcher)**

The California gnatcatcher (CAGN) was listed as threatened by the USFWS on March 30, 1993, and the final rule for revised designated critical habitat was effective as on January 18, 2008 (72 FR 72010). The project area is located within CAGN designated critical habitat, Unit 9. CAGN currently breed within the Whittier Narrows Dam Reservoir, in the Whittier Narrows Nature Area. Corps' and Whittier Narrows Nature Area observations indicated the presence of two to four breeding pairs of CAGN in Whittier Narrows Nature Area (Ed Barajas, personal communications; Corps field observations, 2014-2018). There are several known breeding occurrences of CAGN near the Nature Area. Critical habitat for CAGN occurs in the southwest portion of the Reservoir (See Figure 4.5-1).

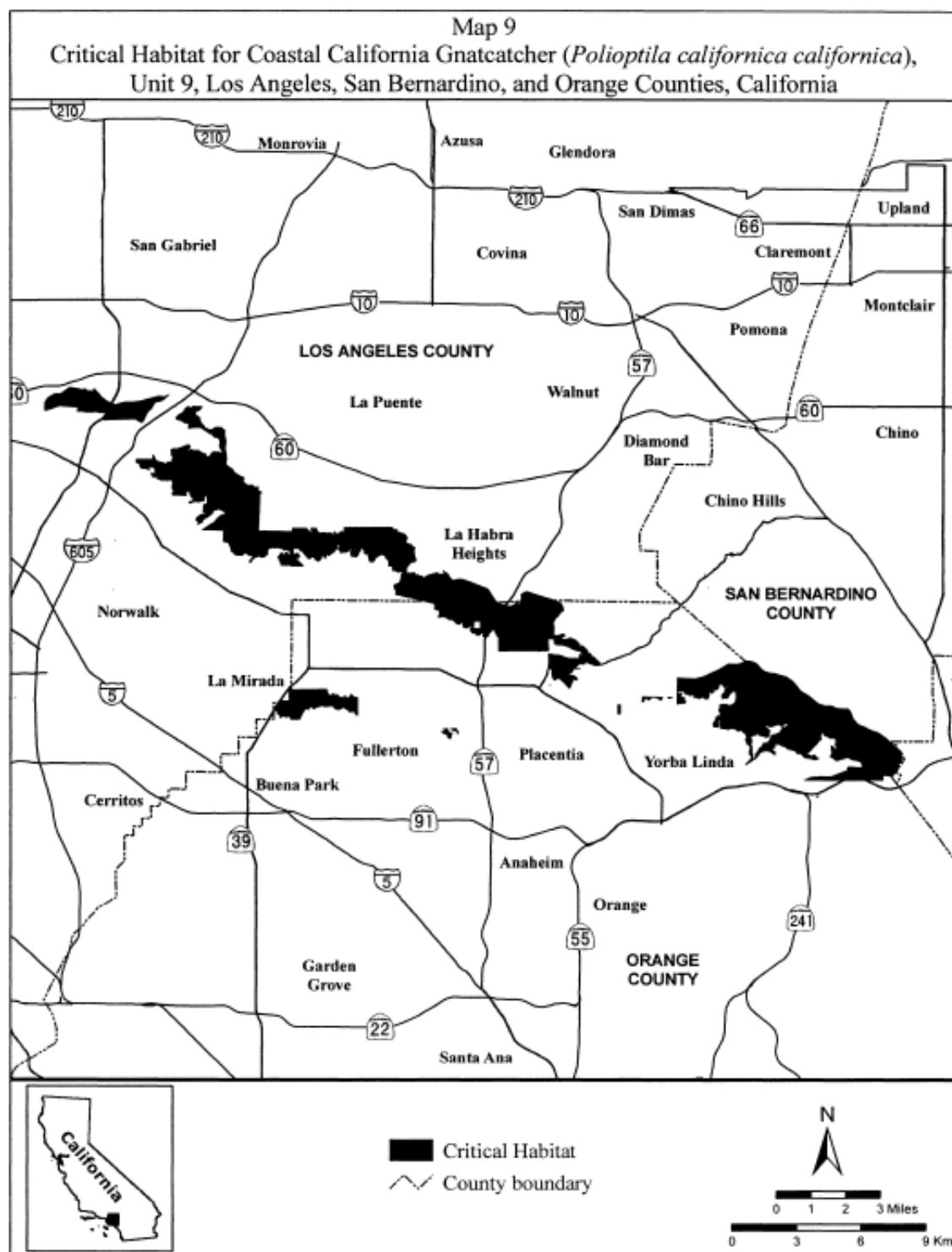


Figure 4.5-1 California Gnatcatcher Designated Critical Habitat Map (USFWS 2007)



### **Physical and Biological Features – California gnatcatcher**

CAGN typically occur in or near sage scrub habitat. Sage scrub is patchily distributed throughout the range of the species, and CAGN are not uniformly distributed within the structurally and floristically variable coastal sage scrub vegetation type. Sage scrub is a broad category of vegetation that includes the following vegetation types described above (See Section 4.5.4.1): *Eriogonum fasciculatum* Shrubland Alliance, *Salvia apiana* Shrubland Alliance, *Salvia mellifera* Shrubland Alliance, *Artemisia californica* Shrubland Alliance. Dominant plant taxa include black sage, brittlebush, California buckwheat, California buckwheat-white sage, California encelia, California sagebrush, California sagebrush-black sage, California sagebrush-California buckwheat, chamise-black sage, chamise-white sage, and coast prickly-pear (Sawyer and Keeler-Wolf 1995).

While several studies have reported that CAGN densities are highest in areas where *Eriogonum fasciculatum* or *Encelia californica* are co-dominant with *Artemisia californica* (e.g., Roach 1989, Weaver 1998, and Bontrager 1991), others have reported occupancy at sites where the composition of shrub species varied considerably (Beyers and Wirtz 1997) or where these shrub species were lacking (Atwood 1990). Therefore, it appears that all shrub species within coastal sage scrub are used by gnatcatchers.

CAGN are typically found in stands of coastal sage scrub that have moderate shrub canopy cover, generally greater than 50 percent (Beyers and Wirtz 1997) but less than 60 percent canopy cover. CAGN will use sparsely vegetated coastal sage scrub as long as perennial shrubs are available, although there appears to be a minimum cover threshold below which the habitat becomes unsuitable (Beyers and Wirtz 1997). The relative density of shrub cover influences gnatcatcher territory sizes, with territory sizes increasing as shrub cover decreases, probably due to limited resource availability. CAGN prey upon arthropods, including insects such as leafhoppers and planthoppers (Homoptera) and spiders commonly found in sage scrub plant communities (Burger *et al.* 1999).

CAGN tends to occur most frequently within California sagebrush-dominated stands on mesas, gently sloping areas, and along the lower slopes of the coastal ranges. Atwood and Bolsinger (1992) reported that 84 percent of all recent coastal California gnatcatcher locality records in the U.S. occurred below an elevation of 820 feet and 97 percent occurred below 1,640 feet.

The gnatcatcher generally disperses short distances through contiguous, undisturbed habitat across fragmented and highly disturbed sage scrub habitat, such as that found along highway and utility corridors or remnant mosaics of habitat adjacent to developed lands. Within the Reservoir, gnatcatchers disperse short distances, must deal with wildland fires and fragmented habitat from the various uses of dam and reservoir O&M, developed and dispersed recreation, agriculture, and homeless encampments.

Dispersal is the means by which genetic and demographic exchange between subpopulations maintains the viability of the regional metapopulation. In the CAGN dispersal of juveniles is the means by which genetic and demographic exchange between subpopulations maintains the viability of the regional metapopulation (Bailey and Mock 1998). Studies of banded individuals in southern San Diego County and in Los Angeles County have documented median dispersal

distances range from 1.5 up to 2.5 miles (Bailey and Mock 1998; Galvin 1998). These measures likely underestimate the gnatcatcher's typical dispersal capacity because of the difficulty of detecting dispersed individuals in open populations and the opportunity for successful dispersal to maximum distances being truncated in small isolated patches of habitat (Galvin 1998). Juvenile CAGN are able to traverse highly man-modified landscapes for short distances (400 to 900 feet).

Throughout the dispersal surveys gnatcatchers were observed most frequently in coastal sage scrub. Nonetheless, CAGN were also observed regularly in riparian and grassland areas, especially those adjacent to coastal sage scrub. Although no quantitative data were collected, gnatcatchers appeared to use these habitat types more frequently during the nonbreeding season than during the breeding season (Bailey and Mock 1998; Campbell et al. 1998; Galvin 1998).

The general dispersal pattern is most juveniles stay in close proximity to their natal areas and a few dispersing a long distance which is similar to that observed elsewhere (Bailey and Mock 1998). These data indicate that gnatcatchers can disperse long distances across unfavorable habitat but more typically there is short distances through contiguous coastal sage scrub. Galvin (1998) indicates that as coastal sage scrub becomes more fragmented and gnatcatcher populations more isolated, short-distance dispersal will become more difficult and the long-distance dispersal may not be sufficient to maintain genetic diversity and inter-population movement.

California sagebrush and California buckwheat were the most commonly used nesting substrates, accounting for over 80 percent of all known nest sites in central-east Orange County (Atwood 1993, Bontrager 1991, and Galvin 1998). It is not known whether the preferences for California sagebrush and California buckwheat as a nesting substrate reflect a preference for these plants or the fact they are the two most abundant species in the coastal sage scrub.

#### **Designated Critical Habitat – California gnatcatcher**

Critical habitat for the CAGN was designated in 2007 [final rule Federal Register (72 FR 72010), December 19, 2007].

Unit 9 encompasses approximately 17,552 acres the majority of which is under private ownership within the Montebello Hills, Puente-Chino Hills, and West Coyote Hills areas (Figure 4.6-3). Core populations of CAGN are known from the Montebello Hills, the Puente-Chino Hills from Whittier east to Yorba Linda, and the East and West Coyote Hills. There are 563.13 acres of critical habitat in Whittier Narrows Dam Reservoir (Figure 4.5-2)

Habitat within this unit was designated because, as a whole, it contains all of the physical or biological features essential to the conservation of the California gnatcatcher. Each area provides one or more of these physical or biological features, which include but are not limited to: space for individual and population growth, and for normal behavior; food, water, air, light, minerals, or other nutritional or physiological requirements; cover or shelter; sites for breeding, reproduction, rearing of offspring; and habitats that are protected from disturbance or are representative of the historic geographical and ecological distributions of a species.



**Figure 4.5-2 California Gnatcatcher Critical Habitat within the Whittier Narrows Dam Reservoir**

Habitat within California gnatcatcher designated critical habitat Unit 9 was designated because it was occupied at the time of listing, is currently occupied, and contains all of the features essential to the conservation of the California gnatcatcher. Additionally, this unit provides for connectivity and genetic interchange among core populations in nearby hills and contains large blocks of habitat capable of supporting persistent populations of California gnatcatchers. The CAGN designated critical habitat is based on the physical or biological features that are essential to the conservation of the species. It includes those habitat components that are essential for the primary biological needs of foraging, nesting, rearing of young, intra-specific communication, roosting, dispersal, genetic exchange, or sheltering. Physical or biological features are provided in undeveloped areas that support various types of sage scrub or support chaparral, grassland, and riparian habitats where they occur proximal to sage scrub and where they may be utilized for biological needs such as breeding and foraging. Physical or biological features associated with the biological needs of dispersal are also found in undeveloped areas that provide linkage between or within larger core areas, including open space and disturbed areas that may receive only periodic use.

The gnatcatcher generally disperses short distances through contiguous, undisturbed habitat across fragmented and highly disturbed sage scrub habitat, such as that found along highway and utility corridors or remnant mosaics of habitat adjacent to developed lands within the Whittier Narrows Dam Reservoir, gnatcatcher disperse short distances, must deal with wildland fires, and fragmented habitat from the various uses of Dam and Reservoir operations and maintenance, developed and dispersed recreation, agriculture, and homeless encampments.

Most importantly, the critical habitat at Whittier Narrows provides for connectivity and genetic interchange among core populations in the adjacent Montebello Hills and La Puente Hills and contains large blocks of quality habitat capable of supporting persistent populations of California gnatcatchers.

***Vireo bellii pusillus* (least Bell's Vireo)**

Least Bell's vireo (LBVI) was listed as an endangered species by the USFWS on May 2, 1986. The final designation of least Bell's vireo designated critical habitat was on February 2, 1994 (USFWS). Neither the Whittier Narrows Project area nor the proposed RMP areas contain designated critical habitat for the LBVI. LBVI natural history and ecology has been intensively studied in both the journal referred and gray literature for 40 years (1978-2018) by a variety of government, academic, and consulting biologists, from central to southern California including the desert regions.

*Nesting Habitat.* LBVI primarily occupies riparian habitats that typically feature dense cover within three to seven feet of the ground and a dense, stratified canopy. It inhabits low, dense riparian growth along water or along dry parts of intermittent streams. Vegetation types used by the vireo are the *Salix gooddingii* Forest Alliance, *Baccharis salicifolia* Shrubland Alliance, *Salix lasiolepis* Shrubland Alliance, *Salix hindsiana* Shrubland Alliance. The understory is typically dominated by *Salix hindsiana* (sandbar willow), *Baccharis salicifolia* (mulefat), individuals of other willow species such as *Salix lasiolepis* (arroyo willow) or *Salix gooddingii* (black willow), and one or more herbaceous species. Important overstory species include mature arroyo willows and black willows. Other overstory species that may contribute to vireo habitat include *Populus fremonti* (Fremont's cottonwood), *Platanus racemosa* (western sycamore) and *Quercus agrifolia* (coast live oak). It primarily nests in small, remnant segments of vegetation typically dominated by willows and mule fat but may also use a variety of shrubs, trees, and vines. Nests are typically built within three feet of the ground in the branches of willows, California wild rose (*Rosa californica*), mulefat, or other understory vegetation (Franzreb 1989). Cover surrounding nests is usually a moderately open midstory with an overstory of willow, cottonwood, sycamore, or oak. Crown cover is usually more than 50 percent and contains occasional small openings. The most critical structural component to least Bell's vireo breeding habitat is a dense shrub layer at two to 10 feet above the ground (Franzreb 1989). The birds forage in riparian and adjoining chaparral habitat (Kus and Minor 1989; Minor 1989).

The project areas does not contain designated critical habitat for the LBVI. Physical and biological features that support LBVI life history requirements identified in the listing of designated critical habitat are general in nature. *"These habitat features can be described as riparian Forest vegetation that generally contains both canopy and shrub layers, and includes some associated upland habitats. Vireos meet their survival and reproductive needs (food, cover, nest sites, nestling and fledgling protection) within the riparian zone in most areas. In some areas they also forage in adjacent upland habitats"* (USFWS 1994).

Physical and/or biological features that support LBVI do, however, occur within various areas of the Whittier Narrows Reservoir. Physical and biological habitat features are also present within the proposed RMP areas, especially along Siphon Road, some portions of the Whittier Narrows

Nature Area, the confluence of the San Gabriel River and the crossover channel, the San Gabriel River and the Rio Hondo.

The presence of homeless encampments within the Reservoir have damaged understory riparian habitat; therefore, a key habitat structure for nesting has been significantly reduced. With the homeless encampments come wildfire started by a homeless encampment as observed in the Lincoln Wildfire in August 2015 which burned four LBVI territories. These vireo territories north of San Gabriel Boulevard on the Rio Hondo River have not recovered. Vireo territories have increased one territory per year since 2014 (15 territories) to 2017 (18 territories). With more vireos moving north from Prado Dam, Marine Corps Base Camp Pendleton, and San Luis Rey River, there will be less riparian habitat for eight vireos to move and find new nesting habitat.

LBVI in the Whittier Narrows Project Area has been surveyed for presences/absences by the Corps from the 2014 to the 2018 breeding seasons. The LBVI surveys occurred bi-weekly from May through August, and the presence of territories was established by locating vocalizing LBVI males and comparing community-level distributions to establish probable territories. One color-banded vireo was found along the San Gabriel River in 2013; it was color-banded as a juvenile bird by USGS (Barbara Kuz, PhD, San Diego Field Station) on the lower San Luis Rey River during the 2012 breeding season. It was subsequently found along the San Gabriel River inside the Whittier Narrows Project Area in the 2013 breeding season, and was re-banded as an adult by USGS. This indicates northward dispersal from their southern breeding habitats, such as Prado Dam Reservoir and Marine Corps Base Camp Pendleton. Territories were primarily observed in “riparian areas” that exhibited a co-dominate *Salix gooddingii* Forestland Alliance with *Baccharis salicifolia* Shrubland Alliance. However, LBVI have been detected nesting in California live oak, as well as mulefat with a California walnut overstory, a single willow or a single cottonwood. Approximately 19 territories were noted (Ed Barajas, Whittier Narrows Natural Area docent, personal communications, 2014-2018)

LBVI have been present within the Whittier Narrows Dam Reservoir since 1996. Anecdotal presences/absences observations (Ed Barajas, Whittier Narrows Natural Area docent, personal communications, 2014-2018) and protocol surveys accomplished by Corps field observations have occurred from 2014-2018, which make up the data set.



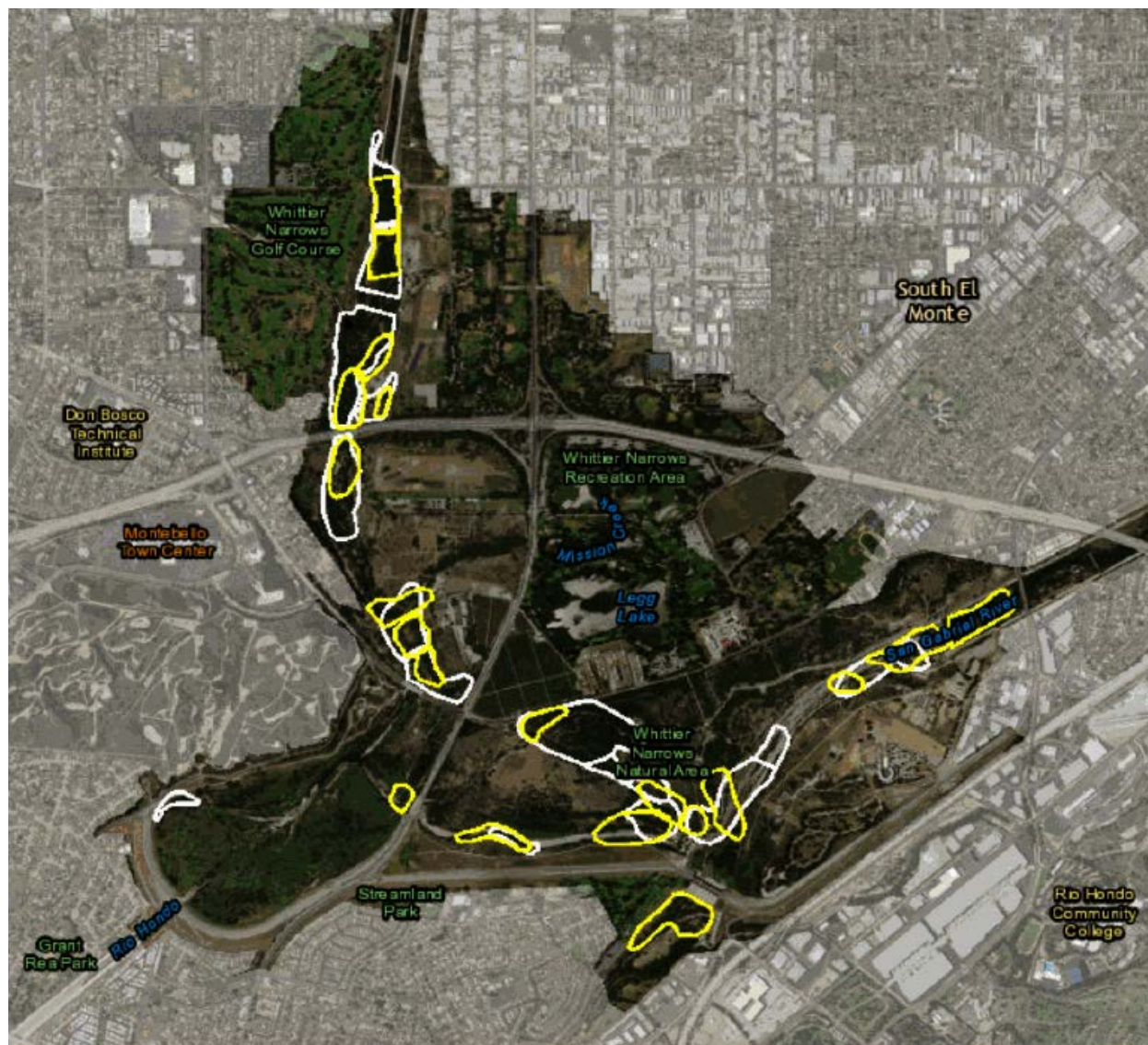
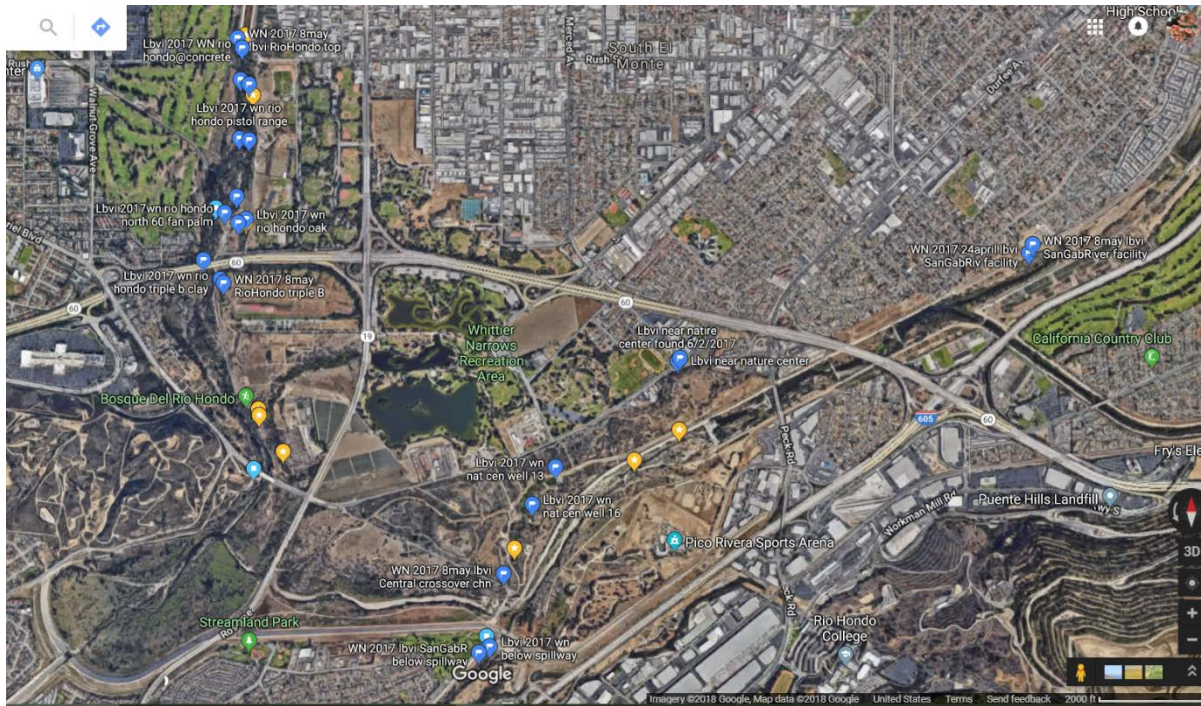


Figure 4.5-3 Least Bell's Vireo 2014 and 2015 Nesting Territories at Whittier Narrows





**Figure 4.5-4 Least Bell's Vireo 2017 Nesting Territories at Whittier Narrows**

## 4.6 CULTURAL RESOURCES

Cultural resources are locations of past human activity, occupation or use on the landscape. The term denotes a wide range of heritage assets including, but not limited to: pre-contact or ethnohistoric archaeological sites such as lithic scatters, villages, procurement areas, resource extraction sites, rock shelters, rock art, and shell middens; and historic period sites such as trash scatters, homesteads, railroads, ranches, logging camps, and buildings or structures that are over 50 years old. Cultural resources also include aspects of the physical environment that are associated with cultural practices or beliefs of a living community that are both rooted in that community's history and are important in maintaining its cultural identity (Parker and King 1998). Commonly referred to as Traditional Cultural Properties (TCP), these areas are afforded the same consideration as other cultural resources.

The term "cultural resource" is not defined in NEPA and has no statutory definition, but the related term "historic property" is defined in law (54 U.S.C. § 300308) and regulation (36 C.F.R. § 800.16 - Definitions). In general, a historic property is defined as a cultural resource that has met standards of age, integrity, and significance that qualify it as eligible for listing on the National Register of Historic Places (NRHP or National Register). The National Historic Preservation Act (NHPA) is the major piece of legislation that mandates that Federal agencies take into account the effects of their undertakings on historic properties.

This section describes general ethnohistoric and archeological information in southern California generally and the area known as the Whittier Narrows in particular, as well as specific information on the Project area. The area potentially affected by the proposed RMPs includes a 100-ft. buffer around the three proposed RMP action areas, including physical disturbance areas

for the Dam and associated features, backward erosion areas, associated permanent roads and haul roads, and all temporary construction staging areas .

#### **4.6.1 Affected Environment**

The Affected Environment or Area of Potential Effects (APE) identified by the Corps includes the preferred RMP area (RMP 5) footprint and physical disturbance areas for the Dam and associated features (spillway, weir, and embankment), backward erosion areas, associated permanent roads and haul roads, and all temporary construction staging areas (as defined in Chapter 3). The APE takes into account a reasonable and good faith effort to capture the potential for visual, auditory, and other non-direct effects. Ground disturbance will occur mostly in areas that were previously disturbed by construction of the flood control project and reservoir. There are, in fact, virtually no undisturbed ground surfaces in this highly urbanized environment for the entire length of the embankment. Some undisturbed and intact subsurface deposits may, however, still be present in and in association with old river terraces. The vertical APE varies from a few inches up to 100 feet in depth; or to the maximum height of constructed features that may be eligible to the NRHP, such as the Dam embankment or bridges. Horizontally, the APE includes a 100-foot buffer around each depicted feature for noise and visual impacts.

#### **4.6.2 Study Area History**

Whittier Narrows is a collection point for surface water and groundwater from the San Gabriel River and Rio Hondo watersheds, and early quotes about the area in Stein et al. (2007), describe hundreds of acres of swamps in 1915, cottonwood-willow jungle in 1933, and abundant plants including blackberries, gooseberries, grapes, elder brush, tule, and sedges, rushes, and ferns. Whittier Narrows has been, and continues to be, an area with a reliable water supply and many useful plants and animals. It has also been, and continues to be, a nexus of travel and transportation. Since the development of flood-control structures, it has been important for flood control, water conservation, recreation, and commercial leases.

##### **4.6.2.1 Cultural Background**

Relatively sedentary populations are estimated to have populated Los Angeles County for over 8,000 years. Generally divided into five cultural sequences or “periods,” the Millingstone, Intermediate, Late Prehistoric, Ethnohistoric/Mission, and the Historic, each cultural period produced rich material inventories and complex social organizations. A short discussion of subsistence and settlement patterns, as they relate to the proposed project area, follows. This section is adapted primarily from Bass (2003), with additions from Hogan and Becker (1999) and Williams (2015).

##### **4.6.2.2 The Prehistoric and Ethnohistoric Periods (8,500 B.P.-1769)**

**Millingstone Period 8,500-5,000 B.P.** The Millingstone Period extends to at least 6,000 Before Present (B.P.) and probably as far back to 8,500 + B.P. (cf. Warren 1968; Wallace 1955). It was originally defined based on sites along the Los Angeles and Ventura county coasts (Wallace 1955) and extended to inland areas based on similar sites without shell middens. Millingstone

Period population density was relatively low compared to later periods and the settlement system may have consisted of small bands moving in a seasonal round from the coast to inland areas and back again. Hard seed processing became one of the major components of subsistence during this period. Overall, the economy was based on plant collecting supplemented by fishing and hunting and, in near-shore and coastal locations, exploitation of marine and estuarine resources (Wallace 1955).

Millingstone Period sites are typified by large, heavy milling tools such as deep basin metates and wedge-shaped manos, and large core/cobble choppers and scrapers (Dillon 1990:8). The portable manos and metates that characterize the Millingstone lithic assemblage may have been used as mobile processing equipment for collected plant materials. The reliance on this subsistence strategy and affiliated tools is further supported by the apparent scarcity of faunal remains at Millingstone sites. Flaked lithic tools trend towards a larger and cruder assemblage than the later periods, and projectile points and hunting-type tools tend to be absent from these assemblages. “Cogged stones,” made by a characteristic pecking and grinding process, also appear in the Millingstone Period assemblages (Eberhardt 1961:361-370). Other artifacts types include worked stones (discoidals, stone balls, and doughnut and cogged stones), worked bone, beads, and scraping tools.

**Intermediate Period (ca. 5,000-500 B.P).** The Intermediate period has also been called the “Hunting Period” or “Middle Horizon.” About 5000 years ago, the Millingstone traditions, with their heavy reliance on vegetal food sources, began to gravitate more towards animal proteins and marine resources. Procurement of plants for caloric intake was not necessarily replaced in kind by game hunting, but rather the local Millingstone dietary regimen began to transition towards other/alternate resources. A higher percentage of projectile points, such as Elko dart points, and smaller flaked stone tools appear in site assemblages. Marine resources such as estuarine and saltwater shellfish, marine mammals, and fish are now abundant in the diets of the local inhabitants. Mortars and pestles were also added to the tool kit, indicating the beginning of acorn use, although it appears that intensive use of acorns began later in inland areas than nearer the coast.

**Late Prehistoric Period 500 A.D.-1769 A.D.** Meighan (1954) originally characterized the Late Prehistoric Period in Southern California. The period probably began sometime around the BC/AD transition, but probably expanded culturally around 500 AD with the introduction of the bow and arrow. The bow and arrow and mortar and pestle mark the introduction of the Late Prehistoric Period. The bow and arrow made hunting more efficient, and was also used during wars. Deer, rabbits and other animals could be hunted by bow and arrow, and smaller animals could be trapped using snares, nets, and deadfalls. Bedrock mortars were used to process acorns, which could be stored. Many items were traded locally and long distance, including obsidian, steatite goods, and shell beads and ornaments. The end of the period is recognized as the end of the 18th Century, when the Spanish mission system took full effect on the native populations.

Complex hunter-gatherer societies resided in southern California at the time the Spanish came to the area. People lived in fairly large, semi-sedentary “central” villages of up to 250 people, with “satellite” villages and temporary camps in the area around the main village that was their lineage or band location. The Proposed Project area falls within the Gabrielino or Tongva tribal

boundaries delineated by Bean and Smith (1978). These territories encompassed the area now recognized as the Los Angeles Basin. The following discussion from Bass (2003) was synthesized primarily from Dillon (1990), Bean and Smith (1978), and Moratto (1984). Although the Takic-speaking Gabrielino/Tongva were not the first inhabitants in the Los Angeles Basin, they arrived around 500 BC and displaced the Hokan speakers.

At the time the Spanish arrived in southern California 1769, the Gabrielino/Tongva occupied most of present-day Los Angeles and Orange counties, along with a number of offshore islands. It is believed that with the exception of the Chumash, the Gabrielino/Tongva were, culturally, the wealthiest, most populous, and most powerful ethnic nationality in pre-contact southern California (Bean and Smith 1978:538). The Gabrielino/Tongva had relationships with neighboring ethnographic groups as far north as the San Joaquin Valley Yokuts, and ethnographic groups as far east as the Colorado River and south into Baja California.

Linguistic evidence suggests that the Gabrielino/Tongva had numerous dialectical differences. This was due to geographical separation along with other factors such as social, cultural, and linguistic contacts with neighboring non-Gabrielino/Tongva speakers. The Gabrielino/Tongva who occupied the San Fernando Valley and the Los Angeles Basin as far east as San Bernardino probably numbered at least 5,000 by the time of European contact. Gabrielino/Tongva settlement patterns indicate the existence of both primary subsistence villages and smaller secondary gathering camps, with multiple clan groupings and small family units inhabiting each respectively. These settlements were dependent upon on specific environmental zones, the time of the year, and resource availability. Houses within the settlements were domed, thatched, circular structures that were at times more than 60 feet in diameter and housed three to four families.

#### **4.6.2.3 The Spanish Period (AD 1769-1821)**

The historic period begins with the first recorded European contact with the Native American population. Locally, the Gabrielino/Tongva encountered Juan Rodriguez Cabrillo in October of 1542 (Wagner 1929), although it was not until 1769 that Captain Gaspar de Portolá and Father Junípero Serra made the first Spanish overland expedition through what is now Los Angeles County. Prior to that time, the Spanish were focused on the immediate coast and islands, and the interior Gabrielino/Tongva may have had little European contact prior to Portolá's journey. Hugo Reid, an immigrant from Scotland who became a Mexican citizen of Los Angeles and married a Gabrielino woman noted 28 Gabrielino/Tongva villages or place names known to him from the 1830s and 1840s (Dakin 1978:220-221). Possibly two to four appear to overlap portions of the Whittier Narrows Dam Flood Control Reservoir (McCawley 1996:42-44).

San Gabriel Mission was founded in 1771, two years after Portolá and Serra's expedition. Native Americans from the Los Angeles plain were encouraged to move from their villages to the mission area, and the Gabrielino name is derived from the mission at which they congregated. The mission became the center of Gabrielino/Tongva culture during this earlier part of the historic period. The Spanish baptized over 7,000 Native Americans at the San Gabriel Mission prior to secularization (Munoz and Hill 1982), and at that time, there were no remaining Native Americans living on the Los Angeles plain or the adjacent coast.

#### **4.6.2.4 The Mexican Period (AD 1821-1848)**

After Mexico gained independence from Spain, the missions were closed in the 1830s and former mission lands were granted to retired soldiers and other Mexican citizens for use as cattle ranches or “ranchos.” (Robinson 1948). The rancho owners lived in one of the towns or in an adobe house on the rancho. Land grants which were very large at first became reduced in size as they were passed on to heirs. Portions of the Whittier Narrows Dam Flood Control Reservoir are within the Rancho Paso de Bartolo, established from a part of the Rancho Paso de Bartolo, passed from former soldier Juan Crispin Pérez to former governor Pio Pico in 1850-1852 (Lindsey and Schiesl 1976:12).

In 1844, Governor Manuel Micheltorena granted Rancho La Merced to Casilda Soto de Lobo; her son, Don Juan Soto (or Juan Lobo), grazed cattle on the property (Roberts and Brock 1987:9). The same year, the governor granted a claim for the “Potrero de la Misión Vieja de San Gabriel,” also known as Potrero Chico, to Juan Alvitre and Antonio Valenzuela (Greenwood et al. 1989). In 1845, Manuel Antonio and his wife received the land grant known as Potrero Grande. Manuel Antonio was a neophyte who rose to be mayordomo (secular manager) of San Gabriel Mission. His effort to receive this land grant was aided by the fact that Manuel and his wife claimed they already had a house on the property (Roberts and Brock 1987:12).

In November 1841, a party of 40 people arrived in the Whittier Narrows basin from New Mexico, led by William (Julian) Workman and John Rowland, and including Juan Matias Sanchez. Workman and Rowland, naturalized Mexican citizens who had converted to Catholicism, had a profitable whiskey distillery in Taos. They purchased Rancho La Puente and divided the rancho between them, with Workman taking the western half. Sanchez became Workman’s foreman (Lindsey and Schiesl 1976). Workman also acquired Rancho La Merced, which encompassed much of Whittier Narrows and the hills to the west from Casilda Soto. He then divided the rancho between his son-in-law, F.P.F. Temple and Juan Matias Sanchez (Lindsey and Schiesl 1976; Roberts and Brock 1987). Sanchez owned and lived at Rancho La Merced until 1875 (Greenwood et al. 1989). Temple and his wife, Margarita Workman, built their residence (now known as La Merced Adobe) on their portion of Rancho La Merced east of the Rio Hondo (Roberts and Brock 1987:29).

#### **4.6.2.5 The American Period (A.D. 1850-Present)**

American immigration into California increased after 1848 when the United States gained control of California as a result of victory in the Mexican-American War and ratification of the Treaty of Guadalupe Hidalgo. By the 1849 gold rush, travelers in southern California began using Native American trails for exploration (Luomala 1978), resulting in more frequent contact in more remote areas, further degrading the land and resources, and undermining indigenous cultures. The number of Native Americans that practiced their traditional lifeways continued to decline (Flinn de Frate 1952).

When California received statehood and the City of Los Angeles was incorporated in 1850, the city consisted mostly of agricultural and ranchland, with a small, concentrated, commercial center (JRP Historical Consulting, LLC 2003), and the Gabrielino/Tongva ethnic identity had

been almost entirely suppressed by the rapidly expanding Los Angeles population. By the 1850s, the San Gabriel Mission and other Los Angeles area missions had more Native Americans from groups other than the Gabrielino/ Tongva. By the end of the 1800s, the Gabrielino/Tongva language and culture was fairly decimated (Dillon 1990:23). The economy began to change in 1869, when the transcontinental railroad opened new markets to the residents of Los Angeles, resulting in a citrus boom in the 1870s.

When the U.S. government took control of California, it pledged to honor the land claims of Mexicans, however, the process was costly and arduous, many land grants were verbal, and titles could not be validated, or claims could not be defended against large numbers of homesteaders. Few ranchos remained with their original owners and the colorful life of the *Californios* was gone, including the identity of many ranchos (Brackett 1951).

Sanchez also acquired Rancho Potrero Grande, which extends into the northwestern part of Whittier Narrows and later acquired Rancho Potrero de Felipe Lugo (Lindsey and Schiesl 1976:33; Roberts and Brock 1987:12). Sanchez sold part of the Potrero Grande lands to Workman and Temple in 1857. Sanchez became an influential person during the 1860s; records show that he helped many people who lived in the “Old Mission” district by acting on their behalf regarding their land claims (Greenwood et al. 1989:21). The “Old Mission” was a small Mexican village of adobe buildings established in the mid-1800s at the approximate location of the old mission. The village is depicted on several maps dating between 1860 and 1900, although Johnston (1962:129) claims the community was destroyed in an 1867 flood, but that the name continued to be used. Sundberg and Whitney-Desautels (1991:7) state that the term “Old Mission” was used for houses in this general area and that the Basye Adobe and probably La Merced Adobe may have been part of this community.

The claim of Juan Alvitre and Antonio Valenzuela for Potrero Chico, granted by Governor Micheltorena in 1844, was recognized by the U.S. Land Commission in 1852. The rancho changed hands again in 1863 when Sanchez, Workman, and Temple purchased part of it from Salome Valenzuela and Maria Siriaca Valenzuela (Greenwood et al. 1989; Roberts and Brock 1987).

Elias Baldwin purchased Rancho Santa Anita and other adjoining ranches after traveling through San Gabriel in 1873. Temple and Workman applied to Baldwin for a loan to keep their bank open during a recession in 1875, which he agreed to do if Workman and Temple agreed to give him a blanket mortgage on their landholdings, including Sanchez’ lands around the Old Mission. They met his conditions, but their bank failed anyway, and Baldwin foreclosed on the La Merced, Potrero Grande, La Puente, and Potrero de Felipe Lugo ranchos. Small parcels were excluded to allow Sanchez and Temple to continue to live in their residences. As a result of this misfortune, Workman died by suicide in 1876, Temple died a ruined man in 1880, and Sanchez died very poor (Greenwood et al. 1989; Roberts and Brock 1987). Baldwin became owner of Santa Anita, San Francisquito, La Puente, La Merced, Potrero Chico, Potrero Grande, and various other ranches totaling about 544,000 acres. The land was managed by H. A. Unruh, Baldwin’s first wife’s nephew. Baldwin improved some of these lands and may have been instrumental in establishing irrigation in the area (Roberts and Brock 1987).



Rafael Basye, a nephew of Juan Sanchez, came to California in 1856 and raised sheep. He married Marintoni (Maria) Alvitre in 1869 (Roberts and Brock 1987). According to Parks (1929), Jesus Andrade and Rafael Basye constructed an adobe building in 1869 to function as a dance hall, saloon, billiard hall, and store. Roberts and Brock (1987), however, cast doubt on Parks' (1929) dates and locations for the Basye Adobe. Roberts and Brock (1987) state that the Basye store was first mentioned in an 1886 county tax sale document, and a store ledger kept by Isabella Basye was begun in 1870 and carried accounts to 1901. Although Basye Adobe may have been affected by a flood ca. 1904 and reconstructed by Walter Temple, Sr., when he brought his family to live there in 1917, it was a favorite place for socializing and celebrating holidays and would have an important place in local history.

Paolo Briano bought the northern part of Margarita Temple's (F. P. F. Temple's widow) homestead in 1927, including the Temple residence. Briano established vineyards, apple and peach orchards, and a general store. The store was on the southwest corner at the intersection of Durfee Avenue and San Gabriel Boulevard, and may have been associated with La Merced Adobe (Roberts and Brock 1987:19, 36).

#### **4.6.2.6 The Changing Economy of the Whittier Narrows Area**

Whittier Narrows had been a focal point of settlement, subsistence, and transportation long before Europeans arrived in the area. Each new group has brought with them their own cultural attributes and altered the cultural landscape by instituting new systems. By the 1860s, the El Monte region had more small farms than any other part of Los Angeles County, except for the City of Los Angeles (Lindsey and Schiesl 1976), primarily growing grain crops. James Cate, who arrived in the area in 1863 and bought 200 acres of the Rancho Paso de Bartolo (Roberts and Brock 1987:39), introduced English walnut groves to the area, and they caught on quickly. His son founded an irrigation company that brought water from the San Gabriel River, through Whittier Narrows, to Pico Rivera and Whittier (Lindsey and Schiesl 1976). By the late 1920s, however, land subdivisions and drought had lowered the water table and halted most walnut production (Lindsey and Schiesl 1976:18). During the first two decades of the 20<sup>th</sup> century, while walnut groves were still present in some areas, numerous small farms growing vegetables, flowers, and citrus fruits were founded in the Whittier Narrows area, particularly in El Monte and Mountain View (Lindsey and Schiesl 1976).

Other industries also arrived during this period, including the motion-picture industry, which used rural areas around Hollywood for outdoor scenes, and the oil industry. Although accounts of the location of the first well in the area are contradictory (Lindsey and Schiesl 1976; Roberts and Brock 1978), they agree that the first well on Walter Temple's property struck oil in 1917. William S. Prugh purchased Lot 53 of Tract 701 from the estate of E. Baldwin in 1911. The Montebello Oil Field Map of 1920 shows that the Petroleum Midway Company was operating in the area by this date and that wells Prugh No. 2 and Prugh No. 8 were pumping oil.

Dairy farms expanded into the project area in the 1920s and 1930s, attracted to open spaces, lower prices for land, and the fact that alfalfa was grown in El Monte. They started out as small family operations, but the Depression and a milk price war resulted in the consolidation of the many small dairies into a few larger ones (Lindsey and Schiesl 1976:19).

The population in the Whittier Narrows area continued to grow throughout the twentieth century, and the main forms of livelihood changed several times. Transportation, which had always been important, also changed. Footpaths and wagon trails were followed by railroads and stage-coach routes. This made travel to and from the area easier, which increased commerce and settlement there. By the mid-1900s, areas in the heart of the basin were developing and major roads were present.

#### **4.6.2.7 Whittier Narrows Flood Control Reservoir**

The Los Angeles Basin is drained by two major river systems (i.e., the Los Angeles and San Gabriel Rivers) and one minor stream (Ballona Creek) and the area has undoubtedly been subject to flooding throughout prehistory. The earliest recorded flooding of the San Gabriel River was in 1771 (Van Wormer 1985). An exceptionally severe flood in the winter of 1867-1868 caused the Old San Gabriel River (as seen on pre-1867 maps) to absorb San Jose Creek and cut a new channel to the sea, where it now empties into Alamitos Bay, between Long Beach and Seal Beach rather than San Pedro Bay. The Rio Hondo, meanwhile, took the former channel of the San Gabriel River and joined with Alhambra Wash and other drainages. It now flows southwesterly and joins the Los Angeles River in South Gate (Lindsey and Schiesl 1976). The San Gabriel River flooded seven more times between 1869 and 1891. In 1891, the San Gabriel River flooded, and the upper part of the river changed course again (Van Wormer 1985).

Prior to 1891, floods did not cause extensive property damage in the Los Angeles Basin, but as population and enterprises increased, floods became more costly. In the winter of 1910-1911, the San Gabriel River flooded and destroyed bridges and farmland. As a result of these floods, residents formed the San Antonio Protection District. In 1913, Frank Olmstead, County Flood Control Engineer, published a plan for flood control in the basin (Van Wormer 1985). His plan consisted of retaining and storing floodwaters, spreading floodwaters over gravel beds to replenish the water table, and straightening and reinforcing river channels.

The flood in the winter of 1914 was disastrous and in response, a county-wide flood-control agency, the Los Angeles County Flood Control District was formed, with James W. Reagan as chief engineer. Work was delayed by several factors, including World War I, and in 1924, Reagan submitted what would become the second comprehensive flood-control plan for the Los Angeles Basin. This plan included a large dam at the junction of the east and west forks of the San Gabriel River. Work began on the dam in late 1928 or early 1929, but was halted in October 1929 when it was discovered that the planned site was geologically unsound and the dam was never built. Plans were then formulated that called for the construction of smaller dams along the river, and two dams were completed in 1934, and a third in 1939.

The Corps took over flood-control management for the Los Angeles Basin in 1935, and in 1936, legislation changed the mission of the Corps in the basin from temporary emergency relief to permanent supervision of flood control. In 1938, the Corps produced a general plan for the Rio Hondo and the San Gabriel River, which included a proposal for creating the Whittier Narrows Dam Flood Control Reservoir. Another large flood, in March 1938, while proving the effectiveness of flood-control measures that had been constructed in the basin, also showed that more work was needed. This resulted in the Flood Control Act of 1938, which required a revised

plan for the Los Angeles Basin. This new plan for flood control, submitted in 1940, was approved by Congress as the Flood Control Act of 1941 (Van Wormer 1985:34). The Los Angeles County Drainage Area (LACDA) is the resulting comprehensive flood control plan. The development of recreational facilities at the Reservoir was authorized by the Flood Control Act of 1944, and water conservation was approved in 1956. Development of recreational facilities in the Reservoir began in 1958.

In 1949, the Corps purchased property to carry out the 1940 plan. Whittier Narrows Dam was completed in June 1957; it was the last of the five flood-control reservoirs to be constructed in the Los Angeles area. The flood control program in the Los Angeles Basin was first tested in January-February 1969. During those two months, Los Angeles County experienced major floods during rainstorms that set records exceeded only by the storm of 1938. The flood control measures that had been taken, however, prevented widespread destruction. Most of the measures specified in the Los Angeles Basin flood control plan were in place by 1979. Since then, work has concentrated on maintenance and minor improvements.

#### **4.6.3 Archival and Records Search Results**

Records on file at the Corps Los Angeles District office were verified with recent cultural resources records searches conducted by ASM Affiliates, Inc. for the Tehachapi Renewable Transmission Project (TRTP) in June 2014, a supplemental search in January 2015 (Williams 2015) and the U.S. Environmental Protection Agency (2016), TRTP records at the Angeles National Forest, and a comprehensive records search at the California Historical Resources Information System (CHRIS) in October 2017. Records searches included a review of information available in the CHRIS Geographical Information System inventory for known and recorded sites and surveyed areas located within a 0.25-mile-radius buffer of the Proposed Project area (i.e., all three alternative plan areas). These records are used to provide background information available regarding cultural resources in the Proposed Project area.

Fifty-one cultural resources studies have been conducted within the Proposed Project area and surrounding 0.25-mile buffer area, primarily archaeological surveys (n=35), but also including a historic property management plan, five literature reviews and records searches, one archaeological monitoring project, two archaeological or architectural significance evaluations, and eight other field studies. Each of these studies intersect the Proposed Project area to some extent, many completely overlapping it. Eighteen historic period structures or archaeological sites, including eight TLs, a railroad, a historic monument, the Montebello Oil Field, the Juan Matias Sanchez and La Merced adobes (or remains), the former Temple School, and the remnant architectural elements of the Whittier Narrows Dam Recreation Area are recorded within 0.25 miles of or within the three Proposed Project areas. The only archaeological sites with prehistoric artifacts recorded is a small scatter of three ceramic sherds and some metal fragments and a scatter of largely historical material with a concentration of prehistoric artifacts including, mano fragments, metate, utilized flakes, chert flakes, scrapers, and fire-affected rock.

<b>Table 4.6-1 Recorded Sites within 0.25 Miles of the Proposed Project Areas</b>				
<b>Site Description</b>	<b>RMP</b>			<b>Total</b>
	<b>3</b>	<b>5</b>	<b>3 &amp; 5</b>	
Architectural remains (recreation facility or historic adobe with refuse deposits)	–	–	<b>2</b>	<b>2</b>
Historic rancho/adobe	–	–	1	1
Homestead	–	–	1	1
Monument	–	1	–	1
Multicomponent artifact scatter	–	1	1	2
Oil field with associated historic debris	–	–	1	1
Railroad, standard gauge	–	–	1	1
School	1	–	–	1
Transmission line	1	1	6	8
<b>Total</b>	<b>2</b>	<b>3</b>	<b>13</b>	<b>18</b>

Several historic farms and dairies are also shown on historic maps of the area although remains from these have not been found during surveys. Most of the sites identified by the records search are historic, however, there were several Kizh village sites located in or near Whittier Narrows area, including *'Ahwiínga*, *Shiváanga*, *Wíichínga*, *Houtnga*, and *'Íisatkanga*, and the Whittier Narrows Dam Reservoir is located in an important area for the Gabrielino/Tongva people. Smaller “satellite” villages may also have been located nearby. Only the nine previously recorded sites within the Proposed Project area are listed in Table 4.6-1.

Other known but not previously recorded historic period resources over 50 years of age within the RMPs include Lincoln Avenue, Rosemead Boulevard, Rooks Road, and the Pico Rivera Golf Course.

In addition, several historic period house and farm locations are mapped within the footprint of all alternatives' components. Several were originally located on roads which are now being proposed for use as access routes and some in the areas where borrow areas are proposed. Previous surveys in these areas have not found extant resources at these locations, however, the presence or absence of subsurface archaeological deposits is unknown.

**Table 4.6-2 Previously Recorded Cultural Resources within the Proposed Project Area and 100-Foot Buffer Area**

<b>Project Area</b>	<b>Primary Number (P-19-)</b>	<b>Site Name / Description (Recorder)</b>	<b>NRHP Eligibility Status</b>
5	003813	Montebello Oil Field: well pads, oil wells, pipeline, house pads, & access roads, also some isolated pockets of historic debris (Terri Fulton & Phil Fulton/ 2008)	Determined Not NRHP Eligible (Criterion A) by Consensus with the SHPO (6Y; parcel 5271-001-030)
No Action Alternative/Future without Project / RMP 3E	004221	Concrete slab foundation & associated features: 28 x 26 foot concrete slab foundation, a cinder block & metal pedestal tank footing, an abandoned utility pole with a 1912 date nail, & 4 large eucalyptus trees that are likely part of the original landscape planting (Terri Fulton & Phil Fulton/ 2008)	Not Previously Evaluated
All Proposed Project Areas	186889	Whittier Narrows Dam Recreation Area architectural elements: surface & subsurface remains of concrete floors, concrete foundations, brick/mortar foundations, & swimming/wading pool associated with former buildings (Peter Messick/ 2003)	Not Previously Evaluated
All Proposed Project Areas	188983	Los Angeles Dept. of Water & Power Boulder Lines 1 & 2: A 40-mile segment of the Boulder Dam - Los Angeles 287.5 kV TL, two parallel electrical transmission circuits carried on steel lattice towers running approximately 270 miles (Noah Stewart/ 2008)	Element of District, previously determined NRHP eligible
All Proposed Project Areas	190504	Rio Hondo-Amador-Jose-Mesa-Narrows 66kV TL: 90 4-legged steel lattice & wood pylon towers ~120 feet tall, installed ~750-1150 feet apart (W. Tinsley Becker/2010)	Determined Not NRHP Eligible (SHPO letter USFS101112A)
All Proposed Project Areas	190505	Mesa-Walnut 220kV TL: constructed in 1956, includes 60 4-legged steel lattice towers ~120 feet tall, installed ~1230 feet apart along its 14.79 mile span (W. Tinsley Becker/2010)	Determined Not NRHP Eligible (SHPO letter USFS101209C)
All Proposed Project Areas	190507	SCE Siphon Road Towers: remnant grouping of 5 66kV steel lattice obelisk type towers within the Whittier Narrows National Recreation Area immediately south of Durfee Blvd. in El Monte (W. Tinsley Becker/2010)	Previously Determined Not NRHP Eligible (TRTP Programmatic Agreement); the towers were replaced with monopoles between 2011 and 2012
All Proposed Project Areas	190508	SCE Walnut-Hillgen-Industry-Mesa-Reno 66kV TL: ~75 4-legged steel lattice towers ~120 feet tall & tubular steel poles erected along a 17 mile span, with each tower/pole installed ~1200 feet apart (W. Tinsley Becker/2010)	Determined Not NRHP Eligible (SHPO letter USFS 101209D)

<b>Project Area</b>	<b>Primary Number (P-19-)</b>	<b>Site Name / Description (Recorder)</b>	<b>NRHP Eligibility Status</b>
All Proposed Project Areas	Pending	Whittier Narrows Dam: an earth filled structure controlling the flow of the San Gabriel River & the Rio Hondo built between 1950 & 1957 it is the last of five dams proposed in 1930s plans prepared by the Corps (JRP Historical Consulting LLP/ 2017)	Determined Not NRHP Eligible (SHPO letter COE_2018_0611_001)

A search of the Native American Heritage Commission Sacred Lands File was requested on May 24, 2017, with results received on May 30, 2017. An update was requested on September 19, 2017 with results received on September 25, 2017. Sacred lands and/or Native American cultural resources were identified by this search and the general vicinity is considered sensitive, as the confluence of the San Gabriel River and the Rio Hondo was an important water source and several ethnographic villages were located in the basin, as was the original San Gabriel Mission. Informal consultation regarding the area with several of the local Gabrielino and Tongva tribes has reinforced awareness that the area is highly sensitive for these tribes.

## **4.7 SOCIOECONOMICS AND ENVIRONMENTAL JUSTICE**

This section provides general information on the Cities upstream and downstream of the Project as well as information on known use of the Reservoir for recreation. The area potentially affected by the proposed RMPs for this resource includes the area immediately upstream of the Project area to Santa Fe Dam as well as the cities downstream that could potentially experience inundation with possible Dam failure scenarios. Specific information for environmental justice is presented only for cities of South El Monte, Montebello, Pico Rivera, and Industry, which are immediately adjacent to the Project.

### **4.7.1 General Socioeconomic Conditions**

The communities immediately upstream to the north and west of the Whittier Narrows Dam Reservoir of the Upper San Gabriel Valley include the Cities of El Monte, South El Monte, Montebello, and Baldwin Park. The primary areas downstream of Whittier Narrows Dam are the cities of Pico Rivera, Downey, Paramount, Hawaiian Gardens, Bellflower, Cerritos, Artesia, Lakewood, and Long Beach.



<b>Table 4.7.1 Ethnicity of Cities Upstream of Whittier Narrows Dam Project</b>						
<b>City</b>	<b>Population (2011)</b>	<b>Black</b>	<b>Asian or Pacific Islander</b>	<b>Indian</b>	<b>White</b>	<b>Hispanic</b>
El Monte	138,000	1%	15%	1%	47%	46%
Baldwin Park	153,830	2%	12%	1%	41%	44%
Montebello	62,300	1%	12%	1%	47%	39%
South El Monte	55,790	-	14%	2%	36%	48%

<b>Table 4.7.2 Education of Population Upstream of Whittier Narrows Dam Project</b>					
<b>City</b>	<b>Population (2011)</b>	<b>No High School Diploma</b>	<b>High School</b>	<b>BA or AA</b>	<b>Graduate</b>
El Monte	138,000	56%	32%	10%	2%
Baldwin Park	153,830	52%	35%	11%	2%
Montebello	62,300	38%	42%	16%	4%
South El Monte	55,790	65%	28%	6%	1%

<b>Table 4.7.3 Income for Population Upstream of Whittier Narrows Dam Project</b>					
<b>City</b>	<b>Population (2011)</b>	<b>Less than 30,000</b>	<b>30,000 to 75,000</b>	<b>75,000 to 149,000</b>	<b>Over 150,000</b>
El Monte	138,000	45%	42%	11%	2%
Baldwin Park	153,830	33%	48%	16%	2%
Montebello	62,300	38%	41%	16%	1%
South El Monte	55,790	45%	41%	12%	2%

### **Whittier Narrows Dam Project**

The official population of the Whittier Narrows Reservoir is zero, as living in the Reservoir is prohibited by Federal law and Corps' policy. However, homeless take advantage of the open space and lax enforcement to set up camps and crude shelters, usually hidden within areas of the overgrown vegetation of the Nature Area. These areas tend to be closer to the Dam as recreation development occurs at higher elevations. The current estimate of the number of homeless residing in Whittier Narrows Reservoir is around 250 people. Therefore, these unofficial residents tend to be at a higher risk of being flooded, unless they re-locate prior to a storm event.

### **Recreation Use in the Reservoir**

Quantitative data has not been collected on visits to specific amenities, but anecdotal observations made by recreation managers suggest that the most popular amenities are the golf course, athletic fields, Legg Lake, and the picnic areas. The estimated baseline is approximately 2,000 visitors per day including users of the model airplane field, fishing amenities, and boaters. Picnic areas tend to experience higher use during warmer months.

The City of Pico Rivera tracks visitation at Streamland Park and Pico Rivera Municipal Golf Course. The City, through its concessionaire also tracks attendance at the Sports Arena and estimates that between 35,000 and 40,000 people visit annually.

Projected visitation at the Reservoir is estimated to grow at the rate of local population growth. This growth in visitation suggests additional demands for resources at the Reservoir both for active athletic amenities and for lower density, lower impact amenities such as walking trails and picnic areas.

### Downstream of Whittier Narrows Dam Project

Population and other demographics are 2010 data, as that year provides the most comparable information.

<b>Table 4.7-4 Ethnicity by Percent</b>						
<b>Municipality</b>	<b>2010 Population</b>	<b>Hispanic/ Other</b>	<b>White, Non-Hispanic</b>	<b>American Indian</b>	<b>Black</b>	<b>Asian, Pacific Islander</b>
Pico Rivera	62,942	88	7	1	1	1
Santa Fe Springs	16,233	38	52	1	4	4
Downey	107,597	34	53	1	4	8
Norwalk	105,549	38	45	1	5	12
Paramount	54,098	47	35	1	14	4
Bellflower	54,098	29	46	1	13	10
Long Beach	462,257	41	29	1	14	13
Lakewood	80,048	16	60	1	9	14
Artesia	16,522	27	32	1	6	34
Carson	91,714	39	18	2	18	23
Whittier	85,331	27	67	1	1	4
Cerritos	49,041	8	27	1	7	58
Hawaiian Gardens	14,254	46	38	1	4	10
La Palma	15,603	8	43	1	5	45
Cypress	47,802	9	66	1	3	21
Los Alamitos	11,656	6	82	1	2	8
Seal Beach	24,127	3	88	1	1	6

The cities of Pico Rivera, Norwalk, Paramount, Bellflower, Long Beach, Artesia, Carson, Cerritos, Hawaiian Gardens and La Palma all have a majority of minority populations. That is, the white population is a minority population when all other ethnic populations are combined. In the City of Pico Rivera, the Hispanic population is the majority population, indicating a potential significant impact on a minority population in the event of Dam failure.

<b>Table 4.7-5 Education by Percent</b>					
<b>Municipality</b>	<b>2010 Population</b>	<b>High School Not Completed</b>	<b>Completed High School</b>	<b>AA or BA</b>	<b>Graduate Degree</b>
Pico Rivera	62,942	39	28	6	2
Santa Fe Springs	16,233	35	51	12	2
Downey	107,597	28	48	18	6
Norwalk	105,549	37	46	14	3
Paramount	54,098	50	38	10	3
Bellflower	54,098	29	51	17	3
Long Beach	462,257	40	44	14	2
Lakewood	80,048	16	55	24	5
Artesia	16,522	34	42	19	5
Carson	91,714	22	43	24	5
Whittier	85,331	20	48	29	9
Cerritos	49,041	10	37	39	14
Hawaiian Gardens	14,254	54	35	8	2
La Palma	15,603	210	43	37	11
Cypress	47,802	11	49	29	10
Los Alamitos	11,656	9	43	33	15
Seal Beach	24,127	10	45	31	14

<b>Table 4.7-6 Income by Percent</b>					
<b>Municipality</b>	<b>2010 Population</b>	<b>Less than \$30,000</b>	<b>\$30,000 to 74,999</b>	<b>75,000 to 149,999</b>	<b>Over 150,000</b>
Pico Rivera	62,942	34	46	18	2
Santa Fe Springs	16,233	31	49	18	2
Downey	107,597	46	41	12	2
Norwalk	105,549	38	42	16	3
Paramount	54,098	30	43	22	5
Bellflower	54,098	37	45	16	2
Long Beach	462,257	41	42	15	2
Lakewood	80,048	24	46	27	3
Artesia	16,522	25	40	25	10
Carson	91,714	22	48	24	6
Whittier	85,331	22	36	32	10
Cerritos	49,041	14	37	38	10
Hawaiian Gardens	14,254	45	42	11	2
La Palma	15,603	16	38	36	10
Cypress	47,802	18	42	32	8
Los Alamitos	11,656	17	39	31	13
Seal Beach	24,127	37	34	13	8

### **Homeless Demographics**

Based on recent surveys that evaluated the homeless population that are living in Los Angeles County, the total number of individuals classified as homeless was estimated to be about 57,794 in 2017. The survey was sponsored by Los Angeles Homeless Services Authority (LAHSA), which was established in 1993 by the County of Los Angeles, as an independent Joint Powers Agency.

Every two years, LAHSA has sponsored a survey of the homeless population to document both the sheltered and unsheltered homeless population living within Los Angeles County and provided this data to U.S Department of Housing and Urban Development. The survey does not include the homeless population in cities of Long Beach, Pasadena and Glendale, since these cities do not participate with the LAHSA survey.

The LAHSA survey divides the County of Los Angeles into eight (8) Service Planning Areas (SPA). Almost the entire floodplain for Whittier Narrows Dam covers entire area designated for SPA 7. In Figure 4.7-1, the map for SPA 7 shows that the service planning area extends slightly outside the Whittier Narrows Dam floodplain. The LAHSA survey for 2017 indicates the homeless population in SPA 7 is up 50 percent from 2016 to 5,172. Therefore, the homeless population SPA 7 may slightly overstate the homeless population for the floodplain by extending into sections of the cities of Los Angeles, Montebello, Bell, La Mirada and Whittier that are not located within Whittier Narrows Dam floodplain. Also, the boundary for the survey for SPA 7 does not include the homeless population located in City of Long Beach and Orange County. The City of Long Beach conducts its own survey of homeless population within the boundary of Long Beach. Based on the overall results the total homeless population is estimated to be about 6,800 within the floodplain for Whittier Narrows Dam.

The surveys indicate that about 12 percent of the homeless population is classified as children and 20 percent is classified as veterans. The LAHSA survey has identified 684 of the homeless population is classified as severely mentally ill and identified 756 of the homeless population as having chronic substance abuse problems. The Long Beach survey identified the two largest ethnic groups among the homeless population as African American (35 percent) and White (38 percent).



**Figure 4.7-1 County of Los Angeles Service Planning Area 7**

#### **4.7.2 Environmental Justice**

##### **Methodology**

Demographic data from the EPA's EJSCREEN, an online environmental justice screening and mapping tool, served as the source data for evaluation. EJSCREEN incorporates demographic data from the U.S. Census Bureau. Two analyses recommended by the CEQ Guidance, Meaningfully Greater analysis and Fifty Percent analysis, were used to determine whether cities adjacent to the Dam had a notable presence of minority or low-income population. Notable presence of either population would require either of the following results:

- Fifty Percent analysis: The ratio of minority or low-income population relative to the total population of the city equals to or exceeds 50 percent.
- Meaningfully Greater analysis: The percentage of minority or low-income population relative to the same ratios for the State of California equals to or exceeds 50 percentile.

##### **Minority and Low-Income Populations**

Environmental impacts associated with construction of the RMP 3E and RMP 5 are expected to affect areas beyond the immediate vicinity of construction. Thus, the scope of analysis for environmental justice is limited to cities surrounding Whittier Narrows Dam and Reservoir.

Four incorporated cities circumscribe the Whittier Narrows Dam and Reservoir. South El Monte to the north, Montebello to the southwest, Pico Rivera to the south, and the Industry to the east.

The Montebello Hills separates the Dam from nearby cities on its western flank. EJSCREEN data for the cities indicate the following.

- **Industry:** Relative to the total population of the city, the percentage of minority population is approximately 95 percent. Relative to the percentage of minority populations in California, Industry ranks in the 88th percentile. Relative to the total population of the city, the percentage of low-income population is approximately 44 percent. Relative to the percentage of low-income populations in California, Industry ranks in the 66th percentile.
- **Montebello:** Relative to the total population of the city, the percentage of minority population is approximately 87 percent. Relative to the percentage of minority populations in California, Montebello ranks in the 75th percentile. Relative to the total population of the city, the percentage of low-income population is approximately 38 percent. Relative to the percentage of low-income populations in California, Montebello ranks in the 58th percentile.
- **Pico Rivera:** Relative to the total population of the city, the percentage of minority population is approximately 96 percent. Relative to the percentage of minority populations in California, Pico Rivera ranks in the 89<sup>th</sup> percentile. Relative to the total population of the city, the percentage of low-income population is approximately 34 percent. Relative to the percentage of low-income populations in California, Pico Rivera ranks in the 53<sup>rd</sup> percentile.
- **South El Monte:** Relative to the total population of the city, the percentage of minority population is approximately 97 percent. Relative to the percentage of minority populations in California, South El Monte ranks in the 91st percentile. Relative to the total population of the city, the percentage of low-income population is approximately 56 percent. Relative to the percentage of low-income populations in California, South El Monte ranks in the 79th percentile.

Table 4.7-7 Percentile Values for Demographic Indicators				
Demographic Indicators	Percentile Relative to State of California			
	Industry	Montebello	Pico Rivera	South El Monte
Minority Population	88	75	89	91
Low-Income Population	66	58	53	79
Demographic Indicators	Percentage Relative to Total City Population			
	Industry	Montebello	Pico Rivera	South El Monte
Minority Population	95	87	96	97
Low-Income Population	44	38	34	56

Based on the above, there is notable presence of both minority and low-income populations in the four cities surrounding the dam.



### Built Environment and Environmental Indicators

The four cities surrounding the project area comprise a dense, fully developed urban environment with residential, commercial, and industrial land uses. Portions of Montebello and Pico Rivera that adjoin the project area, to the south, consist of residential developments. To the west, are the oil and gas fields in the Montebello Hills. To the eastern flank of the Dam is the I-605 Freeway and an adjacent industrial corridor associated with the city of Industry. The northern boundary of the reservoir adjoins residential and industrial land uses associated with the city of South El Monte. The EPA Superfund contaminated groundwater site is located beneath the Whittier Narrows Reservoir.

Percentile values for selected environmental indicators from EJSCREEN for the surrounding cities relative to the values in the state of California exceed 50<sup>th</sup> percentile. However, the values are not unique to these four cities. With the exception of coastal communities, values for most inland cities in Los Angeles County exceed 50<sup>th</sup> percentile due to the urbanized environment.

**Table 4.7-8 Percentile Values for Selected Environmental Indicators**

Environmental Indicators (Units)	Percentile Relative to State of California			
	Industry	Montebello	Pico Rivera	South El Monte
Particulate Matter (PM 2.5 in µg/m3)	84	89	89	82
Ozone (ppb)	62	56	56	62
Traffic Proximity and Volume (daily traffic count/distance to road)	89	56	67	67
Superfund Proximity (site count/km distance)	74	95	89	76
Hazardous Waste Proximity (facility count/km distance)	88	66	66	91

## 4.8 HAZARDOUS, TOXIC, AND RADIOACTIVE WASTE

This section describes the hazardous, toxic, and radioactive waste (HTRW) considerations applicable to the area surrounding the Whittier Narrows Dam and Reservoir. The area potentially affected by the proposed RMPs for this resource is the area immediately underlying the Whittier Narrows Dam and Reservoir, as well as the area immediately downstream within the footprint of the Project.

### 4.8.1 Existing Conditions

Data reviews and assessment were conducted to the requirements of ASTM E 1527 (2013 version). The regulatory database search that was conducted by the Corps included these publicly accessible, internet-posted databases, which were searched in August 2017:

- State of California Geotracker Database and Envirostor on-line databases and documents index;
- EPA (US Environmental Protection Agency) National Priorities List (NPL) of Superfund sites for information on the San Gabriel Valley Superfund site;
- A previously conducted, site specific Phase I ESA by Woodward-Clyde (1997) for information on the shooting ranges and the oil well sites, neither of which are within the 2017 Geotracker and Envirostor databases.

The Phase I ESA evaluator's data search and screening process had the objective of either eliminating sites with environmental wastes issues from further consideration or their classification as a Recognized Environmental Conditions (RECs), a Controlled Recognized Environmental Conditions (CRECs), or a Historical Recognized Environmental Conditions (HRECs), with regard to the Whittier Narrows Dam Safety Modification Study (DSMS).

### **Groundwater Contamination**

Groundwater contamination was first detected in the San Gabriel Valley in 1979. Despite the widespread extent of contamination, the San Gabriel Reservoir aquifer continues to provide approximately 90 percent of the domestic water supply for the Valley's 1.5 million residents.

A ground water plume is located under Whittier Narrows Dam Reservoir in the general vicinity of Peck Road and Real, El Monte (Figure 4.8-1). The site was designated by EPA in 1983 as a CERCLA - NPL listed site that posed considerable risk to human health and the environment. The site was initially estimated to be approximately four miles long and 1.5 miles wide. Ground water testing by state agencies and water companies indicated that the primary types of contamination were chlorinated solvents including TCE, PCE, and carbon tetrachlorine. The EPA began enforcement efforts in the area in 1983 by assisting three communities in the area whose water systems were most at risk with remedial measures. The state also began a well testing and monitoring program to help identify the sources and levels of contamination.

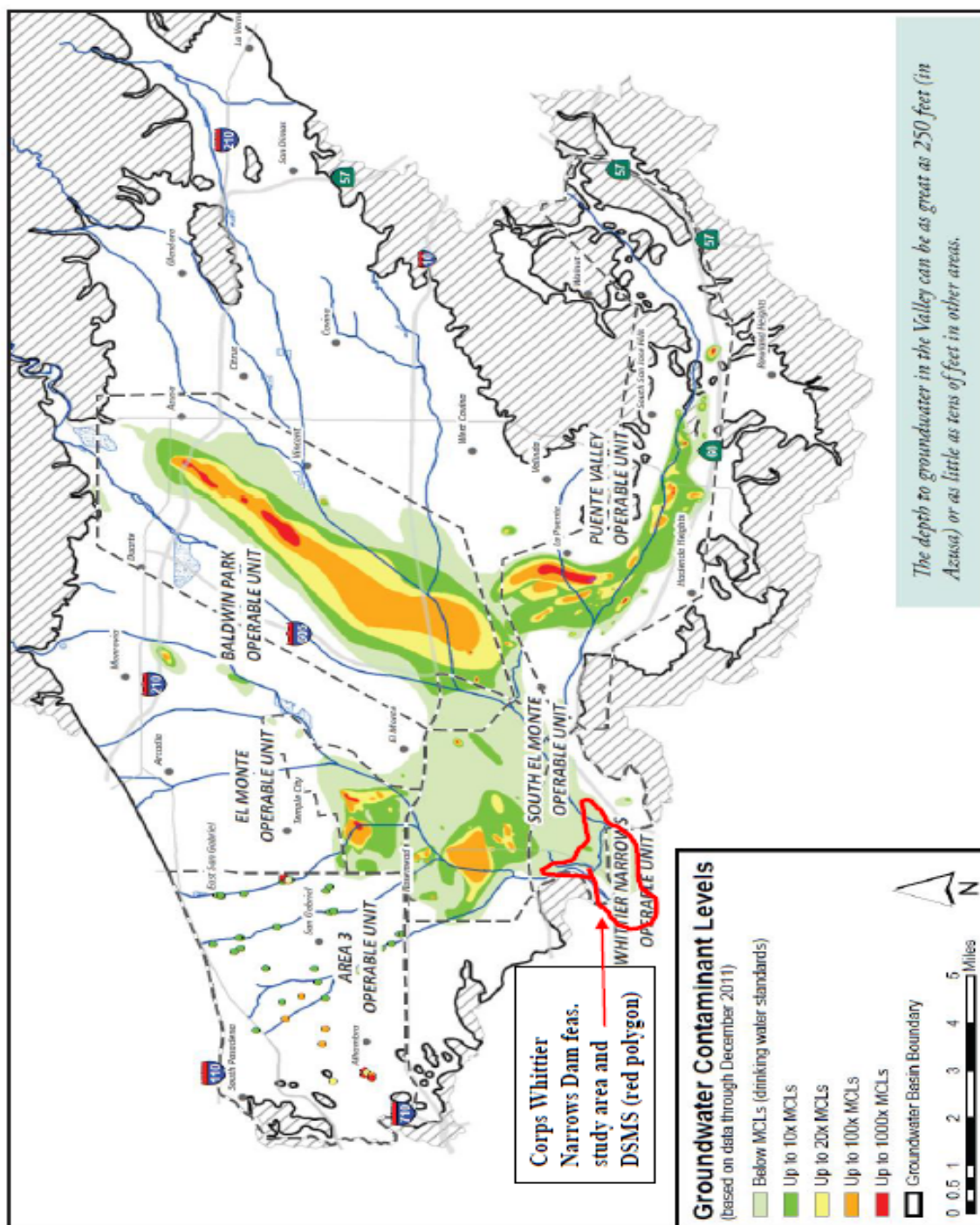


Figure 4.8-1 San Gabriel Valley Superfund Groundwater Contamination Site

Based on EPA's determination that "a substantial threat of continued migration of contamination into the Whittier Narrows Operable Unit (WNOU) still exists." In the 1980s and early 1990s EPA developed a Reservoir-wide plan to set cleanup priorities, and led Federal and state efforts to develop the institutional framework necessary to address the contamination. After hundreds of hours of negotiations, active EPA mediation, assistance from professional third-party environmental mediators, multiple public hearings, and extensive media coverage, eight responsible parties, and seven water agencies signed an agreement in March 2002. The eight companies agreed to pay for cleanup of the polluted groundwater over the next 15 years.

EPA started construction of the Whittier Narrows Groundwater Extraction and Treatment Facility in June 2001 and completed construction in March 2002. The facility consists of groundwater extraction wells (Figure 4.8-2), conveyance pipelines, and 20 pairs of granular activated carbon (GAC) filter vessels for removal of VOCs. The treatment system is capable of extracting and treating approximately 22,000 gallons per minute, or 32 million gallons per day, of contaminated groundwater. EPA entered into an agreement with the City of Whittier to operate and maintain the treatment facility and to supply treated water to local businesses and residents.

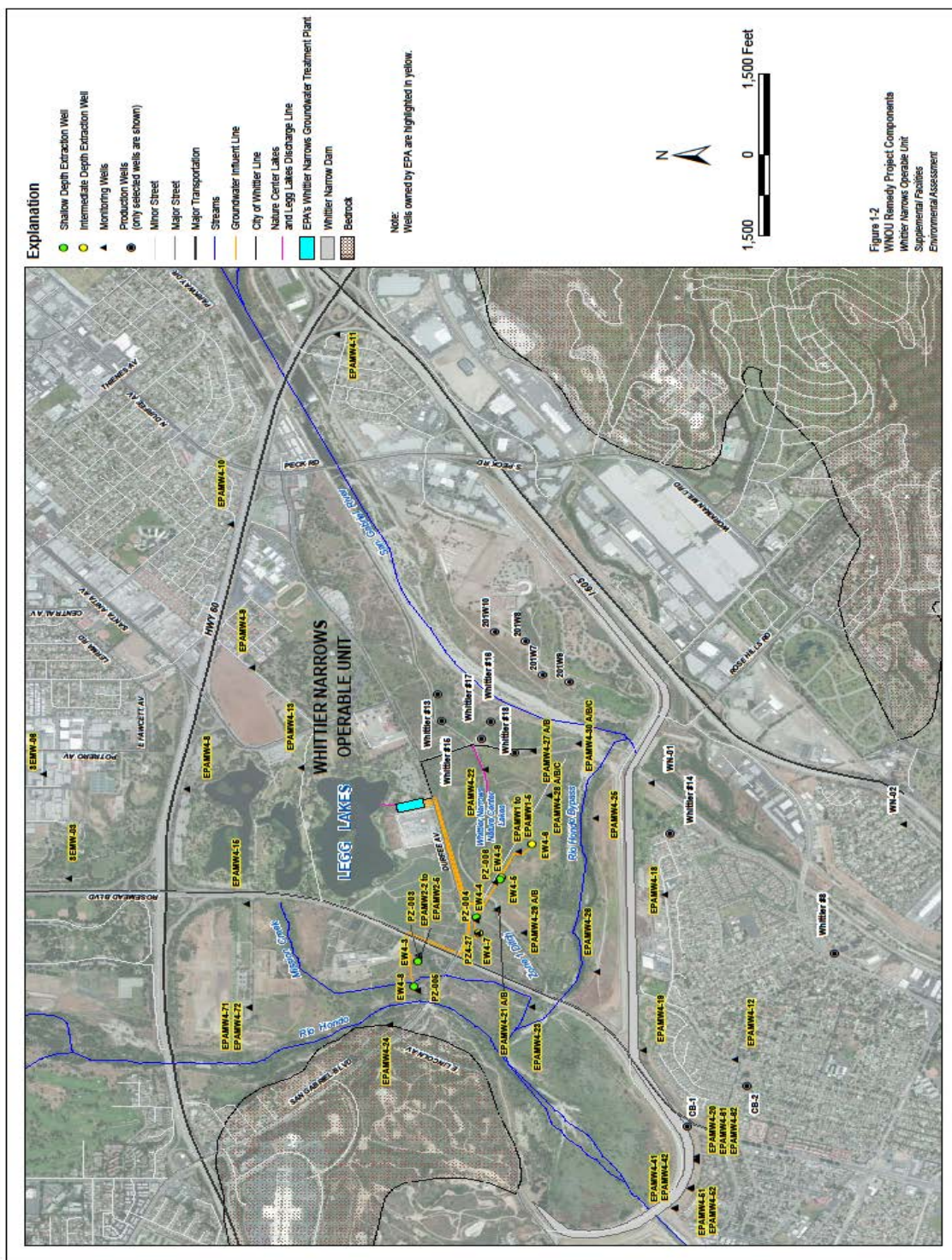
### **Storage Tanks**

Sites within Whittier Narrows Dam Reservoir identified on the State Water Resources Control Board (SWRCB) Geotracker Web site and DTSC's EnviroStor Website indicate:

- An underground storage tank at the former Texaco Research Facility (currently occupied by the Logistics, Terminals, Inc. trucking yard), located at 329 Durfee Avenue, South El Monte, California 91733.
- A leaking underground storage tank (LUST) site is present at the Corps' District Baseyard, 645 Durfee Avenue, South El Monte, California 91733. According to Regional Water Quality Control Board (RWQCB)'s Geotracker Web site, this LUST has been given a regulatory status of "case closed."
- This site is a gasoline LUST that was discovered in 1990 during tank closure, under the facility name of "Streamland Park 3500-3625" (T0603704353) at the address of 3625 Durfee Ave. S., Pico Rivera, CA. This is on the downstream side of Whittier Narrows Dam, at the toe. Contamination was confined to soil and the file was case closed in 1995. This site is of interest in the context of the existence at the southern margin of one of the proposed DSMS staging yards. That is on the down-gradient perimeter of the proposed staging yard. This site is not an REC. A proposed DSMS staging area does overlap with this LUST site but it is case-closed and has been for more than 20 years and impacted soil only. All of those characteristics suggest no risk of issues with the DSMS work at this location.
- The site is known as ARCO / JSND, Inc. (T10000001579), 1808 Durfee Avenue, S. El Monte, CA. It is a diesel fuel, gasoline and MTBE UST LUST site. Leaks were discovered in 1998 and 2006 and the site was under a related enforcement action as of 2015. The site is under 'site characterization' status as of August 2017 and has been in that status since 2015. This is an REC in the context of the DSMS due to proximity, high concentrations of diesel fuel in the soil at the groundwater contact, location, and



remaining unknowns, not the least of which is its open case status. No down-gradient extent of the plume has been identified and no groundwater contaminant plume has been ruled out.



#### **4.8.2 Downstream of Whittier Narrows Dam**

There are several Superfund sites currently being cleaned up downstream of the Whittier Narrows Dam. Dam failure due to dam breach could impact these areas.

**Del Amo Hazardous Waste Site, Torrance** From 1943 until 1972, the Del Amo facility site was a center of large-scale industrial activities, beginning with the production of synthetic rubber during World War II. Wastes were placed in six unlined pits and three unlined ponds on the site and subsequently were covered with soil.

Groundwater and soils are contaminated with volatile organic compounds (VOCs), including benzene and toluene, polycyclic aromatic hydrocarbons (PAHs), and other semi-volatile organic compounds. Floating product, including benzene and petroleum products, also has been identified on top of the water table at various locations on the site.

At the waste pit area, a cap was built in 1999 and has been in operation since January 2000. The soil vapor extraction (SVE) system completed in August 2006, has removed approximately 23,035 pounds of benzene via biodegradation and adsorption. In another location within the site, a hydraulic extraction pilot project has extracted approximately 20 gallons of pure product from contaminated groundwater.

Designs for a groundwater remediation system are underway by EPA and Responsible Parties and has included extensive groundwater modeling as well as field pumping tests. Feasibility studies are also underway to determine an approach for soil and non-aqueous phase liquid contamination at the site.

**Palos Verdes Shelf** From 1947 to 1983, Montrose Chemical Corporation manufactured DDT at its plant near Torrance, California. The plant discharged wastewater containing the now-banned pesticide into Los Angeles sewers that emptied into the Pacific Ocean off White Point on the Palos Verdes Shelf. Since 2003, the Fish Contamination Education Collaborative (FCEC), a public outreach program of the EPA, has been working to protect the most vulnerable populations in southern California from the health risks of consuming DDT contaminated fish off the Palos Verdes Shelf.

Through outreach to affected communities, anglers and businesses, FCEC provides education on the dangers of consuming contaminated fish, as well as recommended portioning and preparation guidelines. EPA is currently evaluating how to best address the pollution, focusing mainly on the areas of highest contamination.

**Pemaco** is a former chemical mixing facility located in Maywood, California, that operated between 1940s and 1991. The facility stored chemicals in over 30 underground storage tanks, 55 gallon drums and six above ground storage tanks. Some of these chemicals leaked into the surrounding soils and groundwater before the tanks could be removed from the site. In 1997, EPA began the cleanup process by tearing down the remains of the facility and removing the tanks and containers.



The Pemaco site has also incorporated renewable energy into cleanup activities. Photovoltaic solar panels were installed to provide power to run vacuum pumps that draw contaminants out of the soil and groundwater. The solar panels produce about 4,500 kilowatt-hours of electricity annually. If this power had come from a fossil-fuel-burning power plant, it would have accounted for 4,311 lbs. of CO<sub>2</sub> emissions.

**Paramount Petroleum** has two refineries at 8835 Somerset Boulevard in Paramount, and at 2400 E. Artesia Boulevard in Long Beach.

**BP** has a refinery at 5900 Cherry Avenue in Long Beach.

**Globe Propane** is located at 5843 Paramount in Long Beach.

## **4.9 LAND USE**

This section describes general land use in the vicinity of the Project as well as land use classifications within the Project area specifically. The area potentially affected by the proposed RMPs for this resource is the area immediately underlying the Whittier Narrows Dam and Reservoir, as well as the area immediately downstream of the west, central, and eastern embankments within the footprint of the Project, including the areas known as Streamland Park and the Pico Rivera Municipal Golf Course.

### **4.9.1 Existing Conditions**

The San Gabriel Valley and the South Coast Basin of metropolitan Los Angeles are densely developed suburban areas adjacent to the City of Los Angeles. Local civic centers, retail, and commercial establishments, schools, libraries, parks, and other suburban amenities are scattered across the area. The area from the northern end of the watersheds to the Pacific Ocean has a population of close to three million people that generally live within a 25-mile radius of the Whittier Narrows Dam Reservoir.

The area downstream of the Project is almost completely built out. Numerous retail centers, schools, parks/recreation centers, major transportation arteries, business ‘campuses’, industrial centers and municipal government centers. A variety of housing types include single-family residential dwellings and multi-family units, such as apartments, condominiums, retirement communities, and trailer parks. Alongside both the San Gabriel River and the Rio Hondo, LACDPW operates and maintains detention basins for groundwater recharge. Military lands include the Naval Weapons Station, Seal Beach and the Los Alamitos Air Base.

Land uses immediately adjacent to the Reservoir consist of a mix of residential, commercial, and light industrial activities. The primary land use south and west of the Reservoir is residential. To the north, Rush Street serves as a commercial and light industrial corridor, with residential neighborhoods located beyond. Santa Anita Avenue serves as a major civic and commercial corridor within the City of South El Monte, with residential neighborhoods located to the east. To the east and southeast, Peck Road and Rooks Road serve primarily as light industrial corridors, with trucking operations; residential neighborhoods are beyond.

The Federal government acquired 2,640.1 acres in fee and has limited rights over an additional 186.5 acres through flowage easements. The total Whittier Narrows Reservoir area was acquired for the purpose of flood risk management, which falls under the allocation of operations. This allocation establishes the primary purpose of the Reservoir as operations for flood risk management. Figure 4.9-1 indicates the land use classifications for the Reservoir per the 2011 Master Plan. All land use classifications are secondary to this purpose and must be compatible with flood risk management. Land within the Reservoir has been outgranted for recreation, agricultural, and other uses (Figure 4.9-2).

The Corps reserves 869.4 acres exclusively for operation and maintenance of the Reservoir for flood risk management. The areas in red on either side of Rosemead Blvd. are classified as Operations and are maintained and operated by the Corps for flood risk management purposes. These areas upstream of the Dam are considered areas of potential impact of the Proposed Action within the Reservoir. Green areas are classified as environmentally sensitive with development restrictions, light and dark blue areas indicate various levels of recreation use intensity, and orange areas are areas that are part of the recreation outgrant to LACDR&P, but have been classified by the Corps as a potential area to perform non-statutory mitigation. Land immediately downstream of the Dam and upstream of the east embankment is leased to the City of Pico Rivera for recreation use.

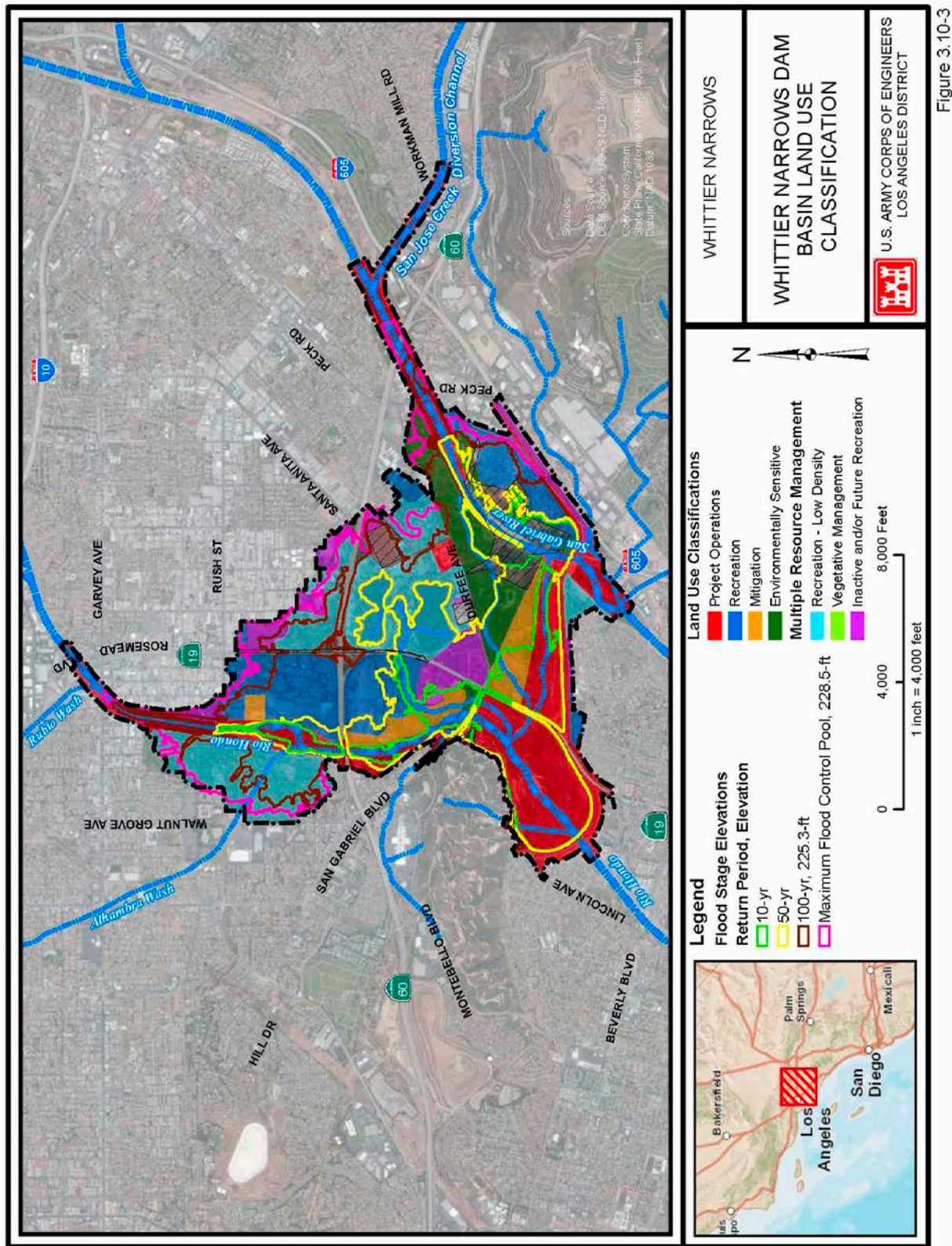
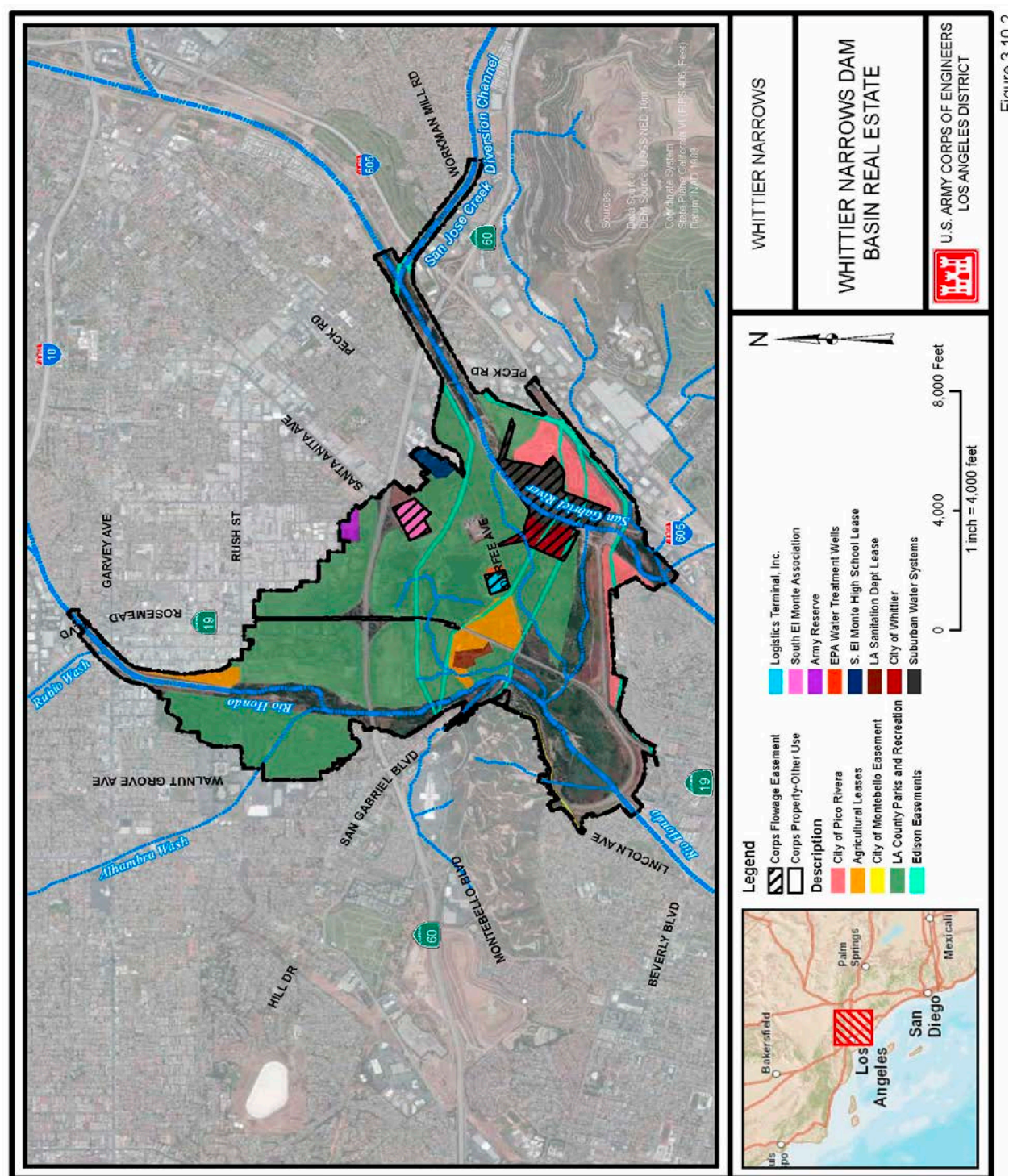


Figure 4.9-1 Land Use Classification for Whittier Narrows Dam Reservoir





### **West Embankment**

The west embankment runs along Lincoln Ave. south and curves eastward, crossing the Rio Hondo and then curves northward along Rosemead Blvd. (which crosses over the top of the embankment) before it turns eastward again. The area upstream of the west embankment and west of Rosemead Blvd. is classified for “Operations” and is an open, sparsely vegetated area with unofficial trails throughout the area. Until about 2004, approximately one dozen oil wells dotted the area, but these have been removed and capped by LACDPW in anticipation of implementing additional water conservation within the Reservoir. Even though underground pipes have been capped, numerous pipes still run through the area.

At the northwestern corner of the area (the southeast corner of San Gabriel Blvd. and Lincoln Ave.), a 3.75 acre parcel is owned by Sentinel Peak Resources, a privately owned firm. The company’s focus is on acquisition, development, and exploration of oil and gas assets, primarily on heavy oil development in California. This area is subject to inundation above 206.0 ft., the 10 year level of exceedence, or a 10-year event. The site is also covered in scrub/ruderal vegetation, including palm trees.

West of Lincoln Ave. is the Montebello Hills that are covered in coastal sage scrub vegetation with oil wells still in production. Immediately downstream is the channelized Rio Hondo with residential homes on either side. The Rio Hondo separates the City of Montebello from the City of Pico Rivera. Backyards start less than 200 feet from the downstream toe of the Dam. The area between the backyard fences and the toe of the embankment is considered an area of potential construction impact.

### **Central Embankment**

The central embankment continues from Rosemead Blvd. eastward to the San Gabriel River where the spillway structure is located. Upstream of the central embankment to the overflow channel the area is classified as “Operations” for flood risk management activities. The area is open with grasses mowed annually between the embankment and the cross over channel. On the north side of the overflow channel is a stand of trees and scattered riparian habitat. From the crossover channel to Durfee Ave. the area is classified as “Environmentally Sensitive”. To the northeast the Nature Area is part of the recreation lease to the LACDP&R.

Downstream of the central embankment the Federal government owns in fee several parcels. At the western end, the approximate 20 acre site is leased to the City of Pico Rivera. The City developed Streamland Park which consists of baseball fields, picnic areas, tot lot and parking. At the eastern end a 22 acre site in the triangle created by the embankment and the San Gabriel River is also leased to the City of Pico Rivera. The area has been developed as the Pico Rivera Golf Course, a nine-hole executive course.

The Federal government owns an additional strip between the two (2) recreation areas immediately downstream of the Dam toe. This is currently leased to the City of Pico Rivera. This strip of just over three (3) acres is sub-leased to the Whittier Fertilizer Company. The Company sells mulch, fertilizers, turf sod, and other landscaping products.

The Zoning Plan for the City of Pico Rivera (2014) indicates the area on the north side of Kruse Road to the Federal land between the two (2) recreation areas is zoned as Open Space and as Multiple-Family Residential with the open space designation a narrow strip between the two Multiple-Family Residential strips. A previous land use plan indicates this open space is the Los Angeles Department of Water and Power (DWP) high power line corridor. Currently, in between the two (2) recreation areas, the Whittier Fertilizer Company is located on several parcels for a total of almost 12 acres, which as indicated above are zoned for other uses.

### **Surrounding Communities**

In addition to the City of Montebello and the City of Pico Rivera, the communities immediately surrounding the Reservoir include the City of South El Monte, and the City of Industry. The City of Rosemead is located adjacent to the northwest portion of the Reservoir. The City of South El Monte, to the north and northwest is heavily manufacturing in the western half and contains residential, commercial, and public facilities in its eastern half (City of South El Monte General Plan).

### **East Embankment**

The east embankment stretches from the south side of the San Gabriel River to the end of the embankment along the San Gabriel River Freeway (I-605). Within the Reservoir, upstream of the spillway structure on the San Gabriel River to the southeast is Bicentennial Park, an abandoned RV park on land leased to the City of Pico Rivera. Moving to the northeast is the Sports Arena operated by the City of Pico Rivera and equestrian stables on land leased to and operated by LACDP&R. Access to the area is by Rooks Road that crosses Peck Road. To the south of Peck Road is a light industrial complex with housing to the north of Peck Road. The embankment ends near the Peck Road onramp to the San Gabriel River Freeway. Bicentennial Park is considered an area of potential construction impact.

## **4.10 TRAFFIC AND TRANSPORTATION**

This section describes general traffic conditions and general transportation on roadways within the vicinity of the Project as well as downstream of the Dam. The area potentially affected by the proposed RMPs include the Project area and those areas immediately adjacent to the Dam and Reservoir that could be impacted by construction activities. This area is generally bounded on the north by SR-60, on the east by I-605, on the west by Montebello Boulevard, and on the south by Beverly Boulevard

### **4.10.1 Existing Conditions**

Urban and sub-urban Los Angeles County is criss-crossed with a network of freeways, local roadways and connector roads. Mass transportation includes local and non-stop commuter bus lines, Metrolink, and various light rail lines such as the Blue Line, Red Line, Green Line and Gold Line. Amtrak provides commuter and long-distance rail service into and out of the Los Angeles metropolitan area. International and local airports provide commercial and private air transportation.



The Pomona Freeway (SR-60) and the San Gabriel River Freeway (I-605) intersect at the northeast corner of the Reservoir and Rosemead Blvd. (SR-19) runs north-south through the middle of the Reservoir. The Reservoir is surrounded by residential and arterial streets. San Gabriel Boulevard originates just west of the Reservoir and continues as Durfee Avenue east of Rosemead Boulevard. Table 4.10-1 lists the major access roadways associated with the Reservoir and their average traffic volumes.

<b>Table 4.10-1 Average Annual Traffic Volumes</b>	
<b>Roadway Name</b>	<b>Average Daily Two-way Traffic</b>
Interstate 605	242,000
State Route 60	235,000
Rosemead Boulevard	48,000
San Gabriel Boulevard	31,000
Whittier Blvd.	31,800
Santa Anita Ave.	12,000
Springfield Drive	4,300
Peck Road	27,000
San Gabriel River Parkway	8,900
Gallatin Road	9,100
Source: Google Earth Pro, 2013	

Numerous bus stops are located through and adjacent to the Reservoir along Rosemead and San Gabriel Boulevards. Bicycle paths through the Reservoir include:

- The San Gabriel River Bike Trail, a 38-mile Class I bike path that runs north from Seal Beach along the San Gabriel River to the San Gabriel Mountains.
- The Los Angeles River Bike Trail and Rio Hondo Bike Trail together form 30 miles of Class I bike paths and run from Long Beach to Temple City along the Los Angeles River and the Rio Hondo, known as the LARio Trail.
- A network of Class III bike paths access the Reservoir from the north through El Monte.

#### **Downstream of the Whittier Narrows Dam**

Major north/south transportation corridors include the Long Beach Freeway (I-710) and San Gabriel River Freeway (I-605), east/west; Artesia Freeway (SR-91), the Century Freeway (SR-105) and the Garden Grove Freeway (SR-22) and northwest/southeast; the San Diego Freeway (SR-405). The major arterial road between the Long Beach Freeway and San Gabriel River Freeway is Rosemead Boulevard that becomes Lakewood Boulevard. Major arterial streets that cross the area east to west include Beverly Boulevard, Washington Boulevard, Slauson Boulevard, Florence Avenue, Firestone Boulevard, Imperial Highway, Rosecrans Boulevard, Wardlow Road., and Pacific Coast Highway (Table 4.10-2).

<b>Table 4.10-2 Average Traffic Volumes on Nearby Roadways</b>	
<b>Intersection</b>	<b>Average Daily Number of Vehicles</b>
Rosemead Blvd @ Washington	28,500
Pioneer @ Slausen	29,300
Telegraph @ Paramount	21,000
Florence @ Pomering Rd	46,500
Downey Ave. @ Lexington Rd.	12,200
Lakewood @ Muller St	42,400
Firestone @ Willey Burke Ave	19,800
Cherry Ave @ 63 <sup>rd</sup> St	26,300
Source: Google Earth Pro, 2013	

Air transportation includes Shepard Field just south of the San Gabriel River Spillway, the Commercial Bus Plaza Heliport, McDonald Douglas Space Systems Heliport, Meadowlark Airport, and Compton/Woodley Airport. The Norwalk/Santa Fe Springs Metro Bus Plaza is a major service center/end point for the Green Line and bus depot.





## **4.11 ESTHETICS**

This section describes the general viewshed in the vicinity of the Project. For the purposes of this esthetic analysis, the study area is defined as the viewshed of the Project area and the area approximately 0.5 miles downstream of the Dam that could be impacted by construction activities.

Esthetics can include viewsheds, odors, lights, and glare. Esthetic resources can be defined as a person's sensory perception of the environment. It includes physical features, such as land, water and air, and spiritual features, such as the beauty of place or the knowledge that such a place exists.

Viewsheds are generally described in terms of visual quality, or quality of views. Views can be categorized into three types: the first one half-mile being the foreground, from one-half mile to five miles being the middle ground, and greater than five miles being the background. Attention to detail at varied distances determines the type of view captured by the viewer.

Esthetics analysis considers the existing and future appearance, or perception of views, of the areas surrounding the site, and viewer sensitivity. Esthetics analysis for the Proposed RMPs includes describing existing visual characteristics of the Action Area and vicinity.

Esthetic resources in the Project area are the natural and man-made, moving and stationary physical features that compose the character of the landscape as visually observed from a given location. The physical features that are visible in the landscape (e.g., landforms, water bodies, animals, vegetation, and structures) contribute to the scenery, visual quality, and visual appeal of the Project area and vicinity. The spiritual can be identified as the sense of a lush green open space, an oasis in the dense urban setting of metropolitan southern California.

Visual resources considered are water resources, landform, vegetation, land use, and user activities. The Visual Resources Assessment Procedure for the U.S. Army Corps of Engineers (VRAP) Management Classification System (MCS) establishes the assessment framework for the area and sets the visual resource criteria to be used throughout the visual assessment.

The VRAP is a method to: 1) evaluate and classify existing aesthetic or visual quality; 2) assess and measure visual impacts caused by a Corps' water resource project; 3) evaluate the beneficial or adverse nature of the visual impacts; and 4) make recommendations for changes in plans, designs, and operations of water resource projects.

### **4.11.1 Existing Conditions**

The area developed from agriculture to bedroom communities, with many areas incorporating into cities along with the City of Los Angeles. The area is typical of the urban/sub-urban sprawl that makes up southern California today. Each city has its own center of government surrounded by suburban development of a variety of housing, retail centers, parks, schools, hospitals, and other urban amenities. There is very little open space except for parks. Closer to the foothills of



the San Gabriel Mountains, there remain open patches such as the quarries and undeveloped land that one day can be expected to become future areas of housing and other suburban development.

**Looking Upstream to the north and downstream to the south from the Road on the Dam Crest (Central and West Embankments)**

**Users:** Typical users include bicyclists, walkers, and joggers. Occasional Corps' maintenance workers in vehicles.

**User Activity:** The road on the Dam's crest is an asphalt roadway used for maintenance access to the Dam spillway and the Dam itself. A secondary purpose is as a recreation route for bicyclists, walkers, and joggers.

**Elements that unify the Zone:** Open area to the west, views of the west embankment/ Rio Hondo and Montebello Hills in the distance from the central embankment; Nature Area to the north, and east, some parts of the east embankment and spillway to the east (depending on location); to the southeast, the San Gabriel River immediately downstream of the spillway and immediately downstream (at the toe of the Dam) the Pico Rivera Golf Course, Whittier Fertilizer Company, and residential area of single-family homes.

**Water:** The Rio Hondo (currently dry) to the west, the overflow channel from the San Gabriel River to the north, the San Gabriel River upstream of the Dam to the southeast and southeast (depending on location).

**Landform Type:** The area is generally flat except for the Montebello Hills to the west (adjacent to the western edge of the Reservoir) and the San Gabriel Mountains in the distance to the north.

**Vegetation:** Along the Rio Hondo, a mix of riverine, native and non-native vegetation, such as eucalyptus and *Arundo donax*. To the north, looking into the Nature Area; immediately upstream is a patch of annual grass between the toe of the Dam and the overflow channel with some scattered trees adjacent to the overflow channel; to the northeast overgrown native vegetation with some no-native trees and shrubs in the Nature Area; to the east, riverine habitat along the San Gabriel River. Downstream, the San Gabriel River also has some riverine habitat. Downstream of the Dam, the Rio Hondo is concrete lined, so there is no vegetation in that channel. Downstream of the central embankment the Pico Rivera Golf Course consists of Ornamental Landscaping, turf, shrubs and non-native trees. Residential housing downstream also has Ornamental Landscaping.

**Land/Water Use:** The Reservoir is a Flood Control Reservoir with recreation amenities developed in the Reservoir and immediately downstream of the Dam.

**Access:** Access is from Lincoln Ave. turnout on the far west side, Rosemead Blvd to either the west or central embankments and from access ramps on either side of the Dam

on the eastern end of the central embankment near the spillway. There is no public access to the east embankment with locked gates on either side of the spillway.

**Litter/Pollution:** While the roadway itself is clear of debris and trash, vegetative debris can be seen in the Nature Area upstream of the central embankment and the open, highly disturbed area of the Rio Hondo area upstream of the west embankment. There are a few scattered pieces of trash visible along Rosemead Blvd. Trash/litter carried downstream by storm events can be seen caught in some vegetation lining the river channel upstream of the eastern embankment.

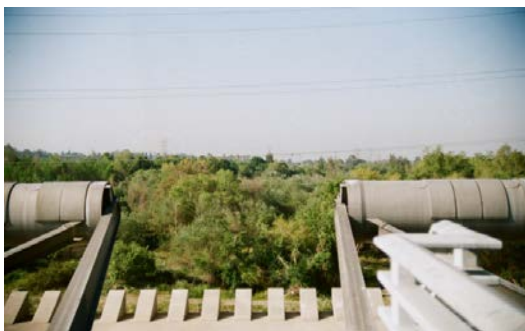
**Adjacent Scenery:** Looking downstream from various vantage points, the tall buildings of downtown Long Beach in the far distance towards the Pacific Ocean, urban development in between. To the north looking across the Reservoir, the tree tops within the Reservoir and suburban development beyond with the San Gabriel Mountains in the far distance. Closer, the Montebello Hills to the west, Rosemead Blvd. between the west and central embankments, and some light industrial buildings to the northeast, beyond the San Gabriel River and embankment. From the central embankment the Whittier Fertilizer Company is immediately downstream. Although use of heavy “construction” equipment can be seen, only a low rumble could occasionally be heard.

**Sounds:** Generally quiet with low traffic noise, wind caused noise, mostly rustling vegetation, minor distant sounds of San Gabriel River (depending on location)

**Odors:** Fresh earthen smell (most likely from Whittier Fertilizer Company), but not offensive, minor oil/traffic odor, however generally typical day with a slight breeze atop the Dan crest. Odors are passing depending on area conditions.

**Visibility:** On a clear day exceptional, views of San Gabriel Mountains to the north, downtown Long Beach to the south, 17 miles away.

**Other attributes:** Generally tranquil and peaceful, on top of the world feeling.



**Photo 4.11-1 Looking Downstream, San Gabriel River, Beyond the Spillway**



**Photo 4.11-2 Looking Downstream, Whittier Narrows Fertilizer Company**





**Photo 4.11-3 Looking Upstream at  
Rosemead Blvd. Bridge and Montebello  
Hills**



**Photo 4.11-4 Looking Downstream at  
the Rio Hondo Channel**

**Travelling north and south on Rosemead Blvd., crossing over the top of the  
Dam**

**Users:** Motorists travelling north/south through the Reservoir

**User Activity:** The roadway is a major commuter link to the Pomona Freeway as well as points north and south of the Reservoir. The heaviest use is during peak commuter hours in the morning and late afternoon.

**Elements that unify the Zone:** Open area to the west, views of the west embankment; to the east, Nature Area to the north and east, and residential area of single-family homes downstream of the Dam to the west and east.

**Water:** Generally not visible unless water is being held for water conservation or following a storm event. Water from the overflow channel is visible when crossing the bridge over the channel.

**Landform Type:** The area is generally flat except for the Montebello Hills to the west (adjacent to the western edge of the Reservoir) and the San Gabriel Mountains in the distance to the north. Elevation of roadway rises up to cross over the embankment and back down to invert elevation.

**Vegetation:** Within the Reservoir, some scattered trees adjacent to the overflow channel; to the west, tree tops of vegetation along the Rio Hondo; to the east overgrown native vegetation with some non-native trees and shrubs in the Nature Area; downstream of the Dam, the Rio Hondo is concrete lined, so there is no vegetation in that channel, and downstream of the central and west embankments the residential housing has ornamental landscaping.

**Land/Water Use:** The Reservoir is a Flood Control Reservoir with recreation amenities developed in the Reservoir and immediately downstream of the Dam. There is no water used for recreation except Legg Lake, Center Lake, and North Lake north of Durfee Ave. and just south of the Pomona Freeway.

**Access:** Rosemead Blvd. separates the west and central embankments. Rosemead Blvd is a 6-lane roadway through the Reservoir. Access to Rosemead Blvd. is from San Gabriel Blvd./Durfee Ave. as the closest cross street to the Dam. Further to the north, Rosemead Blvd. may be accessed by the Pomona Freeway (I-60) and other local roads north of the Reservoir. Several parking lots for various recreation areas may be accessed from Rosemead Blvd.

**Litter/Pollution:** There are a few scattered pieces of trash visible along Rosemead Blvd. Trash/litter carried downstream by storm events can be seen caught in some vegetation.

**Adjacent Scenery:** Travelling southward, when reaching the crest elevation, looking downstream, the tall buildings of downtown Long Beach in the far distance towards the Pacific Ocean, with urban development in between can be seen. Travelling north looking across the Reservoir, the tree tops within the Reservoir and suburban development beyond with the San Gabriel Mountains in the far distance can be seen. Closer, the Montebello Hills to the west are seen.

**Sounds:** Generally interior car noise with windows closed. Some intermittent traffic noise. With windows open, increased traffic noise.

**Odors:** From inside car as typical traveler, no noticeable external odors.

**Visibility:** On a clear day exceptional, views of San Gabriel Mountains to the north, downtown Long Beach to the south, 17 miles away.

**Other attributes:** Often roadside vendors selling bags of fruit and flowers. Minimal roadside shoulder and typical high speeds make it difficult to stop for purchase.



**Photo 4.11-5 Looking North, Rosemead Blvd., Mid-Morning**

**From Within the Nature Area, Upstream of the Central Embankment and Operations Area upstream of the West Embankment**

**Users:** Recreation users including walkers, and joggers, equestrians, dirt bikes. Occasional Corps' maintenance workers in vehicles.

**User Activity:** Users are generally joggers and equestrians upstream of the west embankment and hikers, bicyclists, birders through the Nature Area. Corps' Maintenance workers and other maintenance crews such as LACPR and Southern California Edison (SCE) may access these areas at various times.

**Elements that unify the Zone:** Upstream of the west embankment, a mix of native and non-native vegetation along the dry Rio Hondo. Dirt trails have become established over time. Remnants of old oil derrick pads are visible if you know where to look. Upstream of the central embankment in the Nature Area over-grown mostly native vegetation with a few non-native single trees. Dedicated dirt trails loop around through the Nature Area to the three mitigation ponds and back to the Nature Center building and parking lot. There is some evidence of any off-road activities.

**Water:** The Rio Hondo (currently dry) upstream of the west embankment, upstream of the central embankment the overflow channel from the San Gabriel River, and the San Gabriel River to the far eastern area of the central embankment from a dirt road are visible through the trees.

**Landform Type:** The area is generally flat except for the Montebello Hills to the west (adjacent to the western edge of the Reservoir) and occasional glimpses of the San Gabriel Mountains in the distance to the north through the trees.

**Vegetation:** Along the Rio Hondo, a mix of riverine, native and non-native vegetation, such as eucalyptus and *Arundo donax*. To the north, looking into the Nature Area; immediately upstream is a patch of annual grass between the toe of the Dam and the overflow channel with some scattered trees adjacent to the overflow channel; to the northeast overgrown native vegetation with some no-native trees and shrubs in the Nature Area; to the east, riverine habitat along the San Gabriel River.

**Access:** Upstream of the west embankment access although not restricted, is not well known to the occasional park visitor. Access to the area may be from a gate located on the south side of San Gabriel Blvd. that is not always locked and gaps in the fence. On the west side along Lincoln Ave. the west levee/bicycle trail can be accessed from the Lincoln Ave, turnout at the Dam crest. Other access points (though unofficial) are the Rio Hondo itself under San Gabriel Blvd. Bridge from Bosque Del Rio as there are steps leading down into the river, from the overflow channel from the Nature Area east of Rosemead Blvd. and from Rosemead Blvd access to the Dam crest. Access into the Nature Area upstream of the central embankment is through the Nature Area Parking lot/driveway where the trails head. Access from downstream of the Dam is via the ramp up the embankment near the Pico Rivera Golf Course and down the upstream side into the Nature Area.

**Litter/Pollution:** Vegetative debris can be seen in both areas consisting of broken off tree limbs and dead shrub-like vegetation that may have been deposited in earlier storm events.

**Adjacent Scenery:** Due to the height of the dam and vegetation and surrounding roadways, scenery is severely limited to the immediate surroundings. Occasional glimpses of the San Gabriel Mountains depend on where you are standing. The Montebello Hills loom to the west when upstream of the west embankment.

**Sounds:** Generally quiet with low traffic noise, wind caused noise, mostly rustling vegetation (depending on location).

**Odors:** Fresh earthen smell, generally typical slight breeze. Odors are passing depending on area conditions.

**Visibility:** Typically good visibility, but limited due to vegetation height and Dam height.

**Other attributes:** Generally tranquil and peaceful.



**Photo 4.11-6 Looking upstream from the Dam Crest at Rio Hondo**

## **4.12 RECREATION RESOURCES**

This section describes the recreation amenities of the Project, including Streamland Park and the Pico Rivera Golf Course, which are within the footprint of the proposed RMPs. Areas potentially affected by the proposed RMPs include the Project area of the Whittier Narrows Dam and Reservoir, including Streamland Park and the Pico Rivera Golf Course immediately downstream of the central embankment.

### **4.12.1 Existing Conditions**

A variety of recreation resources are available within the Reservoir, including passive and active uses. The Whittier Narrows Master Plan, 2011 divides the Reservoir into several recreation areas with Rosemead Boulevard and Durfee Avenue as the central axis (Figure 4.12-1).

#### **4.12.1.1 Los Angeles County Department of Parks and Recreation**

Although these areas are located upstream of the Dam in the Reservoir, it is not anticipated that any of these areas would be directly impacted by the construction activities of any of the Action RMPs.

Recreation Area A is located west of Rosemead Boulevard, north of the Pomona Freeway (SR-60), and east of the Rio Hondo. The Area covers 144 acres and recreation amenities include baseball and soccer fields, a park administration building, a BMX facility, the Los Angeles Rifle and Revolver Range, a model airplane/hobby area, four tot lots, and parking for approximately 450 cars.



Recreation Area B is located north of the Pomona Freeway and east of Rosemead Boulevard. in the northeastern quadrant of the Reservoir. Recreation amenities include a picnic area with playing fields, tennis courts, and a dog show area. An abandoned Nike Missile Site is located west of the tennis courts. The American Military Museum, located south of Rush Street, is operated by concession. Three paved lots provide parking for approximately 550 cars.



**Photo 4.12-1 Typical Picnic Area**



**Photo 4.12-2 Tot Lot with sculpture by Artist Benjamin Dominguez**

Recreation Area C consists of 152 acres south of the Pomona Freeway and west of Rosemead Boulevard. The area includes the Triple B Clays trap and skeet shooting and archery range. The Bosque del Rio Hondo and the Sporting Dog Training facility are located in the southern portion of the quadrant.

Recreation Area D is located in the southeastern quadrant of the Reservoir, covers 214 acres, and contains three lakes (Legg Lake, Center Lake, and North Lake). Amenities in this area include a group picnic area, tot lots and fishing. Parking for approximately 1,150 cars is available.



**Photo 4.12-3 Fishing at Legg Lake**



Recreation Area E is located north of Durfee Avenue and east of Santa Anita Avenue. The site consists of approximately 58 acres and includes picnicking and children's play areas. Parking for approximately 290 cars is available in the area.

The Whittier Narrows Golf Course is approximately 216 acres located west of the Rio Hondo. It consists of an 18-hole course and a 9-hole executive course. There is also a driving range, concession stand, clubhouse, rest rooms, and parking for approximately 300 cars.

#### **Areas Potentially Impacted by Construction**

The Nature Area is 320 acres located south of Durfee Avenue, east of Rosemead Boulevard and north of the San Gabriel River Channel. A small visitor's center and trail head are located in the northeast corner of the area. There is parking for approximately 40 cars and two buses.

Special Events The Cinco de Mayo Celebration is traditionally held for one day on the first Sunday in May with approximately 25,000-40,000 people in attendance and 3,000-4,000 vehicles. The Fiestas Patrias event is traditionally held for one day on the second Sunday in September with approximately 40,000-60,000 people in attendance and 4,500-5,750 vehicles. A Tet Festival is held in February for two days with average daily attendance of 7,500.



**Photo 4.12-4 Cinco de Mayo Celebration**



**Photo 4.12-5 Boy Scouts Celebrating their 100<sup>th</sup> Anniversary with a 3-Day Celebration**

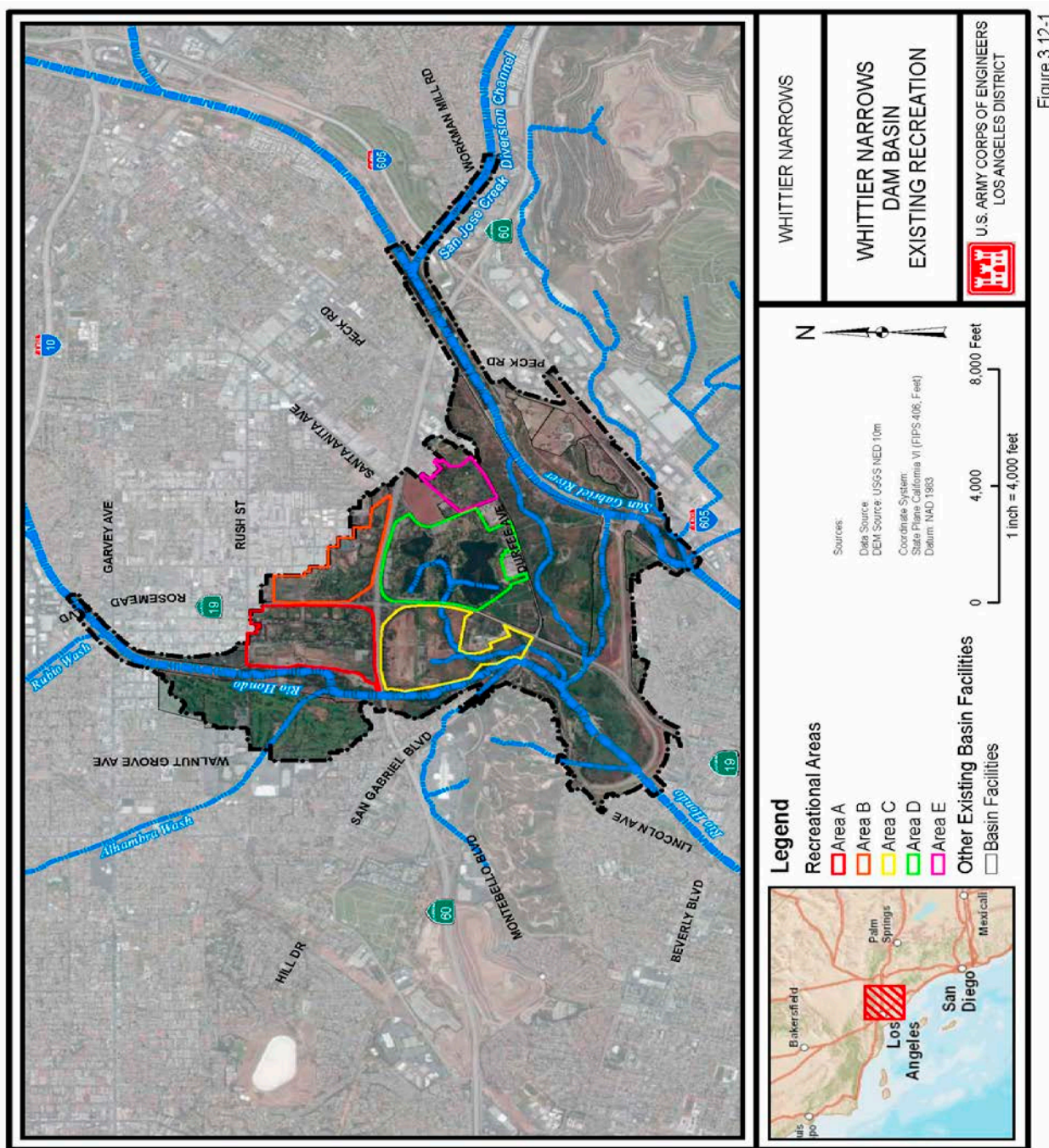


Figure 3.12-1

Figure 4.12-1 Recreation at Whittier Narrows Reservoir



The following areas described are anticipated to be impacted either temporarily during construction or permanently in the case of RMP 3E.

### **City of Pico Rivera**

The Bicentennial Park and Sports Arena is 63 acres located in the eastern portion of the Reservoir between Rooks Road and the San Gabriel River. Amenities include a sports arena, equestrian center with stables, and campgrounds currently not in use.



**Photo 4.12-6 Closed Bicentennial Park**



**Photo 4.12-7 City of Pico Rivera Sports Arena**

Streamland Park is located downstream of the Whittier Narrows Dam, east of Rosemead Boulevard. It is operated by the City of Pico Rivera and has two baseball diamonds, three basketball courts, four restrooms, and a tot lot with a slide and swing.



**Photo 4.12-8 Pico Rivera Municipal Golf Course**

Pico Rivera Municipal Golf Course is operated by the City of Pico Rivera and is located downstream of the Dam, north of the San Gabriel River. The 28-acre site consists of a 9-hole executive course, driving range, clubhouse, and paved parking for approximately 75 cars.

The City has several programs including youth programs through the Southern California Golf Association (642 participants in 2017, 328 unique) with 14 percent of participants in youth programs receiving financial assistance of 90 percent of cost. Instructors/mentors must be Titleist Performance Institute certified and the program is run with Up2Us Sports.



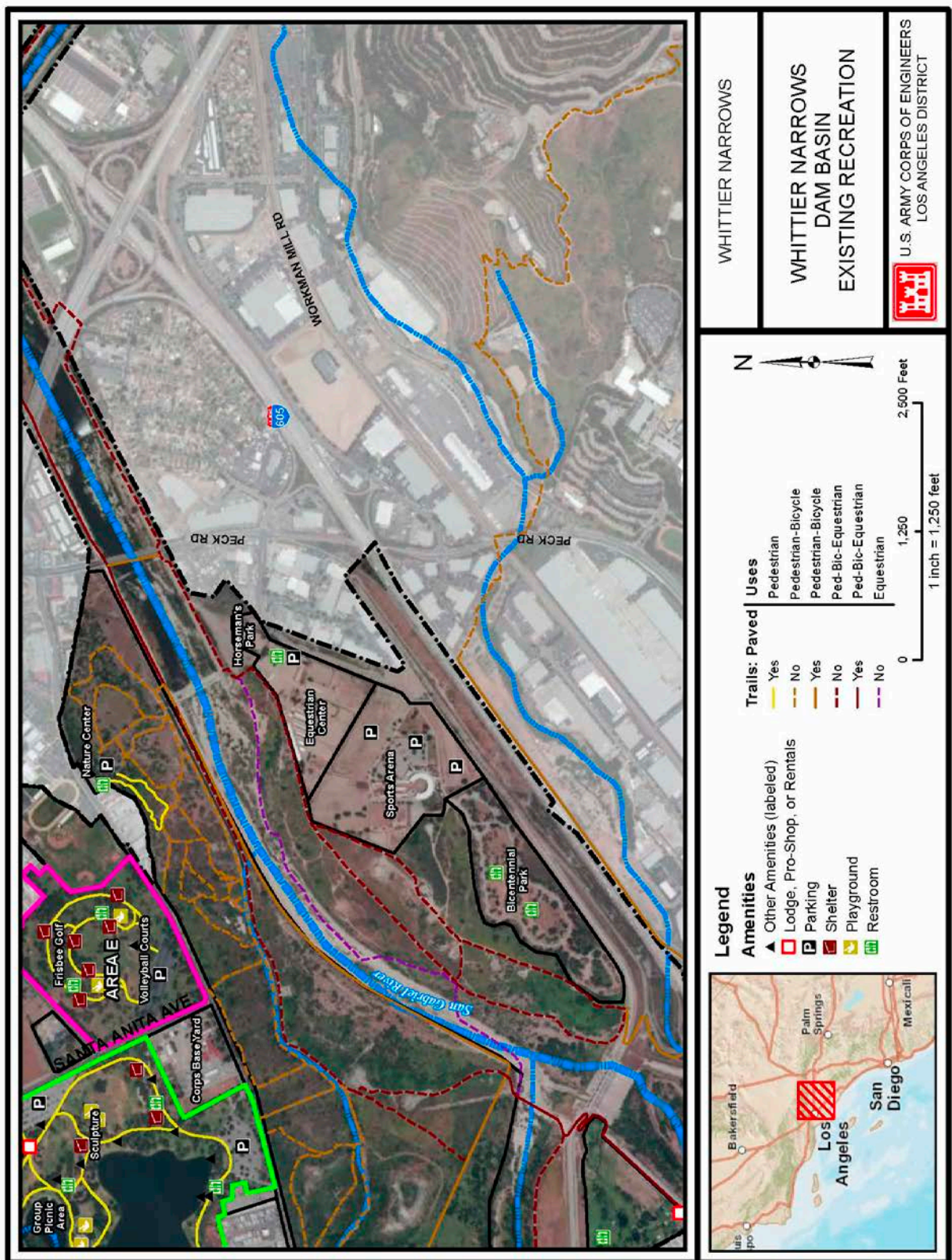
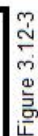


Figure 3.12-2

Figure 4.12-2 Bicentennial Park, Sports Area, and Stables





**Figure 4.12-3 Streamland Park and Pico Rivera Golf Course**

<b>Table 4.12-1 Golf Course Users</b>	
<b>Programs</b>	
SCGA Junior	642 (2017)
First Tee (USGA Sponsored)	80
Mentor/Mentee (Latino High School)	120
Pico Kids Play Free	100 plus
Latina (Hispanic Girls)	60
Autistic	60
Golf the Easy Way	170
<b>Competitions</b>	
SCPGA Youth	
Kids Summer League	
El Rancho High School	
Santa Fe High School	
St. Paul's High School (Women)	
Rio Hondo College	

### 4.13 UTILITIES

This section describes utilities with the Project area, including those that are within the Project footprint immediately downstream of the Dam. Utilities that could be affected by the proposed RMPs include those within the RMP action area including those that transit the embankments or run immediately downstream of the west, central, or east embankments.

#### 4.13.1 Existing Conditions

Utilities (18-inch waste water pipeline) owned by Santa Fe Springs Waste Water Disposal Company) crosses the embankment just west of Lincoln Ave. (Figure 4.13-1)

Utilities (storm drain) at stations 13+00 to 22+00 (Figure 4.13-1) owned by Los Angeles County Department of Public Works (Unit U-199) encroaches on the footprint. The 78-inch RCP parallels the embankment toe, ranging between 30 and 45 f.t downstream of the toe.

Utilities (gas line) owned by Southern California Gas Company at stations 9+00 to 19+00 (Figure 4.13-1). The gas line parallels the embankment toe

Utilities (pipelines) owned by The Texas Company located at approximate station 12+00 (Figure 4.13-1).

Utilities (water pipeline) owned by San Gabriel Valley Water Co. at stations 19+00 to 37+00 (Figure 4.13-1). The 17-inch water pipeline parallels the embankment toe. For the trench drain installation, it is assumed that the pipe would temporarily be removed and the filter and gravel drain installed. Once filter and gravel drain is installed, utilities would be restored. Installation of the filter/drainage blanket may require a similar procedure.



Utilities (waste water pipeline) owned by Santa Fe Springs Waste Water Disposal Company crossing Whittier Narrows Dam within Lincoln Boulevard. (Figure 4.13-1) They show an 8-inch wastewater pipeline buried under Lincoln Boulevard crossing the crest of Whittier Narrows Dam between pipeline Stations 20+00 and 22+00.

Utilities (storm drain) used by Los Angeles County Department of Water and Power located at approximate station 28+00. (Figure 4.13-1) The storm drain will be affected by toe modification.

The diversion conduit (Station 30+67.84) is a 5-foot diameter, circular, reinforced concrete conduit located at the base of the west embankment, adjacent to the left (east) outlet works wall. The diversion conduit is always under water when a pool is retained and passes flow to an earthen channels which parallels the Rio Hondo Channel for off-channel spreading (Figure 4.13-1).

Water pump station owned by Central Basin Municipal Water District located south of station 44+00 (Figure 4.13-1). Location of associated plumbing currently unknown.

Station 69+52 (Mission Creek Gallery). The 18-foot diameter gallery is found at approximate elevation 179 feet NGVD. Twenty-four inch tall seepage collars are located at a 20-foot spacing at the gallery joint locations. Two pipes cross the embankment in this gallery; the first utility is a 60-inch RCP, operated by the Sanitation Districts of Los Angeles and a 30-inch diameter diversion for the former Mission Creek (subsequently sealed at the upstream intake). The second utility is an electrical communication line operated by General Telephone Company of California. (Figure 4.13-1).

Utility Gallery (Station 115+42.14). The 14.5-foot wide by 12-foot tall, semielliptical, reinforced concrete gallery is located west of the spillway, and is used to pass 36-inch and 30-inch diameter concrete water pipes through the dam. A water pipeline right of way granted to the City of Whittier and Cate Ditch Company routed through this gallery (Figure 4.13-2).

Utility Gallery (Station 126+60). The 14.5-foot wide by 12-foot tall, semielliptical, reinforced concrete gallery is located west of the spillway. A 48-inch Metropolitan Water District pipe and possibly one other cross the embankment through the utility gallery Eighteen inch tall seepage collars are located at a 20-foot spacing at the joints.

Station 126+20 (east of the spillway). Easement for a right of way for a 66 inch RCP effluent pipeline to the Los Angeles County Sanitation District. The pipeline runs parallel between the East Embankment and the San Gabriel River Freeway 605 (Figure 4.13-2).

High Tension Power Lines parallel to Rosemead Blvd. owned by Los Angeles Department of Water and Power. High tension power lines are along the downstream toe of the Dam between Stations 48+00 and 62+00, and 125+00 and 130+00 (Figure 4.13-3). The pile-supported towers are within the probable alignment footprint of both the trench drain and filter/drainage blanket.

Groundwater observation wells owned by Department of Toxic Substances Control (DTSC). Not shown on map, but set back from the embankment to approximately 100+ feet between stations 32+00 and 80+00. The license for the monitoring wells was issued from the Corps to DTSC.

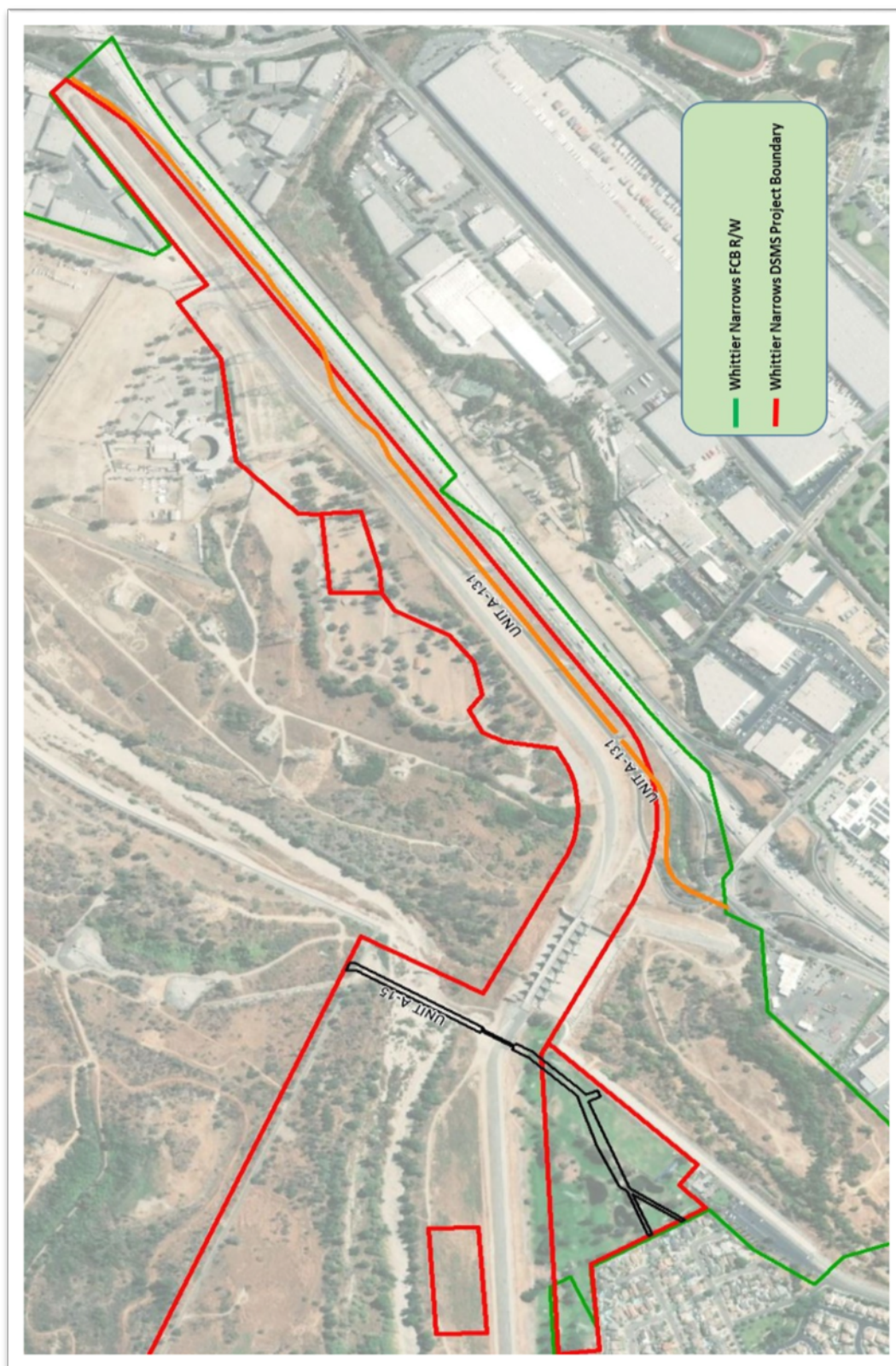
Energy use within the Reservoir includes lighting, heating, and air conditioning for various park and recreation amenities including restrooms, sports complex, tennis center, equestrian center, museum, buildings associated with the golf course, the BMX moto-cross track, and the shooting and archery ranges. Outdoor security lighting is available throughout the park, and outdoor sports fields are also lit at night. The additional amenities operated by lessees as described previously also require energy use for lighting, heating, and air conditioning.

Utility service providers serving the LACDPR Whittier Narrows Dam Reservoir Recreation Area include:

- San Gabriel Valley Water Company (Water Services)
  - Los Angeles County Consolidated Sewer Maintenance District and Sanitation Districts of Los Angeles County (Sewer and Wastewater Services)
  - Universal Waste Services and Sanitation Districts of Los Angeles County (Solid Waste Disposal Services)
  - Southern California Edison (Electrical Power Services)
  - Sempra Utilities (aka Southern California Gas Company) (Natural Gas Services)
  - AT&T (Telephone Services)
  - Time Warner Cable and Sunesys (Cable and Telecommunication Services)
- .







**Figure 4.13-2 Utility Relocations (Central and East Embankments)**



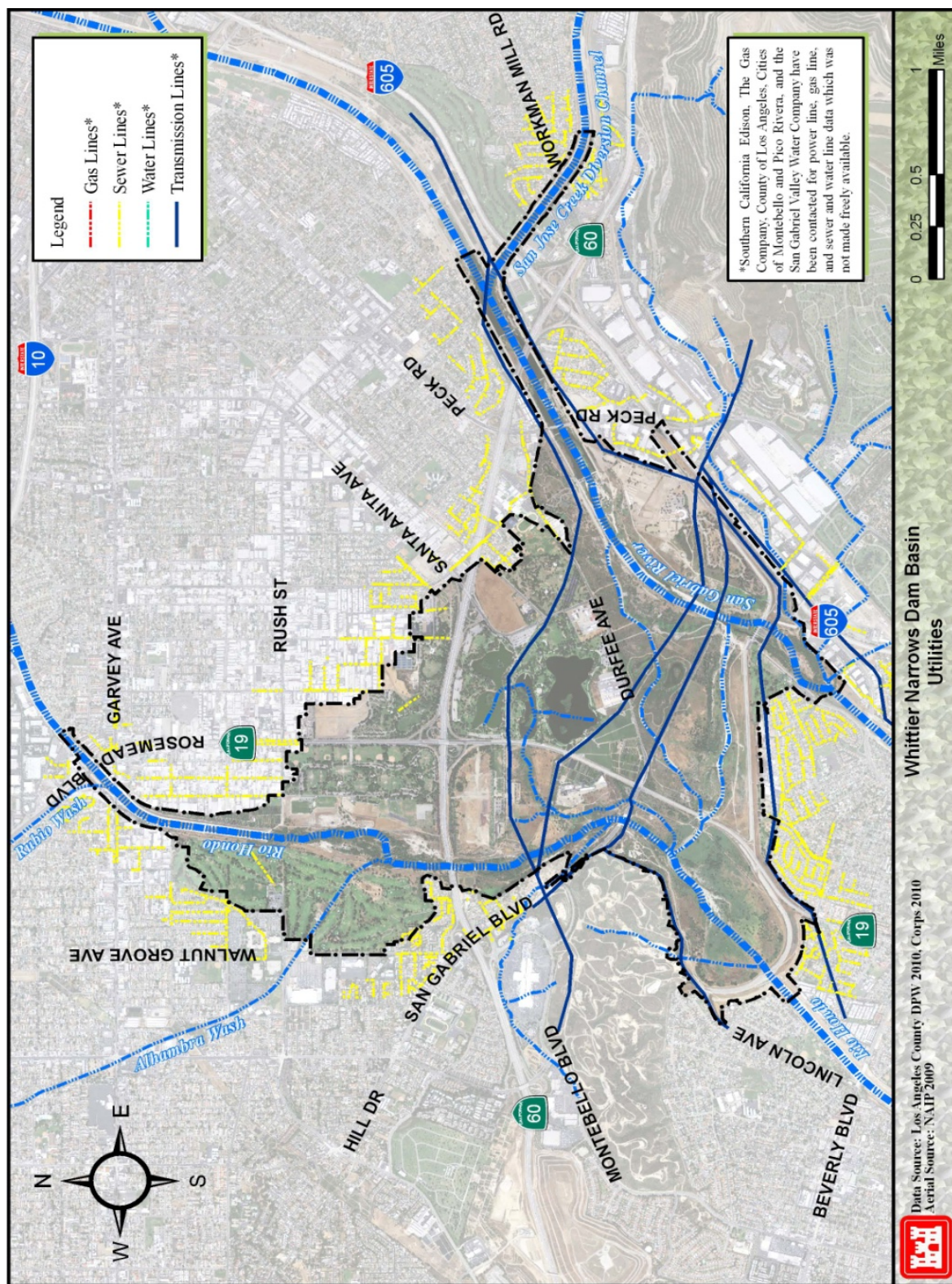


Figure 4.13-3 High Power Transmission Lines through Whittier Narrows Dam Reservoir

#### **4.14 PUBLIC HEALTH and SAFETY**

Public health and safety covers a wide range of conditions that range from natural disasters such as floods, fires, diseases, and earthquakes to man-made incidents such as accidents, breaking and entering, gang activity, and other crimes. Public health and safety includes the health and safety risks inherent in the construction of any of the RMPs. Existing health and safety issues were identified based on current use and conditions within the Reservoir and issues that could be exacerbated with or without the implementation of any RMP.

Public health and safety incidents associated with construction include vehicle and machinery accidents, use conflicts, and a variety of activity related accidents and injuries. Most foreseeable public health and safety impacts associated with a RMP are likely to be short-term and occur during the construction period. Equipment and materials to be used during the implementation of a RMP were identified and potential safety risks identified in order to minimize worker risk during construction. Construction-related impacts were assessed based on the potential to expose the public and site workers to construction-related health and safety hazards and the potential for construction-related activities to adversely affect the public health and safety.

This section describes general information of public health and safety risks in southern California, the vicinity of the Project and the Whittier Narrows Dam and Reservoir. Areas that could potentially be impacted by the proposed RMPs include the Project area and the four communities of South El Monte, Montebello, Pico Rivera, and the City of Industry, which are immediately adjacent to the Project. Public health and safety considerations also exist for the communities downstream of Whittier Narrows Dam at risk from the consequences of Dam failure through dam breach.

##### **4.14.1 Existing Conditions**

The watershed is a typical urban/suburban interface with dense business and government centers with the suburban sprawl that comes with it consisting of a variety of housing from single family homes to mobile home parks, and senior living facilities, shopping malls, retail centers, schools, parks, and other cultural and social amenities.

Southern California is home to significant threats, including earthquakes, wildfires, flooding and mudslides. More recently, terrorism has been added to the threats for which the region must be prepared. The unexpected nature of these natural and unnatural events requires extensive coordination, collaboration and flexibility among all the agencies and organizations involved in the planning, mitigation, response and recovery.

**Safety** is defined as the protection of persons and property from unintentional damage or destruction caused by accidental or natural events.

**Security** is defined as the protection of persons or property from intentional damage or destruction caused by vandalism, criminal activity or terrorist attacks.



Public health and safety focuses on the potential risks to the public and park personnel from hazards that may occur within the Reservoir or which may impact public services adjacent to the Reservoir. Nearby public services, such as law enforcement, fire protection, and hospitals are designated as respondents to health and safety issues within the Reservoir, may be impacted by activities in the Reservoir, or may depend on access through the Reservoir.

Public health and safety issues within the Reservoir can arise from recreation uses, plants and wildlife, flooding, hazardous materials, criminal activity, vehicle accidents, use conflicts, intoxication, and a variety of sports and activity-related accidents and injuries. A number of public service agencies provide security or emergency response to the Reservoir (Table 4.14-1). Onsite law enforcement at the recreation amenities is currently provided by the Los Angeles County Sheriff which provides protection at LACDP&R parks.

### **Flood Risk and Reservoir Safety**

During storm and flood events, inflow to the Reservoir can create hazardous conditions related to flowing water, erosion of soil from stream-banks, inundation of Reservoir lands, and potential for Dam failure (See Section 2.2 for more information of Dam and Reservoir operations). The Emergency Action and Notification Subplan for Whittier Narrows Dam Reservoir addresses actions to be taken during emergency situations in the Reservoir resulting from an earthquake, flooding, or security alert. The County maintains close coordination with law enforcement and the Corps as well as fire, medical, and emergency response agencies in the area.

The LACDP&R evacuation plan would ensure that public use of the Reservoir during a potential flood condition would be curtailed. Local law enforcement would restrict traffic through the Reservoir by erecting roadway barriers and signage and redirecting traffic. The County determines the response to hazards which occur within the boundaries of the Reservoir. The Corps has a comprehensive notification protocol that is followed during storm and flood periods to notify entities that may be affected by flooding.

### **Vector-Borne Diseases**

Several species of mosquitoes in California are known to transmit agents that cause mosquito borne diseases including western equine encephalomyelitis, St Louis encephalitis, malaria and West Nile virus. Within an urban environment, the lack of many of the natural predators can enable mosquitoes to reach nuisance levels and the potential for the spread of mosquito-borne diseases can increase without monitoring and abatement measures.

Mosquitoes use in stagnant or standing water for breeding and completing their seven-day life cycle. If not managed properly, detention Reservoirs and wetlands can become breeding sites. Mosquito control methods include use of biological and chemical insecticides. Biological methods include mosquito fish that feed on mosquito larvae and installation of nesting or roosting houses to attract bats or birds that feed on adult mosquitoes. Chemical methods include *Bacillus thuringiensis* var. *israelensis* and Methoprene applied to the water surface to kill larvae.

The California Department of Public Health (CDPH) has coordinated a statewide mosquito-borne encephalitis surveillance program since 1969. Though no cases of encephalitis or West Nile virus (WNV) have been reported in humans in Los Angeles County, the total number of human cases of

WNV has risen steadily throughout the state of California since 1969. In Los Angeles County cases of WNV have been found in birds and positive samples in mosquito pool samples.

Control of mosquitoes in the Proposed Project Area is under the jurisdiction of the Greater Los Angeles Vector Control District.

### **Homeland Security**

The Corps has established programs to detect, protect, and respond to threats to Corps facilities and infrastructure. Areas of focus for Dam security are surveillance detection, identification of site vulnerabilities, emergency response and prevention, and assessment of infrastructure interdependencies. Surveillance detection is monitoring for the presence of suspicious activities or individuals. Identification of site vulnerabilities includes evaluating access and dam operational security and cyber security measures. The Corps also develops plans to prevent and respond to security emergencies including consideration of the interdependencies with other water control infrastructure needed to maintain the Dam's function. The Corps continues to evolve the measures to ensure that potential national security threats to Dam infrastructure are addressed.

#### **4.14.2 Downstream of Dam**

The suburban area downstream of Whittier Narrows Dam is an area that experiences typical criminal activities such as murder, breaking and entering, gangs, and other activities. Safety issues include traffic accidents, recreation injuries, household accidents, localized street flooding during major storm events, outbreaks of flu and other easily transmitted diseases, and accidental structural fires. Dense populations such as this area can often exacerbate these issues.

### **City of Pico Rivera**

The City of Pico Rivera (estimated 2010 population of 63,138) is most at-risk in the event of a Dam failure. Section 2.4 describes the flooding impacts under both a breach (Dam failure) and non-breach event to the downstream cities. The flood hazard areas of the City of Pico Rivera (City) are subject to periodic inundation which could under extreme storm events result in health and safety hazards, loss of life, property damage, disruption of commerce and governmental services, extraordinary public expenditures for flood protection and relief, and impairment of the tax base, all of which adversely affect the public health, safety, and general welfare. These flood losses are caused by uses that are inadequately elevated, flood proofed, or protected from flood damage. The cumulative effect of obstructions in areas of special flood hazards which increase flood heights and velocities also contribute to the flood loss.

The major limitation of city-wide evacuation is the limited regional access routes. The City is generally bounded by the Dam to the north, the Rio Hondo to the west, San Gabriel River to the east, and Telegraph Road to the south. The Santa Ana Freeway (I-5) is the southernmost east-west evacuation route, which is approximately five miles downstream of the Dam just south of Telegraph Road. The City has designated five east-west roadways for evacuation purposes all of which offer the shortest distance out of the inundation area. However, all routes either cross the Rio Hondo to the west or the San Gabriel River to the east. Refer to the City of Pico Rivera's web site.

The City also has two residential areas which have a single egress point. With the limited amount of regional arterial connections it is expected by local officials that the surrounding freeways would become completely congested during a major emergency

### **Flood Risk and Evacuation Plans**

Over 1.25 million residents of Los Angeles County reside downstream of Whittier Narrows Dam would need to be warned to evacuate (or possibly shelter in place) due to a Dam breach with or without a RMP in place to reduce risk. In particular, the residents in the floodplain would be dependent on the Los Angeles County Sheriff or on local officials for emergency preparedness for warning them of pending dangers of the Dam failure including directions for evacuation to a safe zone.

The current warning systems that are employed to warn residents and businesses of emergency situations downstream of the Dam include:

- **Alert LA** is mass notification system operated by Los Angeles County and would be used to contact both residents and business via recorded phone message, text message, or e-mail messages in case of emergency. The system utilizes the telephone 911 database and is able to contact land-line telephone numbers, whether listed or unlisted. The Los Angeles County Sheriff expects the system will be able to conduct 15,000 calls per hour on reliable basis. The system is limited due to limited database of cell phones in the database.
- **OC Alert** is mass notification system operated by Orange County and would be used to contact both residents and business via recorded phone message, text message, or e-mail messages in case of emergency.
- **Nixle** is private notification system that allows government agencies to send messages to local residents via, email, and web and the information is delivered almost instantly. The Nixle system also offers free app for smartphones that allows users to receive emergency messages from local government agencies.
- **Everbridge** is private notification system that sends messages via telephone, text messages, and emails. The system has a smartphone app that allows emergency managers to track messages in social media to respond to incidents as the incidents occur.
- **City of Compton Alert System** is notification system designed for the residents of Compton which has capacity of 4,000 calls per hour. The residents of Compton can register their phone numbers on Self-Registration Portal on the web.
- **Citizen Alert System** is notification system designed for residents of Downey that has database with 30,000 landlines. The residents need to self-register their emails and cell numbers on the system website. According to the website for the Citizen Alert system, approximately 20 percent of Downey households no longer use landlines. A significant number of residents living in City of Downey depend heavily on text messages and email-enabled cell phones for information and updates.
- **Emergency Alerting System** is designed for the broadcast media to disseminate emergency public information on radio and television stations.
- **Mobile emergency vehicles** warn residents with sirens, loud speakers and public address systems to give direction or information to the public.

- **The notifications of residents by door to door** that are conducted by police, fire, city personnel, and volunteer groups.
- **The websites** sponsored by local government agencies that offer updated and relevant emergency information.
- **Local cable channels and local radio stations** offered by some of communities provide broadcast public information and provide emergency.
- **Radio Stations**-KFI 640AM and KNX 1070AM will broadcast emergency information.

Table 4.14-1 provides a summary of the emergency preparedness plans for the communities downstream of Whittier Narrows Dam. The information in this table is based on feedback from local emergency preparedness officials and review of the websites for each of the cities located within the floodplain for Whittier Narrows Dam. Based on the information in this table, the cities and the Los Angeles County Sheriff have not developed specific emergency plans that would evacuate the residents to a safe zone in response to Dam breach or non-breach event. Existing evacuation plans developed by cities were developed for natural disasters such as fire or earthquakes.

The table also provides a summary of current warning systems implemented by the cities and the current emergency information detailed on the cities websites such as Pico Rivera. The websites for most of cities provide helpful emergency information such as check lists to help prepare for disasters, how to protect your property and yourself during natural disasters, and links to important Federal and state websites for emergency preparedness. In addition, the table includes a list of cities that have established social media sites that could be important communication link between emergency officials and residents during a potential Dam failure event or other natural disaster events.

<b>Table 4.14-1 Summary Of The Emergency Preparedness Plans (Communities Downstream of the Dam)</b>							
<b>Cities</b>	<b>Evac. Plan</b>	<b>Evac. Map</b>	<b>Warning Systems</b>	<b>Social Media</b>	<b>Web Page for Disaster Plan</b>	<b>Evac Check Lists</b>	<b>Links to Disaster Plan</b>
<b>Compton</b>			On The Alert.Com - Sign-up	√			
<b>Downey</b>	√		Citizen Alert Sign-up, Reverse Call System Everbridge and Nixle	√	√	√	
<b>Norwalk</b>			Nixle, Facebook, Twitter	√			
<b>Santa Fe Springs</b>	√	√	Alert LA, Nixle, Reverse 911	√	√	√	√
<b>Montebello</b>	√		Alert LA, Alert County, Auto-dial system	√			
<b>Pico Rivera</b>		√	Alert LA, County auto-dial, City Channel 3, KFI and KNX	√	√	√	√

<b>Table 4.14-2 Current Emergency Preparedness Plans (Communities Upstream of the Dam)</b>							
<b>Artesia</b>			Nixle Dial System	√			
			Sign-up page on website, Auto-dial system	√			
<b>Carson</b>							
<b>Cerritos</b>			Alert LA	√	√		√
<b>Lakewood</b>			Alert LA, KLWD 1620,	√	√	√	√
<b>Paramount</b>			Own reverse 911 system				
<b>Hawaii Gardens</b>	√		Own reverse 911 system	√			
<b>La Palma</b>			Alert OC	√			
<b>Cypress</b>			Nixle Dial System, Alert OC		√	√	√
<b>Bellflower*</b>				√	√	√	√
<b>Los Alamitos</b>			Alert OC	√	√	√	
			Alert OC, Channel SBTB 3, Sirens from police vehicles.	√	√		
<b>Seal Beach</b>				√	√		
<b>Long Beach</b>				√	√	√	√

<b>Cities</b>	<b>Evac. Plan</b>	<b>Evac. Map</b>	<b>Warning Systems</b>	<b>Social Media</b>	<b>Web Page for Disaster Plan</b>	<b>Evac Check Lists</b>	<b>Links to Disaster Plan</b>
South San Gabriel				√	√	√	√
El Monte				√	√	√	√
Rosemead			Alert LA	√	√	√	√
Tempe City				√			
Arcadia				√	√	√	√
Irwindale			Alert LA		√		
Mayflower Village			Nixle Dial System	√			
Baldwin Park							

#### 4.15 PUBLIC SERVICES

This section provides general public services in the vicinity of the Project. The areas that could potentially be affected by the proposed RMPs include the Project area and the four communities of South El Monte, Montebello, Pico Rivera, and the City of Industry, which are immediately adjacent to the Project. Public services considerations also exist for the communities



downstream of Whittier Narrows Dam at risk from the consequences of Dam failure through dam breach.

#### 4.15.1 Existing Conditions

Public services include law enforcement, fire, local police agencies, county sheriff, and emergency medical response. County and local agencies may cover a wide area, often contracting services to other municipalities. A local municipality may have its own emergency management centers or departments, while others may rely on countywide emergency Centers for such situations.

The Los Angeles County Sheriff's Department maintains a substation located at the Nature Area within the Reservoir. Fire Protection and Emergency Medical Technician (EMT) services are provided by the County of Los Angeles Consolidated Fire Department, Fire Station 90 which is located approximately two miles north of the Reservoir. The County maintains mutual aid agreements with other local cities and agencies for police, fire, and EMT services. The nearest emergency room and hospital services are at Greater El Monte Community Hospital approximately two miles north of the Reservoir and Beverly Hospital in Montebello approximately four miles southwest of the Nature Center (Table 4.15-1).

<b>Table 4.15-1 Whittier Narrows Dam Project Area Public Services</b>		
<b>Service</b>	<b>Name and Address</b>	<b>Phone Number</b>
Law Enforcement	Los Angeles County Sheriff Parks Bureau, Whittier Narrows Station 1012 N. Durfee Avenue South El Monte 91733	(626) 575-4241
Law Enforcement	Los Angeles County Sheriff 11234 Valley Boulevard El Monte, CA 91731	(626) 575-4180
Fire/EMT	County of Los Angeles Consolidated Fire District Station No. 90 10115 Rush St South El Monte, CA 91733	(323) 881-2411
Fire/EMT	Montebello Fire Department 600 North Montebello Boulevard Montebello, CA 90640	(323) 887-4510
Hospital	Greater El Monte Community Hospital 1701 Santa Anita Avenue South El Monte, California 91733	(626) 579-7777
Hospital	Beverly Hospital 309 West Beverly Boulevard Montebello CA 90640	(323) 726-1222

## **CHAPTER 5 ENVIRONMENTAL CONSEQUENCES**

This chapter describes the direct and indirect environmental effects on the natural and human environment of the three Risk Management Plans (RMPs) in Chapter 3 identified as being carried forward for further analysis. RMP 1 is the No Action RMP. When formulating plans, NEPA regulations (40 CFR 1502.14(d)) and Corps regulations require consideration of the No Action Alternative in any final array of plans. The other two actions include RMP 3E, Labyrinth Auxiliary Spillway and Seepage, and RMP 5 Protected Overtopping with Seepage Control. Under NEPA, the environmental impacts of each action alternative are analyzed against the environmental conditions that would otherwise occur if no action was taken (i.e., the impacts of each of the Action Alternatives (RMP 3E and 5) are measured from the baseline conditions described in Chapter 4 and those conditions anticipated for the No Action RMP (RMP 1). The discussion of the No Action RMP characterizes the conditions likely to prevail in the Project area within the next 50 years if the U.S. Army Corps of Engineers (Corps) does not implement an RMP. This discussion is broken down by resource area and certain major elements of the alternatives have their own sub-section under each resource area to assist with comparisons.

Because of the potential consequences of dam failure that have a higher likelihood of occurring under the No-Action Alternative, the Dam Safety Modification Study has determined that this plan is not acceptable under the Corps' TRGs. This is primarily due to the life safety risk presented by the dam in its current state. In addition to the unacceptable risks to life safety, the environmental effects of a dam breach are expected to be high and adverse across nearly all resource areas. Because the environmental impacts of dam failure cannot be reasonably isolated from general storm impacts, beyond the consequence of unacceptable life safety risk, the environmental effects of dam failure are not described in specific detail as an operations effect under the no action RMP in this Draft EIS.

NEPA requires that an EIS be prepared when the proposed Federal action (project) as a whole has the potential "to significantly affect the quality of the human environment." The determination of significance is based on context and intensity of impacts. The CEQ regulations implementing NEPA (40 CFR 1502.16) indicate that the analysis of potential environmental impacts of a project should include direct and indirect effects and their significance, which, when compared among and between the individual alternatives, will assist decision-makers in choosing a course of action.

### **Thresholds of Significance**

Significance varies with the resources analyzed in the proposed RMPs. The significance of an action is analyzed in contexts such as society as a whole, the affected region, the affected interests, and the locality. Both the context and intensity of an impact are considered. In evaluating the potential impacts of the project alternatives, the level of significance is determined by applying the thresholds of significance presented in each resource area. Impacts will be described as either no impact, less than significant, significant, or significant and unavoidable impacts. Mitigation measures are proposed to address significant impacts, as applicable.

### Impact Analysis

An impact consequence or effect is defined as a modification to the human or natural environment that would result from the implementation of an action. The three types of impacts that may occur when an action takes place include; (1) direct impacts, (2) indirect impacts, and (3) cumulative impacts. Direct and indirect impacts are addressed in this chapter. Direct impacts are impacts which are caused by the action and occur at the same time and place. Indirect impacts are those impacts which are caused by the action and are later in time or farther removed in distance, but are still reasonably foreseeable. Cumulative impact is the impact on the environment which results from the incremental impact of the action when added to other past, present, and reasonably foreseeable future actions regardless of what agency (Federal or non-Federal) or person undertakes such other actions. Cumulative impacts are addressed in Chapter 6.

Impacts may be temporary (short-term), long lasting (long-term), or permanent. For this EIS, temporary effects are defined as those that would occur during construction and for three years or less after completion of construction. Long-term impacts are those that may be caused by construction and last longer than the three years following completion of construction.

Also, the level of impact has been determined and is reported on the following basis:

The level of significance of an impact is identified and described based on NEPA criteria:

- **Less than significant:** a potential impact is considered less than significant when it does not exceed or reach the threshold established in the relevant significance criteria, and therefore, would not cause a substantial or potentially substantial adverse change to the physical environment. As a result, no mitigation is necessary or required.
- **Significant:** a potential impact is considered significant when it exceeds or reaches the threshold established in the relevant significance criteria; and therefore, would cause a substantial or potentially substantial change to the resource. Environmental Commitments are proposed where appropriate and feasible to avoid impacts or reduce significant adverse impacts to less than significant.
- **Significant and unavoidable:** an impact that would result in a substantial or potentially substantial impact on the resource that could not be reduced to a level of less than significant even with implementation of any appropriate feasible mitigation.
- **No Impact:** a designation of no impact is given when no adverse changes to

## **5.1 EARTH RESOURCES**

The area potentially affected by the proposed RMPs for this resource is the area immediately underlying the Whittier Narrows Dam and Reservoir, as well as the area immediately downstream within the footprint of the Project (Figure 3.7.1).

### **5.1.1 Regulatory Framework**

An overview of the environmental laws and regulations that may be relevant to the geologic and seismic resources in the general area of the proposed action is presented below.

The United States Geologic Survey (USGS) of the U.D. Department of the Interior provides reliable scientific information to describe and understand the earth; minimize loss of life and property from natural disasters; manage water, biological, energy, and mineral resources; and enhance and protect our quality of life. The USGS does not have regulatory authority/jurisdiction but rather it provides scientific information that can be used to help mitigate impacts from natural disasters such as earthquakes, landslides, and volcanoes.

#### **Alquist-Priolo Earthquake Fault Zoning Act**

As noted in Chapter 4, the Alquist-Priolo Earthquake Fault Zoning Act was passed in 1972 to address the hazards of surface faulting to buildings. This state law was a direct result of the 1971 San Fernando Earthquake. The purposed of the Alquist-Priolo Earthquake Fault Zoning Act is to prevent the construction of buildings used for human occupancy on the surface trace of active faults. This act only addresses the hazard of surface fault rupture. Other earthquake hazards are addressed by the Seismic Hazards Mapping Act passed in 1990, which addresses non-surface fault rupture earthquake hazards, including liquefaction and seismically induced landslides.

#### **Seismic Hazards Mapping Act**

The Seismic Hazards Mapping Act requires the mapping of seismic hazard zones to mitigate hazards to help protect public health and safety. Included are shaking hazards, liquefaction, and landslides. Amplified shaking hazard zones are areas where historic occurrence of amplified ground shaking or local geological and geotechnical conditions indicate a potential for ground shaking to be amplified to such a level that mitigation would be required. Liquefaction hazard zones are areas where historic occurrences of liquefaction, or local geological, geotechnical, and groundwater conditions, indicted a potential for permanent ground displacement. Earthquake-induced landslide hazard zones are areas where Holocene occurrence of landslide movement, or local slope of terrain, and geological, geotechnical and ground moisture conditions indicate a potential for permanent ground displacements.

### **5.1.2 Thresholds of Significance**

Whittier Narrows Dam is known to be in a very seismically active environment. The Corps has conducted studies to (1) understand how large earthquakes could be at the site (Corps 1982,

1997, 2009), (2) to quantify the potential impacts to the dam (Corps 1999), and (3) to assess the risk associated with dam failure (Corps 2011).

These studies have shown that, under the unusual combination of very high groundwater elevation and very large earthquakes, the embankment could experience limited damage. The studies have also shown that under the maximum credible earthquake (defined as the greatest earthquake that can reasonably be expected to be generated on a specific source on the basis of seismological and geological evidence) significant damage may to the control structures (the Rio Hondo outlet works and San Gabriel spillway) may occur.

However, the studies have also shown that it is very unlikely that a major earthquake would occur in combination with a large pool (or that large pool would occur after the earthquake but before the dam could be repaired). These studies have shown that the risk of life loss associated with seismic events is well below the tolerable risk guidelines discussed in Chapter 2 and do not warrant further action. No quantifiable difference between the two action RMPs (RMP 3E and RMP 5) has been identified. Therefore, no significance threshold has been established.

Chapter 4 also discusses agricultural leases inside the Reservoir. No farmland of special significance has been identified in the Reservoir. No significance threshold has been established.

The impacts of all proposals on earth resources is primarily related to the movement of fill material or topsoil within the Project area and Reservoir. As a result, this threshold is focused on how any changes in topography would affect the Project itself in ways unrelated to the PFMs. A potentially significant impact may occur to earth resources if a risk management plan, including RPM 1, would result in:

- Permanently altered topography (other than at the Dam structure itself) resulting in effects on Dam operation.

### **5.1.3 Alternative RMP Analysis**

#### **5.1.3.1 RMP 1: No Action**

RMP 1 is described in Chapter 3, section 3.7.1. Construction activities are reasonably foreseeable under this alternative due to the necessity to restore the dam crest to its original elevation. With or without the implementation of either action RMP or the crest elevation restoration, the Corps would continue O&M activities and would continue to implement IRRMs to address PFMs.

#### **IRRM**s

O&M activities undertaken under the No Action alternative also include the IRRMs.

Implementation of IRMMs that have and would foreseeably be implemented during the next 50 years would have no impact on topography, seismicity, and geology within the Project, require no excavation or fill placement, and none of the features directly impact the earthen components of the dam. (Note that the pre-positioned materials were imported from an offsite quarry and

stockpiled downstream of the Dam.) IRRMs would have no direct or indirect impacts on earth resources.

### **Crest Elevation Restoration**

Under the No Action Alternative, restoration of the Dam's crest elevation to its original design elevation is reasonably foreseeable in the next 50 years.

The estimated volume of soil needed to restore the Dam crest 1.8 ft. is 57,000 cubic yards (cy). The estimated dimensions of the borrow area affected to produce these quantities would be about 55 acres with two (2)-ft. deep excavation on average. The likely borrow area would be upstream of the central embankment between the crossover channel and Siphon Road (Figure 3.7-1). Operable Unit water wells, piping, etc. in the area would be avoided. Topsoil from the borrow site would be stockpiled and replaced at closure and the topography would be graded to a natural appearance. The size and anticipated depth of the borrow area would have a direct and temporary impact on earth resources but would not impact operation of the Dam. Impacts are expected to be less than significant. No indirect impacts are anticipated. Any necessary NEPA analysis would occur prior to implementation.

### **Regular/Recurring Operations and Maintenance**

Under the No Action Alternative, O&M activities are anticipated to continue as currently implemented. Regular and recurring O&M activities include mechanical and electrical repair of the gates, vegetation management on the Dam and its appurtenant structures, including the downstream slope of the embankment, and mowing of vegetation upstream in the operations area immediately adjacent to the central embankment, removal of debris and sediment that accumulates at the upstream concrete apron of the outlet on the Rio Hondo and other structures, graffiti removal, and cleaning the relief wells. Other maintenance that is performed as needed includes repair of the concrete crossover weir, levee repair, filling pot-holes on the Dam crest road, and repairing gates and fences. Other maintenance that is performed as needed includes repair of the concrete crossover weir, minor levee repair, filling pot-holes on the Dam crest road, and repairing gates and fences. None of these activities are expected to include more than minor earth movement, excavation, or grading. Impacts are expected to be direct, temporary, and less than significant. No indirect effects are anticipated.

#### **5.1.3.2 RMP 3E: Labyrinth Auxiliary Spillway and Seepage Control**

RMP 3E is described in Chapter 3, section 3.7.2. Under this RMP, overtopping is addressed through adding spillway capacity and backward erosion piping is addressed through construction of a trench drain at the downstream Dam toe and graded filter blanket adjacent to Rosemead Blvd.

### **IRRM**

Impacts are expected to be similar to those described under RMP 1: No Action.



## **Phase 1**

### **Staging Areas**

The staging areas would be developed in two areas, Streamland Park and the Pico Rivera Golf Course. Both locations are located downstream of the central embankment. Both sites would be cleared and grubbed following removal of site amenities and their disposal. The sites would be leveled as needed for staging area facilities. Soil erosion resulting from these activities would be controlled through environmental commitments and would be temporary. Use of Streamland Park and the Pico Rivera Golf Course as staging areas would result in impacts that would be direct and permanent; but would not permanently alter the topography resulting in effects on Dam operations for flood risk management. These impacts are expected to be less than significant. No indirect impacts are anticipated.

### **Close Bike Paths and Dam Crest**

The San Gabriel River Trail would be closed approximately 1,000 ft. upstream of the spillway during the Phase 1 implementation period. The trail crosses the crossover weir and uses the maintenance road ramp west of the spillway to the Dam crest. The road continues down the embankment slope to the Pico Rivera Golf Course where the trail rejoins the River levee. Closure of the bike paths involve no earth movement, excavation, or grading. The closure of the San Gabriel River Trail through the construction area would have no direct or indirect impacts to earth resources.

### **Temporary Relocation of Utilities**

The temporary relocation of utilities would occur downstream of the Dam toe. Temporary relocation of utilities would include excavation of the current utility galleries as well as excavation for the temporary placement of the utilities. Areas would be backfilled and re-graded. Soil erosion resulting from heavy equipment use would be controlled through environmental commitments and would be temporary. The temporary relocation and restoration of the utilities would be direct, temporary and less than significant and would not permanently alter topography resulting in effects on Dam operation for flood risk management. No indirect effects on earth resources are anticipated.

## **Phase 2**

### **Redevelop Staging Areas**

Impacts are similar to the activity “Staging Areas” described under Phase 1, above.

### **Extend Crossover Weir**

When the elevation of water in the San Gabriel River, upstream of the spillway reaches 208.0 ft., water flows over the crossover weir into the crossover channel. After closing the River Trail, the current crossover weir located immediately upstream of the spillway would be relocated approximately 200 ft. upstream so that a new crossover channel can be excavated to allow room for construction of the coffer dam. All work would be from the landside of the River levee. The site would be cleared and grubbed and either excavated or re-graded as need to construct the new weir and crossover channel extension. Potential soil erosion resulting from these activities would be controlled through environmental commitments and would be temporary. The extension of the

crossover weir and channel may have minor permanent impacts to topography in this area of the Reservoir but these potential changes would not result in effects on Dam operation for flood risk management as water would continue to flow over the crossover weir when it reaches elevation 208.0 ft. Impacts to earth resources are expected to be direct, likely permanent, and less than significant. No indirect impacts are anticipated.

### **Batch Plants and Haul Routes**

Batch plants and haul routes would be cleared and grubbed as described in section 3.7.2. Areas would be, cleared, grubbed, and leveled as necessary and any excess material may be used temporarily to construct berms to prevent runoff or to protect from stormwater inundation during construction. Potential soil erosion resulting from these activities would be controlled through environmental commitments and would be temporary. Following construction, excess fill material would be placed in the borrow area. Following completion of construction, the batch plants would be dismantled and the disturbed areas re-graded and hydroseeded. The impacts of development and use of the batch plants and haul roads may have direct, though minor, permanent impacts to topography in this area of the Reservoir but these potential changes would not result in effects on Dam operation for flood risk management. Impacts are expected to be less than significant. No indirect impacts are anticipated.

### **Borrow Area**

The area of the proposed main borrow site would be located in the same area as for the No Action Alternative. (Figure 3.7-1). A second borrow area is proposed in the event that the main borrow area does not provide the required soil (sands and silts) for fill material. This site is located north of Siphon Road as shown on Figure 3.7-1. Operable Unit water wells, piping, etc. in the area would be avoided.

The initial need of fill material to restore the Dam crest elevation 1.8 ft. for the length of the Dam is approximately 57,000 cubic yards (cy). Construction of the coffer dam would require approximately 333,000 cy (total 390,000 cy). Assuming the borrow area is about 55 acres, the estimated depth of the main borrow area would be on average five (5)-ft. deep, including removal of approximately one (1) ft. of top soil. Once the auxiliary spillway construction is completed, fill material of the coffer dam would be used to raise the road beds of Rosemead Blvd., Lincoln Ave. and Rooks Road. Approximately 5,400,000 cy of fill material would be required to raise the three (3) roadways approximately twelve (12) ft. at the Dam crest to prevent overtopping through the roadways. Approximately 333,000 cy from the coffer dam would be used with the remaining fill material (approximately 5,100,000 cy) from the fill material removed from the Dam embankment after the construction of the auxiliary labyrinth spillway. For the construction of the auxiliary labyrinth spillway approximately 8,400,000 cy would be removed and temporarily stockpiled. Approximately 2,200,000 cy of fill would cover the concrete invert of the runout channel from the auxiliary labyrinth spillway to the San Gabriel River.

The remaining approximate 1,100,000 cy of fill material would be placed in the borrow area, that would raise the invert elevation of the borrow area on average just over one (1) ft. and with the replacement of the stockpiled topsoil, raise the elevation approximately an additional one (1)-foot.

The excess fill material returned or placed in the borrow area following construction is estimated to be replace approximately half of the initial fill material removed as borrow for the Dam crest raise and the coffer dam, resulting in an average lowering of the area of between 2 and 3 feet. Following completion of construction, the borrow area would be re-graded to meet the surrounding contours. (Figure 3.7-1). Potential soil erosion resulting from these activities would be controlled through environmental commitments and would be temporary. The development of the borrow area may have direct, though minor, permanent impacts to topography in this area of the Reservoir but these potential changes would not result in effects on Dam operation for flood risk management. Impacts are expected to be less than significant. No indirect impacts are anticipated.

### **Coffer Dam**

The coffer dam would be constructed upstream of the eastern end of the central embankment. As indicated above, approximately 333,000 cy of fill material would be needed to construct the coffer dam. The coffer dam would be approximately 6-1/2 acres, and would be constructed to functionally match the height of the embankment (approximately 40 ft. tall). When the auxiliary spillway construction is completed, the coffer dam would be removed and the material used to raise the road beds or returned to the borrow area. The area would be re-graded to accommodate the approach channel and to meet existing contours. Potential soil erosion resulting from these activities would be controlled through environmental commitments and would be temporary. The impacts to earth resources of the coffer dam construction itself would have no permanent effect on the Dam operations for flood risk management. Impacts are expected to be direct, temporary, and less than significant. No indirect impacts are anticipated.

### **Foundation/Sheetpile**

The spillway subsurface would include foundation improvements to prevent liquefaction during extreme earthquakes. Sheetpile is assumed to extend approximately 40 ft. below the foundation slab and encircle the proposed auxiliary spillway. Some dewatering of the foundation during construction is anticipated to allow the work to proceed in the storm season. This work is not expected to require more than minor earth movement, excavation, or grading. It would not change topographic contours other than at the Dam structure itself. Impacts are expected to be direct, temporary and less than significant as these activities would be below ground surface and would not alter the topography of the embankment. No indirect impacts are anticipated.

### **Construct Auxiliary Spillway**

An approximately 240-ft. wide passive weir auxiliary spillway would be constructed in-line with the existing embankment and immediately west of the existing spillway to increase the spillway capacity. A bridge across the auxiliary spillway would be required to provide access to the San Gabriel River spillway during extreme events.

The top elevation of the spillway would be approximately three (3) ft. lower than the Dam crest elevation. The auxiliary spillway would become active when the water level in the Reservoir reaches elevation 234.0 ft. after the San Gabriel River spillway gates are fully open. This work is not expected to require more than minor earth movement, excavation, or grading. Potential soil erosion resulting from these activities would be controlled through environmental commitments and would be temporary. Although the auxiliary spillway is designed permanently alter the

operation of the Dam for flood risk management, it would not change topographic contours other than at the Dam structure itself. Impacts to earth resources from the construction of the auxiliary labyrinth spillway are expected to be direct, temporary, and less than significant. No indirect impacts are anticipated.

### **Parapet Walls**

Parapet wall would be built on the three (3) Dam crest embankments to raise the Dam crest approximately an additional 12 ft. The addition of the parapet walls on top of the Dam crest would raise the elevation of the Dam crest from 239.0 ft. to 251.0 ft. Water impoundment upstream of the Dam could be increased to this higher elevation. Elevation 251.0 ft. would also expand the upstream water inundation boundary beyond the current upstream, probable maximum flood line. This work is not expected to require more than minor earth movement, excavation, or grading beyond that already described. Potential soil erosion resulting from these activities would be controlled through environmental commitments and would be temporary. Although the parapet walls are designed to permanently alter the operation of the Dam for flood risk management, they would not change topographic contours other than at the Dam structure itself. Impacts to earth resources from the construction of the auxiliary labyrinth spillway are expected to be direct, temporary, and less than significant. No indirect impacts are anticipated.

### **Approach and Runout Channels**

Upstream of the Dam, an approach channel would be graded to improve flow characteristics to the auxiliary spillway. The approach channel would be approximately 240 ft. wide and have an average distance of roughly 500 ft. extending from the upstream limit of the labyrinth to the crossover channel.

Downstream of the Dam, an approximately 240-ft. wide runout channel would extend an average length of approximately 450 ft. between the downstream limit of the labyrinth and the San Gabriel River through the existing Pico Rivera Municipal Golf Course. After the staging area in the Pico Rivera Golf Course is dismantled, the area would be covered with excess fill material from the removal of the embankment for the auxiliary spillway. The fill material would be sloped and graded from the spillway to the San Gabriel River invert downstream of the existing spillway. The River levee would be removed in this area so that flood water from the auxiliary spillway would flow to the San Gabriel River. The fill material would be hydroseeded upon completion of the runout channel.

Potential soil erosion resulting from these activities would be controlled through environmental commitments and would be temporary. Although the approach and runout channels are designed to permanently alter the operation of the Dam for flood risk management, they would not change topographic contours other than to facilitate operation of the Dam structure itself. Impacts to earth resources from the construction of the approach and runout channels are expected to be direct and permanent, but less than significant. No indirect impacts are anticipated.

### **Road Modifications**

As indicated above under Borrow Area, approximately 5,400,000 cy of fill material would be required to raise the three roadways, Rosemead Blvd, Lincoln Ave. and Rooks Road. Potential soil erosion resulting from these activities would be controlled through environmental

commitments and would be temporary. Raising the three roads to the height of the parapet walls on the Dam crest would be in conjunction with the 12-ft. high parapet walls constructed. Impounded water could be held to the higher elevation of 251.0 ft. The raising of the roadways would have a direct, permanent impact on topography; although the approach and runoff channels are designed to permanently alter the operation of the Dam for flood risk management, they would not change topographic contours other than to facilitate operation of the Dam structure itself. No indirect impacts are anticipated.

#### **Trench Drain and Filter Blanket**

For the construction of the trench drain for a distance of 90 ft. downstream from the toe of the embankment, soil excavated would be stockpiled and used as needed for the trench drain fill material needs. Topography changes in this area would be minor with the creation of a five (5)-ft. high berm between the trench drain and the Project right-of way to keep the trench drain accessible and uncovered for maintenance accessibility in perpetuity. This would be minor and compared to the overall height of the Dam, insignificant. Potential soil erosion resulting from these activities would be controlled through environmental commitments and would be temporary. Although the trench drain and filter blanket are designed to permanently alter the operation of the Dam for flood risk management, they would not change topographic contours other than to facilitate operation of the Dam structure itself. Impacts to earth resources from the construction of the trench drain and filter blanket are expected to be direct and permanent, but less than significant. No indirect impacts are anticipated.

#### **Closeout**

Closeout of the Phase 2 construction activities would involve the dismantling of the batch plants and staging areas and removal of these facilities from the Project site. Any gravel or other material laid down on the haul roads would be removed. Soil over culverts over the crossover channel would be removed. The areas would be re-graded. Potential soil erosion resulting from these activities would be controlled through environmental commitments and would be temporary. Impacts are expected to be direct, temporary, and less than significant and would not result in a change in how the Dam is operated for flood risk management. No indirect effects are anticipated.

#### **Regular/Recurring Operations and Maintenance**

O&M activities for RMP 3E would be similar to those of RMP 1, the No Action Alternative. Due to the increased area of the concrete surfaces, the amount of graffiti removal is expected to increase. The majority of the relief wells would be removed, decreasing the associated maintenance effort. The trench drain would be kept clear of vegetation.

The water control manual would be updated to be consistent with Federal requirements and the revised design of the Dam. The operation of the both the outlet works and the spillway would remain unchanged.

None of these activities are expected to include more than minor earth movement, excavation, or grading. The increase in effort compared with O&M described under the No Action Alternative is expected to have direct, temporary, and less than significant impacts to earth resources. No indirect impacts are anticipated.

### **5.1.3.3 RMP 5: Protected Overtopping with Seepage Control**

RMP 5 is described in Chapter 3, section 3.7.3. Under this RMP, overtopping is addressed through hardening of the Dam crest to prevent erosion or subsequent failure of the Dam from events large enough to cause overtopping. Backward erosion piping is addressed through construction of a trench drain at the downstream Dam toe and graded filter blanket adjacent to Rosemead Blvd.

#### **IRRM**s

Impacts would be similar to those described under RMP 1: No Action.

#### **Phase 1**

##### **Staging Areas**

Impacts would be similar in location, duration, nature and extent to those characterized for the same activity under RMP 3E.

##### **Close Bike Paths and Dam Crest**

Impacts would be similar in location, duration, nature and extent to those characterized for the same activity under RMP 3E.

##### **Temporary Relocation of Utilities**

Impacts would be similar in location, duration, nature and extent to those characterized for the same activity under RMP 3E.

#### **Phase 2**

##### **Redevelop Staging Areas**

Impacts would be similar to that characterized for the same activity under RMP 3E.

##### **Batch Plants and Haul Routes**

Impacts would be similar to that characterized for the same activity under RMP 3E.

##### **Remove Topsoil from Downstream Face of Dam**

An approximately two (2)-ft. thick layer of soil would be removed from the downstream slopes of the three embankments of the Dam. The soil would be stockpiled in the identified staging areas during the placement of the roller compacted concrete (RCC). An additional 10-ft. thick layer of material would be removed from the downstream slopes of the three embankments of the Dam. This excavated material would be transported to the batch plants (via the haul road locations shown in Figure 3.7-3) and utilized in the mix of the RCC or for road modifications. Potential soil erosion resulting from these activities would be controlled through environmental commitments and would be temporary. The removal and stockpiling of this topsoil would be temporary and would not change topography other than at the Dam site itself. The impacts to earth resources are expected to be direct, temporary, and less than significant. No indirect impacts are anticipated.



### **Roller Compacted Concrete**

Roller compacted concrete (RCC) would be placed on the entire crest and downstream slope of the earthen embankment (the crest would be restored to the original design elevation of 239.0 ft.). The RCC would be placed in lifts approximately 10-ft. wide and one (1)-ft. high, resulting in a stepped appearance (see Photo 3.7-1). This stepped face would help dissipate energy from overtopping flows. The amount of concrete anticipated to construct the RCC Overlay is 250,000 cy. Upon completion of the RCC, the slope would be buried and hydroseeded. The Dam could still be overtopped as a result of an extreme storm event, but the RCC “steps” would dissipate the water’s energy reducing the potential of downstream inundation and minimize potential of dam failure through breach. The RCC, with the 2-ft. layer of topsoil previously removed, would replace the fill material removed from the downstream slope of the embankment and would not substantially change existing embankment contours, even with the eventual replacement of the topsoil described below. Replacement of this material with RCC would be a direct and permanent change to the downstream slope of the embankment, which is part of the Dam structure. It would not alter topography in a way unrelated to the PFM. The impact is expected to be less than significant. An indirect effects of placement of the RCC may include reduced reduce erosion potential on the downstream side of the embankment. This indirect effect is expected to be less than significant and could be beneficial, by reducing the risk of Dam failure by dam breach.

### **Replace Topsoil**

When placement of the RCC is completed and the concrete has cured, the approximately two (2) ft. of topsoil removed would be placed over the RCC on the downstream slope of the Dam and hydroseeded in compliance with Corps guidelines (*Guidelines for Landscaping and Vegetation Management at Levees, Floodwalls, Embankment Dams, and Appurtenant Structures*, Engineer Technical Letter 1110-2-583). The overall topography of the existing Dam embankments would not substantially change. The approximately 2-ft. layer of embankment material laid over the RCC would replace the fill material removed from the downstream slope of the embankment and would not result in a substantial change to existing embankment contours. Replacement of this material with RCC would be a direct and permanent change to the downstream slope of the embankment, which is part of the Dam structure. It would not alter topography in a way unrelated to the PFM. The impact is expected to be less than significant. No indirect impacts are anticipated.

### **Road Modification/Parapet Wall**

Lincoln Ave. would be raised at the Dam crest five (5) ft. to match the elevation of the parapet wall to be built from Lincoln Ave. to the Montebello Hill area, so that overtopping water does not go around the Dam crest. Fill material would come from excess topsoil material removed from the downstream face of the Dam for the placement of the RCC. The parapet wall would be five (5) high. Parapet walls will also be built over the control structures to prevent damage to the gates during overtopping events. Potential soil erosion resulting from these activities would be controlled through environmental commitments and would be temporary. Although the road modification and parapet wall are designed to permanently alter the operation of the Dam for flood risk management, they would not change topographic contours other than to facilitate operation of the Dam structure itself. Impacts to earth resources are expected to be direct and permanent, but less than significant. No indirect impacts are anticipated.

### **Trench Drain and Filter Blanket**

Impacts are expected to be similar in location, duration, nature and extent to those characterized for the same activity under RMP 3E.

### **Closeout**

All soil removed from the embankments is expected to be used in the RCC mix, the road modifications, and the replacing of topsoil over the RCC on the downstream slope of the embankment. Impacts are expected to be similar in location, duration, nature and extent to those characterized for the same activity under RMP 3E.

### **Regular/Recurring Operations and Maintenance**

O&M activities for RMP 5 would be similar to those of RMP 1, the No Action Alternative. Due to the increased area of the concrete surfaces, the amount of graffiti removal is expected to increase. The majority of the relief wells would be removed, decreasing the associated maintenance effort. The trench drain would be kept clear of vegetation.

None of these activities are expected to include more than minor earth movement, excavation, or grading. Potential soil erosion resulting from these activities would be controlled through environmental commitments and would be temporary. The increase in effort compared with O&M described under the No Action Alternative is expected to have direct, temporary, and less than significant impacts to earth resources. No indirect impacts are anticipated.

#### **5.1.4 Environmental Commitments**

While all potential impacts to earth resources are considered less than significant, **Environmental Commitments (ECs) ER-1 through ER-4** would be implemented to minimize erosion potential during construction.

For all alternatives, these environmental commitments may include, but may not be limited to, the following:

- ER-1** An Erosion-control and Sediment Response Plan will be prepared and implemented at all construction, stockpile, and sediment storage areas, as appropriate.
- ER-2** All suitable excavated fill material shall be stockpiled for the shortest period of time practicable, based on further use.
- ER-3** All clearing, grading, earth moving, and excavation would cease during periods of winds greater than 20 miles per hour (averaged over one hour) when disturbed material is easily windblown, or when dust plumes of 20 percent or greater opacity impact public roads, occupied structures, or neighboring property.
- ER-4** Water unpaved/untreated roads and on disturbed soil areas, when necessary, to minimize fugitive dust.

## **5.2 WATER RESOURCES**

Those areas potentially affected by the proposed RMPs under this resource generally include the portion of the Whittier Narrows Dam Reservoir, south of Durfee Ave, as well as the area of the San Gabriel River to approximately 0.5 miles downstream of the existing spillway.

### **5.2.1 Regulatory Framework**

#### **Clean Water Act**

The Clean Water Act (CWA) governs discharge of dredge or fill materials into the Waters of the US and it governs pollution control and water quality of waterways throughout the U.S. Its intent, in part, is to restore and maintain the biological integrity of the nation's waters (33 U.S.C. 1251 et seq). It provides standards and enforcement, a number of regulatory programs with permits and licenses, grants, and revolving funds, as well as general provisions and provisions for research and related programs. Relevant sections are Sections 401, 402, and 404.

Section 401(a)(1) of the CWA, 33 U.S.C. § 1341(a)(1), provides that “[a]ny applicant for a Federal license or permit to conduct any activity including, but not limited to, the construction or operation of facilities, which may result in any discharge into the navigable waters, shall provide the licensing or permitting agency a certification from the State in which the discharge originates or will originate...that any such discharge will comply with the applicable provisions of sections 1311, 1312, 1313, 1316, and 1317 of this title.” The State of California has authority to give such a certification, which it has delegated to the Regional Water Quality Control Boards. Prior to construction, a CWA Section 401 Water Quality Certification would be requested from the Regional Water Quality Control Board (RWQCB).

Section 402 establishes the National Pollutant Discharge Elimination System (NPDES). Pursuant to Section 402 and the state General Construction Storm Water Permit, a NPDES permit would be required for any project construction activities that would result in the disturbance of one or more acres. Generally, the construction contractor would be required to prepare a Storm Water Pollution Prevention Plan (SWPPP) which would be filed along with a Notice of Intent (NOI) and other compliance related documents with the State Water Resources Control Board (SWRCB). The SWPPP must be prepared by a Qualified SWPPP Developer (QSD) before construction commences. The SWPPP would contain a visual monitoring program, and a water quality monitoring program for non-visible pollutants to determine construction site BMP effectiveness. The SWPPP would list all BMPs to be implemented during construction activities.

Section 404 addresses discharges of dredged or fill material to Waters of the US. Waters of the US, defined at 33 Code of Federal Regulations (C.F.R.) Part 328, include coastal and inland waters, lakes, rivers, and streams, including adjacent wetlands and tributaries. The U.S. Environmental Protection Agency's (EPA) Section 404(b)(1) Guidelines (40 C.F.R. Part 230) are the substantive environmental criteria used by the Corps to evaluate project impacts to Waters of the US. The Corps does not issue itself permits for Corps Civil Works projects but must comply with the 404(b)(1) guidelines. Unless exempt under section 404(r) of the Clean Water Act, the 404(b)(1) guidelines prohibit the Corps from undertaking a project unless it is the LEDPA. The LEDPA is the practicable alternative that is least damaging to the aquatic ecosystem. The term “practicable” is defined in 40 CFR 230.10(a)(2) as: “[a]n alternative ... available and capable of being done after taking into consideration cost, existing technology, and logistics in light of overall project purposes.” A draft CWA 404(b)(1) analysis documenting compliance with Section 404 is found in Appendix F.

### **Executive Order 11988, Floodplain Management**

Executive Order 11988 requires Federal agencies to avoid, to the extent possible, the short- and long-term adverse impacts associated with the occupancy and modification of floodplains. If there is no practicable alternative to undertaking an action in a floodplain, any potential adverse impacts must be mitigated. The Water Resources Council Floodplain Management Guidelines for implementation of EO 11988, as referenced in the Corps' ER 1165-2-26, require an eight-step process that agencies should carry out as part of their decision-making on projects that have potential impacts to or within the floodplain (see Chapter 7.3.8).

### **EO 11990, Protection of Wetlands**

EO 11990, Protection of Wetlands, issued on May 24, 1977, helps avoid the long-term and short-term adverse impacts associated with destroying or modifying wetlands and avoiding direct or indirect support of new construction in wetlands when there is a practicable alternative.

## **5.2.2 Thresholds of Significance**

A potentially significant impact to water resources may occur if a proposed alternative could result in:

- A violation of applicable water quality standards resulting in substantial degradation of surface water quality.
- A substantial and permanent alteration to the existing drainage pattern of the site or area, including the alteration of the course of a stream or river in a manner that would result in a substantial increase in erosion or siltation on or off site.

## **5.2.3 RMP Analysis and Comparison**

### **5.2.3.1 RMP 1: No Action**

#### **Regular/Recurring Operations and Maintenance**

RMP 1 would include routine operations and maintenance activities including but not limited to repairing spillway gates, conducting inspections, access road repair, erosion repair, and structural repair.

Most structural repairs would occur atop the dam, outside of waters of the US in the dry season. Discharges of fill in the reservoir, if any, are expected to be minor and would result in permanent discharge of fill material such as rocks or concrete. In most cases there would be no expansion of the footprint. In some cases, expansion could occur but it would be minor in nature. Thus, there would be no alterations to existing drainage pattern of the site or area. Impacts would be less than significant.

Maintenance activities in the reservoir within waters of the US would likely entail access road repair, mowing, and erosion repair. Most operations and maintenance activities are undertaken during the dry season when the reservoir does not hold water. The activities would disturb compacted native fill, resulting in loose and unconsolidated soils. Unconsolidated substrate could migrate into the water column when the reservoir retains water. However, contribution to

turbidity would not be notable due to the small area where maintenance activities occur. Repeated inundation from water impoundment over time would further recompact soils. Thus, impacts to water quality from soil disturbance would likely entail temporary and de minimis increase in turbidity when the reservoir retains storm flows. Furthermore, materials such as rocks or concrete, if discharged, are chemically inert and would not leach contaminants into the water column. Environmental commitments would be implemented for all O&M activities. In addition, for O&M activities within Waters of the US terms and conditions of the Clean Water Act Section 401 permit would be implemented. Based on the above, there would be no degradation of surface water quality. Impacts would be less than significant.

### **IRRM**s

IRRM's include conducting inspections, conducting annual coordination, updating emergency action plans, and mapping flood zones. IRRM's are composed of technical studies and administrative coordination and would not result in construction activities. Thus, there would be no alterations to existing drainage pattern of the site or area. There would be no violation of applicable water quality standards resulting in substantial degradation of surface water quality. Impacts would be less than significant.

### **Crest Elevation Restoration**

Under the No Action Alternative, maintenance action involving restoration of the Dam's crest elevation to its original design elevation is reasonably foreseeable in the next 50 years. Crest restoration would require discharge of earthen fill atop the existing dam. The activity would be located outside waters of the US.

Earthen fill required to restore the dam crest, construct a temporary coffer dam, and raise the roads traversing the reservoir would be excavated primarily from an approximately 55 acre borrow area would be established within an area bounded by Rosemead Blvd., Siphon Road, and the crossover channel. An approximately 48 acre portion of the footprint is located within waters of the US.

Construction would entail excavation and grading within the borrow area. Upon completion of construction the topography of the borrow area would be depressed relative to the surrounding grade. The depression would slightly increase the storage capacity of the reservoir. The increase would not be notable. Thus, there would be no alterations to existing drainage pattern of the site or area. Impacts would be less than significant.

During construction, soils naturally compacted from periodic inundation would be disturbed. Turbidity levels for low flows would be largely unaffected since the flows are restricted to the active channels. Overbank flows spreading across the lower reservoir where most construction activities are concentrated would result in temporary resuspension of loose soils within the water column. Turbidity would be temporarily increased. However, storm flows temporarily impounded in the reservoir would be highly turbid. Thus, the increase in turbidity would be minor in nature. The rate of resuspension is expected to decrease over time as repeated inundations would result in reconsolidation and re-compaction of loose soils. Furthermore, the borrow area would be restored with riparian vegetation upon completion of construction.

With implementation of environmental commitments as well as implementation of the terms and conditions of the Clean Water Act Section 401 permit, water quality standards would be maintained and there would be no degradation of surface water quality. Impacts would be less than significant.

### **5.2.3.2 RMP 3E: Labyrinth Auxiliary Spillway and Seepage Control**

RMP 3E is described in Chapter 3, section 3.7.2. Under this RMP, overtopping is addressed through adding spillway capacity and backward erosion piping is addressed through construction of a trench drain at the downstream Dam toe and graded filter blanket adjacent to Rosemead Blvd.

#### **Regular/Recurring Operations and Maintenance**

Operations and maintenance activities for RMP 3E would be similar to those of RMP 1.

#### **IRRM**

Implementation of IRRMs RMP 3E would be similar to those of RMP 1.

### **Phase 1**

#### **Staging Areas**

Two recreational areas that adjoin the downstream face of the dam, Streamland Park and the Pico Rivera Golf Course, would be developed as staging areas. The two sites are in the uplands outside of Waters of the US. There would be no alternation of drainage patterns. There would be no direct impacts to water quality since the site is located outside waterways. Site preparation would require earthmoving activities resulting in disturbance of previously compacted soils. Storm runoff across the staging areas could indirectly convey unconsolidated sediment into surface waters. However, with implementation of environmental commitments, indirect impacts to water quality would be minimized. Impacts would be less than significant.

#### **Close Bike Paths and Dam Crest**

The San Gabriel River Trail would be closed approximately 1,000 ft. upstream of the spillway during the Phase 1 implementation period. The trail crosses the crossover weir and uses the maintenance road ramp west of the spillway to the Dam crest. The road continues down the embankment slope to the Pico Rivera Golf Course where the trail rejoins the River levee.

Closure of the bike paths involve no earth movement, excavation, or grading. The closure of the San Gabriel River Trail through the construction area would not affect water resources.

#### **Temporary Relocation of Utilities**

The temporary relocation of utilities would occur in the uplands, outside of Waters of the US, downstream of the dam toe.

Construction of the drain would excavation of trenches, discharge of pipes, and discharge of backfill. Post construction, the affect area would be graded to match the surrounding area. The



feature would not change the surface topography or result in structural extrusions that would change drainage patterns. Impacts would be less than significant.

There would be no direct impacts to water resources. Site preparation would require earthmoving activities resulting in disturbance of previously compacted soils. Storm runoff across the staging areas could indirectly convey unconsolidated sediment into surface waters. However, with implementation of environmental commitments, indirect impacts to water quality would be minimized. Impacts would be less than significant.

Storm runoff across the construction areas could convey unconsolidated sediment into surface waters. However, with implementation of environmental commitments, indirect impacts to water quality would be minimized. Impacts would be less than significant.

## **Phase 2**

### **Redevelop Staging Areas**

The staging areas would be redeveloped in the two areas, Streamland Park and the Pico Rivera Gold Course as for Phase 1. Impacts are similar to those described under Phase 1.

### **Extend Crossover Weir**

When the elevation of water in the San Gabriel River, upstream of the spillway reaches 208.0 ft., water flows over the crossover weir into the crossover channel. After closing the River Trail, the current crossover weir located immediately upstream of the spillway would be relocated approximately 200 ft. upstream so that a new crossover channel can be excavated to allow room for construction of the coffer dam. The activity would be located in Waters of the US.

Construction of the crossover weir would retain hydrological connectivity between the San Gabriel River and the Rio Hondo. Water would continue to flow over the crossover weir when it reaches elevation 208.0 ft. There would be no changes to drainage patterns. Impacts would be less than significant.

Construction would entail excavation, grading, and redeposition of native earthen substrate near and in the San Gabriel River. During construction, soils naturally compacted from periodic inundation would be disturbed. Turbidity levels for low flows would be largely unaffected since the flows are restricted to the active channels. Overbank flows spreading across the lower reservoir where most construction activities are concentrated would result in temporary resuspension of loose soils within the water column. Turbidity would be temporarily increased. However, storm flows temporarily impounded in the reservoir would also be highly turbid. Thus, the increase in turbidity would be minor. The rate of resuspension is expected to decrease over time as repeated inundations would result in reconsolidation and re-compaction of loose soils. With implementation of environmental commitments as well as implementation of the terms and conditions of the Clean Water Act Section 401 permit, water quality standards would be maintained and there would be no degradation of surface water quality. Impacts are expected to be less than significant.

### **Batch Plants and Haul Routes**

Batch plants and haul routes would be cleared and grubbed as described in Section 3.7.2. Areas would be, cleared, grubbed, and leveled as necessary. Following construction, excess earthen fill material would be placed in the borrow area. Following completion of construction, the batch plants would be dismantled and the disturbed areas regraded and hydroseeded.

The proposed batch plants would be above the 10-year flood elevation and outside of waterways subject to regulation under Sections 401 and 404 of the Clean Water Act. Following completion of construction, the batch plants would be dismantled. Affected areas would be restored. There would be no alterations of drainage patterns from the development and use of these areas. Impacts would be less than significant.

There would be no direct impacts to water quality since the sites are located outside waterways. Site preparation would require earthmoving activities resulting in disturbance of previously compacted soils. Storm runoff across the staging areas could indirectly convey unconsolidated sediment into surface waters. However, with implementation of environmental commitments, indirect impacts to water quality would be minimized. Following completion of construction, the batch plants would be dismantled and disturbed areas would be regraded and hydroseeded. Impacts would be less than significant.

In order to accommodate two-way traffic, an existing 20 ft. wide by 8,000 ft. long earthen access road, adjacent to the upstream toe of dam, would be widened to 40 ft. The haul road would mostly be within 10-year flood elevation and are subject to regulation under Sections 401 and 404 of the Clean Water Act. Construction would entail grading areas outside the existing road. The existing topography would be maintained. There would be no structural discharges or changes to topography that would affect drainage patterns. Impacts would be less than significant.

During construction, soils naturally compacted from periodic inundation would be disturbed. Turbidity levels for low flows would be largely unaffected since the flows are restricted to the active channels. Overbank flows spreading across the lower reservoir where most construction activities are concentrated would result in temporary resuspension of loose soils within the water column. Turbidity would be temporarily increased. However, storm flows temporarily impounded in the reservoir would also be highly turbid. Thus, the increase in turbidity would be minor. The rate of resuspension is expected to decrease over time as repeated inundations would result in reconsolidation and re-compaction of loose soils.

With implementation of environmental commitments as well as implementation of the terms and conditions of the Clean Water Act Section 401 permit, water quality standards would be maintained and there would be no degradation of surface water quality. Impacts would be less than significant.

### **Borrow Area**

Earthen fill required to restore the dam crest, construct a temporary coffer dam, and raise the roads traversing the reservoir would be excavated primarily from an approximately 55 acre borrow area would be established within an area bounded by Rosemead Blvd., Siphon Road, and

the crossover channel. An approximately 48 acre portion of the footprint is located within Waters of the US. An approximately 19 acre secondary borrow area could also be established adjacent to Durfee Ave. across from the Los Angeles District Base Yard in South El Monte. This area is located in the uplands, outside Waters of the US.

Construction would entail excavation and grading within the borrow areas. Upon completion of construction the topography of the borrow areas would be depressed relative to the surrounding grade. The depression would slightly increase the storage capacity of the reservoir. The increase would not be notable. However, there would be no alterations to existing drainage pattern of the site or area. Impacts would be less than significant.

During construction, soils naturally compacted from periodic inundation would be disturbed. Turbidity levels for low flows would be largely unaffected since the flows are restricted to the active channels. Overbank flows spreading across the lower reservoir where most construction activities are concentrated would result in temporary resuspension of loose soils within the water column. Turbidity would be temporarily increased. However, storm flows temporarily impounded in the reservoir would be highly turbid. Thus, the increase in turbidity would be minor in nature. The rate of resuspension is expected to decrease over time as repeated inundations would result in reconsolidation and re-compaction of loose soils. Furthermore, the borrow area would be restored with riparian vegetation upon completion of construction.

With implementation of environmental commitments as well as implementation of the terms and conditions of the Clean Water Act Section 401 permit, water quality standards would be maintained and there would be no degradation of surface water quality. Impacts would be less than significant.

### **Cofferdam**

In order to maintain flood risk minimization functions during construction, an approximately seven acre, semicircular, temporary earthen cofferdam would be constructed behind the section of embankment that would be removed for construction of the Auxiliary Labyrinth Spillway. Approximately 297,000 cy of fill required for construction would be excavated from the 55-acre borrow area. The coffer dam would be removed upon completion of construction. Earthen fill from the dam would be redeposited into the borrow area. Affected areas would be regraded and revegetated upon completion of construction. The temporary coffer dam would be located outside Waters of the US.

Presence of the coffer dam could result in minor alterations in drainage pattern in the immediate vicinity of the structure. However, since the structure would be located above the 10-flood pool elevation, drainage pattern alterations, however minor, would only occur in instances where overbank flows from storm events greater than the 10-year storm spread across the lower reservoir. Furthermore, the cofferdam would be removed upon completion of construction. There would be no long term alterations to existing drainage pattern of the site or area. Impacts would be less than significant.

During construction, soils naturally compacted from periodic inundation would be disturbed. Turbidity levels for low flows would be largely unaffected since the flows are restricted to the

active channels. Overbank flows spreading across the lower reservoir where most construction activities are concentrated would result in temporary resuspension of loose soils within the water column. Turbidity would be temporarily increased. However, storm flows temporarily impounded in the reservoir would be highly turbid. Thus, the increase in turbidity would be minor in nature. The rate of resuspension is expected to decrease over time as repeated inundations would result in reconsolidation and re-compaction of loose soils. Furthermore, the cofferdam would be removed upon completion of construction and the borrow area would be restored with riparian vegetation upon completion of construction.

With implementation of environmental commitments water quality standards would be maintained and there would be no degradation of surface water quality. Impacts are expected to be less than significant.

### **Foundation/Sheetpile**

The spillway subsurface would include foundation improvements to prevent liquefaction during extreme earthquakes. Sheetpile is assumed to extend approximately 40 ft. below the foundation slab and encircle the proposed auxiliary spillway. The activity would be located within Waters of the US.

Since the sheetpile would be driven into the ground, there would be no surficial extrusion that could alter the existing surface drainage pattern of the site or area. There would be no structural discharges or changes to topography that would affect surface drainage patterns. A sheetpile barrier 40 ft. below grade is unlikely to notably affect groundwater flow since the earthen substrate at that depth is relatively impermeable to groundwater. Furthermore, the affected area is relatively narrow relative to the width of groundwater flows. There would be no notable change in flows of groundwater. Impacts would be less than significant.

During construction, soils naturally compacted from periodic inundation would be disturbed. Turbidity levels for low flows would be largely unaffected since the flows are restricted to the active channels. Overbank flows spreading across the lower reservoir where most construction activities are concentrated would result in temporary resuspension of loose soils within the water column. Turbidity would be temporarily increased. However, storm flows temporarily impounded in the reservoir would be highly turbid. Thus, the increase in turbidity would be minor in nature. The rate of resuspension is expected to decrease over time as repeated inundations would result in reconsolidation and re-compaction of loose soils.

With implementation of environmental commitments as well as implementation of the terms and conditions of the Clean Water Act Section 401 permit, water quality standards would be maintained and there would be no degradation of surface water quality. Impacts would be less than significant.

Some dewatering of the foundation during construction is anticipated to allow the work to proceed in the storm season. Sheetpile driving and dewatering operations, including dewatering depth, would be coordinated in conjunction with the Department of Toxic Substances Control, the state regulatory agency responsible for operating and overseeing contaminated groundwater

extraction and treatment operations. Thus, sheetpile driving and dewatering would not result in the discharge of contaminated groundwater onto surface waterways.

With implementation of environmental commitments as well as implementation of the terms and conditions of the Clean Water Act Section 402 NPDES permit, water quality standards would be maintained and there would be no degradation of surface water quality. Impacts would be less than significant.

### **Construct Auxiliary Spillway**

A 240-ft. wide passive weir auxiliary spillway would be constructed in-line with the existing embankment and immediately west of the existing spillway to increase the spillway capacity. A bridge across the auxiliary spillway would be required to provide access to the San Gabriel River spillway during extreme events. The activity would be located within Waters of the US.

Since the auxiliary spillway be constructed in-line with the existing embankment there would be no surficial extrusion that could alter the existing drainage pattern of the site or area. Impacts would be less than significant.

During construction, soils naturally compacted from periodic inundation would be disturbed. There would be no water quality impacts during construction since a temporary coffer dam would isolate the construction area from impounded storm flows. Post construction, overbank flows spreading across the lower reservoir where most construction activities are concentrated would result in temporary resuspension of loose soils within the water column where surface disturbance has taken place. Turbidity would be temporarily increased. However, storm flows temporarily impounded in the reservoir would be highly turbid. Thus, the increase in turbidity would be minor in nature. The rate of resuspension is expected to decrease over time as repeated inundations would result in reconsolidation and re-compaction of loose soils.

With implementation of environmental commitments as well as implementation of the terms and conditions of the Clean Water Act Section 401 permit, water quality standards would be maintained and there would be no degradation of surface water quality. Impacts would be less than significant.

### **Parapet Walls**

The parapet wall would be built on the dam crest to raise the dam crest an additional 12 ft., raising the elevation of the dam crest from 239.0 ft. to 251.0 ft.

This feature would be constructed above surface waters, atop the existing dam, and outside of Waters of the US. The wall would follow the existing alignment of the dam. Construction would not result in lateral extrusions or modifications to the dam alignment that would affect drainage patterns. There would be no impacts to drainage patterns.

Materials such as rocks or concrete are chemically inert and would not indirectly leach contaminants into surface waters. There would be no impacts to water quality. Impacts would be less than significant.

### **Approach and Runout Channels.**

An earthen approach channel, approximately 240 ft. wide and 500 ft. long, from the crossover channel to the auxiliary spillway would be graded upstream of the structure. Construction of the approximately 2.75 acre approach channel would entail grading activities outside Waters of the US. Likewise a 240 ft. wide runout channel would be graded downstream of the auxiliary spillway through the Pico Rivera Municipal Golf Course to convey overflows into the San Gabriel River. The runout channel would be located in the uplands outside Waters of the US.

The approach channel would direct overbank flows towards the auxiliary spillway. Thus, there would be minor, localized changes to drainage pattern within vicinity of the auxiliary spillway at the outset of overbank flows into the reservoir. Once elevation of the impounded flood pool rises above the approach channel, the affect would be nonexistent. The runout channel would direct overflows from the spillway into the San Gabriel River under maximum probable flood conditions. All flows would be directed towards the San Gabriel River. There would not be a substantial and permanent alteration to the existing drainage pattern of the site or area, including the alteration of the course of a stream or river in a manner that would result in a substantial increase in erosion or siltation on or off site. Impacts would be less than significant.

During construction of the approach and runout channels, there would be no direct impacts to water quality since the site is located outside waterways. Site preparation would require earthmoving activities resulting in disturbance of previously compacted soils. Storm runoff across the staging areas could indirectly convey unconsolidated sediment into surface waters. However, with implementation of environmental commitments, indirect impacts to water quality would be minimized. Impacts would be less than significant.

### **Road Modifications**

Three roads that traverse the dam embankment would need to be raised in elevation to match the height of the parapet walls on the dam crest: Rosemead Boulevard, Lincoln Avenue, and Rooks Road. Lincoln Avenue and Rooks Road are outside of Waters of the US. An approximately 3,600 ft. long segment of Rosemead Boulevard is located within Waters of the US.

All three roads would be raised but retain the same alignment throughout the reservoir. Thus, there would no alteration to the existing drainage pattern. Impacts would be less than significant.

Raising the elevation of Lincoln Avenue and Rooks Road would not directly impact water quality since the roads are located outside waterways. Site preparation would require earthmoving activities resulting in disturbance of previously compacted soils. Storm runoff across the staging areas could indirectly convey unconsolidated sediment into surface waters. However, with implementation of environmental commitments, indirect impacts to water quality would be minimized. Impacts would be less than significant.

Raising the elevation of Rosemead Boulevard would disturb soils naturally compacted from periodic inundation. Turbidity levels for low flows would be largely unaffected since the flows are restricted to the active channels. Overbank flows spreading across the lower reservoir where most construction activities are concentrated would result in temporary resuspension of loose soils within the water column. Turbidity would be temporarily increased. However, storm flows



temporarily impounded in the reservoir would be highly turbid. Thus, the increase in turbidity would be minor in nature. The rate of resuspension is expected to decrease over time as repeated inundations would result in reconsolidation and re-compaction of loose soils. With implementation of environmental commitments as well as implementation of the terms and conditions of the Clean Water Act Section 401 permit, water quality standards would be maintained and there would be no degradation of surface water quality. Impacts would be less than significant.

### **Trench Drain and Filter Blanket**

These features would be located outside Waters of the US.

Construction of the drain would require excavation of a trench and discharge of structural fill. Post construction, the affect area would be graded to match the surrounding area. The feature would not change the surface topography or result in structural extrusions that would change drainage patterns. Impacts would be less than significant.

There would be no direct impacts to water resources. Site preparation would require earthmoving activities resulting in disturbance of previously compacted soils. Storm runoff across the staging areas could indirectly convey unconsolidated sediment into surface waters. However, with implementation of environmental commitments, indirect impacts to water quality would be minimized. Impacts would be less than significant.

### **Closeout**

Closeout of the Phase 2 construction activities would involve the dismantling of the batch plants and staging areas and removal of these facilities from the Project site. Any gravel or other material laid down on the haul roads would be removed. Soil over culverts over the crossover channel would be removed. The areas would be re-graded. Excess borrow soils would be deposited into the borrow areas from which they were excavated.

Closeout activities would restore the construction areas pre-project conditions. Areas affected by construction would be graded to match the surrounding grade and drainage patterns. Drainage patterns would not be affected. Impacts would be less than significant.

Grading activities would disturb soils naturally compacted from periodic inundation. Furthermore, the areas would be revegetated. Impounded flows would result in temporary resuspension of loose soils within the water column. Turbidity would be temporarily increased. However, storm flows temporarily impounded in the Reservoir would also be highly turbid. Thus, the increase in turbidity would be minor. With sufficient inundation and with establishment of vegetation, turbidity is expected to decrease over time as repeated inundations would result in reconsolidation and re-compaction of loose soils.

With implementation of environmental commitments as well as implementation of the terms and conditions of the Clean Water Act Section 401 permit, water quality standards would be maintained and there would be no degradation of surface water quality. Impacts are expected to be less than significant.

### **5.2.3.3 RMP 5: Protected Overtopping with Seepage Control**

Under this RMP, overtopping is addressed through hardening of the dam crest to prevent erosion or subsequent failure of the dam from events large enough to cause overtopping. Backward erosion piping is addressed through construction of a trench drain at the downstream dam toe and graded filter blanket adjacent to Rosemead Blvd.

#### **Regular/Recurring Operations and Maintenance**

Operations and maintenance activities for RMP 5 would be similar to those of RMP 1.

#### **IRRM**

Implementation of IRRMs RMP 5 would be similar to those of RMP 1.

#### **Phase 1**

##### **Staging Areas**

Impacts are expected to be similar to that characterized for the same activity under RMP 3E.

##### **Close Bike Paths and Dam Crest**

Impacts are expected to be similar to that characterized for the same activity under RMP 3E.

##### **Temporary Relocation of Utilities**

Impacts are expected to be similar to that characterized for the same activity under RMP 3E.

#### **Phase 2**

##### **Redevelop Staging Areas**

Impacts are expected to be similar to that characterized for the same activity under RMP 3E.

##### **Batch Plants and Haul Routes**

Impacts are expected to be similar to that characterized for the same activity under RMP 3E.

##### **Remove Topsoil**

Topsoil from the downstream face of the embankment would be removed and stored in staging areas in the uplands, outside Waters of the US. There would be no alternation of drainage patterns. There would be no direct impacts to water quality since the site is located outside waterways. Site preparation would require earthmoving activities resulting in disturbance of previously compacted soils. Storm runoff across the staging areas could indirectly convey unconsolidated sediment into surface waters. However, with implementation of environmental commitments, indirect impacts to water quality would be minimized. Impacts would be less than significant.

##### **Roller Compacted Concrete**

The placement of the RCC on the downstream face of the embankments would occur areas in the uplands, outside Waters of the US. There would be no alternation of drainage patterns.

Construction would require materials such as rocks or concrete are chemically inert and would not leach contaminants into the water column. Impacts would be less than significant.

### **Replace Topsoil**

After the RCC has been placed in “steps” down the embankment. Two (2) ft. of topsoil would be replaced on the RCC “steps”. This activity would occur outside Waters of the US. There would be no alternation of drainage patterns. There would be no direct impacts to water quality since the site is located outside waterways. Site preparation would require earthmoving activities resulting in disturbance of previously compacted soils. Storm runoff across the staging areas could indirectly convey unconsolidated sediment into surface waters. However, with implementation of environmental commitments, indirect impacts to water quality would be minimized. Impacts would be less than significant.

### **Road Modification**

Impacts are expected to be similar to that characterized for the same activity under RMP 3E.

### **Trench Drain and Filter Blanket**

Impacts are expected to be similar to that characterized for the same activity under RMP 3E.

### **Closeout**

Impacts are expected to be similar to that characterized for the same activity under RMP 3E.

## **5.2.4 ENVIRONMENTAL COMMITMENTS**

While all potential impacts to water resources are expected to be less than significant, **Environmental Commitments (ECs) WR-1 through WR-5** would be implemented to minimize impacts to water quality during construction.

For all alternatives, these environmental commitments may include, but may not be limited to, the following:

- WR-1** The construction contractor shall be required to obtain all applicable construction permits, which may include National Pollution Discharge Elimination System (NPDES), and prepare a Storm Water Pollution Prevention Plan (SWPPP). The SWPPP will include an Erosion and Sediment Control Plan to control potential erosion, sedimentation or turbidity.
- WR-2** Workers shall be educated on measures included in the SWPPP and other applicable permits and environmental commitments prior to beginning work in the Proposed Project Area.
- WR-3** A Spill Response Plan will be developed. This plan may include disposition and location of spill kits, fueling locations and requirements, “No-fueling zones”, and other requirements.
- WR-4** Fluids released because of spills, equipment failure (broken hose, punctured tank) or refueling would be immediately controlled, contained, and cleaned-up per Federal and state regulations. Any contaminated materials will be disposed of promptly and properly to prevent contamination of the site.

**WR-5** Stockpile sites, parking areas, and staging areas shall be located to avoid erosion into open water.

### **5.3 AIR QUALITY**

The proposed RMPs are located within the South Coast Air Basin (SCAB) under the jurisdiction of the South Coast Air Quality Management District (SCAQMD). The relevant airshed, and the area potentially impacted by the proposed RMPs is the SCAB. The SCAB consists of the urbanized areas of Los Angeles, Riverside, San Bernardino and Orange Counties, and the ocean offshore of the South Coast waters.

#### **5.3.1 Regulatory Framework**

##### **National Ambient Air Quality Standards**

The Clean Air Act identified and established the National Ambient Air Quality Standards (NAAQS) for a number of criteria pollutants in order to protect the public health and welfare. The criteria pollutants include ozone (O<sub>3</sub>), carbon monoxide (CO), suspended particulate matter (PM), sulfur dioxide (SO<sub>2</sub>), nitrogen dioxide (NO<sub>2</sub>), and lead (Pb). PM emissions are regulated in two size classes: Particulates up to 10 microns in diameter (PM<sub>10</sub>) and particulates up to 2.5 microns in diameter (PM<sub>2.5</sub>).

A region is given the status of “attainment” or “unclassified” if the NAAQS have not been exceeded. A status of “nonattainment” for particular criteria pollutants is assigned if the NAAQS have been exceeded. Once designated as nonattainment, attainment status may be achieved after three years of data showing non-exceedance of the standard. When an area is reclassified from nonattainment to attainment, it is designated as a “maintenance area,” indicating the requirement to establish and enforce a plan to maintain attainment of the standard.

##### **General Conformity Rule**

Section 176(c) of the federal Clean Air Act states that a federal agency cannot issue a permit for, or support an activity within, a nonattainment or maintenance area unless the agency determines it will conform to the most recent U.S. EPA-approved State Implementation Plan. Thus, a federal action must not:

- Cause or contribute to any new violation of a NAAQS.
- Increase the frequency or severity of any existing violation.
- Delay the timely attainment of any standard, interim emission reduction, or other milestone.

A conformity determination is required for each criteria pollutant or precursor where the total of direct and indirect emissions of the criteria pollutant or precursor in a nonattainment or maintenance area caused by the federal action would equal or exceed the General Conformity applicability rates specified in 40 C.F.R. section 93.153.

**Table 5.3-1: NAAQS Attainment Designations for the South Coast Air Basin (SCAB) and Applicable General Conformity Applicability Rates**

Pollutant	Attainment Status	General Conformity Applicability Rates (tons/year)
Ozone (8-Hour)	Nonattainment, extreme	10
CO	Attainment/Maintenance	100
NO <sub>2</sub>	Attainment/Maintenance	100
SO <sub>2</sub>	Attainment	100
PM <sub>10</sub> (24-Hour)	Attainment/Maintenance	100
PM <sub>2.5</sub>	Nonattainment	100
Pb	Nonattainment	25

The SCAB is currently in extreme nonattainment for ozone (precursors: VOC or NO<sub>x</sub>); nonattainment for PM<sub>2.5</sub>; attainment/maintenance for PM<sub>10</sub>; attainment/maintenance for NO<sub>2</sub>; attainment/maintenance for CO; and nonattainment for lead. Based on the present attainment designation for the SCAB, a federal action would conform to the SIP if annual emissions are below 100 tons of CO, PM<sub>2.5</sub>, PM<sub>10</sub>, or NO<sub>2</sub>, 10 tons of VOC, or 25 tons of lead.

### 5.3.2 Thresholds of Significance

A potentially significant impact may occur to air quality if a proposed alternative would result in:

- Exceedance of General Conformity Applicability Rates

### 5.3.3 RMP Analysis and Comparison

#### Emission Estimates Methodology

Emissions, including GHG emissions, were estimated using CalEEMod.2016.3.2 emission modeling software. Estimates of lead emissions were not calculated. Lead emissions from mobile sources in California have significantly decreased due to the near elimination of lead in fuels. Thus, CalEEMod does not provide estimated emissions for lead. Little to no quantifiable and foreseeable lead emissions would be generated by any of the alternatives.

Ozone (O<sub>3</sub>) formation is driven by two major classes of directly emitted precursors: nitrogen oxides (NO<sub>x</sub>) and volatile organic compounds (VOC). The relation between O<sub>3</sub>, NO<sub>x</sub> and VOC is driven by complex nonlinear photochemistry. Due to the variability in rates of O<sub>3</sub> formation, CalEEMod does not provide estimates for the compound. Instead, the emission estimates for VOCs is used as a surrogate for reporting O<sub>3</sub> emissions per the General Conformity Applicability Rates. Since the consumption of VOC in O<sub>3</sub> formation reaction is variable, actual contribution of NO<sub>x</sub> and VOC from construction related emission to formation of regional O<sub>3</sub> levels cannot be determined. See Appendix B for detailed equipment list, assumptions, and CalEEMod reports.

### Climate Change and Greenhouse Gases

As discussed in Chapter 4, the Corps policy is to integrate climate change adaption planning and actions into its missions, operations, programs, and projects to address resiliency with respect to potential changes in hydrologic processes. Furthermore, effective April 5, 2017, the Council on Environmental Quality withdrew its “Final Guidance for Federal Departments and Agencies on Consideration of Greenhouse Gas Emissions and the Effects of Climate Change in National Environmental Policy Act Reviews.” The guidance established a recommended reference point of 25,000 metric tons of annual CO<sub>2</sub> emissions as warranting further review.

Therefore, the Corps will not make a NEPA significance impact determination for GHG emissions or climate change. Rather, in compliance with NEPA implementing regulations, the anticipated GHG emissions and climate change impacts will be disclosed for each RMP.

#### 5.3.3.1 RMP 1: No Action

##### Regular/Recurring Operations and Maintenance

The No Action Alternative would also include routine operations and maintenance activities including but not limited to repairing spillway gates, conducting inspections and remote monitoring, pre-positioning materials, and repairing relief wells. These activities would result in periodic use of on-road and off-road equipment. Emissions would be short-term since the duration of typical routine operations and maintenance operations is approximately two weeks. Emissions from maintenance activities are exempt from the CAA General Conformity Rule per 40 CFR 93.153(c)(2)(iv). Estimated emissions are shown below:

<b>Table 5.3-2 RMP 1 No Action: Estimated Annual Emissions from Routine Operations and Maintenance</b>		
<b>Pollutants</b>	<b>General Conformity Applicability Rates (tons/year)</b>	<b>Emissions (tons/year)</b>
Ozone (VOC)	10	0.02
NO <sub>2</sub>	100	0.21
CO	100	0.14
Pb	25	-
PM <sub>10</sub>	100	0.01
PM <sub>2.5</sub>	100	0.01

<b>Table 5.3-3 RMP 1 No Action: Estimated GHG Emissions from Routine Operations and Maintenance</b>	
<b>Pollutants</b>	<b>2021 Estimated Annual Emissions (tons/year)</b>
GHG	27



### IRRM

IRRM includes conducting inspections, conducting annual coordination, updating emergency action plans, and mapping flood zones. IRRMs are composed of technical studies and administrative coordination and would not result in construction activities.

### Crest Elevation Restoration

Under the No Action RMP, restoration of the dam's crest elevation to its original design elevation is reasonably foreseeable in the next 50 years. The work would require excavation of approximately 57,000 cy of earthen fill from an approximately 55 acre borrow area. The work would result in emissions from off road earthmoving equipment such as dozers, excavators, loaders, and graders in addition to on-road haul trucks for export and import of fill. Crest restoration would require earthmoving and construction activities over a period of two years. Estimated emissions are shown below:

<b>Table 5.3-4 RMP 1 No Action: Estimated Annual Emissions from Construction</b>			
<b>Pollutants</b>	<b>General Conformity Applicability Rates (tons/year)</b>	<b>Construction Year 1 (tons/year)</b>	<b>Construction Year 2 (tons/year)</b>
Ozone (VOC)	10	0.2	0.03
NO <sub>2</sub>	100	2.4	0.2
CO	100	1.9	0.2
Pb	25	-	-
PM <sub>10</sub>	100	0.2	0.01
PM <sub>2.5</sub>	100	0.1	0.01

<b>Table 5.3-5 RMP 1 No Action: Estimated GHG Emissions from Construction</b>		
<b>Pollutants</b>	<b>Construction Year 1 (tons/year)</b>	<b>Construction Year 2 (tons/year)</b>
GHG	310	46.9

Total (combined construction and O&M) estimated emissions for the No Action RMP are shown below:

<b>Table 5.3-6 RMP 1: No Action: Total (Combined Construction and O&amp;M) Estimated Annual Emissions</b>			
<b>Pollutants</b>	<b>General Conformity Applicability Rates (tons/year)</b>	<b>Construction Year 1 (tons/year)</b>	<b>Construction Year 2 (tons/year)</b>
Ozone (VOC)	10	0.22	0.05
NO <sub>2</sub>	100	2.61	0.41
CO	100	2.04	0.34
Pb	25	-	-
PM <sub>10</sub>	100	0.21	0.02
PM <sub>2.5</sub>	100	0.11	0.02

<b>Table 5.3-7 RMP 1: No Action: Total Estimated GHG Emissions</b>		
<b>Pollutants</b>	<b>Construction Year 1 (tons/year)</b>	<b>Construction Year 2 (tons/year)</b>
GHG	327	73.9

Estimated emissions for the No Action RMP would be below the General Conformity Applicability Rates. Impacts to air quality would be less than significant under NEPA. Furthermore, General Conformity analyses under the CAA would not be required. For the purposes of the Clean Air Act, the total estimated emissions are reflected in Table 5.3-4, as O&M activities are exempt from the General Conformity Rule. With implementation of air quality best management practices, potential air quality impacts would be further reduced.

### **5.3.3.2 RMP 3E: Labyrinth Auxiliary Spillway and Seepage Control**

An approximately 240-ft. long segment of the Central Embankment north of the Pico Rivera Golf Course would be removed and replaced with an Auxiliary Labyrinth Spillway. Corrosion resistant sheet piles would be driven 40 ft. below the foundation slab and encircle the proposed Auxiliary Labyrinth Spillway. The dam's crest elevation would be raised to its original design elevation (239.0 ft.), approximately 1.8 feet above its current height will earthen fill from the borrow areas. Approximately 12 ft. high parapet walls would be installed atop the newly raised crest. In order to maintain flood risk minimization functions during construction, an approximately seven acre, semicircular, temporary earthen cofferdam would be constructed behind the section of embankment that would be removed for construction of the Auxiliary Labyrinth Spillway. Two borrow areas, a primary and secondary, would be required to provide fill for construction. Trench drains, relief wells, and filter blankets would be installed

downstream of the embankment. An approach and runout channel would need to be constructed upstream and downstream of the auxiliary spillway, respectively. Three roads that traverse the dam embankment would need to be raised in elevation to match the height of the parapet walls on the dam crest: Rosemead Boulevard, Lincoln Avenue, and Rooks Road. Construction would take over a period of four years. The work would result in emissions from off road earthmoving equipment such as dozers, excavators, loaders, and graders in addition to on-road haul trucks for export and import of fill. Estimated emissions are shown below:

<b>Table 5.3-8 RMP 3E: Labyrinth Auxiliary Spillway and Seepage Control Estimated Annual Emissions from Construction</b>					
<b>Pollutants</b>	<b>General Conformity Applicability Rates (tons/year)</b>	<b>Construction Year 1 (tons/year)</b>	<b>Construction Year 2 (tons/year)</b>	<b>Construction Year 3 (tons/year)</b>	<b>Construction Year 4 (tons/year)</b>
Ozone (VOC)	10	0.6	0.3	0.4	0.3
NO <sub>2</sub>	100	6.3	2.6	4.0	3.4
CO	100	4.0	2.8	5.2	4.8
Pb	25	-	-	-	-
PM <sub>10</sub>	100	1.9	1.8	0.3	0.2
PM <sub>2.5</sub>	100	1.1	0.1	0.2	0.1

<b>Table 5.3-9 RMP 3E: Labyrinth Auxiliary Spillway and Seepage Control Estimated GHG Emissions from Construction</b>				
<b>Pollutants</b>	<b>Construction Year 1 (tons/year)</b>	<b>Construction Year 2 (tons/year)</b>	<b>Construction Year 3 (tons/year)</b>	<b>Construction Year 4 (tons/year)</b>
GHG	695	435	792	724

Operations and maintenance of structures under RMP 5 would be no different from those characterized for the No Action RMP.

Implementation of IRRMs would be no different from those characterized for the No Action RMP.

Total estimated emissions for construction and O&M (O&M emissions are discussed under RMP 1) are shown below:

<b>Table 5.3-10 RMP 3E: Labyrinth Auxiliary Spillway and Seepage Control Total (Construction and O&amp;M) Estimated Annual Emissions</b>					
<b>Pollutants</b>	<b>General Conformity Applicability Rates (tons/year)</b>	<b>Construction Year 1 (tons/year)</b>	<b>Construction Year 2 (tons/year)</b>	<b>Construction Year 3 (tons/year)</b>	<b>Construction Year 4 (tons/year)</b>
Ozone (VOC)	10	0.62	0.32	0.42	0.32
NO <sub>2</sub>	100	6.51	2.81	4.21	3.61
CO	100	4.14	2.94	5.34	4.94
Pb	25	-	-	-	-
PM <sub>10</sub>	100	1.91	1.81	0.31	0.21
PM <sub>2.5</sub>	100	1.11	0.11	0.21	0.11

<b>Table 5.3-8 RMP 3E: Labyrinth Auxiliary Spillway and Seepage Control Total (Construction and O&amp;M) Estimated GHG Emissions</b>				
<b>Pollutants</b>	<b>Construction Year 1 (tons/year)</b>	<b>Construction Year 2 (tons/year)</b>	<b>Construction Year 3 (tons/year)</b>	<b>Construction Year 4 (tons/year)</b>
GHG	722	462	819	751

Estimated emissions for RMP 3E would be below the General Conformity Applicability Rates. Impacts to air quality would be less than significant under NEPA. Furthermore, General Conformity analyses under the CAA would not be required. For the purposes of the Clean Air Act, the total estimated emissions are reflected in Table 5.3-10, as O&M activities are exempt from the General Conformity Rule. With implementation of air quality best management practices, potential air quality impacts would be further reduced.

### 5.3.3.3 RMP 5: Protected Overtopping and Seepage Control

Roller compacted concrete (RCC) would be placed on the crest and downstream slope of the embankment to prevent erosion during overtopping. The stepped RCC face would help dissipate energy from overtopping flows. In addition, the design may include a splash pad or flip bucket at the downstream toe. Approximately 5 ft. high parapet walls would be installed atop the crest. RMP 5 would include routine O&M and IRRMs from the RMP 1 (No Action).

The work would result in emissions from off road earthmoving equipment such as dozers, excavators, loaders, and graders in addition to on-road haul trucks for export and import of fill. Construction would occur over a four year period. Estimated emissions are shown below:

<b>Table 5.3-9 RMP 5: Protected Overtopping and Seepage Control Estimated Annual Emissions from Construction</b>					
<b>Pollutants</b>	<b>General Conformity Applicability Rates (tons/year)</b>	<b>Construction Year 1 (tons/year)</b>	<b>Construction Year 2 (tons/year)</b>	<b>Construction Year 3 (tons/year)</b>	<b>Construction Year 4 (tons/year)</b>
Ozone (VOC)	10	0.5	0.2	0.3	0.2
NO <sub>2</sub>	100	5.3	2.4	3.0	2.6
CO	100	3.1	2.6	3.6	3.4
Pb	25	-	-	-	-
PM <sub>10</sub>	100	1.8	0.1	0.1	0.1
PM <sub>2.5</sub>	100	1.1	0.1	0.1	0.1

<b>Table 5.3-10 RMP 5: Protected Overtopping and Seepage Control Estimated GHG Emissions from Construction</b>				
<b>Pollutants</b>	<b>Construction Year 1 (tons/year)</b>	<b>Construction Year 2 (tons/year)</b>	<b>Construction Year 3 (tons/year)</b>	<b>Construction Year 4 (tons/year)</b>
GHG	551	399	521	494

Operations and maintenance of structures under RMP 5 would be no different from those characterized for the No Action RMP.

Implementation of IRRMs would be no different from those characterized for the No Action RMP.

Total estimated emissions for construction and O&M (O&M emissions are discussed under RMP 1) are shown below:

<b>Table 5.3-11 RMP 5: Protected Overtopping and Seepage Control Total (Construction and O&amp;M) Estimated Annual Emissions</b>					
<b>Pollutants</b>	<b>General Conformity Applicability Rates (tons/year)</b>	<b>Constructio n Year 1 (tons/year)</b>	<b>Construction Year 2 (tons/year)</b>	<b>Constructio n Year 3 (tons/year)</b>	<b>Constructio n Year 4 (tons/year)</b>
Ozone (VOC)	10	0.52	0.22	0.32	0.22
NO2	100	5.51	2.61	3.21	2.81
CO	100	3.24	2.74	3.74	3.54
Pb	25	-	-	-	-
PM10	100	1.81	0.11	0.11	0.11
PM2.5	100	1.11	0.11	0.11	0.11

<b>Table 5.3-12 RMP 5: Protected Overtopping and Seepage Control Total (Construction and O&amp;M) Estimated GHG Emissions</b>				
<b>Pollutants</b>	<b>Constructio n Year 1 (tons/year)</b>	<b>Constructio n Year 2 (tons/year)</b>	<b>Constructio n Year 3 (tons/year)</b>	<b>Constructio n Year 4 (tons/year)</b>
GHG	578	426	548	521

Estimated emissions for RMP 3E would be below the General Conformity Applicability Rates. Impacts to air quality would be less than significant under NEPA. Furthermore, General Conformity analyses under the CAA would not be required. For the purposes of the Clean Air Act, the total estimated emissions are reflected in Table 5.3-11, as O&M activities are exempt from the General Conformity Rule. With implementation of air quality best management practices, potential air quality impacts would be further reduced.

### 5.3.4 Environmental Commitments

While all potential impacts to air quality are considered less than significant, **Environmental Commitments (ECs) AQ-1 through AQ-7** would be implemented to minimize impacts to air quality during construction.

For all alternatives, these environmental commitments may include, but may not be limited to, the following:



- AQ-1** A Fugitive Dust Emission Control Plan would be developed and implemented. Fugitive dust from unpaved/untreated roads and other disturbed areas will be minimized by watering or other means during active operations.
- AQ-2** Maintain and tune engines per manufacturer's specifications to perform to EPA certification levels, where applicable, and to perform at verified standards applicable to retrofit technologies.
- AQ-3** All on-road construction vehicles would meet all applicable California on-road emission standards.
- AQ-4** Vehicle speeds shall be limited to 30 mph or less within the work areas.
- AQ-5** All off-road construction diesel engines not registered under California Air Resources Board's Statewide Portable Equipment Registration Program, which have a rating of 50 horsepower or more, shall meet, at a minimum, the Tier 3 California Emission Standards for Off-road Compression-Ignition Engines as specified in California Code of Regulations, Title 13, Section 2423(b)(1). If a Tier 3 or Tier 3-equivalent engine is not available for a particular item of equipment, Tier 2 compliant engines shall be allowed on a case by case basis.
- AQ-6** Diesel catalytic converters, diesel oxidation catalysts and diesel particulate filters as certified and/or verified by the EPA or CARB shall be installed on equipment operating
- AQ-7** Minimize use and trips of heavy equipment to the maximum extent practicable. Limit unnecessary idling of heavy equipment to five minutes.

## **5.4 NOISE AND VIBRATION**

The area potentially affected by the proposed RMPs for this resource generally encompasses the RMP action area as well as the area 0.5 miles south of the west, central, and east embankments.

### **5.4.1 Regulatory Framework**

#### **Noise Control Act of 1972, as amended (42 U.S.C. 4901 et seq.)**

The Noise Control Act of 1972 establishes a national policy to promote an environment for all Americans free from noise that jeopardizes their health and welfare. Primary responsibility for control of noise rests with state and local governments, although the USEPA is directed by Congress to coordinate the programs of all Federal agencies relating to noise research and noise control.

Noise generated by any activity, which may affect human health or welfare on Federal, lands must comply with noise limits specified in the Noise Control Act of 1972.

### **5.4.2 Thresholds of Significance**

A potentially significant impact may occur in regard to noise if a risk management plan would result in:

- Increased and sustained noise levels above the existing ambient condition and exceeding exterior noise levels for commercial and industrial properties (60-70 dBA) in the neighboring communities.
- Increased and sustained vibration above the existing ambient condition creating the potential for structural damage.

In general, human sound perception is noticeable at 3dBA, while a change of 5dBA is clearly noticeable. Empirical studies have shown people begin to notice changes in environmental noise level around 5 dBA. Average increases in noise levels less than 5 dBA cannot be definitively considered as producing an adverse impact.

Common sources of noise include vehicle traffic, other means of transportation, construction, industrial practices, and recreation uses in the Reservoir.

### **5.4.3 RMP Analysis and Comparison**

Impact analysis of the alternatives was prepared with identification of construction equipment to be used and average noise levels were calculated based on number and type of equipment to be used on a daily basis. Industry standards for manufactured equipment were reviewed and use quantified to determine average noise quality during implementation of the RMPs in comparison to the ambient average noise level of the area.

Noise can be defined as unwanted sound or combination of sounds that may interfere with conversation, work, rest, recreation, and sleep, or in the extreme may produce physiological or psychological damage. Sound has two main components to a human ear; pitch and loudness. Sound travels from a source in the form of wave, which exerts a pressure on a receptor such as a human ear. While the pitch of a sound is generally associated with an annoyance, sound loudness can interfere with activities such as conversation, sleep, and learning, and can even have lasting physiological effects, such as hearing loss.

Human response to noise is subjective and can vary greatly from person to person. Factors that influence individual response include the intensity, frequency, and pattern of noise; the amount of background noise present before the intruding noise; and the nature of work or human activity that is exposed to the noise source.

The preferred unit for measuring sound is the decibel (dB). The amount of pressure a sound wave exerts is referred to as sound level, commonly measured in decibels (dB). As a reference, a sound level of zero dB corresponds roughly to the threshold of human hearing and a sound level in the range of 120 to 140 dB can produce human pain. Those who are more sensitive to noise such as children and the elderly are at higher risk of being adversely affected by excessive noise levels.

**Table 5.5-1 Typical Construction Equipment and Modeled Attenuation at Various Distances from Sources**

Noise Source	Distance from Source				
	50 feet	100 feet	200 feet	500 feet	1,000 feet
Auger Drill Rig	84	78	72	64	58
Backhoe	78	72	66	58	52
Bull dozer	82	76	70	62	56
Compactor (Ground)	80	74	68	60	54
Concrete Batch Plant	83	77	71	63	57
Concrete Mixing Truck	79	73	67	59	53
Concrete Pump Truck	81	75	69	61	55
Concrete Saw	90	84	78	70	64
Crane	81	75	69	61	55
Dump Truck	76	70	64	56	50
Excavator	81	75	69	61	55
Front-End Loader	79	73	67	59	53
Generator	81	75	69	61	55
Grader	85	79	73	65	59
Horizontal Boring Hydraulic Jack	82	76	70	62	56
Mounted Impact Hammer (Hoe Ram)	90	84	78	70	64
Rock Crusher	93	87	81	73	67
Rock Drill	81	75	69	61	55
Pneumatic Tools	85	79	73	65	59
Truck (Pickup)	75	69	63	55	49
Truck (Flat-bed)	74	68	62	54	48

The dBA at 50 feet is a measured noise emission. The 100- to 1,000-foot results are modeled estimates.  
Source: FHWA 2007

#### **5.4.3.1 RMP 1: No Action**

RMP 1 is described in Chapter 3, section 3.7.1. Construction activities are reasonably foreseeable under this alternative due to the necessity to restore the dam crest to its original elevation. With or without the implementation of either action RMP or the crest elevation restoration, the Corps would continue O&M activities and would continue to implement IRRMs to address PFMs.

Recreation amenities are spread throughout the Reservoir with most active recreation area located to the north of Durfee Ave. A significant increase in noise levels is not anticipated under everyday conditions. Although the recreation area is fairly well built out, additional recreation

development could increase the overall noise level within the Reservoir. Use of the recreation amenities in the Reservoir would continue, although it is possible given the future plans of the LACP&R that a dedicated Special Events area would be developed that would provide opportunities for more special events to take place in the Whittier Narrows Dam Reservoir recreation area. This would allow large events such as festivals to take place in a dedicated area, increasing the noise level within that location.

### **IRRM**s

O&M activities undertaken under the No Action alternative also include the IRRMs. Implementation of IRMMs that have and would be implemented (Remote Monitoring, Inspection and Monitoring, Pre-position of Materials, Relief Well Repair, Annual Coordination, Emergency Action Plan Update, and Flood Mapping) require no construction, and are expected to have only minor temporary, direct impact on noise and vibration as they do not include construction activities, and would largely entail administrative or technical exercises that are not expected to result in noise-producing activities that would result in and sustained noise levels above the existing ambient condition and exceeding exterior noise levels for commercial and industrial properties in the neighboring communities. Activities may include minor equipment use, such as a pickup truck, flatbed truck, generator, or similar. Noise and vibration is expected to attenuate to below ambient at 500 ft. from the source. All actions are expected to be located more than 500 ft. from the nearest sensitive receptor, which is residential housing. Impacts are expected to be less than significant. No indirect impacts are anticipated.

### **Close Bike Paths and Dam Crest**

The San Gabriel River Trail would be closed approximately 1,000 ft. upstream of the spillway during the construction period. Closure of the San Gabriel River Trail during restoration of the Dam crest elevation would be temporary and is not anticipated to have any direct or indirect impacts on noise and vibration as the action is largely administrative and is not expected to result in noise or vibration-producing activities that would result in and sustained noise levels above the existing ambient condition and exceeding exterior noise levels for commercial and industrial properties in the neighboring communities. All actions are located more than 2,600 ft. from the nearest sensitive receptor, which is residential housing.

### **Crest Elevation Restoration**

Under the No Action Alternative, restoration of the Dam's crest elevation to its original design elevation is reasonably foreseeable in the next 50 years.

The estimated volume of soil to restore the Dam crest and affected roads 1.8 ft. is 57,000 cy. The estimated dimensions of the borrow area affected to produce these quantities would be about 55 acres with two (2) ft. deep excavation on average. The assumed borrow area would be upstream of the Central embankment between the crossover channel and Siphon Road. Topsoil from the borrow site would be stockpiled and replaced at closure and the topography would be graded to a natural appearance. If pursued, it would be subject to separate detailed analysis under NEPA.

The crest elevation restoration would add construction equipment on the crest. The nearest sensitive receptors, which are residential housing, are approximately 400 ft. away from the proposed activity. Impacts associated with construction using heavy equipment on the crest of

the levee is expected to attenuate to at or near ambient conditions at the nearest sensitive receptors.

Batch plants would be located upstream of the embankments. The batch plant upstream of the central embankment would be the closest to the nearest sensitive receptor at approximately 950 ft. Sound generated by the use of heavy equipment such as excavators or front end loaders, loaded trucks and the operation of the batch plants is expected to attenuate to approximately ambient levels at this distance. The height and volume of the Dam would significantly attenuate noise impacts to the residential area.

The borrow area would be located upstream of the central embankment. The borrow area would be at least 1,800 ft. from the closest sensitive receptor, the residential area adjacent to the Pico Rivera Golf Course. Sound generated by the use of heavy equipment such as excavators or front end loaders and loaded trucks is expected to attenuate to approximately ambient levels at this distance. The height and volume of the Dam would significantly attenuate noise impacts to the residential area. Impacts for the crest elevation restoration are expected to be direct, temporary, and less than significant. No indirect impacts are anticipated.

#### **Regular/Recurring Operations and Maintenance**

Under the No Action RMP, O&M activities are anticipated to continue as currently implemented. Regular and recurring O&M activities include mechanical and electrical repair of the gates, vegetation management on the Dam and its appurtenant structures, including the downstream slope of the embankment, and mowing of vegetation upstream in the operations area immediately adjacent to the central embankment, removal of debris and sediment that accumulates at the upstream concrete apron of the outlet on the Rio Hondo and other structures, graffiti removal, and cleaning the relief wells. Other maintenance that is performed as needed includes repair of the concrete crossover weir, levee repair, filling pot-holes on the Dam crest road, and repairing gates and fences.

Regular/Recurring O&M activities are expected to have only minor temporary, direct impact on noise and vibration. Activities may include minor equipment use, such as a pickup truck, flatbed truck, generator, or similar. O&M activities may occasionally include use of construction equipment such as an excavator or a front-end loader, or may occasionally include use of high dBa-producing tools, such as pneumatic tools or a concrete saw. Noise and vibration is expected to attenuate to ambient or below at 500 ft. from the source. All actions are expected to be located more than 500 ft. from the nearest sensitive receptor, which is residential housing. Impacts are expected to be less than significant. No indirect impacts are anticipated.

#### **5.4.3.2 RMP 3E: Labyrinth Auxiliary Spillway and Seepage Control**

RMP 3E is described in Chapter 3, section 3.7.2. Under this RMP, overtopping is addressed through adding spillway capacity and backward erosion piping is addressed through construction of a trench drain at the downstream Dam toe and graded filter blanket adjacent to Rosemead Blvd.

## **IRRM**

Impacts would be similar to those characterized for the same activity under RMP 1: No Action.

## **Phase 1**

### **Staging Areas**

Development of the staging area in the western half of Streamland Park would involve the use of several pieces of heavy earth-moving equipment to clear and grub the site. Trucks would be loaded to haul material to be disposed off-site. Personal vehicles would be parked in the area, arriving in the early morning and leaving in the late afternoon. The nearest residential area is immediately adjacent to the south side of the planned staging area. Increased noise levels above the existing ambient condition could exceed exterior noise levels for commercial and industrial properties in the neighboring communities. These impacts would be direct and temporary, but could also be significant as the nearest residential area is immediately west of and adjacent to the park. Environmental Commitments N-1 through N-13 would be implemented to reduce impacts to less than significant.

Development of the staging area in the Pico Rivera Golf Course would be similar to that of Streamland Park, but a larger area of 22 acres compared to 8 acres, which would generally equate to a longer construction time. The site would be cleared and grubbed. Material to be disposed would be hauled off-site. Increased noise levels above the existing ambient condition could exceed exterior noise levels and could be potentially significant. With the implementation of Environmental Commitments N-1 through N-13, impacts would be reduced to less than significant.

### **Close Bike Paths and Dam Crest**

Similar to RMP 1.

### **Temporary Relocation of Utilities**

The temporary relocation and reconnection of utilities would be short-term and would occur downstream of the toe of the Dam. The nearest sensitive receptors, which are residential housing, are less than 300 ft. away from the proposed activity near Streamland Park and the nearest receptor downstream of the west embankment is less than 200 ft. away, from the utility relocation area. Impacts from the temporary relocation of utilities are expected to attenuate to at or near ambient conditions at the nearest sensitive receptors. Impacts are expected to be direct, temporary and less than significant. No indirect impacts are anticipated. For the duration of the temporary relocation and reconnection of utilities through the Dam, ECs N-1 through N-13 would be implemented to further reduce impacts.

The high power tower located in the Pico Rivera Golf Course approximately 400 ft. from the nearest residential units would be relocated to the far eastern end of the Golf Course, over 1,000 ft. from the nearest residential units. The noise created from removal and re-installation of the tower is expected to attenuate to ambient or below at these residential units. Impacts are expected to be direct, temporary, and less than significant. No indirect impacts are anticipated. Dismantling and re-installing the tower could occur simultaneously with the development and continued operation of the golf course as a staging area. If that were to occur, the noise created



by this activity would be in addition to noise created by the development and continued operation of the staging area. Impacts would be further minimized with Environmental Commitments N-1 through N-13.

## **Phase 2**

### **Redevelop Staging Areas**

Impacts would be similar to those under “Staging Areas” described under Phase 1, above.

### **Extend Crossover Weir**

Water from the San Gabriel River when reaching elevation 208.0 ft. flows over the crossover weir into the crossover channel. After closing the River Trail, the current crossover weir located immediately upstream of the spillway would be relocated approximately 200 ft. upstream so that a new crossover channel can be dug due to the need for the coffer dam during construction of the auxiliary labyrinth spillway. Construction would entail excavation, grading, and redeposition earthen substrate. Extension of the crossover weir and crossover channel would occur north of the central embankment, approximately 1,100 to 1,500 ft. from the nearest sensitive receptors, the residential housing south of Pico Rivera Golf Course. Sound generated by the use of heavy equipment such as excavators or front end loaders is expected to attenuate to ambient levels, or below, at this distance. The height and volume of the Dam would significantly attenuate noise impacts to the residential area. Impacts are expected to be direct, temporary, and less than significant. No indirect impacts are expected.

### **Batch Plants and Haul Routes**

The three batch plants would be located upstream of the embankments. The batch plant upstream of the central embankment would be the closest to the nearest sensitive receptor at approximately 950 ft. Sound generated by the use of heavy equipment such as excavators or front end loaders, loaded trucks and the operation of the batch plants is expected to attenuate to approximately ambient levels at this distance. The height and volume of the Dam would significantly attenuate noise impacts to the residential area. Impacts are expected to be direct, temporary, and less than significant. No indirect impacts are anticipated.

### **Borrow Area**

The borrow area would be located upstream of the central embankment. The borrow area would be at least 1,800 ft. from the closest sensitive receptor, the residential area adjacent to the Pico Rivera Golf Course. Sound generated by the use of heavy equipment such as excavators or front end loaders and loaded trucks is expected to attenuate to approximately ambient levels at this distance. The height and volume of the Dam would significantly attenuate noise impacts to the residential area. Impacts are expected to be direct, temporary, and less than significant. No indirect impacts are anticipated.

### **Cofferdam**

The cofferdam would be located upstream of the embankments. The nearest sensitive receptor, the residential area adjacent to the Pico Rivera Golf Course is approximately 1,450 ft. from the location of the cofferdam. Sound generated by the use of heavy equipment such as excavators or front end loaders and loaded trucks is expected to attenuate to approximately ambient levels at

this distance. The height and volume of the Dam would significantly attenuate noise impacts to the residential area. Impacts would be direct, temporary, and less than significant. No indirect impacts are anticipated.

### **Foundation/Sheetpile**

The sheetpile would be implemented at the downstream edge of the auxiliary spillway. The closest distance between residences and the location of sheetpile installation will be approximately 750 feet. The closest residential area is expected to be the development adjacent to the Pico Rivera Golf Course. At this distance, noise is expected to attenuate to approximately ambient levels. The ground borne vibration caused by the driving of sheetpile is also expected to attenuate, but may remain perceptible to human receptors. Vibratory motion is commonly described by identifying the peak particle velocity (PPV). Using Caltrans guidance (Transportation and Construction Vibration Guidance Manual, 2013) for pile driving and assuming the (1) closest distance between the dam and the residences, and (2) soil parameters appropriate for the site, the vibrations are anticipated to be below the threshold for human detection and well below the damaging threshold. Caltrans reports the damaging threshold for extremely fragile historic buildings, ruins, and ancient monuments to be 0.08 in/sec PPV. The threshold for human detection is generally taken as 0.01 to 0.02 in/sec PPV. The threshold for most of the impacted residences is expected to be closer to 0.3 in/sec PPV. Greater distances result in lower PPV. The foundation/sheetpile construction component is expected to have the greatest potential for ground-borne vibration of the components in RMP 3E. Impacts for vibration for other components are expected to be similar to, or less than, the foundation sheetpile component. Impacts are expected to be direct, temporary, and less than significant. No indirect impacts are anticipated. Environmental Commitments N-1 through N-13 would be implemented to minimize impacts.

### **Construct Auxiliary Spillway**

A 240-ft. wide passive weir auxiliary spillway would be constructed in-line with the existing embankment and immediately west of the existing spillway to increase the spillway capacity. A bridge across the auxiliary spillway would be required to provide access to the San Gabriel River spillway during extreme events. Construction related noises, such as demolition of the embankment and the use of heavy equipment is expected to attenuate to approximately ambient levels at this distance, which is approximately 700 ft. from the residential area south of Pico Rivera Golf Course. Impacts are expected to be direct, temporary, and less than significant. No indirect impacts are anticipated. Environmental Commitments N-1 through N-13 would be implemented to further minimize impacts.

### **Parapet Walls**

The additional construction of the 12 ft. high parapet wall on the crest would add construction equipment on the crest. The nearest sensitive receptors, which are residential housing, are approximately 400 ft. away from the proposed activity. Impacts associated with construction using heavy equipment on the crest of the levee are expected to attenuate to at or near ambient conditions at the nearest sensitive receptors. Impacts are expected to be direct, temporary and less than significant. No indirect impacts are anticipated. For the duration of the temporary relocation and reconnection of utilities through the Dam, **ECs N-1 through N-13** would be implemented to further reduce impacts.

### **Approach and Runout Channels**

The approach channel would be located upstream of the embankments. The approach channel would be the closest to the nearest sensitive receptor at approximately 1,450 ft. being the residential area adjacent to the Pico Rivera Golf Course. The height and volume of the Dam would significantly attenuate noise impacts to the residential area. Impacts are expected to be direct, temporary, and less than significant. No indirect impacts are anticipated.

The runout channel would be developed downstream of the auxiliary spillway. The nearest sensitive receptor would be over 900 ft. away, being the residential area adjacent to the Pico Rivera Golf Course. Environmental Commitments N-1 through N-13 would be implemented to minimize impacts. Impacts are expected to be direct, temporary, and less than significant. No indirect impacts are anticipated.

### **Road Modifications**

Noise created by the raising of Rosemead Blvd. would have a direct but temporary impact on the residential areas on either side of the roadway as homes are located less than 200 ft. from the area of downstream construction. Impacts are expected to be direct, temporary, and less than significant. Impacts would be further minimized by the implementation of ECs N-1 through N-13. No indirect impacts are anticipated.

### **Trench Drain and Filter Blanket**

The construction of the trench drain and filter blanket would occur in a 90 ft. wide strip from the downstream toe of the Dam. The closest sensitive receptor at approximately 325 ft would be the residential area adjacent to Streamland Park. Noise associated with construction using heavy equipment on the crest of the levee is expected to attenuate to at or near ambient conditions at the nearest sensitive receptors. Impacts are expected to be direct, temporary and less than significant. No indirect impacts are anticipated. For the duration of the temporary relocation and reconnection of utilities through the Dam, ECs N-1 through N-13 would be implemented to further reduce impacts.

### **Closeout**

Closeout of the Phase 2 construction activities would involve the dismantling of the batch plants and staging areas and removal of these facilities from the Project site. Any gravel or other material laid down on the haul roads would be removed. Soil over culverts over the crossover channel would be removed. The batch plant upstream of the central embankment would be the closest to the nearest sensitive receptor at approximately 950 ft. Sound generated by the use of heavy equipment such as excavators or front end loaders, loaded trucks and the dismantling of the batch plants is expected to attenuate to approximately ambient levels at this distance. The height and volume of the Dam would significantly attenuate noise impacts to the residential area. Impacts are expected to be direct, temporary, and less than significant. No indirect impacts are anticipated.

The residential areas adjacent to the staging areas would be disturbed as trucks and heavy-duty equipment would be leaving the sites and other equipment re-grading and hydroseeding the sites. Impacts would be similar to those described under “Staging Areas”, above.

### **Regular/Recurring Operations and Maintenance**

Operations and maintenance activities for RMP 3E would be similar to those of RMP 1: No Action.

#### **5.4.3.3 RMP 5: Protected Overtopping with Seepage Control**

RMP 5 is described in Chapter 3, section 3.7.3. Under this RMP, overtopping is addressed through hardening of the Dam crest to prevent erosion or subsequent failure of the Dam from events large enough to cause overtopping. Backward erosion piping is addressed through construction of a trench drain at the downstream Dam toe and graded filter blanket adjacent to Rosemead Blvd.

### **IRRMs**

Impacts would be similar to characterized for the same activity under RMP 1: No Action.

#### **Phase 1**

##### **Staging Areas**

Impacts would be similar to those characterized for the same activity under RMP 3E.

##### **Close Bike Paths and Dam Crest**

Impacts would be similar to that characterized for the same activity under RMP 1.

##### **Temporary Relocation of Utilities**

Impacts would be similar to that characterized for the same activity under RMP 3E.

#### **Phase 2**

##### **Redevelop Staging Areas**

Impacts would be similar to that characterized for the same activity under RMP 3E.

##### **Batch Plants and Haul Routes**

Impacts would be similar to that characterized for the same activity under RMP 3E.

##### **Remove Topsoil**

Removal of topsoil from the downstream face of the Dam would be approximately 200 ft. from the nearest receptors, being the residential area downstream of the west embankment and the residential area adjacent to Streamland Park. Other residential areas are within 350 ft., adjacent to the Pico Rivera Golf Course. Increased noise levels above the existing ambient condition could exceed exterior noise levels for commercial and industrial properties in the neighboring communities during active construction periods. These impacts would be direct and temporary, but could also be both significant and unavoidable as the nearest residential area is immediately west of and adjacent to the park. Best management practices N-1 through N-13 would be implemented to reduce impacts to a level of less than significant. No indirect impacts are anticipated.

### **Roller Compacted Concrete**

Vibratory compactors and other heavy equipment will be operating along the crest and downstream face of the dam during the placement of the roller compacted concrete. The distance between residences the location of RCC placement will typically be greater than 115 feet. The nearest receptors would likely be the residential area downstream of the west embankment and the residential area adjacent to Streamland Park. Other residential areas are within 350 ft., adjacent to the Pico Rivera Golf Course. Noise impacts are expected attenuate to ambient levels at these distances during these activities.

Vibratory motion is commonly described by identifying the peak particle velocity (PPV). Using Caltrans guidance (Transportation and Construction Vibration Guidance Manual, 2013) for vibratory compactors and assuming the (1) closest distance between the dam and the residences, and (2) soil parameters appropriate for the site, the vibrations are anticipated to be at or below the threshold for human detection and well below the damaging threshold. The threshold for human detection is generally taken as 0.01 to 0.02 in/sec PPV. Caltrans reports the damaging threshold for extremely fragile historic buildings, ruins, and ancient monuments to be 0.08 in/sec PPV. The threshold for damage for most of the impacted residences will be closer to 0.3 in/sec PPV. Greater distances result in lower PPV. The RCC construction component is expected to have the greatest potential for ground-borne vibration of the components in RMP 5. These impacts are expected to be direct and temporary, and less than significant. No indirect impacts are anticipated.

### **Replace Topsoil**

Replacing topsoil on the downstream face of the Dam would be approximately 200 ft. from the nearest receptors, being the residential area downstream of the west embankment and the residential area adjacent to Streamland Park. Other residential areas are within 350 ft., adjacent to the Pico Rivera Golf Course. Increased noise levels above the existing ambient condition could exceed exterior noise levels for commercial and industrial properties in the neighboring communities during active construction periods. These impacts are expected to be direct and temporary, but could also be both significant and unavoidable as the nearest residential area is immediately west of and adjacent to the park. Environmental Commitments N-1 through N-13 would be implemented to reduce impacts to a level of less than significant. No indirect impacts are anticipated.

### **Road Modifications**

Raising Lincoln Ave. would be approximately 500 ft. from the nearest sensitive receptor, being a residential area downstream of the Dam. Noise impacts associated with construction using heavy equipment is expected to attenuate to at or near ambient conditions at the nearest sensitive receptors. Impacts are expected to be direct, temporary and less than significant. No indirect impacts are anticipated. ECs N-1 through N-13 would be implemented to further reduce impacts.

### **Construct Parapet Wall**

Construction of the parapet wall between Lincoln Ave. and the Montebello Hills would be approximately 500 ft. from the nearest sensitive receptor, being a residential area downstream of the Dam. Noise associated with construction using heavy equipment is expected to attenuate to at or near ambient conditions at the nearest sensitive receptors. Impacts are expected to be direct,

temporary and less than significant. No indirect impacts are anticipated. ECs N-1 through N-13 would be implemented to further reduce impacts.

#### **Trench Drain and Filter Blanket**

Impacts would be similar to that characterized for the same activity under Risk Management Plan 3E.

#### **Closeout**

Impacts would be similar to that characterized for the same activity under RMP 3E.

#### **Operations and Maintenance**

O&M activities for RMP 5 would be similar to those of RMP 1.

### **5.4.4 Environmental Commitments**

While most potential impacts to noise and vibration are considered less than significant, components of RMP 3E and RMP 5 have the potential for significant impacts that will be reduced to a level of less than significant with **Environmental Commitments (ECs) N-1 through N-13** described below.

- N-1** All equipment will be subject to noise reduction measures, as applicable. These measures may include, but may not be limited to, properly operating and maintaining mufflers, correct placement of equipment engine covers, and ensuring that small loading equipment is equipped with rubber tires. Equipment shall be maintained in accordance with manufacturer's recommendations. All machinery shall be equipped with the best available exhaust mufflers and "hush kits," as applicable.
- N-2** Construction activities likely to create noise and dust shall be restricted to the hours of 7 a.m. to 5 p.m. Noise producing signals, including horns, whistles, alarms, and bells shall be limited to safety warning purposes only.
- N-3** A contractor-prepared Construction Noise and Vibration Monitoring Plan prepared by an appropriate acoustical consultant will be reviewed and approved by the Corps' Project team before beginning work on the project.
- N-4** Monitor construction noise for the project duration, at the most potentially affected sensitive receivers. Summaries of measured noise levels should be provided weekly or more often, if noise complaints arise.
- N-5** Inspect all equipment periodically to ensure proper maintenance and presence of noise control devices (e.g., lubrication, mufflers that do not leak, and shrouding).
- N-6** Maintain temporary barriers in good condition through construction.
- N-7** Restrict idling of mobile equipment to no more than five minutes.
- N-8** Designate a disturbance coordinator (DC) during the construction period and post a 24-hour contact number around the project site, and provide to nearby residents.
- N-9** Provide written notice of construction-related activities to nearby sensitive receptors identifying the type, duration, and frequency of activities and a mechanism to register complaints.



- N-10** Limit operation of trucks and bulldozers sensitive to at least 60 ft. away from sensitive structures. If operation of equipment closer than 60 ft. is required, vibration monitoring should be conducted.
- N-11** Whenever construction occurs within 500 ft. of occupied residences, temporary barriers shall be constructed around the construction sites to shield the ground floor of the noise-sensitive uses. These barriers shall achieve a Sound Transmission Class of 30 or greater, based on certified sound transmission loss data taken according to American Society for Testing and Materials Test Method E 90.
- N-12** Construction equipment staging areas shall be located as far as practicable from residential areas.
- N-13** Routes for heavy construction site vehicles shall be identified to minimize noise impacts to residences and noise-sensitive receptors.

## **5.5 BIOLOGICAL RESOURCES**

The area potentially affected by the proposed RMPs for this resource is the Project boundaries with consideration of regional linkages in the Montebello Hills to the west, the La Puente and Chino Hills to the east, and the San Gabriel River and Rio Hondo as they relate to wildlife movement.

### **5.5.1 Regulatory Framework**

#### **Endangered Species Act (ESA)**

The ESA was enacted “to provide a means whereby the ecosystems upon which endangered species and threatened species depend may be conserved, [and] to provide a program for the conservation of such endangered species and threatened species.” 16 U.S.C. § 1531(b). When a species is listed as threatened or endangered, the Secretary of the Interior designates critical habitat. 16 U.S.C. § 1533(a)(3)(A). Under ESA Section 7(a)(2), each federal agency must insure that any action it authorizes, funds, or carries out is not likely to jeopardize the continued existence of any listed species or result in the destruction or adverse modification of the species’ designated critical habitat. 16 U.S.C. § 1536(a)(2). In fulfilling this obligation, each agency is required to “use the best scientific and commercial data available.” *Id.* If an agency determines that its actions “may affect” a listed species or its critical habitat, the agency must conduct informal or formal consultation, as appropriate, with either the United States Fish and Wildlife Service (USFWS) or the National Marine Fisheries Service (NMFS), depending on the species at issue (50 C.F.R. §§ 402.01, 402.14(a)–(b)).

#### **Fish and Wildlife Coordination Act (FWCA)**

The FWCA (16 U.S.C. § 661-667), as amended, requires Federal agencies consult with the USFWS and state wildlife agencies whenever the “waters of any stream or other body of water are proposed or authorized, permitted, or licensed to be impounded, diverted, ... or otherwise controlled or modified for any purpose whatever, including navigation and drainage.” Federal agencies must consider effects that these projects would have on wildlife development and provide for improvement of these resources. Consultation is to be undertaken for the purpose of “preventing loss of and damage to wildlife resources.” Full consideration is given to USFWS and state agency comments and recommendations resulting from this consultation.

### **Migratory Bird Treaty Act (MBTA)**

The MBTA, 16 U.S.C. §§ 703-711, makes it unlawful at any time, by any means or in any manner, to pursue, hunt, take, capture, kill, attempt to take, capture, or kill, possess, offer for sale, sell, offer to barter, barter, offer to purchase, purchase, deliver for shipment, ship, export, import, cause to be shipped, exported, or imported, deliver for transportation, transport or cause to be transported, carry or cause to be carried, or receive for shipment, transportation, carriage, or export, any migratory bird listed in 50 C.F.R. Part 10, including feathers or other parts, nests, eggs, or products, except as allowed by implementing regulations. According to MBTA implementing regulations at 50 C.F.R. 10.12, “take” means “to pursue, hunt, shoot, wound, kill, trap, capture, or collect, or attempt to pursue, hunt, shoot, wound, kill, trap, capture, or collect.” “Take” refers to conduct directed at birds, such as hunting and poaching, and does not refer to accidental activity or the unintended results of other conduct.

### **Executive Orders**

Relevant EOs include the following:

- ***Protection and Enhancement of Environmental Quality—EO 11514***, issued on March 5, 1970, supports the purpose and policies of NEPA and directs Federal agencies to **take measures to meet national environmental goals**.
- ***Protection of Wetlands—EO 11990***, issued on May 24, 1977, helps avoid the long-term and short-term adverse impacts associated with destroying or modifying wetlands and avoiding direct or indirect support of new construction in wetlands when there is a practicable alternative.
- ***Invasive Species—EO 13112***, issued on February 3, 1999, helps prevent the introduction of invasive species and provides for their control and minimizes the economic, ecological, and human health impacts that invasive species cause.
- ***Migratory Birds—EO 13186***, issued on January 10, 2001, promotes the conservation of migratory birds and their habitats and directs Federal agencies to implement the Migratory Bird Treaty Act.

### **5.5.2 Thresholds of Significance**

An RMP may result in a potentially significant impact related to Biological Resources if it would:

- Have a substantial adverse effect or net loss in habitat of ESA designated critical habitat.
- Have a substantial adverse effect, either directly or through habitat modification, on any species identified as federally endangered or threatened species
- Have a permanent substantial effect, either directly or through habitat modification to wildlife inhabiting the Project area

### **5.5.3 RMP Analysis and Comparison**

#### **5.5.3.1 RMP 1: No Action**

RMP 1 is described in Chapter 3, section 3.7.1. Construction activities are reasonably foreseeable under this alternative due to the necessity to restore the dam crest to its original elevation. With or without the implementation of either action RMP or the crest elevation restoration, the Corps would continue O&M activities and would continue to implement IRRMs to address PFM.

#### **IRRM**

O&M activities undertaken under the No Action alternative also include the IRRMs. Implementation of IRRMs including Repair Spillway Gates and Pre-Positioning of Materials, and Flood Mapping are complete, were subject to separate analysis, and did not result in significant impact to biological resources. Implementation of IRRMs including Remote Monitoring, Inspection and Monitoring, Emergency Action Plan Update, and Annual Coordination are ongoing. These IRRMs do not currently include ground or vegetation disturbing activities, require no excavation, and have limited potential for other physical disturbance in the Reservoir. Some potential exists for minor vegetation disturbance during “Inspection and Monitoring”, though this activity is not expected to result in vegetation clearing or the use of heavy equipment. These activities would not have a permanent substantial effect, directly or through habitat modification, to wildlife inhabiting the Project area. These activities have the potential to result in minor, temporary direct impacts to biological resources that are less than significant. No indirect impacts are anticipated.

#### **Close Bike Paths and Dam Crest**

The San Gabriel River Trail would be closed approximately 1,000 ft. upstream of the spillway during the period of construction for the crest elevation restoration. Closure of the San Gabriel River Trail during restoration of the Dam crest elevation would not involve any direct impacts to biological resources. The potential exists for direct impacts to vegetation from individual recreationists navigating around the closure. These impacts are expected to be minor, temporary and less than significant. These activities would not have a permanent substantial effect, directly or through habitat modification, to wildlife inhabiting the Project area. No indirect impacts are anticipated.

#### **Crest Elevation Restoration**

Under the No Action Alternative, restoration of the Dam’s crest elevation to its original design elevation is reasonably foreseeable in the next 50 years in the absence of an action RMP that either includes a crest elevation repair or makes it unnecessary. If pursued, it may be subject to separate detailed analysis at that time, but general impacts to biological resources are described. The estimated volume of soil to restore the Dam crest and affected roads is 57,000 cy. The estimated dimensions of the borrow area affected to produce these quantities would be about 55 acres with two (2)-ft. deep excavation on average. The proposed borrow area would be upstream of the Central embankment between the crossover channel and Siphon Road (Figure 3.7-3).

Components of a crest restoration are expected to include a borrow area, haul roads, and staging areas similar to those described under RMP 3E, although specific locations are not fully described at this time. Direct impacts, therefore, are expected to be similar to, though somewhat less than, the impacts described for those components under RMP 3E. Indirect impacts are also expected to be similar, though the impacts associated with the crossover weir/crossover channel relocation and coffer dam would not occur, and therefore the amount of area expected to be usable by wildlife during the construction period is expected to be greater than under RMP 3E. If a temporary culvert crossing would be necessary to access the borrow areas, the crest elevation restoration could temporarily impact the fringe wetlands that occur in the crossover channel. Impacts to federally listed species and their critical habitat also have the potential to occur. Any necessary NEPA analysis or ESA consultation would occur at the time of implementation.

### **Regular/Recurring Operations and Maintenance**

The Corps is required, through maintenance activities, to ensure that the Dam is free of debris, graffiti, sediment and vegetation as prescribed in the current O&M Manual as well as applicable laws, regulations, and policies as noted under the Regulatory Framework section, above. Corps Engineering Technical Letter (ETL) 1110-2-583 (30 April 2014), *Guidelines for Landscape Planting and Vegetation Management at Levees, Floodwalls, Embankment Dams, and Appurtenant Structures*, provides clarifying guidance on requirements of dam and levee inspection and certification. Regular and recurring O&M activities include mechanical and electrical repair of the gates, graffiti removal or covering, and cleaning the relief wells. Other maintenance that is performed as needed includes repair of the concrete crossover weir, levee repair, filling pot-holes on the Dam crest road, and repairing gates and fences. These activities are anticipated to occur either on the Dam structure itself or on built features within the Reservoir. If more than ruderal vegetation occurs in the areas of impact, the activity would be coordinated with a Corps biologist to ensure avoidance of impacts to species.

Removal of debris and sediment on the concrete aprons of structures (and within the gates as necessary) would be excavated by scooping and lifting the material out of these areas. These areas collect sediment and debris after precipitation events but, because they are frequently cleaned, are not expected to contain significant native vegetation or habitat. Vegetation immediately downstream of outlet apron will be removed and debris taken outside of channel for placement at approved areas. Vegetation will be maintained on existing roadways, including the Dam toe roads.

Currently, vegetation management occurs on the Dam and its appurtenant structures, including the downstream slope of the embankment, and approximately 40 acres is mowed within the operations area of the Dam, immediately upstream of the central embankment. Vegetation maintenance activities would begin prior to the breeding season (March 15 to September 15 each year) to avoid impacts to nesting birds. Mowing of the central embankment areas would begin prior to March 15 of each year, unless coordinated with a Corps biologist as necessary, and grasses would be kept short through September. Coordination with a Corps biologist will occur prior to implementation to ensure avoidance of impacts to species. These activities would not have a permanent substantial effect, directly or through habitat modification, to wildlife inhabiting the Project area. These activities are expected to result in minor, temporary, direct impacts to biological resources that are less than significant. No indirect impacts are anticipated.

Activities could be subject to additional NEPA or other environmental compliance at the time of implementation. Impacts to critical habitat will be discussed below.

### **5.5.3.2 RMP 3E: Labyrinth Auxiliary Spillway and Seepage Control**

RMP 3E is described in Chapter 3, section 3.7.2. Under this RMP, overtopping is addressed through adding spillway capacity and backward erosion piping is addressed through construction of a trench drain at the downstream Dam toe and graded filter blanket adjacent to Rosemead Blvd.

#### **IRRM**

Impacts would be similar to those described under RMP 1: No Action.

#### **Phase 1**

##### **Staging Areas**

Federal Land currently out-granted to the City of Pico Rivera, used for the Pico Rivera Municipal Golf Course (approximately 22 acres) and Streamland Park (approximately 8 acres), would be used as staging areas during construction. These areas are either highly disturbed or include ornamental/turfgrass and highly maintained vegetated areas, including ball fields (Streamland Park) and golf course vegetated elements (Pico Rivera Golf Course). Removal of vegetation in these areas may have an effect on the complement of urban-adapted residential birds, such as house sparrows, mockingbirds, house finches, starlings, blackbirds, etc., and small mammals, such as ground squirrels, opossums, and raccoons. Species are expected to relocate after disturbance. These activities would not have a permanent substantial effect, directly or through habitat modification, to wildlife inhabiting the Project area. Impacts are expected to be direct, temporary, and less than significant. No indirect effects are anticipated.

##### **Temporary Relocation of Utilities**

Relocation of utilities involves providing for construction access to existing subsurface utilities which pass through the embankment, excavating areas downstream of the dam, re-routing existing utilities, modifying the foundation, pipes, and galleries and returning the utilities to the modified structures. These areas are either highly disturbed or include ornamental/turfgrass and highly maintained vegetated areas downstream of the Dam. Removal of vegetation in these areas may have a direct effect on the complement of urban-adapted residential birds, such as mockingbirds, house finches, starlings, blackbirds, etc., and small mammals, such as rodents, opossums, and raccoons. Species are expected to relocate after disturbance. These activities would not have a permanent substantial effect, directly or through habitat modification, to wildlife inhabiting the Project area. Impacts are expected to be direct, temporary, and less than significant. No indirect effects are anticipated.

## **Phase 2**

### **Redevelop Staging Areas**

Redevelopment of the staging areas for construction of the dam site would occur within areas previously utilized for staging areas in Phase 1 and is not expected to result in direct or indirect impacts to biological resources.

### **Close Bike Paths and Dam Crest**

The San Gabriel River Trail would be closed approximately 1,000 ft. upstream of the spillway during the period of construction for the crest elevation restoration. Closure of the San Gabriel River Trail during restoration of the Dam crest elevation are not expected to involve any direct or indirect impacts to animal resources. The potential exists for direct impacts to vegetation from individual recreationists navigating around the closure. These activities would not have a permanent substantial effect, directly or through habitat modification, to wildlife inhabiting the Project area. These impacts are expected to be temporary and less than significant. No indirect impacts are anticipated.

### **Extend Crossover Weir**

Water from the San Gabriel River when reaching elevation 208.0 ft. flows over the crossover weir into the crossover channel. The elevation of Whittier Narrows Reservoir along the embankment increases from the West Embankment to the East Embankment. Thus, the West Embankment serves as the primary flood pool where flows are controlled by the dam on Rio Hondo. In contrast, the outlet works at the San Gabriel River along the East Embankment functions as a spillway. The flood pool for most storms less than the 10-year storm event does not reach the Central Embankment. Repeated water impoundment and subsequent inundation of the reservoir behind the West Embankment fostered development of wetlands adjacent to the Rio Hondo. Wetlands within Whittier Narrows Reservoir are concentrated within the reservoir behind the West Embankment on the Rio Hondo. After closing the River Trail, the current crossover weir located immediately upstream of the spillway would be realigned approximately 200 ft. upstream due to the need for construction of a coffer dam. All work would be from the landside of the River levee.

The area disturbed from the realignment of the crossover weir/crossover channel and extension of the crossover weir includes a mix of *Sambucus nigra* Shrubland Alliance (blue elderberry), which occurs in patches on both sides of Siphon Road, *Arundo donax*, and ruderal species closer to the dam face. The area is dominated by blue elderberry and mustard, and interspersed with *Arundo donax*, black walnut (*Juglans californica*), English walnut (*Juglans regia*), various fruit trees (*Prunus* spp.), stands of mulefat and remnant black willow (*Salix gooddingii*), and cottonwood trees (*Populus fremonti*). This vegetation is not hydrophytic vegetation. Because the flood pool for most storms less than the 10-year storm event often does not reach the Central Embankment or the East Embankment, there is insufficient inundation to form hydric soils. Slivers of wetlands are located in the San Gabriel River and the crossover channel.

The area of the existing crossover channel is approximately 2,000 ft. by approximately 150 ft. extending west from the existing weir, for a total fill area of 6.5 acres. The realigned crossover channel would begin north of the existing weir near the current Siphon Road and extend



approximately 2,500 ft. to its confluence with the existing crossover channel, essentially moving the crossover channel north to allow for the construction of the cofferdam. The crossover weir/crossover channel realignment (combined with the construction of the cofferdam, a related component) would directly, though temporarily, impact approximately 44 acres, and temporarily displace general wildlife from these areas. Construction of the temporary culvert crossing needed to access the borrow area, crossover channel realignment, and crossover weir extension could impact fringe wetlands that maybe located in the San Gabriel River and the crossover channel. This impact are expected to be direct, temporary, and less than significant. No indirect impacts are anticipated. Once construction in these areas cease, and the area undergoes closeout actions, the area is expected to recover enough to support general wildlife values. These activities would not have a permanent substantial effect, directly or through habitat modification, to wildlife inhabiting the Project area. Direct impacts are expected by the displacement of general birds and other wildlife from the construction area, these impacts are expected to be temporary and less than significant. No indirect impacts are anticipated.

The entire area for the crossover weir/crossover channel realignment (combined with the construction of the cofferdam, a related component), however, is within the area designated as critical habitat for the CAGN, and would temporarily directly impact approximately 44 acres of designated critical habitat. In addition, the crossover weir/crossover channel realignment would have direct impacts on 2 to 3 least Bell's vireo territories. Effects to CAGN and LBVI are discussed below.

### **Batch Plants and Haul Routes**

The three areas identified for batch plants include the Lincoln Avenue Batch Plant (approximately 4.8 acres), the Central Embankment Batch Plant (approximately 3.6 acres), and the East Embankment Batch Plant (approximately 2.6 acres). The batch plants and haul roads will undergo closeout actions after completion of Dam modifications.

The West Embankment Batch Plant Site near the southeast corner of San Gabriel Boulevard and Lincoln Road. Material deliveries to the West batch plant site would be made via existing roads (Lincoln Ave. and Rosemead Blvd.), as would delivery of the concrete to the Dam. The Lincoln Avenue batch plant would directly impact approximately 4.8 acres of sparse mulefat scrub habitat with an understory of mostly ruderal species, and temporarily displace general terrestrial wildlife and avian species from these areas. Use of existing haul routes is expected to have only minimal impact to existing habitat. This area is inside designated critical habitat for CAGN.

The Central Embankment batch plant is located immediately upstream of the Central Embankment, in the operations area that is currently kept free of vegetation as a part of regular and recurring dam maintenance. The area contains mostly a mixture of annual grasses and ruderal vegetation, with inclusions of elderberry and mustard. The Central Embankment batch plant would directly impact approximately 3.6 acres of this habitat, and temporarily displace general terrestrial wildlife and avian species from these areas. This area is inside designated critical habitat for CAGN.

Access to the Central Embankment batch plant would require modification/replacement of the bridge where Siphon Road crosses the Zone 1 "ditch" channel. East Embankment batch plant

would directly impact approximately 2.6 acres of urban and non-native species including ornamental trees and remnants of maintained turf, and temporarily displace general terrestrial wildlife and avian species from these areas. The access for this batch plant is assumed to occur on existing roads. The East Embankment batch plant and access roads are outside designated critical habitat for CAGN but used by the CAGN for movement/dispersal across the I-605 freeway to the La Puente Hills.

In addition to the direct impact to vegetation and habitat, temporary, indirect effects on general wildlife will include noise impacts from the batch plants and use of haul roads.

Construction for the project will continue for a minimum of eight hours per day, six days per week. Actual dam construction is assumed to take approximately 2.5 years. During the construction period, many various sized trucks will be using the haul routes. Constant use may habituate some birds and terrestrial wildlife but others will not be able to habituate. Road noise may contribute to stress and alter animal behavioral responses in many ways (USDOT FHA 2018). Animals rely on meaningful sounds for communication, navigation, avoiding danger and finding food against a background of noise. Here noise is defined as “any human sound that alters the behavior of animals or interferes with their functioning” (Bowles, 1995). The level of disturbance may be qualified as damage (harming health, reproduction, survivorship, habitat use, distribution, abundance or genetic distribution) or disturbance (causing a detectable change in behavior). In their environment birds, particularly, must be able to discriminate their own and the song’s and those of other species apart from any background noise (Dooling 1982). Calls are important in the isolation of species, pair bond formation, pre-copulatory display, territorial defense, danger, advertisement of food sources and flock cohesion (Knight 1974). The threshold for hearing in birds is higher than for humans at all frequencies and the overlap in the discernable frequencies between species indicates that birds do not filter out other species by simply being unable to detect them (i.e. birds can hear songs of other species). As yet, there is no definitive evidence to explain why noise has a profound effect on some species but not others and at distances that would seem to preclude noise-masking vocalization (up to 3 km). Further, there is no indication of any other effects or interactions that might contribute to these results. Other possible effects include visual disturbance, air pollution, microclimatic effects, road kill or increased attraction of predators to the roadside all of which appear unlikely to have such distant effects (Forman, Reineking, Hersperger 2002). It is known that birds vary in habitat size requirements and it may be that the patch size available in conjunction with noise has influenced distribution patterns (Vickery, Hunter, Melvin 1994). Birds and other wildlife that communicate by auditory signals may be at a disadvantage near roads, and may relocate to other areas.

The effects of road noise on bird populations have been studied in the U.S., particularly in California. Published studies has shown that 60% of the species analyzed exhibited evidence of reduced densities close to the roads. The distance over which the effect was observed depended how busy the roads (CADOT 2016). Effects of noise to federally listed species, least Bell’s vireo, is discussed under the endangered species section of this chapter.

Once construction in these areas cease, and the area will go through closeout actions, the area is expected to recover enough to support general wildlife values. The direct displacement of birds

and other general wildlife from the construction area, and the indirect displacement due to noise from the construction activity, batch plant use, and haul routes is expected to be temporary, and less than significant. These activities would not have a permanent substantial effect, directly or through habitat modification, to wildlife inhabiting the Project area. Endangered species and critical habitat are discussed below.

### **Borrow Area**

The borrow area is expected to impact approximately 55 acres of vegetation similar to that described under “Extend Crossover Weir”. Impacts to fringe wetlands associated with a culvert needed to access the borrow area are also discussed under that heading. Use of the borrow site and haul roads for the major Dam modification effort is expected to take approximately 2.5 years. Once construction in these areas cease, and the area is stabilized through closeout activities, it is expected to recover enough to support general wildlife values. The borrow site has been managed by the Natural Area for raptor foraging for many decades. Even though the borrow site area is managed for raptor foraging, these birds will still have other areas to temporarily relocate. A potential secondary borrow site, of approximately 19 acres, may be implemented above Siphon Rd, as shown on figure 3.7.1. The direct displacement of birds and other wildlife from the construction area, and the indirect displacement due to noise from the construction activity, batch plant use, and haul routes is expected to be direct, temporary, and less than significant.

In combination with the other components of RMP 3E, impacts to common resident wildlife expected to be direct and temporary, displacing these individuals while construction is ongoing. Common resident wildlife, such as small mammals, reptiles, and birds would be most affected by loss of habitat and potential reductions in population numbers. Megafauna (such as coyotes) are expected to be able to move out of the area of disturbance. Recolonization by common resident wildlife could be relatively direct and immediate depending on precipitation and growth rate of seed and stolon regeneration plants. Terrestrial habitat connectivity is present from the Montebello Hills west of the Whittier Narrows Dam Reservoir, the San Gabriel River Corridor, and the La Puente Hills to the east.

In addition to direct, temporary, loss of habitat for a period of approximately 2.5 years, indirect impacts would accrue from the construction noise in the area, which would likely make some areas unusable by wildlife even if those areas are not directly impacted by construction. RMP 3E is estimated to temporarily impact approximately 130 acres for the construction operations and permanently impact 1 acre due to road modifications. However, due to indirect impacts associated with construction noise and activity, the approximate 169 acres south of Siphon Road are expected to be largely unusable by wildlife for a majority of the construction period. Overall, however, these activities would not have a permanent substantial effect, directly or through habitat modification, to wildlife inhabiting the Project area, and are expected to be less than significant. Endangered species and critical habitat are discussed below.

### **Cofferdam**

The cofferdam would impact approximately 14 of the 44 acres impacted by the crossover weir/crossover channel realignment. The area disturbed includes a mix of *Sambucus nigra* Shrubland Alliance (blue elderberry) (near the existing crossover channel) and ruderal species

which occur in the Operations area closest to the embankment, with *Arundo donax* dispersed throughout. The area of disturbance is analyzed under the section on the crossover weir/crossover channel, above.

### **Construct Auxiliary Spillway /Foundation Sheetpile/Approach and Runout Channels**

A 250-ft. wide passive weir auxiliary spillway would be constructed in-line with the existing embankment and immediately west of the existing spillway to increase the spillway capacity. The spillway subsurface would include foundation improvements to prevent liquefaction during extreme earthquakes. Also, sheetpile is assumed to extend 40 ft. below the foundation slab and encircle the spillway. Upstream of the Dam, an approach channel would be graded to improve flow characteristics to the auxiliary spillway. The approach channel would be 240 ft. wide and have an average distance of roughly 450 ft. extending from the upstream limit of the labyrinth to the crossover channel. Downstream of the Dam, a 240-ft. wide runout channel would extend an average length of approximately 500 ft. between downstream limit of the labyrinth and the San Gabriel River through the existing Pico Rivera Municipal Golf Course.

The auxiliary spillway/foundation sheetpile would be constructed approximately in-line with the existing embankment, with no impact on biological resources. The approach channel would be constructed on areas previously disturbed by the cofferdam, and crossover weir/crossover channel realignment as discussed previously. These areas are not expected to result in impacts to biological resources beyond those previously discussed.

The approximately 2.75 acre runout channel would be constructed in non-native, ornamental vegetation, and maintained turf of the Pico Rivera Municipal Golf Course. Once construction in these areas cease, and the area is stabilized during closeout, the area is expected to recover enough to support general wildlife values. These activities would not have a permanent substantial effect, directly or through habitat modification, to wildlife inhabiting the Project area. Endangered species and critical habitat are discussed below.

### **Parapet Walls**

The additional construction of the 12 ft. high parapet wall on the crest involves only the dam structure, including embankments. The addition of parapet walls could potentially raise the flood pool elevation under an extreme event to elevation 251 ft. This would potentially inundate areas above the current Reservoir to that elevation, and the area would be subject to the general effects of changes in inundation described under RMP 1. Because the majority of the new area of inundation would occur in urban areas, impacts to biological resources are expected to be direct, temporary, and less than significant.

### **Road Modifications**

The crest of the Dam would be raised to increase the storage capacity and reduce the peak discharge that would need to pass through the spillway. Along the existing embankment, the crest raise would be raised 12 ft. (to elevation 251 ft.) by constructing concrete “parapet walls” on the upstream side of the existing dam crest. Parapet walls will also be used over the existing outlet works and spillway. Embankments associated with three roads, Rooks Road/Sports Arena Drive, Lincoln Avenue, and Rosemead Boulevard will be raised to accommodate the new dam height.

Raising the roads will require expanding the roadbed to accommodate a stable slope. Permanent, direct impacts are expected to occur to 0.32 acres of ruderal vegetation/ornamental plantings/maintained turf at Rooks Road/Sports Arena Drive; 0.28 acres of ruderal and remnant ornamental vegetation at Lincoln Avenue, and approximately 0.64 acres of ruderal vegetation at Rosemead Boulevard. Indirect impacts are not anticipated. Once construction in these areas cease, and is stabilized through closeout the area is expected to support general wildlife values. The temporary displacement of birds and other general terrestrial wildlife from the construction area is expected to be temporary, and less than significant. These activities would not have a permanent substantial effect, directly or through habitat modification, to wildlife inhabiting the Project area. The area associated with the raising of Rosemead Boulevard is inside designated critical habitat for the CAGN. Impacts to endangered species and critical habitat are discussed below.

#### **Trench Drain and Filter Blanket**

Improvements to the seepage control system would extend from approximate stations 14+00 (Lincoln Ave.) to 22+50; from 44+00 to 47+00 (the terminus of the existing trench and the west side of Rosemead Boulevard, respectively); from 50+00 to 117+80 (east side of Rosemead Blvd. and the right side of the San Gabriel River, respectively); and from 123+20 to 130+00 (the left side of the San Gabriel River and Rooks Road (Figure 3.7-3), respectively). It would extend approximately 90 ft. downstream from the existing toe of the Dam.

The trench drain and filter blanket will impact disturbed area that consists mostly of ruderal vegetation. Construction of the trench drain would result in the permanent conversion of this area to structural components, however, this loss would be direct and permanent, but less than significant. These activities would not have a permanent substantial effect, directly or through habitat modification, to wildlife inhabiting the Project area. No indirect impacts are anticipated.

#### **Closeout**

Closeout of the Phase 2 construction activities would involve the dismantling of the batch plants and staging areas and removal of these facilities from the Project site. Any gravel or other material laid down on the haul roads would be removed. Soil over culverts over the crossover channel would be removed. These activities would be temporary, occur in previously disturbed areas, and are not expected to result in additional direct or indirect impacts to biological resources beyond those already discussed.

#### **Regular/Recurring Operations and Maintenance**

Similar to RMP 1.

#### **5.5.3.3 RMP 5: Protected Overtopping with Seepage Control**

RMP 5 is described in Chapter 3, section 3.7.3. Under this RMP, overtopping is addressed through hardening of the Dam crest to prevent erosion or subsequent failure of the Dam from events large enough to cause overtopping. Backward erosion piping is addressed through construction of a trench drain at the downstream Dam toe and graded filter blanket adjacent to Rosemead Blvd.

No coffer dam or borrow area would be needed for construction of RMP 5.

### **IRRM**s

Impacts would be similar to those described under RMP 1: No Action.

### **Phase 1**

#### **Staging Areas**

Similar to those described under RMP 3E.

#### **Temporary Relocation of Utilities**

Similar to those described under RMP 3E.

### **Phase 2**

#### **Redevelop Staging Areas**

Similar to those described under RMP 3E

#### **Close bike paths and Dam Crest**

Similar to those described under RMP 3E

#### **Batch Plants and Haul Routes**

The three areas identified for batch plants include the Lincoln Avenue Batch Plant (approximately 4.8 acres), the Central Embankment Batch Plant (approximately 3.6 acres), and the East Embankment Batch Plant (approximately 2.6 acres). The batch plants and haul roads will be recontoured and hydroseeded post-construction.

Impacts to biological resources from RMP 5 stem largely from the disturbance created by the batch plants and haul routes. Vegetation and habitat types up river or north of the Whittier Narrows Dam Reservoir will be minimally impacted at other area locales. Batch plants to make concrete as well as haul routes will impact some vegetation and habitat types for a period of approximately 2.5 years.

Common resident mammalian and reptilian wildlife and migratory bird species will be marginally impacted due to batch plant operations and haul routes. Since construction activities will occur for 2.5 years in the Reservoir area, wildlife species and birds would become habituated to the daily noise and activities taking place, outside the areas of direct impact. Construction for the project will continue for a minimum of eight hours per day, five days per week. During the construction period, many various sized trucks will be using the haul routes. Some birds and terrestrial wildlife may not be able to habituate to this ongoing activity.

RMP 5 is estimated to have direct and indirect, though temporary, impact on 21.0 acres of habitat of varying quality. These activities would not have a permanent substantial effect, directly or through habitat modification, to wildlife inhabiting the Project area. Impacts to common resident wildlife are expected to be temporary, both direct and indirect, but less than significant.



### **Remove/Replace Topsoil**

Topsoil and embankment fill will be removed prior to installation of the Roller Compacted Concrete (RCC). Once the RCC is complete and cured, the topsoil would be replaced on the dam embankments and the area hydroseeded with a small rooted seed mix in compliance with Corps guidelines. Removal of vegetation in these areas may have an indirect effect on the complement of urban-adapted residential birds, and some native and non-native small mammals and reptiles. Species are adapted to urban environments will have other vegetated urban habitat to relocate. After the disturbance, wildlife adapted to urban habitats will recolonize the action area. These activities would not have a permanent substantial effect, directly or through habitat modification, to wildlife inhabiting the Project area. Effects will be minor, temporary, and less than significant. No direct effects are anticipated.

### **Roller Compacted Concrete**

Roller compacted concrete (RCC) would be placed on the entire crest and downstream slope of the earthen embankment (the crest would be restored to the original design elevation of 239.0 ft).

The RCC component of RMP 5 involves only the dam structure, including embankments. Impacts from removing topsoil from the dam embankments, and impacts associated with required batch plants and haul roads are discussed separately. The RCC component of RMP 5 is not expected to result in additional direct or indirect impacts to biological resources beyond those already discussed.

### **Road Modifications**

The addition of Roller Compacted Concrete will raise the elevation of the dam to its design elevation of 239'. Raising the elevation of the dam will require raising the roads to meet the new elevation, and consequently expanding the roadbed to accommodate a stable slope. For RMP 5, the footprint for the road modifications is anticipated to be similar to, but somewhat smaller than, footprints identified for RMP 3E. For purposes of analysis, however, acreage impacted is considered to be the same as RMP 3E.

Raising the roads will require expanding the roadbed to accommodate a stable slope. Permanent, direct impacts are expected to occur to 0.32 acres of ruderal weedy non-native grass vegetation/ornamental plantings/maintained turf at Rooks Road/Sports Arena Drive; 0.28 acres of ruderal vegetation at Lincoln Avenue, and approximately 0.64 acres of ruderal vegetation at Rosemead Boulevard. Indirect impacts are not anticipated. Once construction in these areas cease, the area is expected to recover enough to support general wildlife values. These activities would not have a permanent substantial effect, directly or through habitat modification, to wildlife inhabiting the Project area. The temporary displacement of birds and other general terrestrial wildlife from the construction area is expected to be temporary, and less than significant. The area associated with the raising of Rosemead Boulevard is inside designated critical habitat for the CAGN. Impacts to endangered species and critical habitat are discussed below.

### **Construct Parapet Walls**

A five-ft. high parapet wall would be constructed over several short lengths of the dam embankment where overtopping protection is not feasible or efficient. It will be more cost

effective to install a parapet wall between the west side of Lincoln Avenue and the northwestern terminus of the embankment in the Montebello Hills. Parapet walls would also be built on and near the bridges for the outlet works and spillway gates to prevent overtopping.

The parapet wall component of RMP 5 involves only the dam structure, including embankments. Impacts from removing topsoil from the dam embankments, and impacts associated with required batch plants and haul roads are discussed separately. The parapet wall component of RMP 5 is not expected to result in additional direct or indirect impacts to biological resources beyond those already discussed.

#### **Trench Drain and Filter Blanket**

Impacts associated with the construction of the trench drain and filter blanket are expected to be similar to those discussed under RMP 3E. Improvements to the seepage control system would extend from approximate stations 14+00 (Lincoln Ave.) to 22+50; from 44+00 to 47+00 (the terminus of the existing trench and the west side of Rosemead Boulevard, respectively); from 50+00 to 117+80 (east side of Rosemead Blvd. and the right side of the San Gabriel River, respectively); and from 123+20 to 130+00 (the left side of the San Gabriel River and Rooks Road (Figure 3.7- 3), respectively). It would extend approximately 90 ft. downstream from the existing toe of the Dam.

The trench drain and filter blanket will impact disturbed area that consists mostly of ruderal vegetation. Construction of the trench drain would result in the permanent conversion of this area to structural components; however, this would not result in a loss of habitat or other biological values and are expected to be less than significant. These activities would not have a permanent substantial effect, directly or through habitat modification, to wildlife inhabiting the Project area. Indirect impacts are not anticipated.

#### **Closeout**

Closeout of the Phase 2 construction activities would involve the dismantling of the batch plants and staging areas and removal of these facilities from the Project site. Any gravel or other material laid down on the haul roads would be removed. These activities would be temporary, occur in previously disturbed areas, and are not expected to result in additional direct or indirect impacts to biological resources beyond those already discussed.

#### **Regular/Recurring Operations and Maintenance**

Similar to RMP 1: No Action.

#### **5.5.3.4 Listed Species and Critical Habitat**

This discussion focuses on how the proposed RMPs might impact two federally listed species the California gnatcatcher (CAGN) and the least Bell's vireo (LBVI). Designated critical habitat for the California gnatcatcher also occurs inside the Reservoir. Nevin's barberry is not found inside the RMP Action Area and will not be impacted by the proposed RMPs. Analysis of effects to endangered species is not easily separated into separate construction components. Therefore, effects for each proposed RMP are discussed by species.

### **California Gnatcatcher/Designated Critical Habitat**

Approximately 563 acres of designated critical habitat for the California gnatcatcher occur inside the Reservoir. Gnatcatchers use the critical habitat for dispersal between the Montebello Hills and La Puente Hills. Based on the dispersing gnatcatcher studies, the birds could use the entire area or only portions of the vegetation types. They are not known to nest within the RMP action area. Nesting does occur farther north in the Reservoir, as described in Chapter 4. The proposed RMPs could add an additional stressor for gnatcatchers trying to disperse across the Reservoir between the Montebello Hills and the La Puente Hills.

### **RMP 1: No Action**

RMP 1, with the crest raise component, is expected to have direct, though temporary, impact on approximately 72 acres of designated critical habitat for CAGN within the Reservoir. This includes both the haul routes and the use of a borrow site south of Siphon Road. Effects from noise on CAGN daily dispersal is also included in the acreage calculation. NEPA and ESA compliance activities would occur at the time of implementation.

Currently, vegetation management occurs on the Dam and its appurtenant structures, including the downstream slope of the embankment, and approximately 40 acres is mowed within the operations area of the Dam, immediately upstream of the central embankment. Vegetation maintenance activities would begin prior to the breeding season (March 15 to September 15 each year) to avoid impacts to nesting birds. Mowing of the central embankment areas would begin prior to March 15 of each year unless coordinated with a Corps biologist, and grasses would be kept short through September. Coordination with a Corps biologist will occur prior to implementation to ensure avoidance of impacts to species. Activities could be subject to additional NEPA or other environmental compliance at the time of implementation.

### **RMP 3E: Labyrinth Auxiliary Spillway with Seepage Control**

RMP 3E is estimated to have direct, though temporary, impact on 117 acres of designated critical habitat for CAGN within the Reservoir. However, due to indirect impacts associated with construction noise and activity, and the intensity of activity in the construction area, the approximate 169 acres south of Siphon Road are expected to be largely unusable by CAGN for dispersal for a majority of the 2.5-year construction period. Individual CAGN dispersal habitat may be affected due to nearly continual haul route use anticipated over the construction period. Work will continue five days per week, throughout the year including during winter rainfall events unless there is significant storm flow to prevent construction activity. CAGN will need to disperse around this area during the anticipated 2.5-year construction period within the Reservoir. RMP 3E is expected to result in largely temporary, though significant, direct and indirect effects to both CAGN and their designated critical habitat. Coordination with the US Fish and Wildlife Service is ongoing.

### **RMP 5: Protected Overtopping with Seepage Control**

RMP 5 is expected to have direct, though temporary, impact on 21 acres (including batch plants and haul routes on the Central and Western Embankments) of designated critical habitat for CAGN within the Reservoir. This temporary modification is not expected to result in permanent adverse modification to designated critical habitat, based on the general nature of those components, as outlined in Chapter 4. Individual CAGN dispersal habitat may be affected

indirectly due to nearly continual haul route use anticipated over the construction period as well as batch plant use. Work will continue five days per week throughout the year, including during winter rainfall events unless there is significant storm flow to prevent construction activity. CAGN disperse during fall and winter periods. Nonetheless, not all of the critical habitat will be affected by the Corps action under this RMP. Because construction activities for RMP 5 include only limited physical disturbance in the Reservoir, CAGN may still be able to utilize this portion of the Reservoir for dispersal, though use may be limited. RMP 5 is expected to result in temporary and less than significant, direct and indirect effects to both CAGN and their designated critical habitat. Coordination with the US Fish and Wildlife Service is ongoing.

### **Least Bell's Vireo**

LBVI were considered once a common summer visitor throughout its breeding range which include the San Gabriel River and Whittier Narrows environs in 1933 with a population decline recognized by 1944. Vireos have re-occupied habitat within the Reservoir since mid-1990 with small population increases from 2010 to the present. Vireos are highly site tenacious and return to the same territory and nearly the same nesting substrate from the previous year.

### **RMP 1: No Action**

The crest restoration component is currently expected to include the potential loss of 4 territories along Siphon Road due to the continual traffic along the haul routes and the operation of the batch plants, as well as activity in the borrow area. Effects to vireo may also be indirect through noise and construction activities, and could be significant under NEPA. NEPA and ESA compliance activities would occur at the time of implementation.

### **RMP 3E: Labyrinth Auxiliary Spillway with Seepage Control**

Under RMP 3E, there would be a direct loss of 4 current vireo territories due to the activities associated with the construction of the crossover weir/crossover channel, the potential loss of 1 current vireo territory in the San Gabriel River as the result of construction of the auxiliary spillway, and the potential loss of an additional 4 territories along Siphon Rd due to the continual traffic along the haul routes and the operation of the batch plants, as well as activity in the borrow area. Effects to vireo may also be indirect through noise and construction activities. Effects have the potential to be significant. Coordination with the US Fish and Wildlife Service is ongoing.

### **RMP 5: Protected Overtopping with Seepage Control**

Under RMP 5, no LBVI territories will be directly affected by project construction activities. Indirect effects to LBVI may indirectly effect 8 vireo nesting territories along Siphon Road due to impacts from noise of truck and other vehicle traffic along Siphon Road and the cross over weir over as well as noise from the batch plant rock crusher over a 2.5-year period. There are several pieces of construction equipment (example, bull dozer, concrete mixing truck, concrete pump truck, grader, rock crusher, flat-bed truck) in which the modeled attenuation noise levels range from the high 70 decibels to the mid 80 decibels ranging from 50 ft. to 200 ft. from the noise source, and may be sustained above ambient levels for substantial periods during construction. LBVI territories along Siphon Road range from 50 ft. to 200 ft. from the road (See Section 5.5). Table 5.5-1 lists the typical construction equipment and decibels at various distances.

Under RMP 5, it is estimated that 46 trucks per day or 276 trucks trips per week would occur on Siphon Road to deliver/remove construction materials from the construction site. This number does not include other traffic connected to ongoing construction operations travelling among the different areas of construction. This activity would occur six days per week for approximately 2.5 years. A potential exists that LBVI breeding territories may be disturbed by the increased amount of traffic, including large trucks, cement mixers, and other construction vehicles traveling Siphon Road daily or other construction activity. LBVI may abandon current occupied nest territories in the habitat along Siphon Road due to the increased activity and noise. Construction equipment noted above would exceed the USFWS 60 dBA average per hour criterion in the territories immediately adjacent to Siphon Road. Coordination with the Service is ongoing.

Eight vireo territories are recently occupied along or in the near vicinity of Siphon Road and the center embankment batch plant. LBVI territories are approximately 2 acres which yields approximately 16 acres of vireo territories that will be affected by the project actions (Barbara Kus, PhD, USGS, WERC, San Diego Field Station personal communication April 2017). If these site tenacious vireos are unable to sustain territories within the vicinity of Siphon Road due to amplified escalated noise levels, they may have to search out and discover new areas for territories, and compete for some form of riparian habitat including food resources with other vireos with the likelihood for predation and parasitism. Impacts are expected to be temporary, indirect, and less than significant based on minimization measures currently under consideration.

### **Minimization Measures**

As part of the Dam Safety Modification Project, the Corps is proposing to minimize potential effects to LBVI and to CAGN and its critical habitat by offsetting the acres of direct, though ultimately temporary, impact to CAGN designated critical habitat and the potential indirect effects to LBVI with restoration of suitable habitat in the northern portion of the Reservoir in the Whittier Narrows Natural Area. It is anticipated that restoration would occur adjacent to the existing Whittier Nature Center parking lot and also in the area of the “mitigated lakes”. This area is chosen, in part, because of the current CAGN nesting that has been documented over a period of several years (Personal Communication: Ed Barajas, 12 years Los Angeles County Natural Area Docent). Restoration of habitat may require minor earth movement and re-grading of the sites to prepare for planting. Prior to implementation, a restoration plan would be developed and may be subject to separate analysis under NEPA at that time. Restoration of this habitat will provide an alternative route for dispersal for CAGN between the Montebello and La Puente Hills as well as breeding habitat in currently known breeding locations for CAGN. It will also offset other potential impacts related to the construction, operations, and maintenance. Restoration is expected to begin prior to Phase II of the dam safety modification project and be accomplished concurrent with RMP implementation.

### **5.5.4 Environmental Commitments**

Environmental Commitments BIO-1 through BIO-3 will be implemented to reduce potential impacts to biological resources:

- BIO-1** Initial clearing and grubbing of construction areas in occupied habitat will occur outside of the breeding season for both the CAGN and LBVI.
- BIO-2** Vegetation maintenance activities would begin prior to the breeding season (March 15 to September 15 each year) to avoid impacts to nesting birds. Mowing of the central embankment areas would begin prior to March 15 of each year, unless coordinated with a Corps biologist, and grasses would be kept short through September.
- BIO-3** Corps will conduct surveys for presence of endangered species prior to, and during, implementation of the preferred RMP.

## **5.6 CULTURAL RESOURCES**

The area potentially affected by the proposed RMPs includes a 100 ft. buffer around the three proposed RMP action areas, including physical disturbance areas for the Dam and associated features, backward erosion areas, associated permanent roads and haul roads, and all temporary construction staging areas.

### **5.6.1 Regulatory Framework**

#### **National Historic Preservation Act**

While the NEPA requires analysis of the full spectrum of aesthetic, historic and cultural resources, the National Historic Preservation Act (NHPA) is concerned with a subset of cultural resources known as historic properties. A historic property is defined as a cultural resource that has met certain standards of age, integrity, and significance (as defined in the call-out box) that qualify it as eligible for listing on the National Register of Historic Places (NRHP or National Register). Cultural resources that are not eligible for the National Register are still considered as part of the NEPA review. The NHPA is the major piece of legislation that mandates that Federal agencies take into account the effects of their undertakings on historic properties.

Regulations at 36 C.F.R. 800 outline the process through which Section 106 of the NHPA is administered. In general, the process can be broken into four steps. These are (1) defining the undertaking and assessing whether it has the potential to affect historic properties included on, or eligible for inclusion on, the National Register; (2) making a good faith effort to identify those properties within the area of potential effect; (3) assessing the undertaking's effects on those resources; and (4) taking steps to avoid or mitigate adverse effects if present.

### **5.6.2 Thresholds of Significance**

In addition to NEPA, the Corps must comply with NHPA Section 106 and assess impacts to historic properties pursuant to the Advisory Council on Historic Preservation's (ACHP's) regulations implementing NHPA Section 106, found at 36 C.F.R. Part 800. An adverse effect to historic properties is found when an undertaking alters the characteristics that qualify the property for inclusion on the National Register in a manner that diminishes the integrity of the property. Integrity is the ability of a property to convey its significance, based on its location, design, setting, materials, workmanship, feeling, and association. Adverse effects can be direct or



indirect, and include reasonably foreseeable impacts that may occur later in time, be farther removed in distance, or be cumulative (ACHP 2003).

Examples of adverse effects under 36 C.F.R. § 800.5 (including but not limited to):

- Physical destruction, damage, or alteration that is not consistent with the Department of the Interior Secretary's Standard for the Treatment of Historic Properties (36 C.F.R. Part 68) to all or part of the property.
- Removal of the property from its historic location.
- Isolation of the property from its setting, or alteration of the character of the setting (e.g., visual, atmospheric or audible elements) when that character contributes to the property's NRHP eligibility qualifications.
- Neglect of a property resulting in its deterioration or destruction.
- Transfer, lease, or sale of the property.

Mitigation under Section 106 of the NHPA is defined as a measure to resolve specific adverse effects to historic properties. If resolution of adverse effects is required, it is typically referenced in the NEPA review and documented in a Memorandum of Agreement or Programmatic Agreement developed in consultation with the Section 106 consulting parties, which may include the State Historic Preservation Officer (SHPO), tribes, ACHP, and other interested parties.

The concept of adverse effect under the NHPA and significant impact under NEPA are similar in concept but are not equivalent. A broad range of impacts from very minor to major could be classified as an adverse effect but the context and intensity of these impacts may not meet the threshold of NEPA significance, as NEPA requires consideration of the degree to which the action may adversely affect historic properties. For example, a battlefield or a traditional cultural property which are eligible under criterion A may be adversely affected by the introduction of visual intrusions because these intrusions would diminish its integrity of location, setting, and feeling. This would be an adverse effect under NHPA but may not meet the threshold of significance under NEPA. The demolition of the property; however, would most likely constitute a significant impact because its destruction would preclude its eligibility for the National Register.

An adverse effect under NHPA would be considered a significant impact under NEPA if:

- Implementation of the alternative disturbs any human remains, including those interred outside formal cemeteries.
- Implementation of the alternative would result in the loss of a historic property's eligibility status under criteria A-C due to remaining effects even after minimization and mitigation.
- Implementation of the alternative would result in the destruction of a site eligible under criterion D with no resolution of adverse effects (generally mitigation through data recovery, or other negotiated resolution).

- Implementation of the alternative would result in a major modification of a National Historic Landmark or a property meeting the criteria of a National Historic Landmark as defined in 36 C.F.R. 65.

### 5.6.3 RMP Analysis and Comparison

Nine previously recorded sites or historic structures were identified within 100 feet (or immediately adjacent to this 100 foot buffer) of the three RMPs; one is no longer extant, therefore eight are located within 100 feet of the three RMPs. One site, the Siphon Road transmission towers (P-19-190507), is included in the table but is not counted as it was determined as not NRHP eligible and was replaced with a new transmission line in 2011-2012.

The APE identified by the CORPS includes the preferred Risk Management Plan area (RMP 5) footprint and physical disturbance areas for the dam and associated construction areas such as staging areas and haul roads, etc., as defined in Section 4.6.1 and discussed in the sections below.

Table 5.6-1 provides a summary of these sites, their NRHP eligibility status, impact assessments, and which alternative footprint each site is located within or near.

<b>Table 5.6-1. Previously Recorded Cultural Resources within 100 Feet of Each RMP</b>				
<b>RMP (Project Area)</b>	<b>Primary Number (P-19-)</b>	<b>Site Name / Description (Recorder)</b>	<b>NRHP Eligibility Status</b>	<b>Impact Assessment</b>
RMP 5	003813	Montebello Oil Field: well pads, oil wells, pipeline, house pads, & access roads, also some isolated pockets of historic debris (Terri Fulton & Phil Fulton/ 2008)	Determined Not NRHP Eligible (Criterion A) with concurrence from SHPO (6Y; parcel 5271-001-030)	Previously evaluated site area is not within current project area & may require evaluation & consultation under Section 106; if a historic property is identified, impact could be significant if there is destruction of a site eligible under criterion D with no resolution of adverse effects.

<b>RMP (Project Area)</b>	<b>Primary Number (P-19-)</b>	<b>Site Name / Description (Recorder)</b>	<b>NRHP Eligibility Status</b>	<b>Impact Assessment</b>
No Action Alternative/ Future without Project / RMP 3E	004221	Concrete slab foundation & associated features: 28 x 26 foot concrete slab foundation, a cinder block & metal pedestal tank footing, an abandoned utility pole with a 1912 date nail, & 4 large eucalyptus trees that are likely part of the original landscape planting (Terri Fulton & Phil Fulton/ 2008)	Not Previously Evaluated	Site could be indirectly affected by construction activities & avoidance is preferred. May require evaluation & consultation under Section 106; if a historic property is identified, impact could be significant if there is destruction of a site eligible under criterion D with no resolution of adverse effects.
All RMPs	186889	Whittier Narrows Dam Recreation Area architectural elements: surface & subsurface remains of concrete floors, concrete foundations, brick/mortar foundations, & swimming/wading pool associated with former buildings (Peter Messick/ 2003)	Not Previously Evaluated	Requires evaluation & consultation if any of these alternatives is selected; if a historic property is identified, impact could be significant if there is destruction of a site eligible under criterion D with no resolution of adverse effects.
All RMPs*	188983	Los Angeles Dept. of Water & Power Boulder Lines 1 & 2: A 40-mile segment of the Boulder Dam - Los Angeles 287.5 kV TL, two parallel electrical transmission circuits carried on steel lattice towers running approximately 270 miles (Noah Stewart/ 2008)	Element of District, previously determined NRHP eligible under Criteria A and C	Requires consultation or avoidance if any towers will be affected; impact could be significant if there is loss of a historic property's eligibility status under criteria A-C due to remaining effects even after minimization & mitigation.
All RMPs	190504	Rio Hondo-Amador-Jose-Mesa-Narrows 66kV TL: 90 4-legged steel lattice & wood pylon towers ~120 feet tall, installed ~750-1150 feet apart (W. Tinsley Becker/2010)	Determined Not NRHP Eligible (SHPO letter USFS101112A)	No significant impact.
All RMPs	190505	Mesa-Walnut 220kV TL: constructed in 1956, includes 60 4-legged steel lattice towers ~120 feet tall, installed ~1230 feet apart along its 14.79 mile span (W. Tinsley Becker/2010)	Determined Not NRHP Eligible (SHPO letter USFS101209C)	No significant impact.

RMP (Project Area)	Primary Number (P-19-)	Site Name / Description (Recorder)	NRHP Eligibility Status	Impact Assessment
All RMPs	190507	SCE Siphon Road Towers: remnant grouping of five 66kV steel lattice obelisk type towers within the Whittier Narrows National Recreation Area immediately south of Durfee Blvd. in El Monte (W. Tinsley Becker/2010)	Previously Determined Not NRHP Eligible (per SHPO Determinations of Eligibility database & TRTP Programmatic Agreement)	No longer extant, towers replaced with monopoles 2011-2012; no significant impact (not included in count of sites in text).
All RMPs	190508	SCE Walnut-Hillgen-Industry-Mesa-Reno 66kV TL: ~75 4-legged steel lattice towers ~120 feet tall & tubular steel poles erected along a 17 mile span, with each tower/pole installed ~1200 feet apart (W. Tinsley Becker/2010)	Determined Not NRHP Eligible (SHPO letter USFS 101209D)	No significant impact.
All RMPs	Pending	Whittier Narrows Dam: an earth filled structure controlling the flow of the San Gabriel River & the Rio Hondo built between 1950 & 1957; it is the last of five dams proposed in 1930s plans prepared by the Corps (JRP Historical Consulting LLP/ 2017)	Determined Not NRHP Eligible (SHPO letter COE_2018_0611_001)	No significant iimpact.
* Site is immediately adjacent to the 100 ft. buffer of all RMPs..				

### 5.6.3.1 RMP 1: No Action

RMP 1 is described in Chapter 3, section 3.7.1. Construction activities are reasonably foreseeable under this alternative due to the necessity to restore the dam crest to its original elevation. With or without the implementation of either action RMP or the crest elevation restoration, the Corps would continue O&M activities and would continue to implement IRRMs to address PFMs.

If crest elevation restoration is pursued, restoring the elevation would be subject to consultation under Section 106 and separate detailed analysis under NEPA at that time, but general impacts to cultural resources are described below.

### IRRM

Several IRMMs that have been or would be implemented include only monitoring, inspection, or other non-invasive activities; remote monitoring, inspection and monitoring, annual coordination; emergency action plan update; and flood mapping. These IRRMs have no potential to affect historic properties due to the nature of their activities, as they are non-invasive activities and require no construction, earth-moving activities, or alteration of structures. If other future actions (i.e., “Section 106 undertakings”) which are unknown at this time are included as part of such coordination or plans, these would require a separate Section 106 and NEPA analysis at that time.

### **Close Bike Paths and Dam Crest**

The San Gabriel River Trail would be closed approximately 1,000 ft. upstream of the spillway during the construction period. This closure would have no potential to affect historic properties unless authorized or unauthorized (i.e., user-created) trails replaced the closed portion of the San Gabriel River Trail. Replacement trails would be subject to consultation under Section 106 and separate detailed analysis under NEPA at that time.

### **Crest Elevation Restoration**

Seven previously recorded sites (Table 5.6-1) are located within the RMP 1 crest restoration area. Six sites/structures, five of which are high power transmission lines and the dam itself, have been evaluated and determined not eligible for NRHP listing with SHPO concurrence. None of these resources would be adversely affected by this alternative as none are NRHP eligible. Therefore, there would be no significant impacts related to these resources based on current Section 106 regulations, however, consultation with the SHPO would be required for the undertaking. Also, as NRHP eligibility can change over time, re-evaluation of these resources might be required at the time of the proposed restoration if there is new evidence regarding dam construction and engineering, flood control practices, electrical generation or transmission, or other relevant subjects.

As part of the crest elevation restoration, the borrow area to be used and the culvert to be constructed are assumed to be located upstream of the central embankment between the crossover channel and Siphon Road (see Figure 3.7-1). Extant architectural elements of the Whittier Narrows Dam Recreation Area (P-19-186889) also overlap the footprint of the RMP 1 borrow area but are unlikely to be affected by the crossover channel culvert. This site has not been evaluated for listing on the NRHP and could be impacted by construction activities. The site would require evaluation and consultation with the SHPO, and, if determined NRHP eligible, avoided, or resolution of adverse effects would be required. Based on past archaeological surveys of the area, there are no recorded ethnographic or prehistoric archaeological sites in this area. However, several ethnographic Gabriellino villages were located in Whittier Narrows, and use of this area for borrow would require consultation with the Tribes and other interested parties to identify historic properties, in particular, those of traditional religious and cultural significance, and assess if project effects are adverse or not.

### **Recurring Maintenance and Repair Actions**

All maintenance, repair, and IRRM actions that involve the Whittier Narrows Dam structure would have no effect to historic properties as the dam has been determined not eligible for listing on the NRHP with concurrence from the SHPO. This would include all structural and electrical repairs, graffiti removal, repair of the spillway gates, relief well repair, vegetation removal and mowing, and also includes mechanical and electrical repair of the outlet and spillway gates, cleaning and repair of relief wells, and vegetation removal from the structures and mowing of operations areas.

### **Summary**

As this alternative does not involve construction of an action RMP, the **No Action RMP** would have no impact on cultural resources due to construction of a RMP. With or without the

implementation of any action RMP, the Corps would continue operations and maintenance activities and would continue to implement IRRMs to address PFMs.

All maintenance, repair, and IRRM actions that involve the Whittier Narrows Dam structure would have no effect to historic properties as the dam has been determined not eligible for listing on the NRHP with concurrence from the SHPO. This would include all structural and electrical repairs, graffiti removal, repair of the spillway gates, relief well repair, vegetation removal and mowing, and also includes mechanical and electrical repair of the outlet and spillway gates, cleaning and repair of relief wells, and vegetation removal from the structures and mowing of operations areas.

The **No Action RMP** therefore is not anticipated to have direct or indirect significant impacts to cultural resources from ongoing operation and maintenance activities, IRRMs, or the crest elevation repair that would permanently alter the structure of the dam, with the exception of the use of a borrow area, which could result in adverse effects under Section 106 to the Whittier Narrows Dam Recreation Area (P-19-186889) and possibly as yet unidentified historic properties, based on informal Tribal consultation. If historic properties are identified and adverse effects are assessed, resolution of these effects would be required under Section 106. This alternative is not expected to result in disturbance of any human remains or major modification of a National Historic Landmark property or eligible property without resolution of adverse effects. The alternative would not result in the loss of a historic property's eligibility status under criteria A-C due to remaining effects even after minimization and mitigation. The alternative would not result in the destruction of a historic property eligible under criterion D with no resolution of adverse effects.

#### **5.6.3.2 RMP 3E: Labyrinth Auxiliary Spillway and Seepage Control**

RMP 3E is described in Chapter 3, section 3.7.2. Under this RMP, overtopping is addressed through adding spillway capacity and backward erosion piping is addressed through construction of a trench drain at the downstream Dam toe and graded filter blanket adjacent to Rosemead Blvd.

Operations and Maintenance (O&M) includes revising the Water Control Manual. Other activities are expected to be similar in nature to those described for RMP 1, with additional efforts for new facilities identified below. If other future actions (i.e., "Section 106 undertakings") which are unknown at this time are included as part of revision of the water control manual, these would require a separate Section 106 analysis at that time to identify the presence of historic properties and if there are adverse effects to any historic properties.

#### **IRRM**s

Impacts are expected to be similar to those described for IRRMs under RMP 1: No Action.



## **Phase 1**

### **Staging Areas**

The staging areas would be developed in two areas, Streamland Park and the Pico Rivera Golf Course. Both locations are located downstream of the central embankment. Both sites would be cleared and grubbed following removal of site amenities and their disposal. The sites would be leveled as needed for staging area facilities. Clearing and grubbing of the Pico Rivera Golf Course for use as staging area facilities would require evaluation of the golf course to determine if it is eligible for listing on the NRHP (i.e., a historic property), and if so, if the alterations would be an adverse effect to the qualities that make it NRHP eligible. If the alterations to the golf course are determined to be an adverse effect to a historic property, resolution of the adverse effect would be required through execution of a PA or other agreement document to avoid a significant impact under NEPA. The current Streamland Park is not the site of the original Streamland Park and is not of historic age (i.e., is under 50 years of age); therefore the architectural features of this park do not require analysis under Section 106, however, the location of the park will be included in the Section 106 APE consultation.

### **Close Bike Paths and Dam Crest**

The San Gabriel River Trail would be closed approximately 1,000 ft. upstream of the spillway during the Phase 1 implementation period. The trail crosses the crossover weir and uses the maintenance road ramp west of the spillway to the Dam crest. The road continues down the embankment slope to the Pico Rivera Golf Course where the trail rejoins the River levee. Closure of the San Gabriel River Trail and Dam Crest would have no potential to affect historic properties unless authorized or unauthorized (i.e., user-created) trails replaced the closed portion of the trail. Temporary alternative trails to be implemented by the Corps during closure of the San Gabriel River Trail would be subject to consultation under Section 106 and separate detailed analysis under NEPA at that time, once specific details about these alternative trails are known.

### **Temporary Relocation of Utilities**

The temporary relocation of utilities would occur downstream of the Dam toe. The temporary relocation and restoration of the utilities through the embankment would be direct and temporary during implementation of Phase 1 and would have no effect to historic properties as the dam has been determined not eligible for listing on the NRHP with concurrence from the SHPO.

## **Phase 2**

### **Redevelop Staging Areas**

The staging areas would be redeveloped in the two areas, Streamland Park and the Pico Rivera Gold Course as for Phase 1. Both locations are located downstream of the central embankment. The sites would be cleared and leveled as needed for staging area facilities. Clearing and grubbing of the Pico Rivera Golf Course for use as staging area facilities would require evaluation of the golf course to determine if it is eligible for listing on the NRHP (i.e., a historic property), and if so, if the alterations would be an adverse effect to the qualities that make it NRHP eligible. If the alterations to the golf course are determined to be an adverse effect to a historic property, resolution of the adverse effect would be required through execution of a PA or other agreement document to avoid a significant impact under NEPA. The current Streamland

Park is not the site of the original Streamland Park and is not of historic age (i.e., is under 50 years of age); therefore the architectural features of this park do not require analysis under Section 106, however, the location of the park will be included in the Section 106 APE consultation.

### **Extend Crossover Weir**

When the elevation of water in the San Gabriel River, upstream of the spillway reaches 208.0 ft., water flows over the crossover weir into the crossover channel. After closing the River Trail, the current crossover weir located immediately upstream of the spillway would be relocated approximately 200 ft. upstream so that a new crossover channel can be dug due to the need for the coffer dam during construction of the auxiliary labyrinth spillway. All work would be from the landside of the River levee. The crossover weir would have no impact on known cultural resources and historic properties, and therefore is not expected to have a significant impact under NEPA. Excavation of a new channel may expose previously unknown archaeological deposits that would require Section 106 evaluation, consultation, and resolution of adverse effects (if any) at the time of discovery, per 26 C.F.R. 800.13. If any adverse effects are not resolved this would result in a significant impact.

### **Batch Plants and Haul Routes**

Batch plants and haul routes would be cleared and grubbed as described in section 3.7.2. Areas would be leveled as necessary with excess material used temporarily as berms to prevent runoff or to protect from inundation during construction. Following construction, excess fill material would be placed in the borrow area. Following completion of construction, the batch plants would be dismantled and the area regraded and hydroseeded. Although use of the batch plants and haul routes would be temporary, clearing, grubbing, grading, and hydroseeding could have adverse effects on historic properties if they are present in these areas. One batch plant area is within the site boundary of the former Whittier Narrows Dam Recreation Area (P19-186889), which has not been evaluated for NRHP eligibility, and the other is adjacent to the recorded area of the Montebello Oil Field (P19-003813), which has been previously determined not NRHP eligible, with SHPO concurrence. Both sites could be impacted by construction activities and consultation with the SHPO is required. The recreation area would require evaluation, and if determined NRHP eligible, avoided or mitigation of adverse effects would be implemented.

Planned haul routes include current, paved roads, unpaved roads, and new planned haul roads. The only known sites in the vicinity of newly planned haul roads are ineligible sites such as the Dam and TLs that have been previously determined ineligible for listing on the NRHP. Although no adverse effects to historic properties are expected, resolution of any adverse effects would be required to avoid a significant impact under NEPA, and if implementation of the alternative resulted in the destruction of a site eligible under criterion D with no resolution of adverse effects, this would be considered a significant impact.

### **Borrow Area**

The area of the proposed main borrow site would be located in the same area as for the No Action RMP (RMP 1). (Figure 3.7-1). A second borrow area northeast of the primary borrow area may be needed if the main borrow area does not provide the required soil (sands and silts) for fill material. Monitored water wells in the area would be avoided,

The initial need of fill material to raise the Dam crest elevation 1.8 ft. for the length of the Dam is 57,000 cubic yards (cy). Construction of the coffer dam would require approximately 297,000 cy (Total 354,000 cy). Assuming the borrow area is about 55 acres, the estimated depth of the main borrow area would be on average five (5)-ft. deep, including removal of one (1)-foot of top soil. Once the auxiliary spillway construction is completed, fill material of the coffer dam would be used to raise the road beds of Rosemead Blvd., Lincoln Ave., and Rooks Road.

Approximately 5,400,000cy of fill material would be required to raise the three (3) roadways eight (8)-ft. at the Dam crest to prevent overtopping through the roadways. 297,000 cy from the coffer dam would be used with the remaining fill material (approximately 5,100,000 cy) from the fill material removed from the Dam embankment after the construction of the auxiliary labyrinth spillway. For the construction of the auxiliary labyrinth spillway 8,400,000 cy would be removed and temporarily stockpiled. Approximately 2,200,000 cy of fill would cover the concrete invert of the runout channel from the auxiliary labyrinth spillway to the San Gabriel River.

The remaining 1,100,00 cy of fill material would be placed in the borrow area that would raise the invert elevation of the borrow area on average six (6)-inches and with the replacement of the stockpiled top soil, raise the elevation an additional one (1)-foot. Following completion of construction, the borrow area would be contoured with the surrounding area.

The proposed borrow area would create a large depression in the area upstream of the central embankment (Figure 3.7-1). The excess fill material returned or placed in the borrow area following construction would replace approximately half of the initial fill material used for the Dam crest raise and the coffer dam.

Extant architectural elements of the Whittier Narrows Dam Recreation Area (P-19-186889) overlap the footprint of the proposed RMP 3E borrow areas but are unlikely to be affected by the crossover channel culvert. This site has not been evaluated for listing on the NRHP and could be impacted by construction activities. The site would require evaluation and consultation with the SHPO, and, if determined NRHP eligible, avoided, or mitigation of adverse effects would be implemented. The borrow would be used to raise the elevations of Rosemead Blvd., Lincoln Ave., and Rooks Road, all of which require evaluation as historic properties under the NHPA. Modifications to the Dam would have no effect to historic properties as the dam has been determined not eligible for listing on the NRHP with concurrence from the SHPO.

Based on past archaeological surveys of the area, there are no recorded ethnographic or prehistoric archaeological sites in this area. However, several ethnographic Gabrielino villages were located in Whittier Narrows, and use of this area for borrow would require consultation with the Tribes and other interested parties to identify historic properties, in particular, those of traditional religious and cultural significance, and assess if project effects are adverse or not. Resolution of adverse effects to any historic properties would be required; if implementation of this alternative resulted in the destruction of a site eligible under criterion D with no resolution of adverse effects, this would be considered a significant impact under NEPA.

### **Coffer Dam**

The coffer dam would be constructed upstream of the eastern end of the central embankment. As indicated above, approximately 297,000 cy of fill material would be needed to construct the

coffer dam. The coffer dam would be approximately 40 ft. tall, to be as tall as the embankment during construction of the auxiliary spillway. When the auxiliary spillway construction is completed, the coffer dam would be removed and the material used to raise the road beds or returned to the borrow area. The coffer dam would be temporary and have no permanent effect on the Dam operations for flood risk management. Based on past archaeological surveys of the area, there are no recorded ethnographic or prehistoric archaeological sites in the immediate area planned for the coffer dam, however, several ethnographic Gabrielino villages were located in Whittier Narrows, and use of this area would require consultation with the Tribes and other interested parties to identify historic properties, in particular, those of traditional religious and cultural significance, and assess if project effects are adverse or not. If eligible, resolution of the adverse effect would be required to avoid a significant impact under NEPA.

### **Foundation/Sheetpile**

The spillway subsurface would include foundation improvements to prevent liquefaction during extreme earthquakes. Sheetpile is assumed to extend 40 ft. below the foundation slab and encircle the spillway. Some dewatering of the foundation during construction is anticipated to allow the work to proceed in the dry season. Foundation work and placement of sheetpile would not result in adverse effects to the Whittier Narrows Dam as the Dam has been determined not eligible for NRHP listing in consultation with the SHPO.

### **Construct Auxiliary Spillway**

A 250-foot wide passive weir auxiliary spillway would be constructed in-line with the existing embankment and immediately west of the existing spillway to increase the spillway capacity. A bridge across the auxiliary spillway would be required to provide access to the San Gabriel River spillway during extreme events.

The top elevation of the spillway would be approximately three (3)-ft. lower than the Dam crest elevation. The auxiliary spillway would become active when the water level in the Reservoir reaches elevation 234.0 ft. after the San Gabriel River spillway gates are fully open. The addition of the auxiliary labyrinth spillway would not result in adverse effects to the Whittier Narrows Dam because the Dam has been determined to be not eligible for NRHP listing in consultation with the SHPO.

### **Parapet Walls**

The parapet wall would be built on the Dam crest to raise the Dam crest an additional 12 ft. to meet tolerable risk guidelines. The addition of the parapet walls on top of the Dam crest would raise the ultimate elevation of the Dam crest from 239.0 ft. to 251.0 ft. Water impoundment upstream of the Dam could be increased to this higher elevation, resulting in more water being impounded with a greater risk of Dam breach, causing Dam failure. Elevation 251.0 ft. would also expand the upstream water inundation boundary beyond the current upstream, probable maximum flood line. The additional parapet walls on the Dam crest would not result in adverse effects to the Whittier Narrows Dam as the Dam has been determined not NRHP eligible in consultation with the SHPO. Adverse effects to historic properties could occur if the current upstream probable maximum flood line was raised as most recorded archaeological sites in the reservoir are on higher elevations.

### **Approach and Runout Channels.**

Upstream of the Dam, an approach channel would be graded to improve flow characteristics to the auxiliary spillway. The approach channel would be 240 ft. wide and have an average distance of roughly 500 ft. extending from the upstream limit of the labyrinth to the crossover channel.

Downstream of the Dam, a 240-foot wide runout channel would extend an average length of approximately 450 ft. between the downstream limit of the labyrinth and the San Gabriel River through the existing Pico Rivera Municipal Golf Course. After the staging area in the Pico Rivera Golf Course is dismantled, the area would be covered with excess fill material from the removal of the embankment for the auxiliary spillway. The fill material would be sloped and graded from the spillway to the San Gabriel River invert downstream of the existing spillway. The River levee would be removed in this area so that flood water from the spillway would flow to the San Gabriel River. The fill material would be hydroseeded upon completion of the runout channel.

Both channels would be constructed during the dry season so as to minimize the risk of flooding the work area due to stormwater flows.

Based on past archaeological surveys of the area, there are no recorded ethnographic or prehistoric archaeological sites in the immediate area planned for the approach and runout channels, however, several ethnographic Gabrielino villages were located in Whittier Narrows, and use of this area would require consultation with the Tribes and other interested parties to identify historic properties, in particular, those of traditional religious and cultural significance, and assess if project effects are adverse or not. If eligible, resolution of the adverse effect would be required to avoid a significant impact under NEPA.

### **Road Modifications**

As indicated above under Borrow Area, approximately 5,400,000 cy of fill material would be required to raise the three roadways, Rosemead Blvd, Lincoln Ave. and Rooks Road, Raising the three roads to the height of the parapet walls on the Dam crest would be in conjunction with the 12 foot high parapet walls constructed. Raising the three roadways and impoundment of water to the higher elevation of 251.0 ft. could have an adverse effect on historic properties if any of these three roadways, Rosemead Blvd, Lincoln Ave. and Rooks Road, is determined to be a historic property and mitigation of adverse effects is not accomplished. Archaeological sites also may be found at higher elevations in the reservoir and could require NRHP evaluation, consultation under Section 106, and resolution of adverse effects if any are determined to be historic properties. Resolution of adverse effects to historic properties would be required to avoid a significant impact under NEPA.

### **Trench Drain and Filter Blanket**

For the construction of the trench drain for a distance of 90 ft. downstream from the toe of the embankment, soil cleared would be stockpiled and used as needed for the trench drain fill material needs. Construction of the trench drain and filter blanket would require modification of the Pico Rivera Golf Course, which requires evaluation to determine if it is eligible for listing on the NRHP as a historic landscape. Construction of the trench drain and filter blanket would also possibly require relocation of at least one tower of the Los Angeles Department of Water and Power (LADWP) Boulder-Los Angeles 287.5kV TL. This TL has been determined NRHP

eligible, and modification of the line by relocating a tower may be considered an adverse effect. If the alterations to the golf course and TL are determined to be adverse effects to historic properties, resolution of those adverse effects would be required through execution of a PA or other agreement document to avoid a significant impact under NEPA.

### **Closeout**

For the construction of the trench drain for a distance of 90 ft. downstream from the toe of the embankment, soil cleared would be stockpiled and used as needed for the trench drain fill material needs. Construction of the trench drain and filter blanket would require modification of the Pico Rivera Golf Course, which requires evaluation to determine if it is eligible for listing on the NRHP as a historic landscape. Construction of the trench drain and filter blanket would also possibly require relocation of at least one tower of the Los Angeles Department of Water and Power (LADWP) Boulder-Los Angeles 287.5kV TL. This TL has been determined NRHP eligible, and modification of the line by relocating a tower may be considered an adverse effect. If the alterations to the golf course and TL are determined to be adverse effects to historic properties, resolution of those adverse effects would be required through execution of a PA or other agreement document to avoid a significant impact under NEPA.

### **Operations and Maintenance**

Operations and maintenance activities for RMP 3E would be similar to those of RMP 1, the **No Action Alternative/Future without Project with IRRMs**. The mechanical and electrical repair of the gates, vegetation removal at the structures, mowing, graffiti removal, and cleaning the relief wells would continue. Due to the increased area of the concrete surfaces, the amount of graffiti removal is expected to increase. The majority of the relief wells would be removed, decreasing the associated maintenance effort. Vegetation removal would remain as before though the amount of effort would increase due to the additional area associated with the trench drain.

The water control manual would be updated to be consistent with Federal requirements and the revised design of the Dam. The operation of the both the outlet works and the spillway would remain unchanged.

Neither the increase in effort compared to the continued O&M under the No Action RMP would have an effect to historic properties as the dam has been determined not eligible for listing on the NRHP with concurrence from the SHPO. All maintenance, repair, and IRRM actions that involve the Whittier Narrows Dam structure would have no effect to historic properties as the dam has been determined not eligible for listing on the NRHP with concurrence from the SHPO. This would include all structural and electrical repairs, graffiti removal, repair of the spillway gates, relief well repair, vegetation removal and mowing, and also includes mechanical and electrical repair of the outlet and spillway gates, cleaning and repair of relief wells, and vegetation removal from the structures and mowing of operations areas. If other future actions (i.e., “Section 106 undertakings”) which are unknown at this time are included as part of revision of the water control manual, these would require a separate Section 106 and NEPA analysis at that time.

**Risk Management Plan 3E** therefore is not anticipated to have direct or indirect significant impacts to cultural resources from ongoing operation and maintenance activities, IRRMs, or the



crest elevation repair that would permanently alter the structure of the dam, with the exception of the use of a borrow area, which could result in adverse effects under Section 106 to the Whittier Narrows Dam Recreation Area (P-19-186889) and possibly as yet unidentified historic properties, based on informal Tribal consultation. If historic properties are identified and adverse effects are assessed, resolution of these effects would be required under Section 106. This alternative is not expected to result in disturbance of any human remains or major modification of a National Historic Landmark property or eligible property without resolution of adverse effects. The alternative would not result in the loss of a historic property's eligibility status under criteria A-C due to remaining effects even after minimization and mitigation. The alternative would not result in the destruction of a historic property eligible under criterion D with no resolution of adverse effects.

### **5.6.3.3 RMP 5: Protected Overtopping with Seepage Control**

RMP 5 is described in Chapter 3, section 3.7.3. RMP 5 addresses both risk driving failure modes. Overtopping would be addressed through hardening of the Dam crest to prevent erosion and subsequent failure of the Dam from events or inundation large enough to cause overtopping. Components of this RMP include roller compacted concrete (RCC) on the Dam crest and downstream face of the embankments.

As described in Section 3.7.3, parapet walls would be constructed above the outlet structure, spillway, and between Lincoln Ave. and the outlet structure (Rio Hondo). Lincoln Ave. would be raised 5 ft., to the height of the parapet wall.

Backward erosion piping is addressed through construction of a trench drain at the downstream Dam toe and graded filter blanket adjacent to Rosemead Blvd.

Phase 1 of construction would include development of staging areas and temporary relocation of utilities similar to phase 1 of RMP 3E. Phase 2 includes construction of components described above (for further details refer to Section 3.7.3), and development of batch plants and haul routes to facilitate construction.

Operations and Maintenance (O&M) activities are expected to be similar in nature to those described for the **No Action RMP**. All maintenance, repair, and IRRM actions that involve the Whittier Narrows Dam structure would have no effect to historic properties as the dam has been determined not eligible for listing on the NRHP with concurrence from the SHPO. This would include all structural and electrical repairs, graffiti removal, repair of the spillway gates, relief well repair, vegetation removal and mowing, and also includes mechanical and electrical repair of the outlet and spillway gates, cleaning and repair of relief wells, and vegetation removal from the structures and mowing of operations areas.

### **IRRM**s

Impacts are expected to be similar to those described for IRRMs under RMP 1: No Action.

## **Phase 1**

### **Staging Areas**

The staging areas for RMP 5 would be developed in two areas, Streamland Park and the Pico Rivera Golf Course as for RMP 3E. Both locations are located downstream of the central embankment. Both sites would be cleared and grubbed following removal of site amenities and their disposal. The sites would be leveled as needed for staging area facilities. Use of Streamland Park and the Pico Rivera Golf Course as staging areas would be. Clearing and grubbing of Streamland Park and the Pico Rivera Golf Course for removal of site amenities and disposal for use as staging area facilities would require evaluation of the golf course to determine if it is eligible for listing on the NRHP (i.e., a historic property), and if so, if the alterations would be an adverse effect to the qualities that make it NRHP eligible. If the alterations to the golf course are determined to be an adverse effect to a historic property, resolution of the adverse effect would be required through execution of a PA or other agreement document to avoid a significant impact under NEPA. The current Streamland Park is not the site of the original Streamland Park and is not of historic age (i.e., is under 50 years of age); therefore the architectural features of this park do not require analysis under Section 106, however, the location of the park will be included in the Section 106 APE consultation.

### **Close Bike Paths and Dam Crest**

The San Gabriel River Trail would be closed approximately 1,000 ft. upstream of the spillway during the Phase 1 implementation period. The trail crosses the crossover weir and uses the maintenance road ramp west of the spillway to the Dam crest. The road continues down the embankment slope to the Pico Rivera Golf Course where the trail rejoins the River levee.

Closure of the San Gabriel River Trail and Dam Crest would have no potential to affect historic properties unless authorized or unauthorized (i.e., user-created) trails replaced the closed portion of the trail. Alternative trails would be subject to consultation under Section 106 and separate detailed analysis under NEPA at that time.

### **Temporary Relocation of Utilities**

Similar to RMP 3E, the temporary relocation of utilities would occur downstream of the Dam toe. The temporary relocation and restoration of the utilities through the embankment would be direct and temporary during construction Phase 1 would have no effect to historic properties as the dam has been determined not eligible for listing on the NRHP with concurrence from the SHPO.

## **Phase 2**

### **Redevelop Staging Areas**

The staging areas would be redeveloped in the two areas, Streamland Park and the Pico Rivera Golf Course as for Phase 1. Both locations are located downstream of the central embankment. The sites would be cleared and leveled as needed for staging area facilities. Use of Streamland Park and the Pico Rivera Golf Course as staging areas Clearing and grubbing of Streamland Park and the Pico Rivera Golf Course for removal of site amenities and disposal for use as staging area facilities would require evaluation of the golf course to determine if it is eligible for listing on the NRHP (i.e., a historic property), and if so, if the alterations would be an adverse effect to

the qualities that make it NRHP eligible. If the alterations to the golf course are determined to be an adverse effect to a historic property, resolution of the adverse effect would be required through execution of a PA or other agreement document to avoid a significant impact under NEPA. The current Streamland Park is not the site of the original Streamland Park and is not of historic age (i.e., is under 50 years of age), and therefore the architectural features of this park do not require analysis under Section 106; the location of the park will be included in the Section 106 APE consultation.

### **Batch Plants and Haul Routes**

Similar to RMP 3E, batch plants and haul routes would be cleared and grubbed as described in section 3.7.3. Areas would be leveled as necessary with excess material used temporarily as berms to prevent runoff or to protect from inundation during construction. Following construction, excess fill material would be placed in the borrow area. Following completion of construction, the batch plants would be dismantled and the area regraded and hydroseeded. Although temporary use areas, clearing, grubbing, grading, and hydroseeding could have adverse effects on historic properties if they are present in the batch plant and haul road areas. One batch plant area is within the site boundary of the former Whittier Narrows Dam Recreation Area (P19-186889), which has not been evaluated for NRHP eligibility, and the other is adjacent to the recorded area of the Montebello Oil Field (P19-003813), which has been previously determined not NRHP eligible, with SHPO concurrence. Both areas could be impacted by construction activities and would require evaluation and consultation with the SHPO, and, if determined NRHP eligible, avoided, or mitigation of adverse effects. Planned haul routes include current, paved roads, unpaved roads, new planned haul roads. The only known sites in the vicinity of newly planned haul roads are ineligible sites such as the Dam and TLs that have been removed and replaced. If adverse effects to a historic property are determined, resolution of the adverse effect would be required to avoid a significant impact under NEPA.

### **Remove Topsoil from Downstream Face of Dam**

A layer of topsoil, approximately 10 ft. deep would be removed from removed from the downstream slopes of the three embankments of the Dam. The topsoil would be stockpiled in either the Golf Course or Streamland Park during the placement of the Roller compacted concrete (RCC). Removal of topsoil from the downstream slopes of the three Dam embankments would have no effect to historic properties as the dam has been determined not eligible for listing on the NRHP with concurrence from the SHPO. Stockpiling the topsoil of Streamland Park and the Pico Rivera Golf Course would require evaluation of the golf course to determine if it is eligible for listing on the NRHP (i.e., a historic property), and if so, if the alterations would be an adverse effect to the qualities that make it NRHP eligible. If the alterations to the golf course are determined to be an adverse effect to a historic property, resolution of the adverse effect would be required through execution of a PA or other agreement document to avoid a significant impact under NEPA. The current Streamland Park is not the site of the original Streamland Park and is not of historic age (i.e., is under 50 years of age); therefore the architectural features of this park do not require analysis under Section 106, however, the location of the park will be included in the Section 106 APE consultation.

### **Roller Compacted Concrete**

Roller compacted concrete (RCC) would be placed on the entire crest and downstream slope of the earthen embankment (the crest would be restored to the original design elevation of 239.0 ft.). The RCC would be placed in lifts approximately 10-feet wide and one foot high, resulting in a stepped appearance (see Photo 3.7-2). This stepped face would help dissipate energy from overtopping flows. The total amount of concrete anticipated to construct the RCC Overlay is 133,333 cy. Upon completion of the RCC, the slope would be buried and hydroseeded. The placement of RCC on the entire crest and downstream slope of the earthen embankment would have no effect to historic properties as the dam has been determined not eligible for listing on the NRHP with concurrence from the SHPO.

### **Replace Topsoil**

When placement of the RCC is completed and the concrete has cured, the top soil would be placed over the RCC and hydroseeded in compliance with Corps guidelines. The topography of the Dam embankments would change with the added two (2) foot width of the topsoil returned to the downstream slope of the Dam. The addition of topsoil on the RCC and hydroseeding it would have no effect to historic properties as the dam has been determined not eligible for listing on the NRHP with concurrence from the SHPO.

### **Road Modification/Parapet Wall**

Lincoln Ave. would be raised at the Dam crest five (5)-ft. to match the elevation of the parapet wall to be built from Lincoln Ave. to the Montebello Hill area, so that over topping water does not go around the Dam crest. Fill material would come from excess fill material removed from the downstream face of the Dam for the placement of the RCC. The parapet wall would be five (5)-ft. high. Raising the elevation of Lincoln Ave. 5 ft. could have an adverse effect on historic properties if Lincoln Ave. is determined to be a historic property and mitigation of adverse effects is not accomplished. The addition of a parapet wall on the Dam would have no effect to historic properties as the dam has been determined not eligible for listing on the NRHP with concurrence from the SHPO.

### **Trench Drain and Filter Blanket**

For the construction of the trench drain 90 ft. downstream from the toe of the embankment, soil cleared would be stockpiled and used as needed for the trench drain fill material needs, the same as described in RMP 3E. Construction of the trench drain and filter blanket would require modification of the Pico Rivera Golf Course, which requires evaluation to determine if it is eligible for listing on the NRHP as a historic landscape. Construction of the trench drain and filter blanket would also possibly require relocation of at least one tower of the Los Angeles Department of Water and Power (LADWP) Boulder-Los Angeles 287.5kV TL. This TL has been determined NRHP eligible, and modification of the line by relocating a tower may be considered an adverse effect. If the alterations to the golf course and TL are determined to be adverse effects to historic properties, resolution of those adverse effects would be required through execution of a PA or other agreement document to avoid a significant impact under NEPA.

### **Closeout**

Closeout of the Phase 2 construction activities would be similar to close-out activities for RMP 3E involving the dismantling of the batch plants and staging areas and removal of these facilities from

the Project site. Any gravel or other material laid down on the haul roads would be removed. Closeout of the Phase 2 construction activities at Streamland Park, the Pico Rivera Golf Course, and any haul road modifications would not require any additional analysis under the NHPA (Section 106), as all determinations of NRHP eligibility and effects assessments for staging and haul roads would include Phase 2 construction activities.

### **Operations and Maintenance**

Operations and maintenance activities for RMP 5 would be similar to those of RMP 3E, and RMP 1, the No Action RMP. The mechanical and electrical repair of the gates, vegetation removal at the structures, mowing, graffiti removal, and cleaning the relief wells would continue. The majority of the relief wells would be removed, decreasing the associated maintenance effort. Vegetation removal would remain as before though the amount of effort would increase due to the additional area associated with the trench drain.

Neither the increase in effort compared to the continued O&M under the No Action RMP would have an effect to historic properties as the dam has been determined not eligible for listing on the NRHP with concurrence from the SHPO. All maintenance, repair, and IRRM actions that involve the Whittier Narrows Dam structure would have no effect to historic properties as the dam has been determined not eligible for listing on the NRHP with concurrence from the SHPO. This would include all structural and electrical repairs, graffiti removal, repair of the spillway gates, relief well repair, vegetation removal and mowing, and also includes mechanical and electrical repair of the outlet and spillway gates, cleaning and repair of relief wells, and vegetation removal from the structures and mowing of operations areas.

The footprint of the RMP 5 is smaller in overall size than those of the other two RMPs, but extends beyond the footprint of the other two in one area. Overall, impacts would be similar to the other two alternatives but is expected to involve fewer sites. The six previously recorded resources are located within or near the footprint of this plan alternative, as follows: (1) the four high power transmission lines that have been evaluated and determined not eligible for NRHP listing with SHPO concurrence; (2) the Montebello Oil Field (P-19-003813); and (3) the concrete slab foundation with associated other features (P-19-004221). None of the high power lines would be impacted by this alternative as none of the transmission lines is NRHP eligible. The Montebello Oil Field as currently recorded would not be impacted by this alternative, however, based on aerial photography, some unrecorded oil field features may be located within the RMP 5 footprint and would require recording, evaluation of NRHP eligibility, and, if determined eligible, possible resolution of adverse effects based on project activities.

One other cultural resource known to be over 50 years of age that is extant within the RMP 5 project area is the Pico Rivera Golf Course. Installation of a toe drain on the downstream embankment would directly impact this resource. The golf course would require evaluation for NRHP eligibility and consultation with SHPO for concurrence regarding a determination of eligibility, as well as concurrence on project impacts and resolution of any impacts, if the golf course is NRHP eligible.

Based on ethnographic and Native American knowledge of the area, RMP 5 has some potential, though likely less potential than either RMP 1 or RMP 3E, to impact tribal cultural resources. The extent of any potential impacts cannot be determined at this time.

In addition, five historic period house and farm locations are mapped within the footprint of the RMP 5 components. Several were originally located on roads which are now being proposed for use as access routes. Previous surveys in these areas have not found extant resources at these locations, however, the presence or absence of subsurface archaeological deposits is unknown. If possible, it is preferable to ascertain the likelihood and/or presence of any subsurface deposits through archival research and testing prior to making any road improvements that would include subsurface disturbance. If subsurface deposits are found, the resources would require NRHP evaluation and possible resolution of adverse effects if avoidance or minimization of adverse effects could not be accomplished through project modification.

**RMP 5** therefore is not anticipated to have direct or indirect significant impacts to cultural resources from ongoing operation and maintenance activities, IRRMs, or the construction activity. If historic properties are identified and adverse effects are assessed, resolution of these effects would be required under Section 106. This alternative is not expected to result in disturbance of any human remains or major modification of a National Historic Landmark property or eligible property without resolution of adverse effects. The alternative would not result in the loss of a historic property's eligibility status under criteria A-C due to remaining effects even after minimization and mitigation. The alternative would not result in the destruction of a historic property eligible under criterion D with no resolution of adverse effects.

### **Summary**

Comparison of the three plans shows that RMPs 1 and 3E could each impact as many as 10 to 12 historic age sites or structures if they are determined NRHP eligible. In contrast, RMP 5 could directly or indirectly impact eight known historic age sites or structures, to include the Whittier Narrows Dam (number pending), Montebello Oil Field (P-19-003813), Whittier Narrows Dam Recreation Area (P-19-1868890), the Los Angeles Department of Water & Power Boulder Lines 1 & 2 (P-19-188983), the Pico Rivera Golf Course, Rosemead Blvd, Lincoln Ave., and Rooks Rd. Only the LADWP Boulder to Los Angeles power line has been determined eligible, the dam and oil field have been determined ineligible, and the eligibility status of the others is as yet undetermined. The presence or absence of subsurface prehistoric archaeological deposits is unknown at this time, but based on the smaller volume of surface disturbance planned for RMP 5 as compared to RMPs 1 and 3E, the likelihood of impacting subsurface deposits is also proportionately lower.

### **5.6.4 Environmental Commitments**

Prior to the initiation of project-related ground disturbing activities the Corps would have a fully executed PA or other agreement in place. The PA or other agreement has stipulations to address the development and implementation of identification, evaluation of cultural resources, and historic property treatment plans. Specific mitigation measures would be developed to address any adverse effects on historic properties. Depending on the nature of the adverse effect, these could include the following:



- CR-1** In the event that previously unknown cultural resources are uncovered, work in the immediate area would cease until the requirements in 36 C.F.R. 800.13 are complied with. The on-site supervisor shall contact a District Archaeologist or an approved archaeological consultant immediately. The on-site supervisor shall additionally divert all Proposed Project-related activities to other areas until the discovery has been evaluated by the District Archaeologist or the approved archaeological consultant, who will consult with interested Native American community groups and Indian Tribes and SHPO, as appropriate, and determine if subsequent treatment is warranted.
- CR-2** Surveying and protecting exposed inundated cultural deposits.
- CR-3** Protecting exposed archaeological sites from vandalism and erosion with fencing and re-vegetation, or capping sites in an approved manner with appropriate material.
- CR-4** Preparing and implementing a discovery plan; if previously undiscovered resources are identified during an undertaking, suspend work while the resource is evaluated and adverse effects are mitigated to avoid any further impact. Continue to consult with Native American groups to identify any traditional cultural properties or resource uses and address impacts.
- CR-5** Developing a plan of action pursuant to NAGPRA between the Corps and interested Native American community groups and Indian Tribes to manage the disposition and treatment of human remains should any be encountered during implementation of the project. The principal purpose of the plan would be to prevent halting construction during the repatriation process.
- CR-6** If human remains are encountered during excavations associated with this Proposed Project, all work must halt, and the County Coroner must be notified (Section 7050.5 of the California Health and Safety Code). The coroner will determine whether the remains are of forensic interest. If the coroner, with the aid of the District Archaeologist, determines that the remains are prehistoric, the coroner will contact the California Native American Heritage Commission (NAHC). The NAHC will be responsible for designating the most likely descendant (MLD).

## **5.7 SOCIOECONOMICS AND ENVIRONMENTAL JUSTICE**

The area potentially affected by the proposed RMPs for this resource includes the area immediately upstream of the Project area to Santa Fe Dam as well as the cities downstream that could potentially experience inundation with possible Dam failure scenarios. Specific information for environmental justice is presented only for Cities of South El Monte, Montebello, Pico Rivera, and the City of Industry, which are immediately adjacent to the Project. Impacts are characterized for IRRMs, Construction Phases 1 and 2, and Regular/Recurring Operations and Maintenance, rather than by construction component.

### **5.7.1 Regulatory Framework**

Executive Order 12898, Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations, require federal agencies to "make achieving environmental justice part of its mission by identifying and addressing, as appropriate,

disproportionately high and adverse human health or environmental effects of its programs, policies, and activities on minority populations and low-income population.”

The EPA has lead responsibility for implementation of Executive Order 12898. In exercising its responsibility, the EPA developed EJSCREEN, an online environmental justice screening and mapping tool, to assist federal agencies.

The Council on Environmental Quality (CEQ) has oversight of the federal government’s compliance with this Executive Order and NEPA. The CEQ, in consultation with the EPA and other agencies, has prepared guidance to assist federal agencies in NEPA compliance in its Environmental Justice: Guidance under the National Environmental Policy Act (CEQ Guidance). The CEQ Guidance provides an overview of Executive Order 12898; summarizes its relationship to NEPA; recommends methods for the integration of environmental justice analysis into NEPA documents; and definitions of key terms and concepts contained in the order.

Per the CEQ Guidance, minority refers to people who are Hispanic or Latino of any race, as well as those who are non-Hispanic or Latino of a race other than White or European-American. The same CEQ Guidance suggests low-income populations be identified using the national poverty thresholds from the U.S. Census Bureau.

### **5.7.2 Thresholds of Significance**

A potentially significant impact may occur to environmental justice if a proposed RMP would result in:

- A disproportionately high adverse impact on minority or low-income communities

A potentially significant impact may occur to socioeconomics if a proposed RMP would result in:

- A substantial population growth in an area, either directly (e.g., by proposing new homes and businesses) or indirectly (e.g., through extension of roads or other infrastructure),
- A substantial number of residents, businesses, or employees to be displaced (includes displacement of affordable housing), necessitating the construction of replacement housing elsewhere.
- A loss in community facilities, events, population, or major industry that would result in an overall loss in community cohesion.

### **5.7.3 RMP Analysis and Comparison**

Four incorporated cities circumscribe the Whittier Narrows Dam and Reservoir. South El Monte is to the north, Montebello to the southwest, Pico Rivera to the south, and the City of Industry to the east. The Montebello Hills separates the Dam from nearby cities on its western flank. There is notable presence of both minority and low-income populations in the four cities.

There would be no discernable direct or indirect impacts to South El Monte, located approximately 1.5 miles north of this area. Likewise, there would be no discernable direct or indirect impacts to the City of Industry, located approximately 1.75 miles east of this area.

## IRRM<sub>s</sub>

## Crest Elevation Restoration

Restoration of the crest elevation would result in the increased construction-related direct and indirect economic activity over the construction period. Population and housing is more than adequate within the urbanized, highly developed Los Angeles metropolitan area, so there would be adequate housing vacancy in the vicinity for accommodating construction workers. Raising the crest elevation to its original design elevation is not expected to affect community growth, either directly or indirectly.

## Environmental Justice

5-86

## **Regular/Recurring Operations and Maintenance**

### **Socioeconomics**

Regular and recurring O&M activities would be limited in extent, occur within the Reservoir or on or near the Dam, be short in duration, and require few workers. These activities are not expected to cause a shift in population, housing, and employment. There would be no direct or indirect impacts to socioeconomics.

### **Environmental Justice**

RMP 1 would include routine O&M activities including but not limited to repairing spillway gates, conducting inspections, access road repair, erosion repair, and structural repair. In addition, these activities are primarily limited to the footprint of the existing dam and adjoining areas upstream and downstream. Routine O&M activities are expected to result in short-term *de minimis* impacts to environmental resources. There would be no disproportionate adverse impacts to minority and low-income populations.

### **5.7.3.2 RMP 3E: Labyrinth Auxiliary Spillway and Seepage Control**

RMP 3E is described in Chapter 3, section 3.7.2. Under this RMP, overtopping is addressed through adding spillway capacity and backward erosion piping is addressed through construction of a trench drain at the downstream Dam toe and graded filter blanket adjacent to Rosemead Blvd.

### **IRRM**

Impacts for socioeconomics and environmental justice are expected to be similar to those described under RMP 1: No Action.

### **Phases 1 and 2**

### **Socioeconomics**

Implementation of the RMP would generate construction expenditures and demand for construction labor more so than restoring the Dam crest. Construction expenditures and the demand for construction labor would provide temporary short-term benefits (increased employment and income) to the regional economy. Expenditures on construction goods, materials, and equipment that are made in the region with the construction of the new auxiliary labyrinth, the 12 foot high parapet wall on the Dam crest, and the raising of Rosemead Blvd., Lincoln Ave., and Rooks Road would generate additional economic benefits as spending ripples through the local economy via inter-industry links. Construction workers would be spend their wages, in part, in the local economy, generating additional economic activity.

Therefore, construction expenditures would provide a short-term benefit to regional earnings and employment. Because **RMP 3E** would involve the slightly longer duration of construction, greatest modifications, and greater cost of modification of the Dam with the auxiliary spillway, 12 foot high parapet walls, and raising the roadways eight (8) ft., the contribution of construction expenditures to the local economy would be the highest of the RMPs. and would also be of

slightly longer duration. It is expected that there would be moderate beneficial impacts on the regional economy from expenditures and labor.

The RMP would result in the increased construction-related direct and indirect economic activity over the construction period. Population and housing is more than adequate within the urbanized, highly developed Los Angeles metropolitan area, so there would be adequate housing vacancy in the vicinity for accommodating construction workers. The construction of RMP 3E is not expected to affect community growth, either directly or indirectly.

For all actionable RMPs information about the proposed construction would be distributed to property owners and potentially affected persons and institutions without any distinction based on minority or income status; the populations that could be affected by these health and safety risks would be determined by their proximity to the proposed project.

The RMP would not require relocating or displacing any emergency or health-related public services. Increased levels of construction in the project area raise the possibility of emergency services experiencing increased activity responding to work related injuries. However, given standard construction health and safety practices, it is unlikely that any incremental increase in emergency services demand would be significant. Only Lincoln Ave would be raised, therefore there would be minimal delays due to construction of raising roadways on emergency services. Thus, construction-related indirect effects on health and safety would be minimal, in regard to access to emergency services. These impacts are expected to be less-than-significant.

Construction of the RMP is not expected to displace important community institutions. However, the temporary reduction in recreation access and use of Streamland Park, the Pico Rivera Golf Course, the San Gabriel River Trail, and the LARio Trail during construction could cause recreationalists to travel to unaffected points of recreation. This drop in attendance over the construction period could affect cohesion in the local community that cater to outdoor recreation visitors associated with Streamland Park and the Pico Rivera Golf Course.

It is likely that land owned by the United States, leased to the City of Pico Rivera, and subleased to the Whittier Fertilizer Company may need to be amended or terminated. The amendment or termination of this lease could impact operations at the company by eliminating access to this leased property, approximately 25% of the current operations yard. A potential reduction in operations could result in adverse business impacts that may entail a potential permanent reduction in the workforce for this facility. While the Whittier Fertilizer Company is not unique in the products it produces and sells, there could be indirect effects to other businesses that rely on this facility to source materials. It is also likely that the use of the Pico River Municipal Golf Course as a staging site could result in a potentially permanent reduction in the work force for this facility. While the use of this land for temporary staging activities or permanent construction could be disruptive to individuals, the overall construction activity is not expected to displace a substantial number of residents, businesses, or employees.

### **Environmental Justice**

Construction of an auxiliary labyrinth spillway, crest restoration, and parapet walls under RMP 3E would entail construction activities from Lincoln Ave. to the west and adjacent to the three embankments to Peck Rd. to the East.

For most site specific resources, impacts would be confined to areas affected by construction. Impacts to biological resources from earthmoving activities would be contained within the reservoir. Likewise, potential impacts to cultural resources from earthmoving activities would mostly be contained within the reservoir. Potential for erosion under earth resources would be limited to areas where areas affected by earthmoving activities. Most impacts would be contained within the confines of the reservoir. Potential impacts to earth resources in Streamland Park or Pico Rivera Golf Course would be avoided or minimized with implementation of applicable environmental commitments. There would be no disproportionate impacts to surrounding communities.

For site specific resources such as recreation, RMP 3E would result in significant and unavoidable impacts because the runout channel would be constructed over the area of the current Pico Rivera Golf Course and a portion of the area would be re-classified as an O&M area. The area of Streamland Park to be used as a staging area would also be removed, but would likely be available for recreation development following construction closeout. Nonetheless, impacts to recreation would likely be felt during the construction period by the local population that use the park. This would result in a disproportionate impact to residents in the city of Pico Rivera that may utilize the golf course and park.

Non-site specific resources or resources where impacts can be transmitted beyond the construction area include water quality, air quality, noise, hazardous materials, and transportation. Potential temporary turbidity impacts to water quality would be limited to the reservoir and waterways. Traffic impacts for construction worker trips and delivery trips for aggregate and other raw materials would be dispersed onto regional arteries: I-605, SR-60, and Rosemead Boulevard. Construction would not require the use, transport, and disposal of hazardous materials; nor would construction interfere with on-going contaminated groundwater extraction and treatment operations. There would be no disproportionate impacts to surrounding communities.

Construction would result in air emissions from off-road and on-road vehicles for the duration of the four year construction period. Estimated emissions of criteria pollutants would not surpass annual or daily emission limits. However, localized air quality within the vicinity of residential developments in Pico Rivera, from Lincoln Ave. to Peck Rd., which are immediately adjacent to the construction, could be affected. Potential air quality impacts would be slightly less for residential developments in Montebello, located further west of the primary construction footprint.

Noise and vibration, especially those associated with the development and use of Streamland Park and Pico Rivera Golf Course during construction, would have temporary impacts on the surrounding community during active construction periods. The impacts would be most notable in the vicinity of residential developments in Pico Rivera, from Lincoln Ave. to Peck Rd., which



are immediately adjacent to the construction. These impacts are not expected to be significant with the implementation of environmental commitments.

Impacts associated with recreation resources, including the potentially significant impact to the Pico Rivera golf course, may disproportionately affect residential developments in Pico Rivera that benefit from the presence of the golf course in their community. Air quality impacts would not be significant under NEPA, but may disproportionately affect nearby residents to the extent they are present during construction after implementation of the environmental commitments. Based on the above, impacts under environmental justice are expected to be potentially significant due to the possibility of high, adverse impacts being disproportionately felt by low-income or minority populations of Pico Rivera in the area of construction. All impacts are expected to be temporary, with the exception of the impacts to the Pico Rivera golf course, which may be permanent if the golf course is not re-established following construction.

### **Regular/Recurring Operations and Maintenance**

Environmental Justice and socioeconomic impacts for O&M activities are expected to be similar to those characterized for the No Action RMP.

#### **5.7.3.3 RMP 5: Protected Overtopping with Seepage Control**

RMP 5 is described in Chapter 3, section 3.7.3. Under this RMP, overtopping is addressed through hardening of the Dam crest to prevent erosion or subsequent failure of the Dam from events large enough to cause overtopping. Backward erosion piping is addressed through construction of a trench drain at the downstream Dam toe and graded filter blanket adjacent to Rosemead Blvd.

### **IRRM**

Impacts for socioeconomics and environmental justice are expected to be similar to those described under RMP 1: No Action.

### **Phases 1 and 2**

#### **Socioeconomics**

Implementation of RMP 5 would generate construction expenditures and demand for construction labor would be similar, but marginally lower than **RMP 3E**. Construction expenditures and the demand for construction labor would provide temporary short-term benefits (increased employment and income) to the regional economy. Expenditures on construction goods, materials, and equipment that are made in the region would be similar to RMP 3E with the construction of the RCC on the downstream slope of the Dam. The construction actions would generate additional economic benefits as spending ripples through the local economy via inter-industry links. Construction workers are expected to spend their wages, in part, in the local economy, generating additional economic activity.

Therefore, construction expenditures would provide a short-term benefit to regional earnings and employment. Because RMP 5 would involve less modification of the Dam than RMP 3E, the

contribution of construction expenditures to the local economy would be close to RMP 3E and would be close in duration to RMP 3E. There would be moderate beneficial impacts on the regional economy from expenditures and labor.

It is likely that land owned by the United States, leased to the City of Pico Rivera, and subleased to the Whittier Fertilizer Company may need to be amended or terminated. The amendment or termination of this lease could impact operations at the company by taking a portion of their operations yard. A potential reduction in operations could result in a potential permanent reduction in the work force for this facility. While the Whittier Fertilizer Company is not unique in the products it produces and sells, it is one of the largest producers of fertilizer in the southern California region.

It is also likely that the use of the Pico River Municipal Golf Course as a staging site could result in a potentially permanent reduction in the work force for this facility. While the use of this land for temporary staging activities or permanent construction could be disruptive to individuals, the overall construction activity is not expected to displace a substantial number of residents, businesses, or employees.

As with RMP 3E, information would be distributed to property owners and potentially affected persons and institutions without any distinction based on minority or income status; the populations that could be affected by these health and safety risks would be determined by their proximity to the proposed project.

Similar to RMP 3E, RMP 5 would not require relocating or displacing any emergency or health-related public services. Increased levels of construction in the project area raise the possibility of emergency services experiencing increased activity responding to work related injuries. However, given standard construction health and safety practices, it is unlikely that any incremental increase in emergency services demand would be significant. Only Lincoln Ave would be raised, therefore there would be minimal delays due to construction of raising roadways on emergency services. Thus, construction-related indirect effects on health and safety would be minimal, in regard to access to emergency services. These impacts are expected to be less-than-significant.

The RMP would result in the increased construction-related direct and indirect economic activity over the construction period. Population and housing is more than adequate within the urbanized, highly developed Los Angeles metropolitan area, so there would be adequate housing vacancy in the vicinity for accommodating construction workers. The construction of RMP 5 is not expected to affect community growth, either directly or indirectly.

Construction of the RMP is not expected to displace important community institutions. However, the temporary reduction in recreation access and use of Streamland Park, the Pico Rivera Golf Course, the San Gabriel River Trail, and the LARio Trail during construction could cause recreationalists to travel to unaffected points of recreation. This drop in attendance over the construction period could affect cohesion in the local community that cater to outdoor recreation visitors associated with Streamland Park and the Pico Rivera Golf Course.

There is no anticipated shift in population, housing, and employment. Construction and labor expenditures would partially off-set the loss of local recreation expenditures during construction.

### **Environmental Justice**

Environmental justice impacts for construction components are expected to be similar to those characterized for RMP 3E.

### **Regular/Recurring Operations and Maintenance**

Regular and recurring O&M activities are expected to be similar to those characterized for RMP 1, for both socioeconomic and Environmental Justice.

## **5.7.4 Environmental Commitments**

The following Environmental Commitments would be implemented by the Corps to reduce potential impacts. For all action alternatives, in addition to the Environmental Commitments N-1 through N-13 would include, but not be limited to:

- EJ-1** Limiting off-site truck hauling on weekends and other times to accommodate tourist and/or recreation-related traffic, especially those days that may be associated with special local events.
- EJ-2** Limiting construction noise and visual disruptions to the extent practicable.
- EJ-3** Initiate, in cooperation with local communities, a recreation communication plan to ensure all impacts to recreation opportunities are provided in an open and transparent manner as early as possible prior to onset of construction.

## **5.8 HAZARDOUS, TOXIC, AND RADIOACTIVE WASTE**

The area potentially affected by the proposed RMPs for this resource is the area immediately underlying the Whittier Narrows Dam and Reservoir, as well as the area immediately downstream within the footprint of the Project.

### **5.8.1 Regulatory Framework**

#### **Comprehensive Environmental Response, Compensation, and Liability Act**

The Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) established prohibitions and requirements concerning closed and abandoned hazardous waste sites. The law authorizes two kinds of response actions: short-term removal to address releases or threatened releases requiring prompt response, and long-term remedial responses that permanently and significantly reduce the dangers from releases or threats of releases of hazardous substances that are serious but not immediately life threatening. CERCLA was amended by the Superfund Amendments and Reauthorization Act (SARA). Title 40 C.F.R. part 312 provides standards and practices for All Appropriate Inquiries.

The National Priorities List (NPL) sites are authorized under Section 105(a) (8) (b) of the (CERCLA also known as the Superfund law and are listed as Superfund sites. This list is updated

annually by the EPA based on various releases or threatened releases throughout the nation. Data was gathered from previous documents that searched and referenced the NPL.

### **Occupational Safety and Health Act**

The Occupational Safety and Health (OSH) Act was enacted to ensure safe and healthful conditions for working men and women. The OSH Act created the Occupational Safety and Health Administration (OSHA) at the Federal level and provided that states could run their own safety and health programs as long as those programs were at least as effective as the Federal program.

## **5.8.2 Thresholds of Significance**

A potentially significant impact may occur to HTRW if a risk management plan would result in:

- Long-term disruption of on-going contaminated groundwater treatment operations.
- Substantial hazard to the public or the environment through the routine transport, use, or disposal of hazardous materials during construction.
- Widespread or long term exposure of humans and the general environment to hazardous materials through the release of hazardous materials.

## **5.8.3 RMP Analysis and Comparison**

### **5.8.3.1 RMP Analysis and Comparison**

RMP 1 is described in Chapter 3, section 3.7.1. Construction activities are reasonably foreseeable under this alternative due to the necessity to restore the dam crest to its original elevation. With or without the implementation of either action RMP or the crest elevation restoration, the Corps would continue O&M activities and would continue to implement IRRMs to address PFMs.

### **IRRM**s

IRRM's include conducting inspections, conducting annual coordination, updating emergency action plans, and mapping flood zones. IRRMs are composed of technical studies and administrative coordination and would not result in construction activities.

### **Crest Elevation Repair**

Crest elevation restoration would require excavation of approximately 57,000 cy of earthen fill. The estimated dimensions of the borrow area affected to produce these quantities would be about 55 acres with two (2) ft. deep excavation on average. This area not within or near contaminated sites. The footprint and depth of the borrow area would be designed in conjunction with the Department of Toxic Substances Control, the state regulatory agency responsible for operating and overseeing contaminated groundwater extraction and treatment operations. Thus, use of borrow earthen fill would avoid excavation to depths that would encounter contaminated groundwater and the location of the site would not interfere with on-going groundwater extraction and treatment operations. Construction would not require

transport, use, or disposal of hazardous materials. The activity is not expected to have direct or indirect HTRW impacts.

If pursued, it would be subject to separate detailed analysis under NEPA at that time, but general impacts to water resources would be similar to those characterized for RMP Alternative 3E below.

### **Regular/Recurring Operations and Maintenance**

RMP 1 would include routine operations and maintenance activities including but not limited to repairing spillway gates, conducting inspections, access road repair, erosion repair, and structural repair. These activities would use native earthen fill, rocks or concrete. Such materials are chemically inert and would not leach contaminants into the environment. In addition, these activities are primarily limited to the footprint of the existing dam and adjoining areas which are not within or near contaminated sites. Furthermore, these activities would not require excavation to depths that would encounter contaminated groundwater nor would these activities interfere with on-going groundwater extraction and treatment operations. Thus, there would be no release of hazardous materials that would result in widespread or long term exposure of humans and the general environment through the release of hazardous materials.

#### **5.8.3.2 Labyrinth Auxiliary Spillway and Seepage Control**

RMP 3E is described in Chapter 3, section 3.7.2. Under this RMP, overtopping is addressed through adding spillway capacity and backward erosion piping is addressed through construction of a trench drain at the downstream Dam toe and graded filter blanket adjacent to Rosemead Blvd.

### **IRRM**

Impacts would be similar to those described under RMP 1: No Action.

### **Phase 1**

#### **Staging Areas**

The staging areas would be developed in two areas, Streamland Park and the Pico Rivera Golf Course. Both locations are located downstream of the central embankment. Both sites would be cleared and grubbed following removal of site amenities and their disposal.

Both locations are outside the boundary of on-going groundwater extraction and treatment operations. There would be no excavation or other type of earthwork that could encounter contaminated groundwater. Grading, clearing, and grubbing are standard pre-construction preparation activities that does not require the routine transport, use, or disposal of hazardous materials during construction. Pico River Golf Course is free of any known or existing surficial environmental conditions relating to hazardous materials and contamination.

A leaking underground storage site was present within the confines of Streamland Park. However, contaminant levels were deemed to no longer exceed applicable regulatory threshold requiring additional regulatory oversight in 1995. All construction debris would be transported

and disposed offsite at landfills as appropriate. There would be no direct or indirect HTRW impacts.

#### **Close Bike Paths and Dam Crest**

The San Gabriel River Trail would be closed approximately 1,000 ft. upstream of the spillway during the Phase 1 implementation period. The trail crosses the crossover weir and uses the maintenance road ramp west of the spillway to the Dam crest. The road continues down the embankment slope to the Pico Rivera Golf Course where the trail rejoins the River levee.

Closure of the bike paths involve no earth movement, excavation, or grading. The closure of the San Gabriel River Trail through the construction area would have no direct or indirect no direct or indirect HTRW impacts.

#### **Temporary Relocation of Utilities**

The temporary relocation of utilities would occur downstream of the dam toe. Temporary relocation of utilities would include excavation of the current utility galleries as well as excavation for the temporary placement of the utilities. Areas would be backfilled and regraded.

The downstream utilities convey water and effluent. There are no utilities that convey petroleum or other potentially hazardous substances. The utilities are outside the boundary of on-going groundwater extraction and treatment operations. Excavation would not be at depths that could encounter contaminated groundwater. Furthermore, excavation is a routine construction practice that does not require the routine transport, use, or disposal of hazardous materials. Backfill would consist of native earthen fill. Such materials are chemically inert and would not leach contaminants into the environment. The activity would have no direct or indirect no direct or indirect HTRW impacts.

### **Phase 2**

#### **Redevelop Staging Areas**

The staging areas would be redeveloped in the two areas, Streamland Park and the Pico Rivera Gold Course as for Phase 1. Impacts are expected to be similar to those described under Phase 1.

#### **Extend Crossover Weir**

When the elevation of water in the San Gabriel River, upstream of the spillway reaches 208.0 ft., water flows over the crossover weir into the crossover channel. After closing the River Trail, the current crossover weir located immediately upstream of the spillway would be relocated approximately 200 ft. upstream so that a new crossover channel can be excavated to allow room for construction of the coffer dam. All work would be from the landside of the river levee. The site would be cleared and grubbed and either excavated or re-graded as need to construct the new weir and crossover channel extension.

The crossover weir is outside the boundary of on-going groundwater extraction and treatment operations. Earthwork would not encounter contaminated groundwater and would not require the routine transport, use, or disposal of hazardous materials. Backfill would consist of native earthen fill. Such materials are chemically inert and would not leach contaminants into the

environment. The area is free of any known or existing surficial environmental conditions relating to hazardous materials and contamination. The activity would have no direct or indirect no direct or indirect HTRW impacts.

### **Batch Plants and Haul Routes**

Batch plants and haul routes would be cleared and grubbed as described in Section 3.7.2. Areas would be, cleared, grubbed, and leveled as necessary. Following construction, excess earthen fill material would be placed in the borrow area. Following completion of construction, the batch plants would be dismantled and the disturbed areas regraded and hydroseeded.

Locations for the batch plants and haul routes outside the boundary of on-going groundwater extraction and treatment operations. There would be no excavation or other type of earthwork that could encounter contaminated groundwater. Grading, clearing, and grubbing are standard pre-construction preparation activities that does not require the routine transport, use, or disposal of hazardous materials during construction. The areas are free of any known or existing surficial environmental conditions relating to hazardous materials and contamination. All construction debris would be transported and disposed offsite at landfills as appropriate. There would be no direct or indirect HTRW impacts.

### **Borrow Area**

The area of the proposed main borrow site would be located in the same area as for the No Action Alternative. (Figure 3.7-1). A second borrow area is proposed in the event that the main borrow area does not provide the required soil (sands and silts) for fill material. This site is located north of Siphon Road as shown on Figure 3.7-1.

Crest elevation restoration would require excavation of approximately 57,000 cy of earthen fill. The estimated dimensions of the borrow area affected to produce these quantities would be about 55 acres with two (2) ft. deep excavation on average. This area not within or near contaminated sites. The footprint and depth of the borrow area would be designed in conjunction with appropriate regulatory agencies responsible for operating and overseeing contaminated groundwater extraction and treatment operations. Thus, use of borrow earthen fill would avoid excavation to depths that would encounter contaminated groundwater and the location of the site would not interfere with on-going groundwater extraction and treatment operations. Construction would not require transport, use, or disposal of hazardous materials.

An approximately 55 acre borrow area would be excavated to an average depth of 5 feet to provide borrow material to restore the Dam crest elevation and construct a temporary coffer dam. Upon completion of construction, fill material of the coffer dam would be used to raise the road beds of Rosemead Blvd., Lincoln Ave. and Rooks Road. Remaining fill material would be placed in the borrow area, that would raise the invert elevation of the borrow area.

A portion of the 55-acre primary borrow area encompass extraction or monitoring wells associated with the on-going groundwater extraction and treatment operations. The secondary borrow site does not encompass but is adjacent to extraction or monitoring wells associated with the on-going groundwater extraction and treatment operations. In order to avoid disruption of on-going contaminated groundwater treatment operations, the footprint and depth of the borrow



area would be designed in conjunction with the Department of Toxic Substances Control, the state regulatory agency responsible for operating and overseeing contaminated groundwater extraction and treatment operations. Thus, use of borrow earthen fill would avoid excavation to depths that would encounter contaminated groundwater and the location of the site would not interfere with on-going groundwater extraction and treatment operations. The 55-acre borrow area is free of any known or existing surficial environmental conditions relating to hazardous materials and contamination. The secondary borrow site adjoins a Corp maintenance yard where there once were leaking underground fuel storage tanks. All tanks were removed with no evidence of groundwater contamination. Contaminant levels were deemed to no longer exceed applicable regulatory threshold requiring additional regulatory oversight. Excavation is a standard construction activity that does not require the routine transport, use, or disposal of hazardous materials. Fill redeposited into the borrow area post construction would consist of native soils. Since the soils are native to the reservoir, the backfill would not introduce additional contaminants not already present within the native substrate. The activity would have no direct or indirect HTRW impacts.

### **Coffer Dam**

The coffer dam would be constructed upstream of the eastern end of the central embankment. As indicated above, approximately 333,000 cy of fill material would be needed to construct the coffer dam. The coffer dam would be approximately 6-1/2 acres, and would be constructed to functionally match the height of the embankment (approximately 40 ft. tall). When the auxiliary spillway construction is completed, the coffer dam would be removed and the material used to raise the road beds or returned to the borrow area. The area would be regarded to accommodate the approach channel and to meet existing contours.

The coffer dam could be adjacent to a monitoring well associated with the on-going groundwater extraction and treatment operations. In order to avoid disruption of on-going contaminated groundwater treatment operations, the footprint and depth of the borrow area would be designed in conjunction with the Department of Toxic Substances Control, the state regulatory agency responsible for operating and overseeing contaminated groundwater extraction and treatment operations. Furthermore, the area is free of any known or existing surficial environmental conditions relating to hazardous materials and contamination. Construction would use standard techniques and would not require the routine transport, use, or disposal of hazardous materials. Fill redeposited into the borrow area post construction would consist of native soils. Since the disturbed soils are native to the Reservoir, the backfill would not introduce additional contaminants not already present within the native substrate. The activity would have no direct or indirect HTRW impacts.

### **Foundation/Sheetpile**

The spillway subsurface would include foundation improvements to prevent liquefaction during extreme earthquakes. Sheetpile is assumed to extend approximately 40 ft. below the foundation slab and encircle the proposed auxiliary spillway. Some dewatering of the foundation during construction is anticipated to allow the work to proceed in the storm season. Sheetpile driving and dewatering operations, including dewatering depth, would be coordinated in conjunction with the Department of Toxic Substances Control, the state regulatory agency responsible for operating and overseeing contaminated groundwater extraction and treatment operations. Thus,

sheetpile driving and dewatering would not result in the discharge of contaminated groundwater onto surface waterways. Furthermore, the area is free of any known or existing surficial environmental conditions relating to hazardous materials and contamination. Construction would use standard techniques and would not require the routine transport, use, or disposal of hazardous materials. The activity would have no direct or indirect HTRW impacts.

### **Construct Auxiliary Spillway**

An approximately 240-foot wide passive weir auxiliary spillway would be constructed in-line with the existing embankment and immediately west of the existing spillway to increase the spillway capacity. A bridge across the auxiliary spillway would be required to provide access to the San Gabriel River spillway during extreme events.

The auxiliary spillway would be located outside the boundary of on-going groundwater extraction and treatment operations. Furthermore, the auxiliary spillway would be outside the boundary of the downstream edge of the contaminated groundwater plume. Furthermore, the area is free of any known or existing surficial environmental conditions relating to hazardous materials and contamination. Construction would use standard techniques and would not require the routine transport, use, or disposal of hazardous materials. Construction would use native earthen fill. Such materials are chemically inert and would not leach contaminants into the environment. The activity would have no direct or indirect HTRW impacts.

### **Parapet Walls**

HTRW impacts would be the same as those characterized for construction of the auxiliary spillway.

### **Road Modifications**

Rosemead Blvd, Lincoln Ave. and Rooks Road would be raised with fill from the borrow area. The roads are located outside the boundary of on-going groundwater extraction and treatment operations. Furthermore, the area is free of any known or existing surficial environmental conditions relating to hazardous materials and contamination. Construction would not require excavation and would use standard techniques and would not require the routine transport, use, or disposal of hazardous materials. Construction would use native earthen fill and rocks for the roadbed. Storm runoff from new asphalt road surfaces would likely leach hydrocarbons (used in binding agents). However, the concentration of hydrocarbons in storm water would likely be at levels substantially lower than regulatory thresholds. Furthermore, concentration of hydrocarbons is expected to decrease over time. The activity would have no discernable direct or indirect HTRW impacts.

### **Trench Drain and Filter Blanket**

For the construction of the trench drain for a distance of 90 ft. downstream from the toe of the embankment, soil excavated would be stockpiled and used as needed for the trench drain fill material needs.

The downstream areas are outside the boundary of on-going groundwater extraction and treatment operations. Excavation would not be at depths that could encounter contaminated

groundwater. Furthermore, excavation is a routine construction practice that does not require the routine transport, use, or disposal of hazardous materials. Backfill would consist of native earthen fill, rocks or concrete. Such materials are chemically inert and would not leach contaminants into the environment. Likewise, the filter blanket would be composed of chemically inert and would not leach contaminants into the environment. The activity would have no direct or indirect HTRW impacts.

### **Closeout**

Closeout of the Phase 2 construction activities would involve the dismantling of the batch plants and staging areas and removal of these facilities from the Project site. Any gravel or other material laid down on the haul roads would be removed. Soil over culverts over the crossover channel would be removed. The areas would be re-graded.

Excess borrow soils would be deposited into the borrow areas from which they were excavated. Since the soils are native to the reservoir, the backfill would not introduce additional contaminants not already present within the native substrate. The activity would have no direct or indirect HTRW impacts.

Closeout operations would not interfere with on-going groundwater extraction and treatment operations nor would they require the routine transport, use, or disposal of hazardous materials. All construction debris would be transported and disposed offsite at landfills as appropriate. There would be no direct or indirect HTRW impacts.

### **Regular/Recurring Operations and Maintenance**

O&M activities for RMP 3E would be similar to those of RMP 1.

#### **5.8.3.3 RMP 5: Protected Overtopping with Seepage Control**

RMP 5 is described in Chapter 3, section 3.7.3. Under this RMP, overtopping is addressed through hardening of the Dam crest to prevent erosion or subsequent failure of the Dam from events large enough to cause overtopping. Backward erosion piping is addressed through construction of a trench drain at the downstream Dam toe and graded filter blanket adjacent to Rosemead Blvd.

### **IRRM**s

Impacts would be similar to those described under RMP 1: No Action.

### **Phase 1**

#### **Staging Areas**

Impacts would be similar to that characterized for the same activity under RMP 3E.

#### **Close Bike Paths and Dam Crest**

Impacts would be similar to that characterized for the same activity under RMP 3E.

#### **Temporary Relocation of Utilities**

Impacts would be similar to that characterized for the same activity under RMP 3E.

## **Phase 2**

### **Redevelop Staging Areas**

Impacts would be similar to that characterized for the same activity under RMP 3E.

### **Batch Plants and Haul Routes**

Impacts would be similar to that characterized for the same activity under RMP 3E.

### **Remove Topsoil from Downstream Face of Dam**

An approximately two (2) foot thick layer of topsoil would be removed from the downstream slopes of the three embankments of the Dam. The topsoil would be stockpiled in the identified staging areas during the placement of the roller compacted concrete (RCC). An additional 10 foot thick layer of material would be removed from the downstream slopes of the three embankments of the dam. This excavated material would be transported to the batch plants (via the concept haul road locations shown in Figure 3.7-3) and utilized in the mix of the RCC or for road modifications.

The downstream areas are outside the boundary of on-going groundwater extraction and treatment operations. There would be no excavation. Construction would use standard that do not require the routine transport, use, or disposal of hazardous materials. Backfill would consist of native earthen fill, rocks or concrete. Such materials are chemically inert and would not leach contaminants into the environment. The area is free of any known or existing surficial environmental conditions relating to hazardous materials and contamination. The activity would have no direct or indirect no direct or indirect HTRW impacts.

### **Roller Compacted Concrete**

An approximately two (2) foot thick layer of topsoil would be removed from the downstream slopes of the three embankments of the Dam. The topsoil would be stockpiled in the identified staging areas during the placement of the roller compacted concrete (RCC). An additional 10 foot thick layer of material would be removed from the downstream slopes of the three embankments of the Dam. This excavated material would be transported to the batch plants (via the concept haul road locations shown in Figure 3.7-3) and utilized in the mix of the RCC or for road modifications described below. This stepped face would help dissipate energy from overtopping flows.

The downstream face of the Dam where the RCC would be constructed is located outside the boundary of on-going groundwater extraction and treatment operations. Furthermore, the area is free of any known or existing surficial environmental conditions relating to hazardous materials and contamination. Construction would use standard techniques and would not require the routine transport, use, or disposal of hazardous materials. Construction would use native earthen fill. Such materials are chemically inert and would not leach contaminants into the environment. The activity would have no direct or indirect HTRW impacts.

### **Replace Topsoil**

When placement of the RCC is completed and the concrete has cured, the approximately two (2)-feet of topsoil removed would be placed over the RCC and hydroseeded in compliance with Corps guidelines (*Guidelines for Landscaping and Vegetation Management at Levees, Floodwalls, Embankment Dams, and Appurtenant Structures*, Engineer Technical Letter 1110-2-583).

Construction would reuse soil previously removed. There would be no excavation. Construction would use standard techniques that do not require the routine transport, use, or disposal of hazardous materials. Backfill would consist of native earthen fill. Such materials are chemically inert and would not leach contaminants into the environment. The area is free of any known or existing surficial environmental conditions relating to hazardous materials and contamination. The activity would have no direct or indirect HTRW impacts.

### **Road Modification/Parapet Wall**

Impacts would be similar to that characterized for the same activity under RMP 3E.

### **Trench Drain and Filter Blanket**

Impacts would be similar to that characterized for the same activity under RMP 3E.

### **Closeout**

Any soil removed from the embankment that is not needed for the RCC mix is expected to be used in road modifications and trench drain/filter blanket construction. Impacts would be similar to that characterized for the same activity under RMP 3E.

### **Regular/Recurring Operations and Maintenance**

O&M activities for RMP 5 would be similar to those of RMP 3E, and RMP 1, the No Action Alternative.

## **5.8.4 Environmental Commitments**

The following environmental commitments (ECs) would be incorporated into the contract specifications or otherwise implemented by the Corps to further reduce potential impacts. For all action alternatives, environmental commitments would include, but not be limited to, the following:

- HW-1** Compliance with all applicable local, regional, state, and Federal laws, policies, and regulations regarding the transportation, storage, handling, management, and disposal of hazardous materials and wastes.
- HW-2** The contractor shall prepare *Solid and Hazardous Materials and Waste Management Plan*.
- HW-3** Contractors shall have in place an accidental spill prevention and response plan for all hazardous materials that may be used on site. In the event of a spill or release of hazardous substances at the construction site, the contaminated soil shall be immediately contained, excavated and treated per Federal and state regulations developed by the EPA, as well as local hazardous waste ordinances.

**HW-4** During construction, should an area of suspected contamination be encountered, construction activity in the area shall cease and soil sampling shall be conducted to determine the nature and extent of the potential contamination. If testing indicates that contamination does exist, the area shall be cleaned up in accordance with applicable Federal and state regulations.

## **5.9 LAND USE**

The area potentially affected by the proposed RMPs for this resource is the area immediately underlying the Whittier Narrows Dam and Reservoir, as well as the area immediately downstream of the west, central, and eastern embankments within the footprint of the Project, including the areas known as Streamland Park and the Pico Rivera Municipal Golf Course.

### **5.9.1 Regulatory Framework**

The Corps completed an updated Master Plan (2011), a conceptual project-specific document for the Whittier Narrows Dam Project. It describes the existing resources in the Reservoir and provides a guide for Corps land management responsibilities and decisions in regard to Project lands, water, and associated resources. The Master Plan provides direction and guidance for land development in the Reservoir and other Project lands pursuant to applicable Federal laws, regulations, and policies.

The Corps land use classification system is defined in EP 1130-2-550. The Corps acquires land for a specific purpose. This purpose is its “allocation. Land allocation refers to the identification and documentation of lands at Civil Works projects in accordance with the authorized purposes for which they were or are to be acquired. There are four primary land allocation categories applicable to Corps projects for Project Operations (e.g., flood risk management, water supply, hydropower, etc.), Recreation, Fish and Wildlife, and Mitigation. Reservoir land was acquired for the Project for the purpose of flood risk management, which falls under the allocation of Project Operations. This allocation establishes the primary and uncompromising purpose of the Reservoir as operations for the purpose of flood risk management. All land use classifications are secondary to this purpose and must be compatible with flood risk management.

Once the land allocation is set, the Project lands are classified according to land use classifications. The Master Plan classifies lands into seven land use classifications as defined by Corps’ guidance (*Environmental Stewardship Operations and Maintenance Guidance Procedures*, ER 1130-2-540, as amended), : (1) Project Operations; (2) Recreation; (3) Mitigation; (4) Environmentally Sensitive; (5) Multiple Resource Management - Recreation - Low Density; (6) Multiple Resource Management - Inactive and/or Future Recreation; and (7) Easement Lands. The Master Plan provides guidance for balancing flood risk management requirements, recreation opportunities, and preservation of natural resources for current and future generations.

### **5.9.2 Thresholds of Significance**

A potentially significant impact may occur to land use if a risk management plan would result in:

- Permanent inconsistencies with the adopted Project Master Plan, unrelated to the use of the Reservoir for its primary allocation, Project Operations for flood risk management.

### **5.9.3 RMP Analysis and Comparison**

#### **5.9.3.1 RMP 1: No Action**

RMP 1 is described in Chapter 3, section 3.7.1. Construction activities are reasonably foreseeable under this alternative due to the necessity to restore the dam crest to its original elevation. With or without the implementation of either action RMP or the crest elevation restoration, the Corps would continue O&M activities and would continue to implement IRRMs to address PFMs.

#### **IRRM**

O&M activities undertaken under the No Action alternative also include the IRRMs. Implementation of IRMMs would have no direct or indirect impact on existing designated land use classification as they are not anticipated to include construction activities, and would largely entail administrative or technical exercises that are not anticipated to result in changes to existing operations. Activities are not inconsistent with the current Project Master Plan. No direct or indirect impacts to land use are anticipated.

#### **Crest Elevation Restoration**

Under the No Action Alternative, restoration of the Dam's crest elevation to its original design elevation is reasonably foreseeable in the next 50 years. If pursued, it would be subject to separate detailed analysis under NEPA at that time.

The borrow area may partially be located in lands designated by the Corps as Mitigation, which was originally set-aside by the Corps as an area for a non-statutory mitigation. A portion of this area currently functions as part of the Nature Area and is managed largely as raptor habitat. The land use classification of land upstream of the central embankment would not change. Even though most of the proposed borrow area is located on land classified as Operations and/or Mitigation, the land use classifications would remain unchanged following construction. Implementation of crest elevation restoration would have direct, though temporary, impact on these areas. Because the activity slated in this area is directly related to flood risk management operations, however, the impacts are expected to be less than significant. Indirect impacts are not anticipated.

#### **Regular/Recurring Operations and Maintenance**

Under the No Action Alternative, O&M activities are anticipated to continue as currently implemented. Regular and recurring O&M activities include mechanical and electrical repair of the gates, vegetation management on the Dam and its appurtenant structures, including the downstream slope of the embankment, and mowing of vegetation upstream in the operations area immediately adjacent to the central embankment, removal of debris and sediment that accumulates at the upstream concrete apron of the outlet on the Rio Hondo and other structures, graffiti removal, and cleaning the relief wells. Other maintenance that is performed as needed includes repair of the concrete crossover weir, levee repair, filling pot-holes on the Dam crest



road, and repairing gates and fences. The regular and recurring O&M activities occur mainly on or immediately adjacent to the Dam and its appurtenant structures, within the area dedicated for Project Operations. Activities may include minor like-for-like repair, but are not anticipated to result in changes to existing operations. Activities are performed in order to maintain Dam function for the purpose of flood risk management and are not inconsistent with the current Project Master Plan. No direct or indirect impacts to land use are anticipated.

#### **5.9.3.2 RMP 3E: Labyrinth Auxiliary Spillway and Seepage Control**

IRRM activity and Regular/Recurring Regular/Recurring Operations and Maintenance would be similar to RMP 1.

RMP 3E would affect several current land use classifications within the Project Area. The majority of the activity would occur in the area designated for Project Operations, and there would be no direct or indirect impact to land use classifications in this area.

The borrow area and extended crossover weir/crossover channel would partially be located in lands designated by the Corps as Mitigation, which was originally set-aside by the Corps as an area for a non-statutory mitigation area. A portion of this area currently functions as part of the Nature Area and is managed largely as raptor habitat. The potential secondary borrow area would occur in lands currently designated Environmentally Sensitive in the Master Plan, inside the “Nature Area”. The Nature Area is on lands owned by the Federal Government and is part of a recreation outgrant to Los Angeles County Department of Parks and Recreation (LACDP&R). In the Environmentally Sensitive designations uses are restricted to non-consumptive activities that have no significant or adverse impacts. The land use classification of land upstream of the central embankment would not change. Even though most of the proposed borrow area is located on land classified as Operations and Mitigation, as the Nature Area is part of the recreation outgrant to LACDP&R, the land use classifications would remain unchanged following construction. Implementation of RMP 3E would have direct, though temporary, impact on these areas. Because the activity slated in this area is directly related to flood risk management operations, however, the impacts are considered less than significant. Indirect impacts are not anticipated.

A majority of the proposed project will occur on property owned in fee by the United States and managed by the Corps. Some of the necessary lands owned by the Government and managed by the Corps are currently under lease or easement to non-federal entities for recreation and other purposes. While no permanent acquisition of land is expected to be required, real estate agreements within the proposed RMP action area may require modification. Land is currently leased to the City of Pico Rivera for recreational purposes. This land includes the Pico Rivera Municipal Golf Course, the portion of Youth Baseball fields located at Streamland Park that are within U.S. Government owned lands, and Bicentennial Park.

Land use classification for Streamland Park is Recreation and the Pico Rivera Golf Course is Recreation-Low Density. This is consistent with the Land Use Plan for Pico Rivera, which classifies these areas as open space. Upon completion of construction and closeout, the area of Streamland Park would remain Recreation, though the footprint of the area would be reduced.

The area of the Pico Rivera Golf Course would be developed as the runout channel and would be re-classified as “Operations” as it would now be part of the structural component of the auxiliary spillway. Impacts to land classifications in this area would be direct and permanent. Because the activity slated in this area is directly related to flood risk management operations, however, the impacts are considered less than significant. The redevelopment of recreation amenities, which are not proposed under the current action, could further reduce impacts. Indirect impacts are not anticipated.

Construction requirements for the trench drain and filter blanket include a parcel of land paralleling the downstream face of the central embankment, which is currently owned by the United States and leased to the City of Pico Rivera. This parcel is currently subleased to the Whittier Fertilizer Company. Modification or termination of the current lease agreement has the potential to impact a portion of the Whittier Fertilizer Company’s operations. The extent of this impact will depend on the type of lease modification, but could require termination of the lease. Effects are direct, may be permanent, but are unlikely to be significant as the termination would only effect a portion of the operations area for the company.

The batch plant on the west embankment is proposed to be located on on the southeast corner of the intersection of San Gabriel Blvd. and Lincoln Ave. This parcel, now vacant, is a former mineral processing parcel. Further analysis during PED to determine the efficiency and effectiveness of this proposed batch plant will determine additional real estate interest in the parcel.

#### **5.9.3.3 RMP 5: Protected Overtopping with Seepage Control**

IRRM activity and Regular/Recurring Operations and Maintenance would be similar to RMP 1.

RMP 5 would affect several current land use classifications within the Project Area. The majority of the activity, including batch plants and haul routes, would occur in the area designated for Project Operations, and there would be no direct or indirect impact to land use classifications in this area.

Pico Rivera Municipal Golf Course and Streamland Park are within lands owned by the Federal Government and leased to the City of Pico Rivera for recreational purposes. These lands will be used as temporary construction areas.

Land use classification for Streamland Park is Recreation and the Pico Rivera Golf Course is Recreation-Low Density. Upon completion of construction and closeout, the area of Streamland Park would remain Recreation, though the footprint of the area would be reduced. Land use may not substantially change for the area of Streamland Park except for the removal of a 90 ft.wide strip against the toe of the embankment on the Park’s north side, to accommodate the trench drain and filter blanket. The Pico Rivera Golf Course area footprint would also be reduced by the same width of 90ft. on the north side, against the toe of the embankment. The classification of Recreation would remain. Impacts to land classifications in this area would be direct and temporary. Because the activity slated in this area is directly related to flood risk management operations, however, the impacts are considered less than significant. The redevelopment of

recreation amenities, which are not proposed under the current action, could further reduce impacts. Indirect impacts are not anticipated.

#### **5.9.4 Environmental Commitments**

There are no Environmental Commitments that could be implemented to offset changes required to land use classifications of the Project.

### **5.10 TRAFFIC AND TRANSPORTATION**

The area potentially affected by the proposed RMPs include the Project area and those areas immediately adjacent to the Dam and Reservoir that could be impacted by construction activities. This area is generally bounded on the north by SR-60, on the east by I-605, on the west by Montebello Blvd., and on the south by Beverly Blvd.

#### **5.10.1 Regulatory Framework**

There are no Federal regulations controlling traffic on local roadways and freeways. Vehicle transportation of materials would be subject to state and local ordinances.

#### **5.10.2 Thresholds of Significance**

A potentially significant impact may occur to traffic and transportation if a risk management plan would result in:

- Closure of a major roadway to through traffic with no suitable alternative route available.
- Restrict access to or from adjacent land uses with no alternative access.

#### **5.10.3 RMP Analysis and Comparison**

##### **5.10.3.1 RMP 1: No Action**

RMP 1 is described in Chapter 3, section 3.7.1. Construction activities are reasonably foreseeable under this alternative due to the necessity to restore the dam crest to its original elevation. With or without the implementation of either action RMP or the crest elevation restoration, the Corps would continue O&M activities and would continue to implement IRRMs to address PFMs.

#### **IRRM**

O&M activities undertaken under the No Action alternative also include the IRRMs. Implementation of IRRMs that have and would be implemented would have no direct or indirect impact on traffic within the Whittier Narrows Dam Reservoir as they are largely administrative or technical exercises requiring no construction and only infrequent visits to the Project area.

### **Crest Elevation Restoration**

Under the No Action Alternative, restoration of the Dam's crest elevation to its original design elevation is reasonably foreseeable in the next 50 years. If pursued, it would be subject to separate detailed analysis under NEPA at that time.

Employee traffic would likely consist of commuting at the start and end of each shift. Additionally, a portion of these employees would likely take midday meal trips. Approximately 30 contractor personnel are anticipated to access the site during any given shift with 50 percent living within a 25-mile radius and 50 percent living within a 50 mile radius of the project area. Assuming that no carpooling occurs, this would equate to 60 daily vehicle "trip ends" (i.e., one-way trips) since each vehicle accessing the construction site generates two daily trips, one inbound and one outbound. Assuming that 50 percent of the employees leave and reenter the site during their midday break, employee trips would increase to 90 ( $60 + 30 = 90$ ) daily trip ends.

Since it is possible that the start or end of the daily work shift may coincide with the existing AM or PM Peak Hour of the existing background traffic, for analysis purposes it was conservatively assumed that all of the arriving and departing trips associated with employee traffic would add to the existing background traffic during these peak periods. Therefore, a total increase of 60 trip ends was assumed to be attributable to employee generated traffic for both the AM and PM Peak Hour periods. The typical construction work week would be 6 days, with no work on Sunday, and no off-site hauling on Saturday or Sunday, eliminating traffic impacts on weekends. Work schedules are anticipated to be modified to avoid annual Special Events held within the Reservoir that attract 40,000 to 50,000 visitors on weekends.

Given the assumptions above, the traffic generated by employees or contractors during crest elevation restoration activities would not meaningfully increase traffic in the area. Crest elevation restoration activities may impact traffic on existing roads within the Reservoir, but are not expected to restrict access to areas outside of active operations areas, or close major roadways. Any impacts are expected to be direct, temporary, and less than significant. No indirect impacts are anticipated.

Restoring the crest elevation would not in itself result in closure of a major roadway to through traffic with no suitable alternative route available or restricted access to or from adjacent land uses with no alternative access. No direct or indirect impacts are anticipated.

### **Regular/Recurring Operations and Maintenance**

Under the No Action Alternative, O&M activities are anticipated to continue as currently implemented. Regular and recurring O&M activities include mechanical and electrical repair of the gates, vegetation management on the Dam and its appurtenant structures, including the downstream slope of the embankment, and mowing of vegetation upstream in the operations area immediately adjacent to the central embankment, removal of debris and sediment that accumulates at the upstream concrete apron of the outlet on the Rio Hondo and other structures, graffiti removal, and cleaning the relief wells. Other maintenance that is performed as needed includes repair of the concrete crossover weir, levee repair, filling pot-holes on the Dam crest road, and repairing gates and fences.

For IRRMs and Regular/Recurring O&M, employee traffic would likely consist of commuting at the start and end of each shift. Additionally, a portion of these employees would likely take midday meal trips. It is assumed that for any individual activity, approximately 6 Corps or contractor personnel would access the site during any given shift with 50 percent living within a 25-mile radius and 50 percent living within a 50 mile radius of the project area. Assuming that no carpooling occurs, this would equate to 12 daily vehicle “trip ends” (i.e., one-way trips) since each vehicle accessing the construction site generates two daily trips, one inbound and one outbound. Assuming that 50 percent of the employees leave and reenter the site during their midday break, employee trips would increase to 18 ( $12 + 6 = 18$ ) daily trip ends. One half of these trip ends would be with flatbed trucks hauling heavy equipment.

Since it is possible that the start or end of the daily work shift may coincide with the existing AM or PM Peak Hour of the existing background traffic, for analysis purposes it was conservatively assumed that all of the arriving and departing trips associated with employee traffic would add to the existing background traffic during these peak periods. Therefore, a total increase of 18 trip ends was assumed to be attributable to employee generated traffic for both the AM and PM Peak Hour periods. The typical construction work week would be 5 days, Monday through Friday, eliminating traffic impacts on weekends. Work schedule would be modified to avoid annual Special Events. Employees would access the vicinity of the Project area through SR-60 or I-605, using routes such as Peck Road or Rosemead Boulevard to enter the Project grounds under most conditions.

Given the assumptions above, the traffic generated by employees or contractors during regular and recurring O&M activities would not meaningfully increase traffic in the area. O&M activities are not expected to impact traffic on existing roads within the Reservoir, restrict access to areas outside of active operations areas, or close major roadways. Impacts are expected to be direct, temporary, and less than significant. No indirect impacts are anticipated.

#### **5.10.3.2 RMP 3E: Labyrinth Auxiliary Spillway and Seepage Control**

RMP 3E is described in Chapter 3, section 3.7.2. Under this RMP, overtopping is addressed through adding spillway capacity and backward erosion piping is addressed through construction of a trench drain at the downstream Dam toe and graded filter blanket adjacent to Rosemead Blvd.

Employee traffic would likely consist of commuting at the start and end of each shift. Additionally, a portion of these employees would likely take midday meal trips. Approximately 60 contractor personnel would access the site during any given shift with 50 percent living within a 25-mile radius and 50 percent living within a 50 mile radius of the project area. Assuming that no carpooling occurs, this would equate to 120 daily vehicle “trip ends” (i.e., one-way trips) since each vehicle accessing the construction site generates two daily trips, one inbound and one outbound. Assuming that 50 percent of the employees leave and reenter the site during their midday break, employee trips would increase to 180 ( $120 + 60 = 180$ ) daily trip ends.

Since it is possible that the start or end of the daily work shift may coincide with the existing AM or PM Peak Hour of the existing background traffic, for analysis purposes it was conservatively assumed that all of the arriving and departing trips associated with employee traffic would add to the existing background traffic during these peak periods. Therefore, a total increase of 60 trip ends was assumed to be attributable to employee generated traffic for both the AM and PM Peak Hour periods. The typical construction work week would be 6 days, with no work on Sunday, and no off-site hauling on Saturday or Sunday, eliminating traffic impacts on weekends. Work schedule would be modified to avoid annual Special Events held within the Reservoir that attract 40,000 to 50,000 visitors on weekends.

### **IRRM**s

Impacts are expected to be similar to those described under RMP 1: No Action.

### **Phase 1**

#### **Staging Areas/Temporary Relocation of Utilities**

The Pico Rivera Golf Course would be closed and the area cleared and grubbed in preparation of use of the area as a staging area to access the downstream slope of the embankment during construction. At completion of construction all areas disturbed would be cleared and left in preparation for further development.

The western half of Streamland Park, approximately 13 acres, would be closed and dismantled and cleared and grubbed so the area could be used as a staging area during construction. Given the assumptions above, the traffic generated by employees or contractors during crest elevation restoration activities would not meaningfully increase traffic in the area (approximate 0.7% increase on San Gabriel River Parkway assuming full 60 trips during each of peak intervals occurred on this road). These efforts would not in themselves result in closure of a major roadway to through traffic with no suitable alternative route available or restricted access to or from adjacent land uses with no alternative access. Impacts are expected to be direct, temporary, and less than significant. There would be no indirect impacts.

#### **Close Bike Paths and Dam Crest**

The closed San Gabriel River Trail through the construction area would not in itself result in closure of a major roadway to through traffic with no suitable alternative route available or restricted access to or from adjacent land uses with no alternative access. There would be no direct or indirect impacts.

### **Phase 2**

#### **Redevelop Staging Areas**

Similar to impacts under Phase 1, RMP 3E

#### **Extend Crossover Weir**

Water from the San Gabriel River when reaching elevation 208.0 ft. flows over the crossover weir into the crossover channel. After closing the River Trail, the current crossover weir located immediately upstream of the spillway would be extended approximately 200 ft. upstream so that

a new crossover channel can be dug due to the need for the coffer dam during construction of the auxiliary labyrinth spillway. All work would be from the landside of the River levee. Given the assumptions above, the traffic generated by employees or contractors during crest elevation restoration activities would not meaningfully increase traffic in the area (approximate 0.7 percent increase on San Gabriel River Parkway; or an approximate 0.2 percent increase on San Gabriel Blvd., assuming full 60 trips during each of peak intervals on each roadway). These efforts would not in themselves result in closure of a major roadway to through traffic with no suitable alternative route available or restricted access to or from adjacent land uses with no alternative access. Impacts are expected to be direct, temporary, and less than significant. There would be no indirect impacts. The extended crossover weir would not in itself result in closure of a major roadway to through traffic with no suitable alternative route available or restricted access to or from adjacent land uses with no alternative access.

### **Batch Plants and Haul Routes**

Delivery of materials to mix concrete on site at the proposed batch plant locations would be acquired from various quarries upstream on the San Gabriel River near Santa Fe Dam. Trucks delivering materials would travel south on the San Gabriel River Freeway (I-605) to the Pomona Freeway (SR-60) westward to Rosemead Blvd., exiting and traveling south to San Gabriel Blvd., turning right to the batch plant on the southeast corner of San Gabriel Blvd. and Lincoln Ave. or turning left to enter the Nature Area via Siphon Road accessible at the southeast corner of Rosemead Blvd. and Durfee Road.

Assuming materials to make 200,000 cy of concrete would be delivered, over a four year period, assuming 17 cy of material per truck, equals 17,765 trucks divided by two (2)-years equals 9,000 trucks per year and assuming 200 days (no deliveries on Saturdays and Sundays), equals 46 trucks per day. Given that the route from the quarries near Santa Fe Dam would be south on the I-605 (242,000 vehicles daily), west to SR-60 (235,000 vehicles daily), south on Rosemead Blvd. (48,000 vehicles daily) to San Gabriel Blvd. (31,000 vehicles daily) the increase of 46 trucks daily would be an increase of .016 percent on San Gabriel Blvd. (worst case). To reduce this number of truck deliveries per day, it is possible that bulk hauling of material begin as soon as onsite storage and staging areas are developed. This is expected to result in fewer impacts on the existing facilities by spreading out the required import operation over a longer period. Delivery of materials to the batch plants would not in itself result in closure of a major roadway to through traffic with no suitable alternative route available or restricted access to or from adjacent land uses with no alternative access. Impacts are expected to be direct, temporary, and less than significant. No indirect impacts are anticipated.

No crossing of the Rio Hondo is expected as all haul routes would avoid the Rio Hondo by using surface streets. Haul routes would not in themselves result in closure of a major roadway to through traffic with no suitable alternative route available or restricted access to or from adjacent land uses with no alternative access. Impacts are expected to be direct, temporary, and less than significant. No indirect impacts are anticipated.

### **Borrow area**

All work would occur on Federal project land. The borrow area result in closure of a major roadway to through traffic with no suitable alternative route available or restricted access to or



from adjacent land uses with no alternative access. Impacts are expected to be indirect, temporary, and less than significant. There would be no additional direct or indirect impacts from this activity. Impacts associated with employee ingress and egress would be similar to “Extend Crossover Weir”, described above.

### **Cofferdam**

All work would occur on Federal project land as the fill material for the coffer dam would come from the borrow area within the Project and trucks moving the fill material would not travel on local roadways. There would be no additional direct or indirect impacts from this activity. Impacts associated with employee ingress and egress would be similar to “Extend Crossover Weir”, described above.

### **Foundation/Sheetpile**

The placement of the sheetpile around the foundation of the auxiliary spillway on the downstream toe of the Dam would have no direct impact on traffic in the area of the Project. All work would occur on Federal project land as materials and equipment would be delivered to the staging area. There would be no additional direct or indirect impacts from this activity. Impacts associated with employee ingress and egress would be similar to “Extend Crossover Weir”, described above.

### **Auxiliary Labyrinth Spillway**

The construction of the auxiliary labyrinth spillway would have no direct impact on traffic in the area of the Project. Material of the Dam embankment would be stockpiled on site until it would be moved by haul routes within the Project to raise the local roadways. All work would occur on Federal project land as the concrete would be developed upstream of the Dam on Project “operations” area and trucks delivering concrete would not travel on local roadways. There would be no additional direct or indirect impacts from this activity. Impacts associated with employee ingress and egress would be similar to “Extend Crossover Weir”, described above.

### **Approach and Runout Channels.**

The construction of the approach channel would occur upstream of the Dam. Concrete required for the concrete apron would come directly from the nearby batch plant located upstream of the central embankment. Trucks delivering materials for the making of concrete are discussed under Batch Plants and Haul Routes. The impacts are not expected to have no direct impact on traffic in the area of the Project. The runout channel work would occur in a portion of the former Pico Rivera Golf Course. All work would occur on Federal project land. Impacts associated with employee ingress and egress would be similar to “Staging Areas”, described above.

### **Road Modifications**

Since both Rosemead Blvd. and Lincoln Ave. would be raised to prevent overtopping via these roadways and to match the elevation of the parapet walls to be constructed on top of the embankments, these roadways to be raised would not be impacted by the increase in truck deliveries as deliveries would be from the north of the Reservoir and the sections of San Gabriel Blvd. and Lincoln Ave. truck deliveries for Dam construction would not need to travel these stretches of the roadways. Raising the roadways would be phased so that only one lane in each direction would be raised at a time in sections to be coordinated with Caltrans. While this would

cause slowing of peak rush hour traffic, there are alternate routes available to reach the Pomona Freeway (SR-60) including the San Gabriel River Freeway (I-605). Most of the day, traffic is less congested, or lighter in number of vehicles through the Reservoir. Impacts are expected to be direct, temporary, and less than significant. No indirect impacts are anticipated.

### **Construct Parapet Walls**

The construction of the parapet walls would occur on the Dam crest. Concrete required for the parapet walls would come directly from the nearby batch plant located upstream of the central embankment. Trucks delivering materials for the making of concrete are discussed under Batch Plants and Haul Routes. The impacts are expected to have no direct impact on traffic in the area of the Project. All work would occur on Federal project land. Impacts associated with employee ingress and egress would be similar to “Extend Crossover Weir”, described above.

### **Trench Drain and Filter Blanket**

For the construction of the trench drain for a distance of 90 ft. downstream from the toe of the embankment, soil cleared would be stockpiled and used as needed for the trench drain fill material needs. Topography changes in this area would be minor with the creation of a five (5) ft. high berm between the trench drain and the Project right-of way to keep the trench drain accessible and uncovered for maintenance accessibility in perpetuity. The trench drain and filter blanket would be constructed on lands of the Federal Project. Deliveries of material would travel on local freeways and roadway, but is not anticipated to be of lengthy duration as described in the description of the project schedule. Impacts associated with employee ingress and egress would be similar to “Staging Areas”, described above.

### **Closeout**

Closeout of the Phase 2 construction activities would involve the dismantling of the batch plants and staging areas and removal of these facilities from the Project site. Any gravel or other material laid down on the haul roads would be removed. Soil over culverts over the crossover channel would be removed. These activities would be short-term and would not in themselves result in closure of a major roadway to through traffic with no suitable alternative route available or restricted access to or from adjacent land uses with no alternative access. No direct or indirect impacts are expected.

### **Operations and Maintenance**

Operations and maintenance activities for RMP 3E would be similar to those of RMP 1. The mechanical and electrical repair of the gates, vegetation removal at the structures, mowing, graffiti removal, and cleaning the relief wells would continue. The majority of the relief wells would be removed, decreasing the associated maintenance effort. Vegetation removal would remain as before though the amount of effort would increase due to the additional area associated with the trench drain.

Neither the increase in effort compared to continued O&M under the No Action Alternative would impact traffic and transportation within the Project area as all O&M activities would occur in areas classified as “operations” There would be no direct or indirect impacts.

### **5.10.2.3 RMP 5: Protected Overtopping with Seepage Control**

RMP 5 is described in Chapter 3, section 3.7.3. Under this RMP, overtopping is addressed through hardening of the Dam crest to prevent erosion or subsequent failure of the Dam from events large enough to cause overtopping. Backward erosion piping is addressed through construction of a trench drain at the downstream Dam toe and graded filter blanket adjacent to Rosemead Blvd.

Similar to RMP 3E, employee traffic would likely consist of commuting at the start and end of each shift, in addition to a portion of these employees making midday meal trips. Approximately 60 contractor personnel would access the site during any given shift with 50 percent living within a 25-mile radius and 50 percent living within a 50 mile radius of the project area. Assuming that no carpooling occurs, this would equate to 120 daily vehicle “trip ends” (i.e., one-way trips) since each vehicle accessing the construction site generates two daily trips, one inbound and one outbound. Assuming that 50 percent of the employees leave and reenter the site during their midday break, employee trips would increase to 180 ( $120 + 30 = 150$ ) daily trip ends.

Since it is possible that the start or end of the daily work shift may coincide with the existing AM or PM Peak Hour of the existing background traffic, for analysis purposes it was conservatively assumed that all of the arriving and departing trips associated with employee traffic would add to the existing background traffic during these peak periods. Therefore, a total increase of 60 trip ends was assumed to be attributable to employee generated traffic for both the AM and PM Peak Hour periods. The typical construction work week would be 6 days, with no work on Sunday, and no off-site hauling on Saturday or Sunday, eliminating traffic impacts on weekends. Work schedule would be modified to avoid annual Special Events held within the Reservoir that attract 40,000 to 50,000 visitors on weekends,

#### **IRRM**s

Impacts are expected to be similar to those described under RMP 1: No Action.

#### **Phase 1**

##### **Staging Areas**

Impacts are expected to be similar to that characterized for the same activity under RMP 3E.

##### **Temporary Relocation of Utilities**

Impacts are expected to be similar to that characterized for the same activity under RMP 3E.

##### **Close Bike Paths and Dam Crest**

Impacts are expected to be similar to that characterized for the same activity under RMP 3E.

#### **Phase 2**

##### **Redevelop Staging Areas**

Impacts are expected to be similar to that characterized for the same activity under RMP 3E.

### **Batch Plants and Haul Routes**

Impacts are expected to be similar to that characterized for the same activity under RMP 3E.

### **Remove Topsoil**

An approximately two (2) ft. thick layer of topsoil would be removed from the downstream slopes of the three embankments of the Dam. The topsoil would be stockpiled in the identified staging areas during the placement of the Roller compacted concrete (RCC). An additional 10 ft. thick layer of material would be removed from the downstream slopes of the three embankments of the Dam. This excavated material would be transported to the batch plants (via the concept haul road locations shown in Figure 3.7-3) and utilized in the mix of the RCC or for road modifications described below. Removal of topsoil from the downstream face of the Dam would have no direct impact on traffic in the area of the Project. All work would occur on Federal project land and the topsoil would be stockpiled within or adjacent to the staging areas downstream of the Dam. Removed topsoil would not be transported off-site. Impacts associated with employee ingress and egress are expected to be similar to “Staging Areas”, described above under RMP 3E.

### **Roller Compacted Concrete**

The placement of the RCC “steps” on the downstream face of the Dam would have no direct impact on traffic in the area of the Project. All work would occur on Federal project land as the concrete for the RCC would be developed upstream of the Dam on Project “operations” area and trucks delivering concrete would not travel on local roadways. Impacts associated with employee ingress and egress are expected to be similar to “Staging Areas”, described above under RMP 3E.

### **Replace Topsoil**

All work would occur on Federal project land since the topsoil has been stockpiled within or adjacent to the staging areas downstream of the Dam. Impacts associated with employee ingress and egress are expected to be similar to “Staging Areas”, described above under RMP 3E.

### **Road Modifications**

Topsoil not used to cover the RCC would be used to raise Lincoln Ave. five (5) ft. at the Dam crest to prevent over topping of the roadway. This would be done in conjunction with construction of a parapet wall from the roadway, westwards into the Montebello Hills area to prevent flood water from going around the roadway in the gap between the raised elevation of the roadway and the elevation of the hill where the parapet wall would “daylight” or meet the natural hill elevation. The raising of the Lincoln Ave. roadbed would not result in closure of a major roadway to through traffic with no suitable alternative route available or restricted access to or from adjacent land uses with no alternative access. Impacts are expected to be direct, temporary, and less than significant.

Since Rosemead Blvd. would not be raised to prevent overtopping, Rosemead Blvd. would not be impacted by the increase in truck deliveries during construction, except by trucks leaving the construction area via the top of the embankment to Rosemead Blvd. during construction hours. Trucks leaving the upstream area of the central embankment by accessing a ramp to Rosemead Blvd. would not in themselves result in closure of a major roadway to through traffic with no

suitable alternative route available or restricted access to or from adjacent land uses with no alternative access. Impacts are expected to be direct, temporary, and less than significant.

#### **Construct Parapet Walls**

Construction of the parapet wall between Lincoln Ave. and the Montebello Hills would have minor impacts on traffic on Lincoln Ave as the work would be immediately adjacent to the road, but is not anticipated to result in road closure. Impacts are expected to be direct, temporary, and less than significant. No indirect impacts are anticipated.

#### **Trench Drain and Filter Blanket**

Impacts are expected to be similar to that characterized for the same activity under RMP 3E.

#### **Closeout**

Impacts are expected to be similar to that characterized for the same activity under RMP 3E.

#### **Regular/Recurring Operations and Maintenance**

O&M activities for RMP 5 would be similar to those of RMP 3E. The mechanical and electrical repair of the gates, vegetation removal at the structures, mowing, graffiti removal, and cleaning the relief wells would continue. The majority of the relief wells would be removed, decreasing the associated maintenance effort. Vegetation removal would remain as before though the amount of effort would increase due to the additional area associated with the trench drain.

Neither the increase in effort compared to continued O&M under the No Action Alternative would impact traffic and transportation within the Project area. Impacts are expected to be similar to the same activity under RMP 1, described above.

### **5.10.3 Environmental Commitments**

Although impacts under all alternatives are less than significant for traffic, the following environmental commitments (ECs) would be implemented by the Corps to further reduce potential impacts. For all action alternatives, environmental commitments may include, but may not be limited to the following:

**TT-1** Preparation of a *Traffic Safety Management Plan* (Plan) for the Proposed Project. The Plan may include the following provisions:

- Temporary traffic control devices shall be identified in accordance with CalTrans' *California Manual on Uniform Traffic Control Devices*. This may include slow-moving-vehicle warning signs, barriers for separating construction and non-construction traffic, use of traffic control flagmen, and any additional measures required for safely passing non-construction traffic through and around construction areas and access points.
- Schedule worker shift changes to minimize existing background traffic peak periods if feasible.
- Establish procedures for coordinating with local emergency response agencies to ensure dissemination of information regarding emergency response vehicle

routes affected by Project construction. Proper notification and coordination with the local emergency response agencies will be critical for these road closures to ensure that emergency vehicle access is not affected.

- Provide dedicated turn lanes for vehicles entering and exiting the Proposed Project site using existing shoulder as best practicable to minimize impacts to vicinity traffic.

**TT-2** Except as necessary to implement the modifications, public streets would be kept operational, particularly during the morning and evening peak hours of traffic. Lane closures should be minimized during peak traffic hours.

**TT-3** Haul routes shall be designed to minimize distances to the work site and avoid heavily congested areas or large residential communities to the maximum extent feasible.

**TT-4** Roads disturbed by trucks or equipment would be properly restored to ensure long-term protection of road surfaces. Such repairs would occur as part of the active construction period.

**TT-6** To the extent feasible, construction worker travel and all construction truck traffic to and from the site should avoid peak traffic hours.

## 5.11 ESTHETICS

For the purposes of this esthetic analysis, the study area is defined as the viewshed of the Project area and the area approximately 0.5 miles downstream of the Dam that could be impacted by construction activities.

### 5.11.1 Regulatory Framework

NEPA and Council on Environmental Quality (CEQ) regulations identify esthetics as one of the elements that must be considered in determining the effects of a project. NEPA, as amended, establishes that the Federal government use all practicable means to ensure safe, healthful, productive, and esthetically and culturally pleasing surroundings for all Americans (42 U.S.C. 4331[b][2]). The Corps has established a number of environmental goals, including avoidance of destruction or degradation, preservation, and enhancement (including restoration)--in a manner calculated to foster and promote the general welfare, allow man and nature to exist in productive harmony, and fulfill social, economic, and other requirements of present and future generations of Americans, is established by PL 91-190 as a valid objective of Federal programs. Therefore, it shall be treated equally with other established objectives in the design of Civil Works projects. (Engineer Manual 1110-2-38, *Engineering Design, Environmental Quality in Design of Civil Works Projects*, May 1971).

Esthetics can include viewsheds, odors, lights, and glare. Esthetic resources can be defined as a person's sensory perception of the environment. It includes physical features, such as land, water and air, and spiritual features, such as the beauty of place or the knowledge that such a place exists.

Viewsheds are generally described in terms of visual quality, or quality of views. Views can be categorized into three types: the first one half-mile being the foreground, from one-half mile to

five miles being the middle ground, and greater than five miles being the background. Attention to detail at varied distances determines the type of view captured by the viewer.

Esthetics analysis considers the existing and future appearance, or perception of views, of the areas surrounding the site, and viewer sensitivity. Esthetics analysis for the Proposed RMPs includes describing existing visual characteristics of the Action Area and vicinity.

Esthetic resources in the Project area are the natural and man-made, moving and stationary physical features that compose the character of the landscape as visually observed from a given location. The physical features that are visible in the landscape (e.g., landforms, water bodies, animals, vegetation, and structures) contribute to the scenery, visual quality, and visual appeal of the Project area and vicinity. The spiritual can be identified as the sense of a lush green open space, an oasis in the dense urban setting of metropolitan southern California.

Visual resources considered are water resources, landform, vegetation, land use, and user activities. The Visual Resources Assessment Procedure for the US Army Corps of Engineers (VRAP) Management Classification System (MCS) establishes the assessment framework for the area and sets the visual resource criteria to be used throughout the visual assessment.

The VRAP is a method to: 1) evaluate and classify existing aesthetic or visual quality; 2) assess and measure visual impacts caused by a Corps' water resource project; 3) evaluate the beneficial or adverse nature of the visual impacts; and 4) make recommendations for changes in plans, designs, and operations of water resource projects.

### **5.11.2 Thresholds of Significance**

A potentially significant impact would may occur to esthetics if a risk management plan would result in:

- Creation of direct, permanent changes to important existing scenic characteristics of a landscape that is viewed by a large number of people.

### **5.11.3 RMP Analysis and Comparison**

#### **5.11.3.1 RMP 1: No Action**

RMP 1 is described in Chapter 3, section 3.7.1. Construction activities are reasonably foreseeable under this alternative due to the necessity to restore the dam crest to its original elevation. With or without the implementation of either action RMP or the crest elevation restoration, the Corps would continue O&M activities and would continue to implement IRRMs to address PFMs.

#### **IRRM**s

O&M activities undertaken under the No Action alternative also include the IRRMs. Implementation of IRMMs that have and would be implemented would have no impact on



esthetic quality within the Whittier Narrows Dam Reservoir as they are downstream of the Reservoir, require no excavation or fill placement, and none of the features directly impact the earthen components of the dam. (Note that the pre-positioned materials were imported from an offsite quarry and stockpiled downstream of the Dam).

### **Crest Elevation Restoration**

Under the No Action Alternative, restoration of the Dam's crest elevation to its original design elevation is reasonably foreseeable in the next 50 years. If pursued, it would be subject to separate detailed analysis under NEPA at that time.

Construction on top of the embankment crest would be visible from Rosemead Blvd and Lincoln Ave. by motorists and passengers traveling over the Dam during daylight hours. From some points in the Nature Area, construction activities would be visible. Trucks carrying fill material and asphalt to and from the embankment crest could be seen as well as heard. Although the Dam crest would be raised to its design elevation by restoring 1.8 ft. of material on top of the crest, the overall appearance of the Dam would not change as this increase in Dam elevation would be unnoticeable close up or from a distance compared to the overall height of the Dam. Therefore, the long-term visual impacts are expected to be direct, permanent, and less than significant.

### **Close Bike Paths and Dam Crest**

Use of the San Gabriel River Trail would be limited during construction of the central embankment. The access to the San Gabriel River Trail would be closed and a detour would be imposed during construction. The detour would require coordination with Los Angeles County Department of Recreation and Parks prior to construction with public notification and posting of signage for the detour. Once the crest elevation construction is completed, the access to the San Gabriel River Trail on both sides of the central embankment would be restored and the San Gabriel River Trail detour would no longer be required. The impact would be a direct result of construction, temporary, and less than significant. The Trail would be reestablished when construction is completed. No indirect effects are anticipated.

During crest elevation of the west embankment, access to the LARio Trail would not be available from the embankment crest adjacent to and accessible from Lincoln Ave. downstream to the levee maintenance road/trail. As with the central embankment, once the crest elevation construction is completed, access would be restored. The impact would be a direct result of construction, temporary, and less than significant. The Trail would be reestablished when construction is completed. No indirect effects are anticipated.

### **Regular/Recurring Operations and Maintenance**

Under the No Action Alternative, O&M activities are anticipated to continue as currently implemented. Regular and recurring O&M activities include mechanical and electrical repair of the gates, vegetation management on the Dam and its appurtenant structures, including the downstream slope of the embankment, and mowing of vegetation upstream in the operations area immediately adjacent to the central embankment, removal of debris and sediment that accumulates at the upstream concrete apron of the outlet on the Rio Hondo and other structures, graffiti removal, and cleaning the relief wells. Other maintenance that is performed as needed includes repair of the concrete crossover weir, levee repair, filling pot-holes on the Dam crest road, and repairing gates and fences. These activities would not change the overall appearance of

the Dam. Therefore, there would be no direct or indirect impacts to esthetics from regular and recurring O&M activities.

### **5.11.3.2 RMP 3E: Labyrinth Auxiliary Spillway and Seepage Control**

RMP 3E is described in Chapter 3, section 3.7.2. Under this RMP, overtopping is addressed through adding spillway capacity and backward erosion piping is addressed through construction of a trench drain at the downstream Dam toe and graded filter blanket adjacent to Rosemead Blvd.

#### **IRRM**

Impacts are expected to be similar to those described under RMP 1: No Action.

#### **Phase 1**

##### **Staging Areas**

Development of the staging areas in Streamland Park and the Pico Rivera Golf Course would include clearing of recreation amenities and clearing and grubbing. The staging area developed in Streamland Park would be visible from the residential area along Kruse Street. The staging area developed at the Pico Rivera Golf Course would be visible from viewers in backyards of homes adjacent to the Golf Course. The impacts are expected to be direct and permanent changes to the visual landscape. Since the area would revert to open space after construction, the impacts are considered less than significant.

##### **Temporary Relocation of Utilities**

The temporary relocation of utilities that would occur at the downstream toe of the Dam would be marginally visible in most areas as the Streamland Park, Whittier Fertilizer Company and Pico Rivera Golf Course lie between the downstream toe of the Dam and viewers. Some viewers may be able to see the relocation of utilities from backyards adjacent to the Golf Course and from adjacent to Streamland Park. Downstream of the west embankment the relocation of utilities may be visible from the residential area several hundred feet downstream of the Dam. Impacts in both areas would be direct, temporary, and less than significant.

##### **Close Bike Paths and Dam Crest**

Impacts are expected to be the same as those for the same activity as described under RMP 1.

#### **Phase 2**

##### **Redevelop Staging Areas**

Impacts are expected to be the same as those for the activity “Staging Areas” under Phase 1, RMP 3E, described above.

##### **Batch Plants and Haul Routes**

The batch plant to be located at the corner of San Gabriel Blvd. and Lincoln Ave. would be visible from motorists on either roadway. This would be a direct, temporary, and less than significant impact as the batch plant would be removed at completion of construction. No indirect impacts are anticipated.

The batch plant upstream of the central embankment would not be visible from downstream of the Dam as the Dam is 40 ft. tall. Motorists traveling on Rosemead Blvd. may catch glimpses of the batch plant depending on speed and weather conditions. Since there is very little pedestrian traffic in the area, the batch plants would not be visible to many casual passers-by. Impacts are expected to be direct, temporary, and less than significant. No indirect impacts are anticipated.

The batch plant developed in Bicentennial Park would not be visible to the casual viewer, Since the Park is closed most of the time, there is little need for anyone to be in the area, users of the sports arena may be able to view some of the area as they arrive and depart on Rooks Road. Impacts are expected to be direct, temporary, and less than significant. No indirect impacts are anticipated.

#### **Borrow area.**

The borrow area would be bigger in area and deeper than for raising the crest elevation of the Dam, but would not readily be visible from Rosemead Blvd. or Durfee Ave by passing motorists. Construction equipment would be visible at times, depending on depth in the borrow area and trucks moving the borrow material as they enter and leave the borrow area. This would be considered a direct, temporary, and less-than-significant visual impact. No indirect impacts are anticipated.

The borrow area is located upstream of the central embankment in the Nature Area. The area is not easily visible from Rosemead Blvd. and few people have access to this portion of the Nature Area. The borrow area would be graded and hydroseeded at completion of construction. The temporary borrow area would not create any direct, permanent changes to important existing scenic characteristics of a landscape that is viewed by a large number of people. Impacts are expected to be less than significant. No indirect impacts are anticipated.

#### **Cofferdam**

The coffer dam would be located upstream of the central embankment and would not be visible from downstream of the Dam. Motorists on Rosemead Blvd. may catch an occasional glimpse of the coffer Dam depending on speed, weather and distance. The impacts are expected to be direct, temporary, and less than significant as the coffer dam would be removed at completion of construction. No indirect impacts are anticipated.

#### **Foundation/Sheetpile**

Residents whose backyards are up against the west side of the Golf Course where the auxiliary spillway would be constructed would be able to see the implementation of sheetpile that would go in around the structure. Instead of the Golf Course, local residents would see the runout channel from the labyrinth to the San Gabriel River which would be soil fill material which may be hydroseeded with grasses, but would be kept under control. No indirect impacts are anticipated.

#### **Construct Auxiliary Spillway**

Residents whose backyards are up against the west side of the Golf Course where the auxiliary spillway would be built would be able to see this construction. A berm would be constructed on the west side of the runout channel that would as high as the San Gabriel River levee so it may

be visible to residents of the area. Instead of the Golf Course, local residents would see the runout channel from the labyrinth to the San Gabriel River which would be constructed of soil fill material and may be hydroseeded with grasses, but would be kept under control. Impacts on esthetics would be direct, temporary and less than significant with completion of construction of the berm that would block views of the auxiliary labyrinth spillway. No indirect impacts are anticipated.

#### **Approach and Runout Channels.**

Residents whose backyards are up against the west side of the Golf Course where the new berm to the San Gabriel River would be built would be able to see this construction. Instead of the Golf Course, local residents would see the runout channel from the labyrinth to the San Gabriel River which would be constructed of fill material and which may be hydroseeded with grasses, but would be managed to comply with the *Guidelines for Landscaping and Vegetation Management at Levees, Floodwalls, Embankment Dams, and Appurtenant Structures*, Engineer Technical Letter 1110-2-583). Impacts on esthetics would be direct, temporary and less than significant with completion of construction of the berm that would block views of the auxiliary labyrinth spillway. No indirect impacts are anticipated.

#### **Road Modifications**

Views of the roadways being raised would be visible from motorists traveling on Rosemead Blvd. and Lincoln Ave. as the roadways are being raised. With the closure of lanes of Rosemead and Lincoln Ave. viewers would be reduced as they would find other routes in order to minimize delays caused by construction. Impacts during construction would be direct, temporary, and are expected to be less than significant. Following construction the increased elevation of the roadways, especially Rosemead Blvd. would provide more expansive views of the surrounding area. No indirect impacts are anticipated.

#### **Construct Parapet Walls**

Most construction on the embankment crest would not be visible from lower elevations, but depending on distance from the Dam, construction of the 12 ft. parapet wall could be visible. Motorist on Rosemead Blvd. and Lincoln Ave would be able to observe construction of the parapet wall as well as raising of said roadways, 12 ft. and 8 ft. respectively.

The 12 ft. parapet wall on top of the embankment would be concrete, and may provide additional vertical surfaces for graffiti that would be visible to some downstream as well as bicyclist and motorists travelling on Rosemead Blvd. It is anticipated that an increase in maintenance would be required. While additional graffiti is considered a less than significant impact, the 12 ft. high wall on top of the embankment crest would block views of the San Gabriel Mountains as well as the Nature Area and views of the Whittier Narrows Recreation Area in the Reservoir. This would be considered a direct, permanent, significant and unavoidable visual impact. No indirect impacts are anticipated.

#### **Trench Drain and Filter Blanket**

With the closure of the Dam crest for recreation use, there would be no viewers from the Dam crest looking down on the area. The nearest viewers would be from the backyards of homes adjacent to Streamland Park and the Pico Rivera Golf Course. The view however would be

blocked by the temporary staging areas. The impacts associated with construction would be direct, but temporary. The view of the trench drain and filter blanket, once constructed, is considered a less than significant visual change. No indirect impacts are anticipated. .

#### **Closeout**

After construction is completed, all equipment and temporary structures, including sources of exterior lighting, would be removed from project areas. The staging areas and haul routes would be restored to a natural state or pre-project condition. After construction and a reclamation ration period, there would be a low degree of contrast between construction sites and the major existing features in the landscape, resulting in a direct, temporary, and less-than significant visual impact.

#### **Regular/Recurring Operations and Maintenance**

Impacts are expected to be similar to the same activity described under RMP 1.

##### **5.11.3.3 RMP 5: Protected Overtopping with Seepage Control**

RMP 5 is described in Chapter 3, section 3.7.3. Under this RMP, overtopping is addressed through hardening of the Dam crest to prevent erosion or subsequent failure of the Dam from events large enough to cause overtopping. Backward erosion piping is addressed through construction of a trench drain at the downstream Dam toe and graded filter blanket adjacent to Rosemead Blvd.

#### **IRRM**

Impacts are expected to be similar to those described under RMP 1: No Action.

#### **Phase 1**

##### **Staging Areas**

Impacts are expected to be similar to that characterized for the same activity under RMP 3E.

##### **Temporary Relocation of Utilities**

Impacts are expected to be similar to that characterized for the same activity under RMP 3E.

##### **Close Bike Paths and Dam Crest**

Impacts are expected to be similar to that characterized for the same activity under RMP 3E.

#### **Phase 2**

##### **Redevelop Staging Areas**

Impacts are expected to be similar to that characterized for the same activity under RMP 3E.

##### **Batch Plants and Haul Routes**

Impacts are expected to be similar to that characterized for the same activity under RMP 3E.

### **Remove Topsoil**

An approximately two (2) ft. thick layer of topsoil would be removed from the downstream slopes of the three embankments of the Dam. The topsoil would be stockpiled in the identified staging areas during the placement of the Roller compacted concrete (RCC). An additional 10 ft. thick layer of material would be removed from the downstream slopes of the three embankments of the Dam. This excavated material would be transported to the batch plants (via the concept haul road locations shown in Figure 3.7-3) and utilized in the mix of the RCC or for road modifications described below. Motorists on Rosemead Blvd. and Lincoln Ave. would be able to observe removal of topsoil from the downstream face of the Dam as they pass over the Dam. Viewers downstream could see the topsoil removed and stockpiled in Streamland Park and the Pico Rivera Golf Course from the residential area along Kruse Road. The staging area at Streamland Park and the remaining area of Streamland Park would partially obscure the view, however. The Whittier Fertilizer Company facility would also obscure the lower elevation of topsoil being removed and stockpiled. Impacts are expected to be direct, temporary, and less than significant. No indirect effects are anticipated.

### **Roller Compacted Concrete**

Motorist on Rosemead Blvd. and Lincoln Ave. would be able to observe construction of the RCC stepped downstream slope as they pass over the Dam. Viewers downstream could see the RCC be placed from the residential area along Kruse St. The staging area at Streamland Park and the remaining area of Streamland Park would partially obscure the view however. The Whittier Fertilizer Company facility would also obscure the lower elevation of construction. Impacts are expected to be direct, temporary, and less than significant. No indirect impacts are anticipated.

### **Replace Topsoil**

Visible stockpiled soil that was removed from the downstream slope of the embankment would be visible to local residents and motorist until the RCC was completed and the 2 ft. layer of soil was placed over the RCC “steps”. The visual impacts would be temporary during construction and would return to similar to existing conditions with the hydroseeding of the top layer of soil. A mix of native grasses and forbes that would conform to Corps’ guidelines for planting of vegetation on dams and levees would be used. The replacement of soil on top of the RCC would not create any direct, permanent changes to important existing scenic characteristics of a landscape that is viewed by a large number of people. Impacts are expected to be direct, temporary, and less than significant. No indirect impacts are anticipated.

### **Road Modifications**

Raising of Lincoln Ave. would not be visible from the surrounding area. Motorists on Lincoln Ave. would be able to observe some of the construction while passing by as only one lane would be open at a time. Following construction the increased elevation of the roadways, especially Rosemead Blvd. would provide more expansive views of the surrounding area. No indirect impacts are anticipated.

### **Construct Parapet Walls**

As with the raising of Lincoln Ave., the view of the construction of the 5 ft. high parapet wall between Lincoln Ave. and the Montebello Hills would not be visible from the surrounding area. Motorists on Lincoln Ave. would be able to observe some of the construction while passing by

as only one lane would be open at a time. As with the 12 ft. high parapet wall that would be constructed under RMP 3E, this parapet wall, although smaller would be subject to tagging /graffiti. It is anticipated that an increase in maintenance would be required. The addition of a 5 ft. high wall on top of the embankment crest would not be visible from more than the immediate Lincoln Ave. area. It would not block views of the San Gabriel Mountains, the Nature Area or views of the Whittier Narrows Recreation Area in the Reservoir. The impact would direct, permanent, but less than significant to the surrounding communities. No indirect impacts are anticipated.

#### **Trench Drain and Filter Blanket**

Impacts are expected to be similar to that characterized for the same activity under RMP 3E.

#### **Closeout**

Impacts are expected to be similar to that characterized for the same activity under RMP 3E.

#### **Regular/Recurring Operations and Maintenance**

Impacts are expected to be similar to that characterized for the same activity under RMP 3E.

### **5.11.4 Environmental Commitments**

While, with the exception of the parapet wall under RMP 3E, esthetic impacts are considered less than significant, Environmental Commitments (ECs) ER-1 through ER-7 described below may be implemented to further reduce impacts.

For all action alternatives, environmental commitments may include, but may not be limited to, the following:

- ER-1** Construction contractors shall ensure that all temporary construction lighting shall be designed and installed to be fully shielded (full cutoff) and to minimize glare and obtrusive light by limiting outdoor lighting that is misdirected, excessive, or unnecessary. Construction lighting shall be oriented away from nearby land use areas including residential areas downstream of the Dam. Where night lighting for safety is required upstream of the embankment, lighting shall be directed away from the Nature Area wherever feasible.
- ER-2** Work and staging areas would be kept orderly and free of trash and debris.
- ER-3** A storage area for collection and storage of recyclable and green waste materials would be kept within the work area. All trash and debris would be removed from the work area at the end of each day.
- ER-4** Signs would be posted prohibiting trespassing within the “construction zone.”
- ER-5** Confine vehicular traffic to routes of travel to and from the project site, and prohibit cross-country vehicle and equipment use outside designated work and storage-staging areas.
- ER-6** Apply anti-graffiti coating to concrete parapet walls to minimize graffiti.
- ER-7** Reduce visibility of construction activities and construction related equipment. Construction activities and construction related equipment, including staging areas, laydown areas, stockpiles, and equipment storage will be temporarily screened



throughout construction when visible from roads, trails, or residences to the extent practicable. Screening will consist of temporary screening fences with colors and materials to reflect the natural surroundings.

## **5.12 RECREATION RESOURCES**

Areas potentially affected by the proposed RMPs include the Project area of the Whittier Narrows Dam and Reservoir, including Streamland Park and the Pico Rivera Golf Course immediately downstream of the central embankment.

### **5.12.1 Regulatory Framework**

#### **Flood Control Act of 1944 (P.L. 78-534)**

The Flood Control Act of 1944 authorized the Corps to construct, maintain and operate public park and recreation amenities at water resource development projects. The Corps may grant leases to local interests for park and recreational purposes on Federally-owned lands controlled by the Corps, including structures or amenities thereon. Preference for use is given to Federal, state, or local governmental agencies. Significant recreation facilities have been developed throughout the Reservoir primarily on land leased to the Los Angeles County Department of Parks and Recreation (LACDP&R) as well as the City of Pico Rivera.

#### **Federal Water Project Recreation Act of 1965, as amended**

The Federal Water Project Recreation Act of 1965, as amended requires that any Federal water project must give full consideration to opportunities afforded by the project for outdoor recreation and fish and wildlife enhancement.

#### **National Trails System Act**

The Act recognizes the increasing popularity of outdoor recreation, and the need to promote access to, and enjoyment of, urban and more-remote outdoor areas.

#### **Executive Order 13195, Trails for America in the 21st Century**

The executive order directs Federal agencies, to the extent permitted by law and where practicable, to protect, connect, promote, and assist trails of all types.

#### **ER 1130-2-540, Environmental Stewardship Operations and Maintenance Guidance Procedures, as amended**

The ER establishes land management policy for Corps-administered project lands and water, based on various authorizing legislation and the principles of good environmental stewardship. Environmental stewardship includes both passive and proactive management to sustain healthy ecosystems and biodiversity, and conserve natural resources, such that Corps lands and waters are left in a condition equal to or better than their condition when acquired, and such that those natural and cultural resources are available to serve the needs of present and future generations.

### **ER 1130-2-550, Recreation Operations and Maintenance Policies, as amended**

The ER establishes the policy for management of recreation programs and activities, and for the operation and maintenance of Corps recreation amenities and related structures, at civil works water resource projects.

“The Corps is the stewards of lands and waters at Corps water resources projects. Its natural resources management mission is to manage and conserve those natural resources, consistent with ecosystem management principles, while providing quality outdoor recreation experiences to serve the needs of present and future generations.... The Corps integrates the management of diverse natural resource components such as fish, wildlife, forests, wetlands, grasslands, soil, air, and water with the provision of public recreation opportunities. The Corps conserves natural resources and provides public recreation opportunities that contribute to the quality of American life.” (Chapter 2, Paragraph 2-2.a.(1)).

#### **5.12.2 Thresholds of Significance**

A significant impact would occur to recreation amenities if a proposed alternative would result in:

- Construction or operational activities that permanently conflict with recreational uses.
- Resulted in a permanent loss of recreational opportunities or resources.
- Increase the use of existing neighborhood and regional parks or other recreation facilities such that substantial physical deterioration of the facility would occur or be accelerated.

#### **5.12.3 RMP Analysis and Comparison**

##### **Work-around of Important Local Events**

The Corps has determined that suitable adjustments in the ongoing multi-year construction schedule may need to be made to all action RMPs to accommodate important short-term local re-occurring events such as the Annual Cinco de Mayo Celebration traditionally held for one day on the first Sunday in May with approximately 25,000-40,000 people in attendance and 3,000-4,000 vehicles and the Fiestas Patrias event traditionally held for one day on the second Sunday in September with approximately 40,000-60,000 people in attendance and 4,500-5,750 vehicles. Although no work or hauling is anticipated on Sundays, set up prior to these events may conflict with on-going construction deliveries and haul routes. Adjustments to the construction schedule might include restricting truck hauling on certain days to accommodate short-term event related traffic associated with special local events. The Corps and construction contractor would coordinate with the LACDP&R prior to these events.

##### **5.12.3.1 RMP 1: No Action**

RMP 1 is described in Chapter 3, section 3.7.1. Construction activities are reasonably foreseeable under this alternative due to the necessity to restore the dam crest to its original elevation. With or without the implementation of either action RMP or the crest elevation

restoration, the Corps would continue O&M activities and would continue to implement IRRMs to address PFMs.

An anticipated increase in local population would increase overall use of recreation amenities. A change in population demographics could change the use patterns of existing amenities, directing the need for different types of recreation amenities. LACDP&R has not indicated the need for development of any new amenities at this time.

### **IRRM**s

O&M activities undertaken under the No Action alternative also include the IRRMs. Implementation of IRRMs that have and would be implemented would have a less than significant impact on recreation amenities within the Whittier Narrows Dam Reservoir Project area. These actions would not result in construction or operational activities that would permanently conflict with recreational uses, a permanent loss of recreational opportunities or resources, or increased the use of existing neighborhood and regional parks or other recreation facilities such that substantial physical deterioration of the facility would occur or be accelerated. No direct or indirect impacts are anticipated.

### **Crest Elevation Restoration**

Under the No Action Alternative, restoration of the Dam's crest elevation to its original design elevation is reasonably foreseeable in the next 50 years. If pursued, it would be subject to separate detailed analysis under NEPA at that time. Restoring the crest elevation would not result in construction or operational activities that permanently conflict with recreational uses, a permanent loss of recreational opportunities or resources, or increase the use of existing neighborhood and regional parks or other recreation facilities such that substantial physical deterioration of the facility would occur or be accelerated.

The borrow site for the crest elevation restoration is expected to require that the area south of Siphon Road from the Rosemead Blvd. and Durfee Ave. intersection with a buffer zone would be closed to the public. Once all construction activities are completed, the area would be reopened to the public. Impacts are expected to be direct, temporary, and less than significant. No indirect impacts are anticipated.

Two of the three proposed batch plants would be located within "operations" areas. There is limited recreation access or use of areas classified as "operations" within the Project area. No direct or indirect impact on recreationalists in the Project area is expected for these batch plants. The third batch plant would be located in the Bicentennial Park.

Even though Bicentennial Park is currently not used as a Recreational Vehicle (RV) Campground as originally designed, the City of Pico Rivera has been using the area for a variety of events including concerts. For RMP 1, the area would be used as a batch plant for the crest elevation restoration. Upon completion of construction the Park would be left cleared and graded to be ready for development. Since the area is not used as designed, impacts would not result in construction or operational activities that permanently conflict with recreational uses, a permanent loss of recreational opportunities or resources, or increase the use of existing neighborhood and regional parks or other recreation facilities such that substantial physical

deterioration of the facility would occur or be accelerated. Impacts are expected to be direct, temporary, and less than significant. No indirect impacts are anticipated.

### **Close Bike Paths and Dam Crest**

Raising the crest elevation would result in temporary closure for the estimated one (1) to two (2)-year period of construction of the San Gabriel River Trail and the LARio Trail that cross over the Dam's crest to the downstream trails. A detour for users of the San Gabriel River Trail through the Nature Area could have an indirect impact on existing dirt trails. The detour would require coordination with Los Angeles County Department of Recreation and Parks (LACDR&P) prior to construction with public notification and posting of signage for the detour. These closures would not result in construction or operational activities that permanently conflict with recreational uses, a permanent loss of recreational opportunities or resources. Unintended use by bicyclists of trails through the Nature Area could accelerate erosion of the trails resulting in an increased use such that additional erosion or deterioration of the trails would occur or be accelerated. Impacts are expected to be indirect, temporary and less than significant and once the Dam crest raise is complete, the trails would be re-opened for pedestrian and bicyclist use.

During crest elevation of the west embankment, access to the LARio Trail would not be available from the embankment crest adjacent to and accessible from Lincoln Ave. downstream to the levee maintenance road/trail. As with the central embankment, once the crest elevation construction is completed, access would be restored. The impact would be a direct result of construction, unavoidable, but temporary. The Trail would be reestablished when construction is completed.

### **Regular/Recurring Operations and Maintenance**

Under the No Action Alternative, O&M activities are anticipated to continue as currently implemented. Regular and recurring O&M activities include mechanical and electrical repair of the gates, vegetation management on the Dam and its appurtenant structures, including the downstream slope of the embankment, and mowing of vegetation upstream in the operations area immediately adjacent to the central embankment, removal of debris and sediment that accumulates at the upstream concrete apron of the outlet on the Rio Hondo and other structures, graffiti removal, and cleaning the relief wells. Other maintenance that is performed as needed includes repair of the concrete crossover weir, levee repair, filling pot-holes on the Dam crest road, and repairing gates and fences.

There is limited recreation access or use of areas classified as "operations" within the Project area, and these O&M activities are minor and short in duration. No direct or indirect impact on recreationalists in the Project area is expected. O&M activities would not result in construction or operational activities that permanently conflict with recreational uses, a permanent loss of recreational opportunities or resources, or increase the use of existing neighborhood and regional parks or other recreation facilities such that substantial physical deterioration of the facility would occur or be accelerated.

### **5.12.3.2 RMP 3E: Labyrinth Auxiliary Spillway and Seepage Control**

RMP 3E is described in Chapter 3, section 3.7.2. Under this RMP, overtopping is addressed through adding spillway capacity and backward erosion piping is addressed through construction of a trench drain at the downstream Dam toe and graded filter blanket adjacent to Rosemead Blvd.

#### **IRRM**s

Impacts are expected to be similar to those described under RMP 1: No Action.

#### **Phase 1**

##### **Staging Areas**

Pico Rivera Municipal Golf Course and Streamland Park are within lands owned by the Federal Government and leased to the City of Pico Rivera for recreational purposes. These lands will be used as temporary construction areas. Land use classification for Streamland Park is Recreation and the Pico Rivera Golf Course is Recreation-Low Density. Upon completion of construction disturbed areas would be cleared and left for further development. The area of Streamland Park would remain classified as Recreation, though the footprint of the area would be reduced. Loss of recreation use would be temporary and could be redeveloped upon completion of construction activities. The impact of the closure of the Streamland Park for use as a staging area would be direct, permanent, but less than significant.

It is anticipated that there would be an increase in the use of neighborhood and regional parks or other recreation facilities such that substantial physical deterioration of the facility would occur or be accelerated. Other recreation areas or parks would include additional use of recreation areas within the Reservoir. These indirect impacts may be permanent, and could be both significant and unavoidable.

The Pico Rivera Golf Course would be closed and the area cleared and grubbed in preparation of use of the area as a staging area to access the downstream slope of the embankment during construction. A portion of the Pico Rivera Golf Course would be developed as the runout channel and would be re-classified as “Operations” as it would then be part of the structural component of the auxiliary spillway. At completion of construction all other areas disturbed would be cleared and left in preparation for further development. The impact of the closure of the Pico Rivera Golf Course for use as a staging area would be direct, likely permanent, and therefore is considered significant and unavoidable.

It is expected that there may be an increase in use of other golf courses as a result of the closure that may lead to substantial physical deterioration of those facilities. Indirect impacts may ensue to other local similar facilities as the Pico Rivera Golf Course is heavily used as indicated by the number of leagues and members identified in Chapter 4.13.3 that regularly use the golf course.. These indirect impacts may be permanent, and could be both significant and unavoidable.

### **Close Bicycle Trail**

The San Gabriel River Trail leaves the levee and enters the Nature Area to access the “crossover weir”. Due to construction of the auxiliary labyrinth spillway, the crossover weir and the eastern end of the crossover channel would be relocated approximately 200 ft. upstream of its current position. The need to do this early in the construction sequence would close the Trail early in the construction schedule for the four (4) year period of construction..

The San Gabriel River Trail that crosses the central embankment at its far eastern end and is located on the downstream slope at the Pico Rivera Municipal Golf Course would not be restored in its current position but would be located to the west to access the maintenance road from the top of the embankment down to the berm west of the runout channel that leads to the San Gabriel River before returning to the downstream San Gabriel River levee. The trail would be able to use the maintenance road on the upstream slope which would be in approximately the same location as currently, and trail users would cross the bridge over the auxiliary labyrinth to the west and travel down the maintenance road to the new berm located west of the runout channel that would cover the Pico Rivera Municipal Golf Course. The berm would tie into the existing San Gabriel River levee at that point. The levee from the spillway to the berm would have been removed.

The temporary closure of the San Gabriel River Trail and the LARio Trail that cross over the Dam’s crest to the downstream trails would not result in a permanent loss of recreational opportunities or resources. A detour for users of the San Gabriel River Trail through the Nature Area could have an indirect impact on existing dirt trails. Unintended use by bicyclists could accelerate erosion of the trails. The detour would require coordination with LACDR&P prior to construction with public notification and posting of signage for the detour. The impacts are expected to be direct, temporary, and less than significant. The trails would be re-opened for pedestrian and bicyclist use after construction is completed.

### **Temporary Relocation of Utilities**

The temporary relocation of utilities would not result in construction or operational activities that permanently conflict with recreational uses, a permanent loss of recreational opportunities or resources, or increase the use of existing neighborhood and regional parks or other recreation facilities such that substantial physical deterioration of the facility would occur or be accelerated. There is limited recreation access or use of areas classified as “operations” within the Project area. No direct or indirect impact on recreationalists in the Project area is expected. Streamland Park and the Pico Rivera Golf Course would have been dismantled and cleared and grubbed for the staging areas. No direct or indirect impacts are anticipated.

## **Phase 2**

### **Redevelop Staging Areas**

Impacts are expected to be similar to the activity “Staging Areas” for Phase 1 of RMP 3E, described above.

### **Batch Plants and Haul Routes**

Two of the three proposed batch plants would be located within “operations” areas. The third batch plant would be located in the Bicentennial Park. The first two would not result in construction or operational activities that permanently conflict with recreational uses, a permanent loss of recreational opportunities or resources, or increase the use of existing neighborhood and regional parks or other recreation facilities such that substantial physical deterioration of the facility would occur or be accelerated.

Even though Bicentennial Park is currently not used as a Recreational Vehicle (RV) Campground as originally designed, the City of Pico Rivera has been using the area for a variety of events including concerts. For RMP 3E, the area would be used as a batch plant for mixing concrete for the 12 ft. parapet wall on top of the east embankment, to raise Rooks Road, and for other project components. Upon completion of construction the Park would be left cleared and graded to be ready for development. Since the area is not used as designed, impacts would not result in construction or operational activities that permanently conflict with recreational uses, a permanent loss of recreational opportunities or resources, or increase the use of existing neighborhood and regional parks or other recreation facilities such that substantial physical deterioration of the facility would occur or be accelerated. Impacts are expected to be direct, temporary, and less than significant. No indirect impacts are anticipated.

### **Borrow Area**

Two potential borrow sites for fill material for a coffer dam and raising the crest elevation are assumed to be necessary for construction. The proposed secondary borrow area, upstream of the central embankment in the Nature Area is part of the outgrant to LACDP&R. Public access to the western half of the Nature Area and its trails would be closed to the public during the four (4)-year period of construction. Once construction is completed, trails would be repaired if necessary and reopened for public use. It is assumed that the area south of Siphon Road from the Rosemead Blvd. and Durfee Ave. intersection with a buffer zone would be closed to the public. Once all construction activities are completed, the area would be reopened to the public. Impacts are expected to be direct, temporary, and less than significant. No indirect impacts are anticipated.

### **Cofferdam**

There is limited recreation access or use of areas classified as “operations” within the Project area. No direct or indirect impact on recreationalists in the Project area is expected. Construction of the cofferdam would not result in construction or operational activities that permanently conflict with recreational uses, a permanent loss of recreational opportunities or resources, or increase the use of existing neighborhood and regional parks or other recreation facilities such that substantial physical deterioration of the facility would occur or be accelerated.

### **Foundation/Sheetpile**

There is limited recreation access or use of areas classified as “operations” within the Project area. The foundation work and sheetpile activity would be limited to the area of the auxiliary labyrinth spillway that would be constructed in the embankment immediately upstream/adjacent to the existing Pico Rivera Golf Course that will have already been dismantled for use as a staging area and would be eventually be used as the area for the runout channel from the



auxiliary spillway to the San Gabriel River. No additional direct or indirect impact on recreationalists in the Project area is expected from this project component. The construction of the foundation/sheetpile would not result in construction or operational activities that permanently conflict with recreational uses, a permanent loss of recreational opportunities or resources, or increase the use of existing neighborhood and regional parks or other recreation facilities such that substantial physical deterioration of the facility would occur or be accelerated.

### **Construct Auxiliary Spillway**

The construction of the auxiliary spillway would not result in construction or operational activities that permanently conflict with recreational uses, a permanent loss of recreational opportunities or resources, or increase the use of existing neighborhood and regional parks or other recreation facilities such that substantial physical deterioration of the facility would occur or be accelerated. No additional direct or indirect impacts on recreation amenities are expected, as the auxiliary labyrinth spillway would be constructed in the embankment immediately upstream/adjacent to the existing Pico Rivera Golf Course that has already been dismantled for use as a staging area and would be eventually be used as the area for the runout channel from the auxiliary spillway to the San Gabriel River.

### **Approach and Runout Channels**

The construction of the approach channel from the overflow channel to the auxiliary spillway would have no additional direct impact on recreation as the San Gabriel River Trail would have been closed previously during Phase 1. The Trail would be restored when construction of the RMP components was completed. The construction of the runout channel would occur in the area of the existing Pico Rivera Golf Course which would already have been dismantled for use as a staging area. A portion of the Pico Rivera Golf Course would be developed as the runout channel and would be re-classified as “Operations” as it would then be part of the structural component of the auxiliary spillway. At completion of construction all other areas disturbed would be cleared and left in preparation for further development. The impact of the reclassification of this portion of this land from recreation to operations would be direct, permanent, significant and unavoidable.

It is expected that there may be an increase in use of other golf courses as a result of the closure that may lead to substantial physical deterioration of those facilities. Indirect impacts may ensue to other local similar facilities as the Pico Rivera Golf Course is heavily used as indicated by the number of leagues and members identified in Chapter 4.13.3 t who regularly use the golf course. These indirect impacts may be permanent, and could be both significant and unavoidable.

### **Road Modifications**

As indicated above under Borrow Area, approximately 5,400,000 cy of fill material would be required to raise the three roadways, Rosemead Blvd, Lincoln Ave. and Rooks Roa. Raising the three roads would be in conjunction with the 12 ft. high parapet walls constructed. It is not anticipated that the raising of the roadways would impact recreation amenities. However due to the temporary closure of the San Gabriel River Trail and the LARio Trail, some additional detours may be needed. Coordination with local recreation agencies will occur. Impacts are expected to be direct, temporary, and less than significant.

### **Construct Parapet Walls**

Construction of the parapet walls on the Dam crest would have no direct impact on recreation amenities as the San Gabriel River Trail and LARio Trail would have been closed during Phase 1 of construction. No additional direct or indirect impacts are anticipated beyond those described under “Close Bicycle Trail”, described above. The trails would reopen following completion of construction.

### **Trench Drain and Filter Blanket**

Construction of the proposed trench drain within an approximately 90 ft. strip across the downstream toe of the embankment would require a strip of Streamland Park and the Pico Rivera Golf Course, thus reducing the footprint of both. The need for a 90 ft. strip from the toe of the embankment would result in loss of most of the outfield area of the two (2) baseball diamonds, two-thirds of the basketball court in Streamland Park. The area of Streamland Park would remain classified as Recreation, though the footprint of the area would be reduced. This is not considered a significant impact, as the Park will still be an available resource and opportunity for recreation purposes following construction. As discussed above, the portion of the Pico Rivera Golf Course also would be developed as the runout channel and would be re-classified as “Operations” as it would then be part of the structural component of the auxiliary spillway. At completion of construction all other areas disturbed would be cleared and left in preparation for further development. Impacts are expected to be similar to those under “Staging Areas”, described above.

### **Closeout**

Closeout of the Phase 2 construction activities would involve the dismantling of the batch plants and staging areas and removal of these facilities from the Project site. Any gravel or other material laid down on the haul roads would be removed. Soil over culverts over the crossover channel would be removed. These activities are not expected to result in direct or indirect impacts beyond those previously described under this alternative, RMP 3E.

### **Regular/Recurring Operations and Maintenance**

Impacts are expected to be similar to the same activity under RMP 1.

#### **5.12.2.3 RMP 5: Protected Overtopping with Seepage Control**

RMP 5 is described in Chapter 3, section 3.7.3. Under this RMP, overtopping is addressed through hardening of the Dam crest to prevent erosion or subsequent failure of the Dam from events large enough to cause overtopping. Backward erosion piping is addressed through construction of a trench drain at the downstream Dam toe and graded filter blanket adjacent to Rosemead Blvd.

### **IRRM**

Impacts are expected to be similar to those described under RMP 1: No Action.

## **Phase 1**

### **Staging Areas**

Impacts are expected to be similar to that characterized for the same activity under RMP 3E. The staging area in the land currently occupied by the Pico Rivera golf will not have a portion converted to Operational use for a runout channel, as under 3E. Therefore, at the close of construction the entire area that is disturbed by construction (with the exception of the area that will be impacted by the trench drain, discussed below) will be cleared and left in preparation for further development. Nonetheless, as it is unknown whether the golf course will be re-established after construction, the impact of the closure of the Pico Rivera Golf Course for use as a staging area would be direct, likely permanent, and therefore is considered significant and unavoidable.

### **Close Bike Paths and Dam Crest**

Impacts are expected to be similar to that characterized for the same activity under RMP 3E.

### **Temporary Relocation of Utilities**

Impacts are expected to be similar to that characterized for the same activity under RMP 3E.

## **Phase 2**

### **Redevelop Staging Areas**

Impacts are expected to be similar to that characterized for the same activity under RMP 3E.

### **Batch Plants and Haul Routes**

Impacts are expected to be similar to that characterized for the same activity under RMP 3E.

### **Remove Topsoil**

A two (2) ft. thick layer of topsoil would be removed from the downstream slopes of the three embankments of the Dam. The topsoil would be stockpiled in either the Golf Course or Streamland Park during the placement of the Roller compacted concrete (RCC). An additional 10 ft. thick layer of material would be removed from the downstream slopes of the three embankments of the Dam. This excavated material would be transported to the batch plants (via the concept haul road locations shown in Figure 3.7-3) and utilized in the mix of the RCC. Although not part of the construction needs, there is the potential for minor disturbance to the eastern portion of Streamland Park that is not owned by the Federal government during this action of removing the topsoil and moving it the location the soil would be stockpiled during construction. The removal of topsoil from the downstream face of the Dam would not have a direct or indirect impact on recreation amenities beyond those described under “Staging Areas”, above, as the Streamland Park and Golf Course would have been dismantled and cleared and grubbed in Phase 1 for the development of the staging areas.

Because the eastern portion of Streamland Park, which is not part of the Project, is anticipated to share the same access road during construction and stockpiling of soil removed from the downstream face of the Dam, this activity has the potential to indirectly impact recreational activities in this eastern portion of Streamland Park. These indirect impacts are expected to be

temporary and less than significant. Coordination with the City of Pico Rivera will further minimize any impacts.

#### **Roller Compacted Concrete**

The placement of the Roller compacted concrete (RCC) on the downstream face of the embankments would not have a direct or indirect impact on recreation amenities beyond those described under “Staging Areas”, above, as both Streamland Park and the Pico Rivera Golf Course would have been dismantled and cleared and grubbed for the development of the staging areas.

#### **Replace Topsoil**

Similar to the activity “Roller Compacted Concrete” for RMP 5, described above.

#### **Road Modifications**

Lincoln Ave. would be raised 5 ft. to meet the raised elevation of the Dam and to prevent flood water from going around the Dam crest to inundate the downstream area. The LARio Trail would be closed during construction of the west embankment that would include a five (5)-ft. parapet wall west of Lincoln Ave. westwards into the Montebello Hills, where the wall would meet grade so that any flood water could not go-around the parapet wall and raised Lincoln Ave. Since the LARio Trail would have been closed previously, the road modification would not directly impact Trail closure. Impacts are expected to be similar to “Close Bicycle Trail”, described above.

#### **Trench Drain and Filter Blanket**

Impacts are expected to be similar to that characterized for the same activity under RMP 3E.

#### **Closeout**

Impacts are expected to be similar to that characterized for the same activity under RMP 3E.

#### **Regular/Recurring Operations and Maintenance**

Impacts would be similar to the same activity under RMP 1, described above.

### **5.12.4 Environmental Commitments**

**Environmental Commitments (ECs) RR-1 through RR-2** would be implemented to minimize impacts to recreation construction.

For all alternatives, these environmental commitments may include, but may not be limited to, the following:

- RR-1** Provide notices and information on current recreation use status during the construction period through local media and signage.
- RR-2** All recreation uses would be detoured from the area for safety of workers and the public.

## **5.13 UTILITIES**

Utilities that could be affected by the proposed RMPs include those within the RMP action area including those that transit the embankments or run immediately downstream of the west, central, or east embankments.

### **5.13.1 Regulatory Framework**

No Federal agencies or regulations are applicable to utilities and service systems associated with this project.

### **5.13.2 Thresholds of Significance**

A potentially significant impact may occur to utilities if a risk management plan would:

- Require a substantial modification to existing utility facilities that would have an adverse impact on recreation amenities, land use, or the local community.
- Cause reduction in services that increased life safety risk.

### **5.13.3 RMP Analysis and Comparison**

#### **5.13.3.1 Risk Management Plan 1 No Action Alternative/Future without Project with IRRMs**

RMP 1 is described in Chapter 3, section 3.7.1. Construction activities are reasonably foreseeable under this alternative due to the necessity to restore the dam crest to its original elevation. With or without the implementation of either action RMP or the crest elevation restoration, the Corps would continue O&M activities and would continue to implement IRRMs to address PFMs.

#### **IRRM**s

O&M activities undertaken under the No Action alternative also include the IRRMs. Implementation of IRRMs that have and would be implemented would have no impact on utilities as the utility galleries are located under/through the Dam and would not be impacted by any of the IRRM activities, which are largely technical or administrative activities not expected to require construction activities. . None of the high-power line towers would need to be relocated. IRRMs would not require a substantial modification to existing utility facilities that would have an adverse impact on recreation amenities, land use, or the local community or caused reduction in services that increased life safety risk. No direct or indirect impacts are anticipated.

#### **Crest Elevation Repair**

Under the No Action Alternative, restoration of the Dam's crest elevation to its original design elevation is reasonably foreseeable in the next 50 years. If pursued, it would be subject to separate detailed analysis under NEPA at that time.

Raising the crest elevation would have no impact on utilities as the utility galleries are located under/through the Dam and would not be impacted by, nor need to be moved to accommodate, crest elevation restoration. No substantial modification to existing utility facilities that would have an adverse impact on recreation amenities, land use, or the local community or caused reduction in services that increased life safety risk is anticipated to occur. No direct or indirect impacts are anticipated.

#### **Regular/Recurring Operations and Maintenance**

Under the No Action Alternative, O&M activities are anticipated to continue as currently implemented. Regular and recurring O&M activities include mechanical and electrical repair of the gates, vegetation management on the Dam and its appurtenant structures, including the downstream slope of the embankment, and mowing of vegetation upstream in the operations area immediately adjacent to the central embankment, removal of debris and sediment that accumulates at the upstream concrete apron of the outlet on the Rio Hondo and other structures, graffiti removal, and cleaning the relief wells. Other maintenance that is performed as needed includes repair of the concrete crossover weir, levee repair, filling pot-holes on the Dam crest road, and repairing gates and fences.

Regular and recurring O&M would have no impact on utilities as the utility galleries are located under/through the Dam and would not be impacted by, nor need to be moved to accommodate, these activities. No substantial modification to existing utility facilities that would have an adverse impact on recreation amenities, land use, or the local community or caused reduction in services that increased life safety risk is anticipated to occur. No direct or indirect impacts are anticipated.

#### **5.13.3.2 RMP 3E Auxiliary Spillway and Seepage Control**

RMP 3E is described in Chapter 3, section 3.7.2. Under this RMP, overtopping is addressed through adding spillway capacity and backward erosion piping is addressed through construction of a trench drain at the downstream Dam toe and graded filter blanket adjacent to Rosemead Blvd.

#### **IRRM**

Impacts are expected to be similar to those described under RMP 1: No Action.

#### **Phase 1**

##### **Staging Areas**

Utilities servicing the Pico Rivera Golf Course and Streamland Park would be disconnected and terminated. Utilities for the staging area needs would be connected under new user. Since these areas would be cleared and grubbed for use as staging areas, the disconnection of utilities would not require a substantial modification to existing utility facilities that would have an adverse impact on recreation amenities, land use, or the local community or caused reduction in services that increased life safety risk. No direct or indirect impacts are anticipated.

### **Temporary Relocation of Utilities**

There would be short-term interruption when re-connections are made to water pipelines. Direct impacts would not be to the local community water supply as the pipe lines through the Dam carry waste water and water for ground water recharge. No water goes directly to public consumers. Since utilities to the Pico Rivera Golf Course and Streamland Park would have been disconnected during the set-up of the staging areas, there would be no adverse impact on recreation amenities, land use, or the local community. Impacts are expected to be direct, temporary, and less than significant. No indirect impacts are anticipated.

One high power transmission tower located in the Pico Rivera Golf Course would be relocated, most likely to the west so that it would be outside the berm to the west of the runout channel that would be constructed from the labyrinth spillway to the San Gabriel River. The impacts of relocation of the high power transmission tower would be direct, permanent, but less than significant. No indirect impacts are anticipated.

### **Phase 2**

No further relocation or disruption of services is anticipated during Phase 2 of the RMP.

### **Regular/Recurring Operations and Maintenance**

Impacts are expected to be similar to those described under the same activity as RMP 1.

#### **5.13.3.3 RMP 5: Protected Overtopping with Seepage Control**

RMP 5 is described in Chapter 3, section 3.7.3. Under this RMP, overtopping is addressed through hardening of the Dam crest to prevent erosion or subsequent failure of the Dam from events large enough to cause overtopping. Backward erosion piping is addressed through construction of a trench drain at the downstream Dam toe and graded filter blanket adjacent to Rosemead Blvd.

### **IRRM**s

Impacts are expected to be similar to those described under RMP 1: No Action.

### **Phase 1**

#### **Staging Areas**

Impacts are expected to be similar to that characterized for the same activity under RMP 3E.

### **Temporary Relocation of Utilities**

Impacts are expected to be similar to that characterized for the same activity under RMP 3E. \

### **Phase 2**

No further relocation or disruption of services is anticipated during Phase 2 of RMP 5.



### **Regular/Recurring Operations and Maintenance**

Impacts are expected to be similar to those described under the same activity as RMP 1.

#### **5.13.3 Environmental Commitments**

**Environmental Commitment (EC) U-1** would be implemented to minimize impacts to utilities during construction.

For all alternatives, these environmental commitments may include, but may not be limited to, the following:

- U-1** If utility service disruption is necessary, residents and businesses in the Proposed Project area would be notified a maximum of seven (7) and minimum of two (2) days prior to service disruption through local newspapers, and direct mailings to affected parties.

#### **5.14 PUBLIC HEALTH AND SAFETY**

Areas that could potentially be impacted by the proposed RMPs include the Project area and the four communities of South El Monte, Montebello, Pico Rivera, and the City of Industry, which are immediately adjacent to the Project. Public health and safety considerations also exist for the communities downstream of Whittier Narrows Dam at risk from the consequences of Dam failure through dam breach.

##### **5.14.1 Regulatory Framework**

There are no Federal regulations governing Public Health and Safety relevant to the evaluation of the proposed alternatives.

Public health and safety covers a wide range of conditions that range from natural disasters such as floods, fires, diseases, and earthquakes to man-made incidents such as accidents, breaking and entering, gang activity, and other crimes. Public health and safety includes the health and safety risks inherent in the construction of any of the RMPs. Existing health and safety issues were identified based on current use and conditions within the Reservoir and issues that could be exacerbated with or without the implementation of any RMP.

Public health and safety incidents associated with construction include vehicle and machinery accidents, use conflicts, and a variety of activity related accidents and injuries.

Most foreseeable public health and safety impacts associated with a RMP would be short-term and occur during the construction period. Equipment and materials to be used during the implementation of a RMP were identified and potential safety risks identified in order to minimize worker risk during construction. Construction-related impacts were assessed based on the potential to expose the public and site workers to construction-related health and safety hazards and the potential for construction-related activities to adversely affect the public health and safety.

### **5.14.2 Thresholds of Significance**

A potentially significant impact may occur to public health and safety if a risk management plan would:

- Impair implementation of or physically interfere with an adopted emergency response plan or emergency evacuation plan,
- Expose people or structures to a significant risk of loss, injury, or death involving fires, or
- Expose people to a significant risk of water-related injury of death, or,
- Expose people to infectious diseases.

### **5.14.3 RMP Analysis and Comparison**

#### **5.14.3.1 RMP 1: No Action**

RMP 1 is described in Chapter 3, section 3.7.1. Construction activities are reasonably foreseeable under this alternative due to the necessity to restore the dam crest to its original elevation. With or without the implementation of either action RMP or the crest elevation restoration, the Corps would continue O&M activities and would continue to implement IRRMs to address PFMs.

#### **IRRM**s

O&M activities undertaken under the No Action alternative also include the IRRMs. Implementation of IRMMs that have and would be implemented would have no direct impact on public health and safety as they are mainly administrative or technical exercises and no construction activity is anticipated. The IRRMs could have beneficial indirect effects, however, as they may aid in the reduction of risk as a result of Dam failure from Dam breach.

#### **Crest Elevation Repair**

Under the No Action Alternative, restoration of the Dam's crest elevation to its original design elevation is reasonably foreseeable in the next 50 years. If pursued, it would be subject to separate detailed analysis under NEPA at that time.

The borrow area construction would avoid monitored water wells in the area, as described under the section for HTRW.

The proposed borrow area would likely create a shallow depression in the area upstream of the central embankment, which would be graded to minimize any standing water. Batch plants and haul routes would be cleared and grubbed as described in section 3.7.3. Areas would be leveled as necessary with excess material used temporarily as berms to prevent runoff or to protect from inundation during construction. Following completion of construction, the batch plants would be dismantled and the area re-graded and hydroseeded. These areas are within the general construction area above the central embankment, inside the Reservoir. The construction site would maintain access for emergency vehicles and would not interfere with evacuation routes. Public access to construction areas would be limited (e.g., through fencing or other means) in

order to minimize risk of loss, injury, or death to the general public. OSHA/Corps Safety requirements, including working in or near water would be maintained, as necessary, onsite (Safety and Health Requirements, EM 385-1-1). Fire control measures would be implemented. The haul routes would increase traffic activity areas inside the Reservoir including Siphon Road that are occasionally used by the public. The haul routes plants would be temporary during construction, and would be subject to OSHA/Corps Safety requirements. While increased usage of these areas during construction could increase the risk of traffic accident, this risk is temporary would be minimized by the application of OSHA/Corps safety requirement. Impacts are expected to be direct, temporary, and less than significant. No indirect impacts are anticipated.

### **Regular/Recurring Operations and Maintenance**

Under the No Action Alternative, O&M activities are anticipated to continue as currently implemented. Regular and recurring O&M activities include mechanical and electrical repair of the gates, vegetation management on the Dam and its appurtenant structures, including the downstream slope of the embankment, and mowing of vegetation upstream in the operations area immediately adjacent to the central embankment, removal of debris and sediment that accumulates at the upstream concrete apron of the outlet on the Rio Hondo and other structures, graffiti removal, and cleaning the relief wells. Other maintenance that is performed as needed includes repair of the concrete crossover weir, levee repair, filling pot-holes on the Dam crest road, and repairing gates and fences. Regular and recurring O&M activities are minor, short term activities subject to the Corps' Safety and Health Requirements, EM 385-1-1.

These O&M activities would not impair implementation of or physically interfere with an adopted emergency response plan or emergency evacuation plan, expose people or structures to a significant risk of loss, injury, or death involving fires, water-related injury or death, or infectious diseases. Impacts from these activities would be direct, temporary, and less than significant. No indirect impacts are anticipated.

### **Dam Failure**

The No Action Alternative would not address the identified PFMs and therefore would not reduce the risk of potential Dam failure associated with the PFMs. If Dam failure were to occur, it would manifest increased sediment, debris, and hazardous material being carried by floodwater downstream causing potential damage to the area of inundation. Deposition of the materials and exposure of people to them in inundated areas could directly impact people's homes and businesses, local infrastructure including roadways, public and emergency services, traffic, utilities, recreation areas, overall esthetic quality, and public health and safety.

#### **5.14.3.2 RMP 3E: Labyrinth Auxiliary Spillway and Seepage Control**

RMP 1 is described in Chapter 3, section 3.7.1. Construction activities are reasonably foreseeable under this alternative due to the necessity to restore the dam crest to its original elevation. With or without the implementation of either action RMP or the crest elevation restoration, the Corps would continue O&M activities and would continue to implement IRRMs to address PFMs.

## **IRRM**

Impacts are expected to be similar to those described under RMP 1: No Action.

### **Phase 1**

#### **Staging Areas**

The staging areas would be developed in two areas, Streamland Park and the Pico Rivera Golf Course. Both locations are located downstream of the central embankment. Both sites would be cleared and grubbed following removal of site amenities and their disposal. The sites would be leveled as needed for staging area facilities. The development of the staging area would maintain access for emergency vehicles and would not interfere with evacuation routes. Public access to construction/staging areas would be limited (e.g., through fencing or other means) in order to minimize risk of loss, injury, or death to the general public. OSHA/Corps Safety requirements, including working in or near water would be maintained, as necessary, onsite (Safety and Health Requirements, EM 385-1-1). Fire control measures would be implemented. Impacts are expected to be direct, temporary, and less than significant. No indirect impacts are anticipated.

#### **Close Bike Paths and Dam Crest**

The San Gabriel River Trail would be closed approximately 1,000 ft. upstream of the spillway during the Phase 1 implementation period. The trail crosses the crossover weir and uses the maintenance road ramp west of the spillway to the Dam crest. The road continues down the embankment slope to the Pico Rivera Golf Course where the trail rejoins the River levee. Bike path/Dam crest closure would result in the need for San Gabriel River Trail users to detour around the construction area. Emergency access to these areas would be maintained. San Gabriel River users (mostly bicyclists) may detour through the Nature Area on unpaved trail/paths to Durfee Road, which may result in an increase in accidents including falls. Impacts are direct, temporary and less than significant.

The closure of the San Gabriel River Trail would not impair implementation of or physically interfere with an adopted emergency response plan or emergency evacuation plan, expose people or structures to a significant risk of loss, injury, or death involving fires, water-related injury or death, or infectious diseases. No other direct or indirect impacts are anticipated.

#### **Temporary Relocation of Utilities**

The temporary relocation of utilities would occur downstream of the Dam toe. The relocation of the utilities would maintain access for emergency vehicles and would not interfere with evacuation routes. Public access to construction/staging areas would be limited (e.g., through fencing or other means) in order to minimize risk of loss, injury, or death to the general public. OSHA/Corps Safety requirements, including working in or near water would be maintained, as necessary, onsite (Safety and Health Requirements, EM 385-1-1). Fire control measures would be implemented. Impacts are expected to be direct, temporary, and less than significant. No indirect impacts are anticipated.

## **Phase 2**

### **Redevelop Staging Areas**

Impacts similar to “Staging Areas” under Phase 1, RMP 3E, above.

### **Extend Crossover Weir**

Water from the San Gabriel River when reaching elevation 208.0 ft. flows over the crossover weir into the crossover channel. After closing the River Trail, the current crossover weir located immediately upstream of the spillway would be extended approximately 200 ft. upstream so that a new crossover channel can be dug due to the need for the coffer dam during construction of the auxiliary labyrinth spillway. All work would be from the landside of the River levee. The extension of the crossover weir/ crossover channel construction area would maintain access for emergency vehicles and would not interfere with evacuation routes, as it would occur inside the Reservoir. Public access to construction/staging areas would be limited (e.g., through fencing or other means) in order to minimize risk of loss, injury, or death to the general public.

OSHA/Corps Safety requirements, including working in or near water would be maintained, as necessary, onsite (Safety and Health Requirements, EM 385-1-1). Fire control measures would be implemented. Impacts are expected to be direct, temporary, and less than significant. No indirect impacts are anticipated.

### **Batch Plants and Haul Routes**

Batch plants and haul routes would be cleared and grubbed as described in section 3.6.3. Areas would be leveled as necessary with excess material used temporarily as berms to prevent runoff or to protect from inundation during construction. Following completion of construction, the batch plants would be dismantled and the area re-graded and hydroseeded. The batch plants and haul routes are within the general construction area above the central embankment, inside the Reservoir. The construction site would maintain access for emergency vehicles and would not interfere with evacuation routes, as it would occur inside the Reservoir. Public access to construction/staging areas would be limited (e.g., through fencing or other means) in order to minimize risk of loss, injury, or death to the general public. OSHA/Corps Safety requirements, including working in or near water would be maintained, as necessary, onsite (Safety and Health Requirements, EM 385-1-1). Fire control measures would be implemented. No direct or indirect impacts are anticipated to public health and safety. The haul routes would increase traffic activity areas inside the Reservoir including Siphon Road that are occasionally used by the public. The haul routes plants would be temporary during construction, and would be subject to OSHA/Corps Safety requirements. While increased usage of these areas during construction could increase the risk of traffic accident, this risk is temporary and considered less than significant. Development and use of the batch plants and haul routes would not impair implementation of or physically interfere with an adopted emergency response plan or emergency evacuation plan, expose people or structures to a significant risk of loss, injury, or death involving fires, water-related injury or death, or infectious diseases. The impacts are expected to be direct, temporary, and less than significant. No indirect impacts are anticipated.

### **Borrow area**

The area of the proposed main borrow site would be located in the same area as for the No Action Alternative. (Figure 3.7-1). A second borrow area may be needed if the main borrow area

does not provide the required soil (sands and silts) for fill material. Monitored water wells in the area would be avoided, as described under the section for HTRW.

The proposed borrow area would create a depression in the area upstream of the central embankment (Figure 3.7-1). The excess fill material returned or placed in the borrow area following construction would replace approximately half of the initial fill material used for the Dam crest raise and the coffer dam, resulting in a depression approximately 3-ft. deep on average, which would be graded to minimize any standing water. This area is inside the Reservoir and would not impair implementation of or physically interfere with an adopted emergency response plan or emergency evacuation plan, expose people or structures to a significant risk of loss, injury, or death involving fires, water-related injury or death, or infectious diseases. The construction site would maintain access for emergency vehicles and would not interfere with evacuation routes, as it would occur inside the Reservoir. Public access to construction/staging areas would be limited (e.g., through fencing or other means) in order to minimize risk of loss, injury, or death to the general public. OSHA/Corps Safety requirements, including working in or near water would be maintained, as necessary, onsite (Safety and Health Requirements, EM 385-1-1). Fire control measures would be implemented. Impacts are expected to be direct, temporary, and less than significant. No indirect impacts are anticipated.

#### **Coffer Dam**

The coffer dam would be constructed upstream of the eastern end of the central embankment. As indicated above, approximately 297,000 cy of fill material would be needed to construct the coffer dam. The coffer dam would be approximately 40 ft. tall, to be as tall as the embankment during construction of the auxiliary spillway. When the auxiliary spillway construction is completed, the coffer dam would be removed and the material used to raise the road beds or returned to the borrow area. The coffer dam would not impair implementation of or physically interfere with an adopted emergency response plan or emergency evacuation plan, expose people or structures to a significant risk of loss, injury, or death involving fires, water-related injury or death, or infectious diseases. The construction site would maintain access for emergency vehicles and would not interfere with evacuation routes, as it would occur inside the Reservoir. Public access to construction/staging areas would be limited (e.g., through fencing or other means) in order to minimize risk of loss, injury, or death to the general public. OSHA/Corps Safety requirements, including working in or near water would be maintained, as necessary, onsite (Safety and Health Requirements, EM 385-1-1). Fire control measures would be implemented. Impacts are expected to be direct, temporary, and less than significant. No indirect impacts are anticipated.

#### **Foundation/Sheetpile**

The spillway subsurface would include foundation improvements to prevent liquefaction during extreme earthquakes. Sheetpile is assumed to extend 40 ft. below the foundation slab and encircle the proposed auxiliary spillway. Some dewatering of the foundation during construction is anticipated to allow the work to proceed in the storm season. This foundation work and placement of sheetpile would not impair implementation of or physically interfere with an adopted emergency response plan or emergency evacuation plan, expose people or structures to a significant risk of loss, injury, or death involving fires, water-related injury or death, or infectious diseases. The construction site would maintain access for emergency vehicles and

would not interfere with evacuation routes. Public access to construction/staging areas would be limited (e.g., through fencing or other means) in order to minimize risk of loss, injury, or death to the general public. OSHA/Corps Safety requirements, including working in or near water would be maintained, as necessary, onsite (Safety and Health Requirements, EM 385-1-1). Fire control measures would be implemented. Impacts would be direct, temporary, and less than significant. No indirect impacts are anticipated.

### **Construct Auxiliary Spillway**

The construction site would maintain access for emergency vehicles and would not interfere with evacuation routes. Public access to construction/staging areas would be limited (e.g., through fencing or other means) in order to minimize risk of loss, injury, or death to the general public. OSHA/Corps Safety requirements, including working in or near water would be maintained, as necessary, onsite (Safety and Health Requirements, EM 385-1-1). Fire control measures would be implemented. A 250-ft. wide passive weir auxiliary spillway would be constructed in-line with the existing embankment and immediately west of the existing spillway to increase the spillway capacity. The existing spillway begins to activate and discharges exceed channel capacity in the San Gabriel River channel when the pool reaches elevation 229 ft. Should the inflows to the dam be such that the pool reaches elevation 234 ft. (i.e., a very rare flood with return period of approximately 7500 years (see table 2.9-1 for explanation of “return periods”), the spillway will be releasing 250,000 cubic feet per second (cfs). Flooding of this magnitude would result in water depths in the City of Pico Rivera of 5-10 ft. and depths in the area immediately downstream of the spillway would likely exceed 10 ft. The auxiliary spillway proposed under RMP 3E would be constructed adjacent to the existing spillway but would not become active until the pool reaches elevation 234 ft. While the proposed auxiliary spillway would result in increased discharges (approximately a ten percent increase at elevation 236 ft.) the depth of flooding at this magnitude flood even with only the existing structure is such that the downstream communities would likely have evacuated. Rather, the auxiliary spillway is proposed as a means of increasing spillway capacity to reduce the risk of Dam failure through Dam breach. A bridge across the auxiliary spillway would be required to provide access to the San Gabriel River spillway during extreme events.

The auxiliary labyrinth spillway would be considered in the development of emergency response and emergency evacuation plans and would not impair implementation of or physically interfere with an adopted emergency response plan or emergency evacuation plan, expose people or structures to a significant risk of loss, injury, or death involving fires, water-related injury or death, or infectious diseases. The impact is expected to be direct, permanent, and less than significant. No indirect impacts are anticipated.

### **Parapet Walls**

The construction site would maintain access for emergency vehicles and would not interfere with evacuation routes. Public access to construction/staging areas would be limited (e.g., through fencing or other means) in order to minimize risk of loss, injury, or death to the general public. OSHA/Corps Safety requirements, including working in or near water would be maintained, as necessary, onsite (Safety and Health Requirements, EM 385-1-1). Fire control measures would be implemented. Parapet wall would be built on the three (3) Dam crest embankments to raise the Dam crest an additional 12 ft. The addition of the parapet walls on top of the Dam crest



would raise the elevation of the Dam crest from 239.0 ft. to 251.0 ft. Water impoundment upstream of the Dam could be increased to this higher elevation,. Elevation 251.0 ft. would also expand the upstream water inundation boundary beyond the current upstream, probable maximum flood line. The additional parapet walls on the Dam crest would be considered in the development of emergency response and emergency evacuation plans and would not impair implementation of or physically interfere with an adopted emergency response plan or emergency evacuation plan, expose people or structures to a significant risk of loss, injury, or death involving fires, water-related injury or death, or infectious diseases. The impact would be direct, permanent, and less than significant.

### **Approach and Runout Channels.**

Upstream of the Dam, an approach channel would be graded to improve flow characteristics to the auxiliary spillway. The approach channel would be 240 ft. wide and have an average distance of roughly 500 ft. extending from the upstream limit of the labyrinth to the crossover channel.

Downstream of the Dam, a 240-ft. wide runout channel would extend an average length of approximately 450 ft. between the downstream limit of the labyrinth and the San Gabriel River through the existing Pico Rivera Municipal Golf Course. After the staging area in the Pico Rivera Golf Course is dismantled, the area would be covered with excess fill material from the removal of the embankment for the auxiliary spillway. The fill material would be sloped and graded from the spillway to the San Gabriel River invert downstream of the existing spillway. The River levee would be removed in this area so that flood water from the auxiliary spillway would flow to the San Gabriel River. The fill material would be hydroseeded upon completion of the runout channel.

Both channels would be constructed during the dry season so as to minimize the risk of flooding the work area due to stormwater. The construction site would maintain access for emergency vehicles and would not interfere with evacuation routes. Public access to construction/staging areas would be limited (e.g., through fencing or other means) in order to minimize risk of loss, injury, or death to the general public. OSHA/Corps Safety requirements, including working in or near water would be maintained, as necessary, onsite (Safety and Health Requirements, EM 385-1-1). Fire control measures would be implemented. Both the approach channel and the runout channel would not impair implementation of or physically interfere with an adopted emergency response plan or emergency evacuation plan, expose people or structures to a significant risk of loss, injury, or death involving fires, water-related injury or death, or infectious diseases. The impacts are expected to be direct, permanent, and less than significant.

### **Road Modifications**

As indicated above under Borrow Area, approximately 5,400,000 cy of fill material would be required to raise the three roadways, Rosemead Blvd, Lincoln Ave. and Rooks Road Raising the three roads would be in conjunction with the 12 ft. high parapet walls constructed. The construction site would maintain access for emergency vehicles and would not interfere with evacuation routes. Public access to construction/staging areas would be limited (e.g., through fencing or other means) in order to minimize risk of loss, injury, or death to the general public. OSHA/Corps Safety requirements, including working in or near water would be maintained, as necessary, onsite (Safety and Health Requirements, EM 385-1-1). Fire control measures would be implemented. The raising of the roadways would not impair implementation of or physically

interfere with an adopted emergency response plan or emergency evacuation plan, expose people or structures to a significant risk of loss, injury, or death involving fires, water-related injury or death, or infectious diseases. The impact would be direct, temporary, and less than significant. No indirect impacts are anticipated.

#### **Trench Drain and Filter Blanket**

For the construction of the trench drain for a distance of 90 ft. downstream from the toe of the embankment, soil cleared would be stockpiled and used as needed for the trench drain fill material needs. Topography changes in this area would be minor with the creation of a five (5) ft. high berm between the trench drain and the Project right-of way to keep the trench drain accessible and uncovered for maintenance accessibility in perpetuity. This would be minor and compared to the overall height of the Dam, relatively insignificant. The construction site would maintain access for emergency vehicles and would not interfere with evacuation routes. Public access to construction/staging areas would be limited (e.g., through fencing or other means) in order to minimize risk of loss, injury, or death to the general public. OSHA/Corps Safety requirements, including working in or near water would be maintained, as necessary, onsite (Safety and Health Requirements, EM 385-1-1). Fire control measures would be implemented. The trench drain and filter blanket would not impair implementation of or physically interfere with an adopted emergency response plan or emergency evacuation plan, expose people or structures to a significant risk of loss, injury, or death involving fires, water-related injury or death, or infectious diseases. The impact is expected to be less than significant. The impact would be direct, temporary, and less than significant. No indirect impacts are anticipated.

#### **Closeout**

Closeout of the Phase 2 construction activities would involve the dismantling of the batch plants and staging areas and removal of these facilities from the Project site. Any gravel or other material laid down on the haul roads would be removed. Soil over culverts over the crossover channel would be removed. The construction site would maintain access for emergency vehicles and would not interfere with evacuation routes. Public access to construction/staging areas would be limited (e.g., through fencing or other means) in order to minimize risk of loss, injury, or death to the general public. OSHA/Corps Safety requirements, including working in or near water would be maintained, as necessary, onsite (Safety and Health Requirements, EM 385-1-1). Fire control measures would be implemented.

These activities would be short-term and would not impair implementation of or physically interfere with an adopted emergency response plan or emergency evacuation plan, expose people or structures to a significant risk of loss, injury, or death involving fires, water-related injury or death, or infectious diseases. The impact is expected to be less than significant.

#### **Regular/Recurring Operations and Maintenance**

Similar to the impacts for the same activity, “O&M,” under RMP 1.

#### **5.14.3.3 RMP 5: Protected Overtopping with Seepage Control**

RMP 5 is described in Chapter 3, section 3.7.3. Under this RMP, overtopping is addressed through hardening of the Dam crest to prevent erosion or subsequent failure of the Dam from

events large enough to cause overtopping. Backward erosion piping is addressed through construction of a trench drain at the downstream Dam toe and graded filter blanket adjacent to Rosemead Blvd.

### **IRRM**s

Impacts are expected to be similar to those described under RMP 1: No Action.

### **Phase 1**

#### **Staging Areas**

Impacts are expected to be similar to that characterized for the same activity under RMP 3E.

#### **Close Bike Paths and Dam Crest**

Impacts are expected to be similar to that characterized for the same activity under RMP 3E.

#### **Temporary Relocation of Utilities**

Impacts are expected to be similar to that characterized for the same activity under RMP 3E.

### **Phase 2**

#### **Redevelop Staging Areas**

Impacts are expected to be similar to that characterized for the same activity under RMP 3E.

#### **Batch Plants and Haul Routes**

Impacts are expected to be similar to that characterized for the same activity under RMP 3E. Batch plants and haul routes would be cleared and grubbed as described in section 3.7.3. Areas would be leveled as necessary with excess material used temporarily as berms to prevent runoff or to protect from inundation during construction. Following completion of construction, the batch plants would be dismantled and the area re-graded and hydroseeded. The batch plants would be temporary during construction and would not impair implementation of or physically interfere with an adopted emergency response plan or emergency evacuation plan, expose people or structures to a significant risk of loss, injury, or death involving fires, water-related injury or death, or infectious diseases. The impact is expected to be less than significant.

#### **Remove Topsoil from Downstream Face of Dam**

A two (2) ft. thick layer of topsoil would be removed from the downstream slopes of the three embankments of the Dam. The topsoil would be stockpiled in either the Golf Course or Streamland Park during the placement of the Roller compacted concrete (RCC). An additional 10 ft. thick layer of material would be removed from the downstream slopes of the three embankments of the Dam. This excavated material would be transported to the batch plants (via the concept haul road locations shown in Figure 3.7-3) and utilized in the mix of the RCC. The construction site would maintain access for emergency vehicles and would not interfere with evacuation routes. Public access to construction/staging areas would be limited (e.g., through fencing or other means) in order to minimize risk of loss, injury, or death to the general public. OSHA/Corps Safety requirements, including working in or near water would be maintained, as necessary, onsite (Safety and Health Requirements, EM 385-1-1). Fire control measures would

be implemented. The stockpiling of this topsoil would occur on Project land and would not impair implementation of or physically interfere with an adopted emergency response plan or emergency evacuation plan, expose people or structures to a significant risk of loss, injury, or death involving fires, water-related injury or death, or infectious diseases. The stockpiling of this topsoil would be a direct, temporary, and less than significant impact. No indirect effects are anticipated.

#### **Roller Compacted Concrete**

Impacts similar to “Remove Topsoil from Downstream Face of Dam,” described above for RMP 5.

#### **Replace Topsoil**

Impacts similar to “Remove Topsoil from Downstream Face of Dam,” described above for RMP 5.

#### **Road Modification/Parapet Wall**

Lincoln Ave. would be raised at the Dam crest approximately five (5)-ft. to match the elevation of the parapet wall to be built from Lincoln Ave. to the Montebello Hill area. Fill material would come from excess fill material removed from the downstream face of the Dam for the placement of the RCC. The parapet wall would also be five (5)-ft. high. The parapet wall and raising Lincoln Ave. would prevent over topping so flood water does not go around the Dam crest. The construction site would maintain access for emergency vehicles and would not interfere with evacuation routes. Public access to construction/staging areas would be limited (e.g., through fencing or other means) in order to minimize risk of loss, injury, or death to the general public. OSHA/Corps Safety requirements, including working in or near water would be maintained, as necessary, onsite (Safety and Health Requirements, EM 385-1-1). Fire control measures would be implemented.

These two actions would not impair implementation of or physically interfere with an adopted emergency response plan or emergency evacuation plan, expose people or structures to a significant risk of loss, injury, or death involving fires, water-related injury or death, or infectious diseases. The impact would direct, permanent, and be less than significant.

#### **Trench Drain and Filter Blanket**

Impacts are expected to be similar to that characterized for the same activity under RMP 3E.

#### **Closeout**

Impacts are expected to be similar to that characterized for the same activity under RMP 3E.

#### **Regular/Recurring Operations and Maintenance**

Impacts are expected to be similar to that characterized for the same activity under RMP 1.

### **5.14.4 Environmental Commitments**

**Environmental Commitments (ECs) PHS-1 through PHS-5** would be implemented to minimize impacts to recreation construction.

For all alternatives, these environmental commitments may include, but may not be limited to, the following:

**PHS-1** Preparation of a *Public Safety Management Plan* to maintain public health and safety during all phases of construction. Components of the plan may include, but may not be limited to:

- Notifying the public of the location and duration of construction activities, closing pedestrian and bicycle paths and trails, and restricting other impacted recreation;
- Coordinating with the public and local jurisdictions to minimize impacts and plan contingencies for maintaining emergency response, emergency evacuation plans and capacity of emergency services during construction;
- Posting signs locating construction sites and warning of the presence of construction equipment;
- Fencing construction staging areas; and
- Providing temporary walkways (with appropriate markings, barriers, and signs to safely separate pedestrians from vehicular traffic) and posting detour signs where a sidewalk or pedestrian or bicycle path or trail would be closed during construction.

**PHS-2** Construction employees shall strictly limit their activities, vehicles, equipment, and construction materials to the proposed footprint and designated staging areas and routes of travel. The construction area(s) shall be the minimal area necessary to complete the project and shall be specified in the construction plans. All people on site shall be instructed that their activities are restricted to the construction areas.

**PHS-3** Contractor shall not allow ponding or puddles of standing water to remain within the construction area that would be subject to mosquito breeding.

**PHS-4** All work and staging areas will be clearly marked and appropriately guarded to ensure public safety.

**PHS-5** The construction contractor will develop a fire prevention and response plan appropriate for the use of heavy equipment in a high fire hazard area prior to the initiation of construction.

## **5.15 PUBLIC SERVICES**

The areas that could potentially be affected by the proposed RMPs include the Project area and the four communities of South El Monte, Montebello, Pico Rivera, and the City of Industry, which are immediately adjacent to the Project. Public services considerations also exist for the communities downstream of Whittier Narrows Dam at risk from the consequences of Dam failure through dam breach.

### **5.15.1 Regulatory Framework**

There are no relevant Federal laws or regulations for public services.

### **5.15.2 Thresholds of Significance**

A potentially significant impact may occur to public services if a risk management plan would result in:

- A need for additional government services related to police, fire protection, schools, parks, libraries, or other public facilities.

### **5.15.3 RMP Analysis and Comparison**

#### **5.15.3.1 RMP 1: No Action**

RMP 1 is described in Chapter 3, section 3.7.1. Construction activities are reasonably foreseeable under this alternative due to the necessity to restore the dam crest to its original elevation. With or without the implementation of either action RMP or the crest elevation restoration, the Corps would continue O&M activities and would continue to implement IRRMs to address PFMs.

Expected general population growth could impact some aspects of the watershed area, such as traffic, demand for housing, increase in recreation resource use, and increased demand for utilities and public services.

#### **IRRM**s

O&M activities undertaken under the No Action alternative also include the IRRMs. Implementation of IRRMs that have and would be implemented (Repair Spillway Gates, Remote Monitoring, Inspection and Monitoring, Pre-position of Materials, Relief Well Repair, Annual Coordination, Emergency Action Plan Update, and Flood Mapping) would not create a direct need for additional government services related to police, fire protection, schools, parks, libraries, or other public facilities. Indirect impacts could entail a need for additional emergency services or reallocation of existing services due to Emergency Action Plan planning and coordination activities. Indirect impacts are expected to be temporary and less than significant.

#### **Crest Elevation Restoration**

Under the No Action Alternative, restoration of the Dam's crest elevation to its original design elevation is reasonably foreseeable in the next 50 years. If pursued, it would be subject to separate detailed analysis under NEPA at that time. Crest elevation restoration is expected to involve the use of a borrow area and batch plants and haul routes within the Reservoir and a restoration of the crest of the Dam. The construction site is expected to maintain access for emergency vehicles and would not interfere with evacuation routes. Public access to construction/staging areas would be limited (e.g., through fencing or other means) in order to minimize risk of loss, injury, or death to the general public. OSHA/Corps Safety requirements, including working in or near water would be maintained, as necessary, onsite (Safety and Health Requirements, EM 385-1-1). Fire control measures would be implemented.

None of these construction activities directly create a need for additional government services related to police, fire protection, schools, parks, libraries or other public facilities as these actions would not induce new population and housing growth in the immediate area. No direct or indirect impacts to public safety are anticipated.

### **Regular/Recurring Operations and Maintenance**

Under the No Action Alternative, O&M activities are anticipated to continue as currently implemented. Regular and recurring O&M activities include mechanical and electrical repair of the gates, vegetation management on the Dam and its appurtenant structures, including the downstream slope of the embankment, and mowing of vegetation upstream in the operations area immediately adjacent to the central embankment, removal of debris and sediment that accumulates at the upstream concrete apron of the outlet on the Rio Hondo and other structures, graffiti removal, and cleaning the relief wells. Other maintenance that is performed as needed includes repair of the concrete crossover weir, levee repair, filling pot-holes on the Dam crest road, and repairing gates and fences.

Continued O&M under the No Action Alternative would not create a need for additional government services related to police, fire protection, schools, parks, libraries, or other public facilities area. O&M would occur within the Project area. Most if not all O&M would be performed by the Corps and would not induce population growth that would create the need for additional services. No direct or indirect impacts to public services is anticipated.

### **5.15.3.2 RMP 3E: Labyrinth Auxiliary Spillway and Seepage Control**

RMP 3E is described in Chapter 3, section 3.7.2. Under this RMP, overtopping is addressed through adding spillway capacity and backward erosion piping is addressed through construction of a trench drain at the downstream Dam toe and graded filter blanket adjacent to Rosemead Blvd.

### **IRRM**

Impacts are expected to be similar to those described under RMP 1: No Action.

### **Phases 1 & 2**

#### **Construction Activities**

Phases 1 and 2 of RMP 3E are construction components of the overall plan to address 2 identified PFMs at Whittier Narrows Dam. Overtopping is addressed an auxiliary labyrinth spillway with access and runout channels, crest raise through use of 12 ft. high parapet walls, raising the road bed elevations, construction of a coffer dam, and the use of borrow areas within the Reservoir. Backward erosion piping is addressed through construction of a trench drain at the downstream Dam toe and graded filter blanket adjacent to Rosemead Blvd. Phase 1 of construction would include development of staging areas and temporary relocation of utilities. Phase 2 includes construction of components described above, and development of batch plants and haul routes to facilitate construction. The construction site would maintain access for emergency vehicles and would not interfere with evacuation routes. Public access to construction/staging areas would be limited (e.g., through fencing or other means) in order to



minimize risk of loss, injury, or death to the general public. OSHA/Corps Safety requirements, including working in or near water would be maintained, as necessary, onsite (Safety and Health Requirements, EM 385-1-1). Fire control measures would be implemented.

None of these construction activities directly create a need for additional government services related to police, fire protection, schools, parks, libraries or other public facilities as these actions would not induce new population and housing growth in the immediate area. No direct impacts are anticipated.

The construction of the parapet walls on top of the Dam crest would raise the elevation of the Dam crest from 239.0 ft. to 251.0 ft. Water impoundment upstream of the Dam could be increased to this higher elevation under extreme precipitation events (e.g., a very rare flood with an annual chance of exceedance of less than 1 in 1,000). Elevation 251.0 ft. would also expand the upstream water inundation boundary beyond the current upstream, probable maximum flood line. A 250-ft. wide passive weir auxiliary spillway would be constructed in-line with the existing embankment and immediately west of the existing spillway to increase the spillway capacity. A passive weir spillway is a means to increase spillway capacity so as to prevent failure of the dam due to overtopping during extreme storms, this would result in an earlier increase of flow into the San Gabriel River over existing conditions. During this event (e.g., a very rare flood with an annual chance of exceedance of less than 1 in 1,000), the San Gabriel River will have likely already topped its banks, and the increase release in water from behind the Dam is not expected to significantly add to downstream inundation. Rather, the auxiliary spillway is proposed as a means of increasing spillway capacity to reduce the risk of Dam failure through Dam breach. These components of RMP 3E could result in the need to reallocate emergency services including police and fire protection to these areas during an extreme precipitation event, but are not expected to create a need for additional government services related to police, fire protection, schools, parks, libraries or other public facilities as these actions would not induce new population and housing growth in the immediate area. Indirect effects are expected to be temporary and less than significant.

#### **Regular/Recurring Operations and Maintenance**

Impacts similar to those described for the same activity under RMP 1.

##### **5.15.3.3 RMP 5: Protected Overtopping with Seepage Control**

RMP 5 is described in Chapter 3, section 3.7.3. Under this RMP, overtopping is addressed through hardening of the Dam crest to prevent erosion or subsequent failure of the Dam from events large enough to cause overtopping. Backward erosion piping is addressed through construction of a trench drain at the downstream Dam toe and graded filter blanket adjacent to Rosemead Blvd.

#### **IRRM**

Impacts are expected to be similar to those described under RMP 1: No Action.

## **Phases 1 and 2**

### **Construction Activities**

Phases 1 and 2 of RMP 5 are construction components of the overall plan to address 2 identified PFMs at Whittier Narrows Dam. Overtopping is addressed through Roller compacted concrete on the face of the dam, as described previously. Backward erosion piping is addressed through construction of a trench drain at the downstream Dam toe and graded filter blanket adjacent to Rosemead Blvd. Phase 1 of construction would include development of staging areas and temporary relocation of utilities. Phase 2 includes construction of components described above, and development of batch plants and haul routes to facilitate construction. The construction site would maintain access for emergency vehicles and would not interfere with evacuation routes. Public access to construction/staging areas would be limited (e.g., through fencing or other means) in order to minimize risk of loss, injury, or death to the general public. OSHA/Corps Safety requirements, including working in or near water would be maintained, as necessary, onsite (Safety and Health Requirements, EM 385-1-1). Fire control measures would be implemented.

None of these construction activities directly create a need for additional government services related to police, fire protection, schools, parks, libraries or other public facilities as these actions would not induce new population and housing growth in the immediate area. No direct or indirect impacts are anticipated.

No direct or indirect impacts are anticipated.

### **Regular/Recurring Operations and Maintenance**

Impacts similar to those described for the same activity under RMP 1.

#### **5.15.4 Environmental Commitments**

Environmental Commitments (ECs) PHS-1 through PHS-5 would be implemented to minimize impacts to Public Services.

For all alternatives, these environmental commitments may include, but may not be limited to, the following:

- PS-1** All contractors shall prepare and implement an *Accident Prevention Plan* per EM 385-1-1 to be approved by the Corps' Safety Office prior to start of construction activities. At a minimum the plan would include:
  - Designated heavy equipment traffic circulation route plans;
  - Emergency evacuation routes
  - Most direct route to a hospital and safe air ambulance landing zone;
  - Name of the Site Safety Officer; and
  - Documentation that all workers have reviewed and signed the plan.
- PS-2** Prior to construction activities, the Contractor shall notify relevant fire and police of traffic management methods to be used to ensure access at all times.

- PS-3** A Communication Plan shall be developed by the Corps' Public Affairs Office (PAO) and implemented during all construction activities. The Communication Plan shall describe how local authorities shall be notified of public safety concerns, incidents, and emergencies.

## **CHAPTER 6 CUMULATIVE IMPACTS, IRREVERSIBLE AND IRRETRIEVABLE ENVIRONMENTAL COMMITMENT OF RESOURCES, RELATIONSHIP BETWEEN LOCAL SHORT-TERM USES OF THE ENVIRONMENT AND MAINTENANCE AND ENHANCEMENT OF LONG-TERM PRODUCTIVITY**

### **6.1 Cumulative Impacts**

The CEQA guidelines and the regulations implementing NEPA require that the cumulative effect of a proposed action be assessed (14 CCR Section 15130; 40 C.F.R. Parts 1500-1508). A cumulative effect is an “impact on the environment which results from the incremental impact of the action when added to other past, present, and reasonably foreseeable future actions” (40 C.F.R. § 1508.7). In addition, they are defined as “two or more individual effects, which, when considered together, are considerable or which compound or increase other environmental impacts” (CEQA Guidelines Sec. 15355). Cumulative effects can result from individually minor but collectively significant actions taking place over time (40 C.F.R. § 1508.7). CEQ’s guidance for considering cumulative effects states that NEPA documents “should compare the cumulative effects of multiple actions with appropriate national, regional, state, or community goals to determine whether the total effect is significant”. The following sections discuss local and regional growth trends and projects that may result in cumulative effects when combined with effects from the actions discussed above.

In general, past, present, and reasonably foreseeable future projects are assessed by resource area. Cumulative effects may arise from single or multiple actions and may result in additive or interactive effects. Interactive effects may be countervailing, where the adverse cumulative effect is less than the sum of the individual effects, or synergistic, where the net adverse cumulative effect is greater than the sum of the individual effects. The factors considered in determining the significance of cumulative effects are similar to those presented for each resource earlier in Chapter 5. An integral part of the cumulative effects analysis involves determining whether effects from the project would contribute to ongoing or foreseeable resource trends. Where effects from the project contribute to regional resource trends, there is a potential for a cumulative effect. The cumulative effects analysis does not assess all expected environmental impacts from regional projects but only those resulting from the project and other past, present, and reasonably foreseeable future actions.

The timeframe for analysis of cumulative effects can be described as the reasonable and foreseeable estimate for implementation of cumulative projects, in addition to the proposed action. For purpose of this analysis and discussion of existing, ongoing, or planned projects, this timeframe would extend from the present to approximately 2070.

### 6.1.1 Past Development

Past development focuses on the area in and surrounding the Whittier Narrows Project including the communities of El Monte, Montebello, and Pico Rivera which in some way have influenced the construction the Dam and development in and around the Reservoir. This includes the urban and cultural development of the area with remnants that remain in the Reservoir today.

#### Pre Dam Development

The area in and around the San Gabriel Blvd. and Durfee Ave. area has been traditionally called *La Misión Vieja* or Old Mission. This was assumed to be the original site of the Mission San Gabriel, just a short distance southwest, on the west bank of the Rio Hondo. The Old Mission area remained mission property until “secularization” enacted by the Mexican government in the 1830s shut down the missions. This freed up former mission land for private land grants, including several in the *Misión Vieja* area like Rancho La Merced, Rancho Potrero Chico, Rancho Potrero Grande, and Rancho Potrero de Felipe Lugo (Medina).

The American conquest of Mexican Alta California, the ensuing Gold Rush, and the arrival of increasing numbers of Americans and Europeans, marked the late 1840s and 1850s. When Casilda Soto de Lobo, a rare female owner of a rancho borrowed money from new arrival William Workman of Rancho La Puente and couldn't repay the \$2,000, Workman foreclosed on her ranch in 1850. Workman, in turn, turned the ranch over to his daughter and son-in-law, Antonia Margarita Workman de Temple and F.P.F. Temple. Cattle ranching was the lifeblood of the regional economy, until the decline of the Gold Rush, a national depression in 1857 and flood and drought in the first half of the 1860s led to a shift to agriculture (Medina).

*Misión Vieja* became a farming community amid the rich soil fed by the river. Some of the land in the *Misión Vieja* area remained in early family hands because of transfers of property to Antonia Margarita Workman de Temple. A little under 133 acres was given by Mrs. Temple to her son, John H. Temple in 1876. John Temple planted walnuts on the ranch and built a home, which he occupied for about a dozen years. There are a couple of old walnut trees still on the property. The 133 acre ranch wound up becoming part of the Whittier Narrows Nature Center (Reid).



**Photo 6.1-1 A walnut tree in the nature center** (Photo by Paul Spitzer)

#### El Monte

El Monte is one of the oldest towns in Los Angeles County. The Santa Fe Trail was extended to El Monte as of 1821 from Kansas City, Missouri. In 1888, El Monte's first crop of walnut trees were planted. El Monte soon grew to become the walnut-growing capital of the world. In the

early 20th century, dairy, fruit, hay, vegetable, walnuts, and truck farms dominated El Monte's economy (Town Square Publications).

Fruit orchards and walnut groves thrived in the low-lying marshlands. El Monte was finally incorporated as a municipality in 1912. By 1915 desperate Mexican families fleeing revolutionary turmoil and poverty began to trickle north, looking for job opportunities in the lush oasis of the San Gabriel Valley. They set up tents on 22 acres of a tree-shaded site that stretched along the Rio Hondo. By about 1921, the encampment, often called "River Camp," began to be known as Hick's Camp, one of most famous barrios in Los Angeles County. The Río Hondo ran along the eastern side of the barrio (Medina).



**Photo 6.1-2 Relaxation in the Río Hondo, Hick's Camp, 1930s**

Source-La Historia Historical Society Museum

By the 1930s, the Great Depression brought change to the community. Large groves and orchards were subdivided into home sites of one acre or less, transforming El Monte to a bedroom community from which residents commuted elsewhere.

### **City of Pico Rivera**

The City of Pico Rivera traces its beginning to the 1870's when the Atchison, Topeka and Santa Fe and the Union Pacific railroads completed rail lines through the area. Newly arrived farmers planted large groves of citrus, avocado and walnut trees in the fertile land between the Rio Hondo and San Gabriel River. Eventually, two communities, Pico and Rivera, were established in the area and over the first four decades of the 20th century these two country towns grew slowly in a rustic agricultural setting.

The end of World War II resulted in a sudden demand for housing, attracting land developers to southern California and the San Gabriel Valley. During the 1950's, large parcels of farm land were purchased and cleared to be replaced by tract homes, schools and churches. Commercial and industrial enterprises were also established in the surrounding areas. By the mid-1950's, leaders from both communities started to voice strong support for incorporation. In an election held January 7, 1958, 56 percent of the voters favored incorporation, approving a Council-Manager form of local government, confirming the name "Pico Rivera" for the new city and

electing five citizens from a field of 24 candidates to serve as members of the first City Council, thereby creating the 61st city in Los Angeles County (City of Pico Rivera).

### **City of Montebello**

From 1,200 acres of farm land, Montebello had its beginning in 1899. The original town site of forty acres was bounded by First Street on the east, Fifth Street on the west, Cleveland on the north, and Los Angeles Avenue on the south. Originally an agricultural community, Montebello boasted having the ideal climate, productive soil, and an abundance of water. From the turn of the century and through the 1920's, the area was famed for its production of flowers, vegetables, berries, and fruits (City of Montebello).

### **Temple School**

F.P.F. Temple provided an acre of land for a school in the newly formed La Puente School District in the 1860s, which was given that name although it was a few miles west of the Rancho La Puente, co-owned by William Workman. A frame school house was built to serve the children of the small, rural district, which did not grow all that much in succeeding decades.

The school was renamed for Walter Temple in 1921 after he donated land and money for a new building and a flagpole for the site. The “new” Temple School was built next to the old La Puente School and remained in operation for many years (Spitzzeri).



**Photo 6.1-3 The Temple School** (Photo: LA Public Library)

After the district and school were found to be within a major floodplain, the school was closed. The old school buildings are currently used by the Corps as its operation and maintenance facility for the Los Angeles District.

### **Marrano Beach**

Marrano Beach unfolded on a swath of marsh land in the Whittier Narrows along the Rio Hondo. It was miles from the sea, but its history as an inclusive recreational destination popular with local Mexican American communities throughout the twentieth century.



The origin of Marrano Beach can be traced to the early *barrios*, or neighborhoods, that arose around the original San Gabriel Mission in the late 1700s. Adobe homes of a Mexican village known as *La Mision Vieja* arose on mission land in the floodplain between the San Gabriel River and Rio Hondo. The *barrio* became one of several communities established in the Narrows, housing laborers tending to the region's crops that were regularly enriched by river sediment.

Within a few decades, neighborhoods near *La Mision Vieja* came to include *La Mision*, *Canta Ranas*, and *El Rancho de Don Daniel*. Marrano Beach was born on the riverfront property of *El Rancho de Don Daniel*, a Mexican land grant from the nineteenth century that had belonged the Repetto-Alvarado family, a prominent family of California land owners. *El Rancho de Don Daniel* encompassed riparian wetlands and ponds surrounding the Rio Hondo, which flowed year-round, and the seasonal Mission Creek. With few opportunities for respite after toiling in the fields, residents of the *barrios* cultivated recreational lifestyles around this section of the river and embraced it as a bucolic resource for community and family activities.

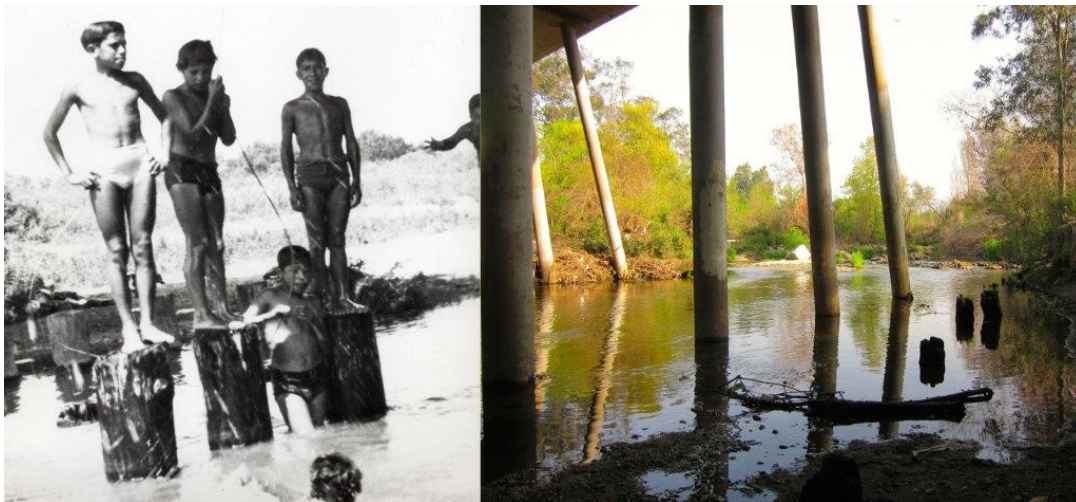


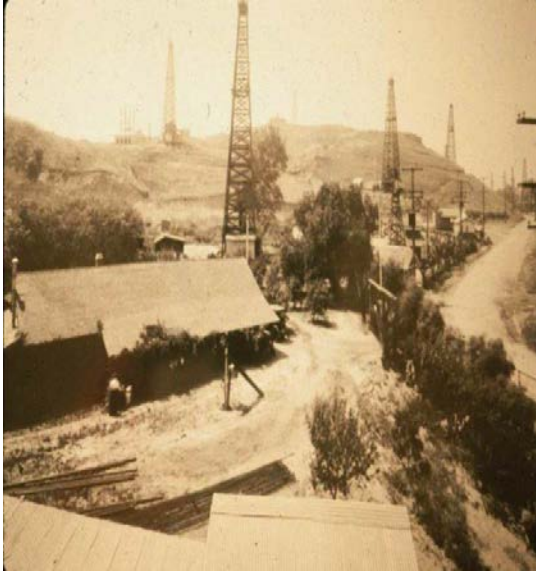
Photo 6.1-4 (L) El Monte youth using the Rio Hondo as a recreational space | Photo: La Historia Historical Society. (R) Marrano Beach today under the San Gabriel Blvd. bridge | Photo: Daniel Medina

In the twentieth century, the profile of *El Rancho de Don Daniel* transformed from a pastoral space of leisure to a symbol of active cultural identity in an era of segregation. By serving as an alternative space of recreation for Mexican Americans affected by policies of racial discrimination applied at recreational zones in Los Angeles, the beach became a place to enforce their cultural claims to the land. By the 1920s, the city and county of L.A. purchased beaches within its borders to ensure white-ownership of seaside properties, protecting one of the city's most prized recreational and tourist assets from the perceived menace of racial intermingling.

In response, Mexican Americans in the San Gabriel Valley devised their own "beach." It was during this era in the 1930s that *El Rancho de Don Daniel* also came to be known as Marrano Beach (Reid).

### Montebello Oil Field

The discovery of oil on the Anita Baldwin property brought Standard Oil Company to start drilling on the Baldwin lease towards the end of 1917. By 1920, Montebello oil fields were producing one-eighth of California's crude oil. Wells were also drilled on what is now the floor of the Reservoir south of San Gabriel Blvd. Following the completion of the Corps' and LACDPW feasibility study for water supply (water conservation) at Whittier Narrows and Santa Fe Dam Reservoirs in 1999, the LACDPW bought out the existing oil leases in the Reservoir, shut them down, and removed the derricks. Underground pipelines still remain however.



**Photo 6.1-5 Basye Adobe**

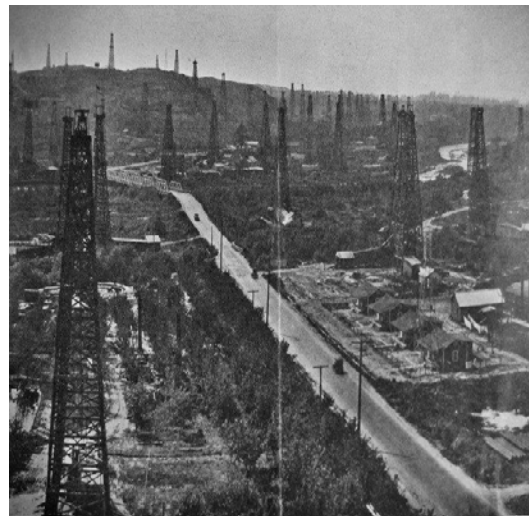
This 1920s photo shows the Basye Adobe, which the Temple family lived in from 1912 to 1917 and which then became Standard Oil Company of California's Temple lease headquarters. The oil wells in the photo are on the lease. At the right is San Gabriel Boulevard heading northwest.

<https://homesteadmuseum.wordpress.com/2017/06/25/drilling-for...>

**Photo 6.1-6 Misión Vieja View**

This detail from a fold-out panoramic image found in a 1921 state oil and gas report shows the Misión Vieja area from atop an oil derrick. The road running through the center is San Gabriel Boulevard heading west from Durfee Avenue and crosses over a new (at the time) bridge over the Rio Hondo (part of which is at the upper right.)

<https://homesteadmuseum.wordpress.com/2016/10/29/sharing-the-history->



### Rose Hills Memorial Park

Rose Hills Memorial Park dubbed "the people's cemetery," has a long, rich history stretching back to 1914. Rose Hills Memorial Park spans 1,400 acres, making it the largest cemetery in

North America and largest memorial park in the world. At its largest, the park once spanned nearly 2,500 acres of the Puente Hills to the east of the Dam.

**Rosemead Airport** was built sometime between 1941 and 1942. This was also the first home of the Goodyear blimp when it was brought to California in the early 1950s. The blimp was based here for approximately six months before it moved to its permanent home in Culver City.

The airport was closed around 1962 coinciding with the sale of Fletcher Aviation to AJ Industries. By 1964, the buildings were bulldozed and the property west of the airport was sold to AeroJet Corporation.

### **Ford Pico Rivera Plant**

The 157-acre Ford Pico Rivera Plant, operated from 1957 until it closed in February 1980. It produced a total of 1,419,498 automobiles. In 1982 the complex was purchased by Northrop Grumman, who developed much of the early design, manufacturing and support phases for the B-2 program at this site. The site was closed and demolished in 2001 (City of Pico Rivera).

### **Dam Construction**

A dam at Whittier Narrows was first proposed by the City of Long Beach in 1920, as a means to secure a city water supply independent from Los Angeles. When that need became mooted by the proposal for what became Hoover Dam, the proposed dam at Whittier Narrows fell under broader plans by the Los Angeles County Flood Control District, an agency tasked with managing a total-basin scheme for river diversion, harbor protection, and flood control.

Plans for the dam were in limbo until 1936 when, as part of the New Deal, Congress passed the Flood Control Act, turning oversight of flood control on all rivers to the U.S. Army Corps of Engineers. The Corps included the Whittier Narrows Dam in a 1938 plan to redevelop the San Gabriel River, which gained higher priority following a devastating flood in March of that year. The plan would see a dam at Whittier Narrows with a flood control basin and recharge gallery directly above it. This meant that sudden rainfall would be controlled in a reservoir created by the dam, where it would slowly percolate into the underground aquifer.

The problem was that the site of the proposed project was home to thousands of people, several school districts, a number of farms, railroad tracks, oil wells, and an Audubon Society bird sanctuary (the precursor to today's Whittier Narrows Nature Center). In spite of the opposition, plans went ahead, and were only detained when Jerry Voorhis blocked Congress from appropriating funds to build the dam in 1946. He proposed an alternative dam a mile downstream, which the Corps rejected as too expensive.

The stalemate dragged on until 1947, when Congressman Richard Nixon -- who had replaced Voorhis in 1946 -- stepped in and convinced the Corps to construct Voorhis's "Plan B" -- the dam a mile further downstream. Last ditch efforts to block the dam, led by San Gabriel Valley irrigation companies, failed, and construction began in 1950 -- some twenty years after the dam was first proposed. Yet the compromise still displaced more than 2,000 people and 560 homes, including much of the Temple School District's population.

Construction of the Whittier Narrows Dam was completed in 1957. Continued use by agricultural interests of much of the Reservoir created by the Dam continued to be worked through the mid-1970s. Several agricultural areas remain today, including strawberry fields at the northeast corner of Durfee Ave. and Rosemead Blvd.

### **Water Conservation and Approved Modifications to Operations**

Conserving water in Los Angeles County has been part of the LACDPW's mission since the Los Angeles County Flood Control District was created by an act of the California legislature in 1915. To aid in the capture and conservation of storm runoff, a small amount of reservoir storage can be managed in coordination with LACDPW for water conservation with no reduction in the Project's flood risk management capability. Minor flows that are natural or part of local water conservation operations pass through the dam unimpeded. In the rainy season, on the receding limb of the hydrograph and when deemed feasible by the Corps, impoundments up to elevation 201.6 ft (NGVD, 29) are retained for release at a rate that LACDPW can capture in its facilities downstream for groundwater recharge. If a storm is forecast or for any other reason, the District can cease water conservation operations and vacate the reservoir in a couple of hours, making that space again available for flood risk management.

This method of cooperative operation for water conservation was first granted by Memorandum from Chief of Engineers to Division Engineer, (11 May 1959) 2<sup>nd</sup> endorsement dated June 9, 1959. The 1,000 acre-foot water conservation pool corresponded to an elevation of 195.5 ft. Subsequently, after a severe short-term drought in 1976-77, the pool was expanded to 2,500 acre-feet (elevation 201.6 ft) by Memorandum from South Pacific Division (SPD) to the Los Angeles District Engineer, (24 Aug 77) 3<sup>rd</sup> Endorsement, February 16, 1978.

When inclement weather is forecast, the Reservoir is drawn down to make space for the anticipated inflow, ensuring there is adequate space available for flood risk management operations. Water released from the Project into the Rio Hondo concrete channel is ultimately carried downstream to the Pacific Ocean.

### **Whittier Narrows Water Reclamation Plant**

The Whittier Narrows WRP was the first reclamation plant built by the Sanitation Districts in 1962 on 27 acres. The original purpose of the plant was to demonstrate large scale water reclamation. It provides primary, secondary and tertiary treatment for 15 million gallons of wastewater per day. The plant serves a population of approximately 150,000 people. All of the reclaimed water is reused at the plant, at the Upper San Gabriel Valley Municipal Water District, and as groundwater recharge into the Rio Hondo and San Gabriel Coastal Spreading Grounds.

### **Recreation**

Following construction of the Dam, the Corps and the LACDP&R entered into a lease which was supplemented several times with additional amenity development throughout the Reservoir, many cost-shared under the authority of the "Code 710 Program." These recreation developments include the Visitor's Center, Model Hobby Area, Area B recreation area, San Gabriel River Trail, LARio Trail, and other amenities. Other recreation amenities include the Whittier Narrows Golf Course, tennis courts, ball fields, archery range, and picnic areas. The

Nature Area was originally operated by the Audubon Society, until operation was assumed by LACDP&R in the 1970s.

### **Recreation Lakes**

The Pomona Freeway (SR-60) was constructed in 1966, the length through the Reservoir being elevated with soil from a borrow pit just to the south of the freeway route, which eventually became North Lake in the Recreation Area outgranted to LACDP&R. Following creation of the “pit,” over 190 species of migratory birds were documented around the lake through the early 1970s. The two southern-most lakes, Center Lake and Legg Lake, were constructed as recreation oriented lakes. Because the borrow pit developed naturally into a wildlife refuge, birders from the Audubon Society, Sierra Club, and Southern Council of Conservation Clubs opposed North Lake being turned into a recreation oriented lake. To resolve the impasse, the Corps and LACDP&R developed a plan that would turn existing rhubarb fields adjacent to the Nature Area into a series of lakes and natural habitat.

A 150-acre parcel was added to the Nature Area south of Durfee Ave. and east of Rosemead Blvd. A 20-acre lake, a 2-acre pond, and a 3-acre pond were excavated with five (5) nesting islands developed on 70 acres of the 150 acre additional land outgranted to LACDP&R. Excavated material from the lake and ponds was used to create protective berms around the lakes to reduce visual and noise impacts from nearby traffic. In just over two years, over 130 different species of birds were observed in the expanded Nature Area. 90 species of plants were documented in the area, but only 21 species had been purposely planted.

### **Bicentennial Park**

Bicentennial Park was developed by the City of Pico Rivera and the Corps as a recreational vehicle (RV) camping park in the 1970s. With the advent of larger RVs and motor homes, the camping spaces as originally designed no longer accommodate these vehicles. As a result, the area has been closed and has been allowed to become overgrown with minimal maintenance by the City of Pico Rivera. The City of Pico Rivera is considering several options for the area including revamping the area as a camping/RV park with expanded picnic areas in conjunction with the adjacent Sports Arena. New recreation developments would require Corps approval.

### **Pico Rivera Memorial Sports Arena**

The Pico Rivera Memorial Sports Arena was built in 1979 and is reputed to be the largest Mexican rodeo ring in the country. An average of 25 shows, preceded by a traditional Mexican rodeo, are held at the Sports Arena every year. It is used for rodeos, professional wrestling and boxing. Famous for its Mexican rodeos (chareadas) and Latin entertainment, the Pico Rivera Sports Arena is a popular recreation spot. As a concert venue, the Pico Rivera Sports Arena can seat up to 6,250.

### **Pico Rivera Municipal Golf Course**

Designed by William F. Bell, the Pico Rivera Golf Course opened in 1968.

The executive nine-hole course plays to a par 29 and measures 1,504 yards. The practice facilities include two putting greens and driving range. Lighting throughout the golf course and driving range enables play and practice until 10:00 p.m.

William F. Bell was the son of William P. Bell. During World War II, William P. Bell was a turf consultant to the U.S. Army Corps of Engineers. After the war, he was joined by his son William F. in the family design business. William P. Bell is known for designing the La Jolla Country Club, both courses at Brookside Golf Club in Pasadena, and the San Diego Country Club. William F. created an impressive number of southern California's best-known layouts, including the Sandpiper and Industry Hills golf clubs, as well as the Bermuda Dunes Country Club.

### **Streamland Park**

The City of Pico Rivera once maintained an amusement park also called Streamland Park on the west side of Rosemead Blvd., downstream of the Dam. The amusement park is said to have operated during the Depression, with many stories on the internet from people now grown who regularly went to the amusement park. For the children it contained a pony ride, an old fashioned Merry-Go-Round, boat ride, airplanes, and other kiddie rides. There was a railway, nearly a mile long ride powered by one of the largest miniature steam locomotives in the country.

Streamland Park was comprised of over fifty acres of rolling wooded land with a large athletic field and dancing facilities. It is said that a good sized stream flowed through the entire length of the park. This stream was supplied from springs to the north and flowed continuously throughout the year. The stream had a sandy bottom and during the summer months it is filled with young and old, enjoying its refreshing coolness and fishing for trout.

The park existed into the 1960s. In 1980, Streamland's 37-acre dry riverbed was replaced by 227 new homes.



**Photo 6.1-7 Streamland Amusement Park, circa 1965** (Photos: DWP)

### **6.1.2 Present**

#### **Whittier Narrows Operable Unit**

The Whittier Narrows Operable Unit (WNOU) is a ground water treatment system whereby contaminated water is pumped up through local wells and piped to the WNOU where the water



is treated and sold to the original purveyor, the City of Whittier. With the expiration of the 10-year operation outgrant to EPA in 2013, the WNOU was transferred to the California Department of Toxic Substances Control. The San Gabriel Valley Water Company became the new water purveyor when additional tanks for treatment were completed in 2014.

### **Southern California Edison (SCE) Tehachapi Renewable Transmission Project (TRTP)**

The Southern California Edison (SCE) Tehachapi Renewable Transmission Project (TRTP) was implemented during 2013 and 2014 with the expansion of its existing easement and improvements including the removal of existing 220 kV transmission lines in existing right-of-way (ROW), replacement of existing lines with 500 kV transmission lines, and relocation of existing 66 kV sub-transmission structures to accommodate the new 500 kV transmission lines.

## **6.1.3 Future**

### **Water Conservation**

The local sponsor, LACDPW has expressed interest in re-analysis with a preferred lower elevation in order to reduce potential infrastructure and environmental resource impacts. Since water conservation is not permitted unless the Dam's DSAC rating is at least a DSAC 4, any approved change in elevation cannot be implemented until the DSAC rating of 4 is achieved following remedial actions.

### **San Gabriel River Discovery Center**

The proposed San Gabriel River Discovery Center is being planned to replace the existing Whittier Narrows Nature Center. The Discovery Center will present the story of the San Gabriel River watershed, emphasize the importance of water resources and the natural values of the watershed, and provide educational and outdoor experiences for people of all ages.

### **Emerald Necklace**

The proposed Emerald Necklace is a 17-mile long network of existing and future parks, greenways, and trails located along the Rio Hondo and San Gabriel River between Peck Road Water Conservation Park to the north and Whittier Narrows Recreation Area to the south. This planning project has identified a series of proposed trail and greening projects which would provide a continuous, looped network of bike paths and multi-use trails while providing improved connections to communities within and adjacent to the San Gabriel Valley.

### **LACDP&R Equestrian Center**

The LACDP&R has prepared a proposal to rehabilitate its equestrian center in the southeastern corner of the Reservoir by adding stables, parking and exercise rings.

### **Montebello Hills Community**

The Montebello Hills, once a high-producing oil field for Standard Oil, is in a secondary-recovery stage. Years of drilling relieved pressure in the ground so the oil doesn't come up as fast as it did during the field's heyday in the 1930s. Future plans for the Montebello Hills Community to be developed on the west side of the Montebello Hills would include approximately 1,200 luxury homes with retail centers, parks, and trails. The eastern side of the



Montebello Hills would be preserved and restored as habitat for the California gnatcatcher, a federally endangered avian species.

### **Gnatcatcher Refuge**

The California Department of Fish and Wildlife (CDFW) has purchased the eastern side of the Montebello Hills (adjacent to the far western edge of the Reservoir) as a refuge for the California gnatcatcher. The CDFW is the state sponsor of the Federal **ESA Nontraditional Section 6 Grant Programs**. The U.S. Fish and Wildlife Service offers funding through the Cooperative Endangered Species Conservation Fund to support conservation planning and purchases of vital habitat for threatened and endangered fish, wildlife, and plant species. The grants are authorized by Section 6 of the Endangered Species Act.

### **Summary**

Past development in the “flats” of the Narrows gave way to the construction of the Dam and Reservoir. The Whittier Narrows Project is an island refugia of open space in the densely urbanized metropolis of southern California. The Project’s purpose of flood risk management limits development within its borders. Competing interests for open space including recreation, water conservation, agriculture, and infrastructure have taxed the Project’s resources. However, the limited development has made it possible for natural areas to evolve that are characteristic of marshes and riparian forest that have been disturbed over time. Some characteristics of remnant riparian forest are present. These vegetative types can be observed in the Nature Area and upstream of the west embankment, especially in and adjacent to the Rio Hondo

## **6.2 SUMMARY OF CUMULATIVE IMPACTS BY RESOURCE**

The potential cumulative impacts from implementation of the Whittier Narrows DSM Preferred RMP, when considered with other relevant proposed actions are summarized below. The scope reviewed for each resource area for cumulative impacts is the same as the one applied under Chapter 5 unless otherwise stated.

### **6.2.1 Earth Resources**

The potential for cumulative impacts related to geology, soils, and seismic hazards is minimal under both the action RMPs and the No Action Alternative, since no significant issues related to these resources or hazards were identified for the Proposed Project. The proposed action alternatives would not contribute to cumulative impacts related to past, present, or reasonably foreseeable future projects. There is not expected to be a significant cumulative impact on earth resources from the proposed RMP’s.

Implementation of any of the alternatives would result in negligible impacts on oil fields, so there would be no impacts on mineral resources expected with the project that would contribute to cumulative impacts.

Soil erosion could occur due to the extensive amount of ground clearing and earthwork involved with construction of the project. However, the proposed action alternatives would be required to meet modern construction criteria including stormwater pollution prevention. These criteria

would also likely apply to future projects in the study area. Further, measures to address any seismic hazards and to maintain the topography of the area are also likely for future projects in the region that could impact earth resources.

### **6.2.2 Water Quality**

Whittier Narrows is a gap in the mountains that make up the southern edge of the San Gabriel valley, and is the site of the confluence of the Rio Hondo and San Gabriel Rivers. The geology of the hills is mirrored underground, where an intrusion of bedrock forces groundwater up to the surface.

The abundance of water made the area an attractive site for agriculture throughout the 19th century and into the 20th, when it was home to a growing population and a wide expanse of walnut, citrus, and other farms. Agriculture likely resulted in discharges of earthen fill resulting in loss of wetlands within the floodplain. The San Gabriel and Rio Hondo were likely modified for irrigation purposes. Agricultural uses of the land continued subsequent to the completion of the Whittier Narrows Dam in 1957. The basin continued to support large agricultural operations through the mid-1970s. Construction of Whittier Narrows Dam in 1957 likely required substantial earthwork which likely affected remaining wetlands within the floodplain and resulted in modifications of both rivers. Thus, circulation patterns were substantially affected by past agricultural and construction activities..

In contrast, these activities resulted in temporary impacts to water quality, namely turbidity during and after construction. Long term water quality impacts reflect long term regional trends and land uses such as urbanization. Due to the reduced flood risks subsequent to the construction of the dam as well as the general acceleration of urbanization within the region after World War II, development increased within the watershed. Runoff from developed areas entering the basin likely impaired surface waters over time commensurate with the increased in urbanization.

Presently, the Whittier Narrows Dam continues to function as a flood risk management facility. Routine maintenance is conducted as needed within waters of the US. Maintenance activities likely entail like-for-like structural repairs using exiting access roads. In most cases there would be no expansion of the footprint. In some cases, expansion could occur but it would be minor in nature. Discharges include fill material such as earthen fill, rocks or concrete.

In addition to the Corps-maintained structures, periodic maintenance and upgrades of infrastructure and utilities take place within the basin. It is likely that roads and utilities traversing the lower basin have had multiple modifications and repairs subsequent to construction, resulting in discharges of fill within the 10 Year Flood Pool Waters of the US. Most maintenance activities whether undertaken by the Corps, lessees, or easement holders are performed in the dry season. Thus, discharges have minimal affect on turbidity. These discharges, in total, do not affect current and circulation patterns and would have minor impacts on substrate. Furthermore, the fill materials are chemically inert and would not leach contaminants into the water column or result in long term impacts to turbidity.

In coming flows convey pollutants associated with the urban environment into the water column: fecal coliform bacteria, pesticides; metals (e.g., copper, chromium, lead); nutrients (nitrogenous and phosphorus compounds); petroleum based oils and solves; and trash. Presently, both the Rio Hondo and San Gabriel River are impaired waters pursuant to Section 303(d) of the Clean Water Act for bacteria.

The dam functions primarily as a flood risk management facility, and will continue to do so for the foreseeable future. Proper maintenance and function of the facility would require at a minimum ongoing routine maintenance activities. Likewise, lessees and easement holders would continue to maintain utilities and infrastructure. Discharges of fill associated with maintenance activities, similar to that characterized above, would not affect current and circulation patterns and would not result in long term impacts to water quality. Runoff from the surrounding urbanized area would continue to determine water quality.

To conclude, current and circulation patterns were substantially affected by agricultural and construction activities, including construction of the Dam. Furthermore, long term water quality impacts reflect long term regional trends and land uses such as urbanization. RMP 1, 3E and 5 would all require construction in waters of the US. The work would not affect current and circulation patterns. The fill would consist of earthen fill, rocks or concrete. The fill materials are chemically inert and would not leach contaminants into the water column or result in long term impacts to turbidity. Incremental contributions to cumulative to water quality would be minimal.

### **6.2.3 Air Quality**

Cumulative air quality impacts from the Preferred RMP could occur as a result of short-term increased worker traffic, construction traffic, and construction equipment. Under all the Alternative RMPs, the exposure of sensitive receptors to project-generated construction equipment and operation emissions, in combination with the emissions of other proposed or ongoing projects within one to six miles, if construction periods were to overlap, would result in short-term high cumulative impacts on sensitive receptors in this area.

Environmental commitments have been identified for the temporary construction-related air quality effects to reduce direct impacts. Estimated construction and operational emissions associated with the Preferred RMP would not exceed RSTs. Thus, construction and operational emissions would not result in significant cumulative impacts to air quality.

### **6.2.4 Noise and Vibration**

Cumulative noise impacts typically occur when multiple projects affect the same geographic areas simultaneously or when sequential projects extend the duration of noise impacts on a given area over a longer period. Noise impacts are primarily localized because sound levels decrease relatively quickly with increasing distance from the source; therefore, the cumulative noise setting would be limited to the area subject to audible increase in noise levels with construction and development of cumulative projects. Cumulative noise impacts from implementing the proposed project, together with other reasonably foreseeable development

activities in the study area, would result primarily from temporary construction activities and would likely be subject to local noise ordinance provisions.

The highest levels of cumulative noise impacts would take place if several development projects were to take place at the same time and be in fairly close proximity. An example would be if the Montebello Hills Development were to be constructed within the same time period as the Proposed RMP. However, these increases would be due to construction activities and would be temporary, and would be subject to local noise ordinance provisions. Therefore, no significant cumulative adverse noise impacts would occur.

Under the Preferred RMP, the exposure of sensitive receptors to project-generated, construction equipment-related vibration levels would result in short-term high impacts. Mitigation has been identified for the temporary construction-related noise effects to reduce this direct impact. Similarly, under of the Preferred RMP, the exposure of sensitive receptors to project-generated, construction equipment-related vibration levels would result in a direct, moderate impact. Mitigation has been identified for the temporary construction-related vibration impacts that would reduce the level of effect. Therefore, implementation of the mitigation measures is expected to also reduce potential cumulative impacts from vibration to less than significant levels.

### **6.2.5 Biological Resources**

Cumulative effects that may have impacts to biological resources, in particular federally listed taxa include the following:

1. The primary purpose of the Project is to provide flood risk management. The Project also has been operated for some level of water conservation since its construction in 1959. To aid in the capture and conservation of storm runoff, a small amount of Reservoir storage may be managed in coordination with Los Angeles County Department of Public Works (LACDPW) for water conservation with no reduction in the Project's flood risk management capability. This method of operation for water conservation was first granted by Memorandum from Chief of Engineers to Division Engineer, (11 May 1959) 2nd endorsement dated June 9, 1959. The 1,000 acre-foot water conservation pool corresponded to an elevation of 195.5 ft. Subsequently, after a severe short-term drought in 1976-77, the pool was expanded to 2,500 acre-feet (elevation 201.6 ft.) by Memorandum from South Pacific Division (SPD) to the Los Angeles District Engineer, (24 Aug 77) 3rd Endorsement, February 16, 1978.

Minor flows that are natural or part of local water conservation operations pass through the dam unimpeded. In the rainy season, on the receding limb of the hydrograph and when deemed feasible by the Corps, impoundments up to elevation 201.6 ft. may be retained for release at a rate that LACDPW can capture in its facilities downstream for groundwater recharge. If a storm is forecast or for any other reason, the District can cease water conservation operations and vacate the reservoir in a couple of hours, making that space again available for flood risk management.

In response to the current ongoing California drought, the Corps has approved and implemented requests for deviation from the Water Control Plan on several occasions. This elevation is confined to the lower Rio Hondo portion of the Reservoir. Elevation 195 .0 ft. is confined largely to the Rio Hondo and lower Rio Hondo portion of the Reservoir. Elevation 201.6 ft. occurs in these areas, in the crossover channel, the Zone 1 ditch, and lower portions of the central embankment area near Rosemead Blvd. The areas below 195 ft. have been inundated frequently since 1959 and the areas below 201.6 ft. have been inundated frequently since approved change in water conservation elevation in 1977. CAGN DCH occurs above elevation 194.0 ft. Currently, the Corps is only holding water for water conservation to elevation 190.0 ft. until the Dam's DSAC rating is addressed and other environmental factors, including the location of nesting LBVI, is assessed at these lower elevations.

The distribution of plants throughout Whittier Narrows Dam Reservoir is indicative of their tolerance to flooding. Western storm systems tend to create ephemeral conditions of rapid rises and draw-downs. Therefore, inundation resulting from these storms is typically short-lived. Water conservation may have amplified this natural pattern of seasonal inundation; however, since water is typically not held behind the Dam for periods of more than a few days, and since most, if not all, of the vegetation in these lower elevations has established after the construction of the Dam and during a period of ongoing water conservation, any effect on vegetation is difficult to quantify.

It is reasonably foreseeable that water conservation may return to previously established elevations, or to higher elevations, in the future. Increasing the duration or frequency of inundation, the seasonality of inundation, or extending the inundation into higher elevations where plant species are less adapted to flooding has the potential to alter vegetation characteristics. The extent and type of alteration would depend nature of the changes. Approximately 563 acres of designated critical habitat for the CAGN occurs within the Reservoir, approximately 285 acres of which occurs below elevation 201.6'. The extent and type of alteration to the essential features of this designated critical habitat would depend on specific water conservation proposals. Similarly, the complement of animal species utilizing the area, including CAGN and LBVI, behind the Reservoir could potentially be affected by future water conservation activities, either through changes in vegetation type, quality, and extent or through direct impacts from inundation. As with vegetation, the extent and type of effect would depend on the nature of the changes.

2. The Water Replenishment District of Southern California (WRD) Groundwater Reliability Improvement Project (GRIP) is to fully eliminate the current demand for imported water by producing 21,000 acre feet annually from local alternative sources to replenish the Central Basin. GRIP will purify approximately 10,000 acre feet (3.25 billion gallons) of tertiary treated (recycled) water annually to near-distilled levels through an advanced water treatment facility. Together, with another 11,000 acre feet (3.6 billion gallons) of recycled water, WRD will deliver 21,000 acre feet of water to the

San Gabriel Coastal Spreading Grounds where it will percolate into the Central Basin.

This project effort is being mitigated with restoration or creation for LBVI riparian habitat someplace inside the San Gabriel River, site selection is yet to be determined.

This activity could redistribute water in the Reservoir, potentially reducing the amount of water available to vegetation along the Zone One ditch and in the Rio Hondo portion of the Reservoir. Additional water may be available for vegetation in the San Gabriel River.

3. Tertiary treated water from the San Jose Reclamation Plant is proposed to be pumped up the San Gabriel River to the Los Angeles County Public Works spreading grounds inside the Corps Santa Fe Dam Reservoir. This could greatly reduce the water table in the San Gabriel and San Jose Creek as well as potential surface water flow into LBVI habitat in the Reservoir.
4. Homeless encampments have increased substantially within the Reservoir over the last several years (circa 40-50 camps). These homeless encampments have and are likely to continue to impact the understory in habitat within the Reservoir currently utilized by the LBVI for nesting.

### **6.2.5 Cultural Resources**

The study area for cultural resources includes the area within and in the vicinity of the Dam as well as the areas proposed for development of cumulative projects identified above. Overall, the project will contribute to the transformation of the Dam, and its associated infrastructure.

Past developments in the study area have resulted in the loss or destruction of the spatial integrity of prehistoric and historic archaeological resources through ground-disturbing activities. Paleontological resources may have been lost through excavation as well. Historic buildings and structures have been lost or impacted due to demolition, substantial alteration, neglect, or incompatible construction. The impacts of current and future cumulative actions in the study area that are not subject to extensive cultural or historic resource review or result from neglect or vandalism would continue whether the proposed restoration measures were implemented or not. Restoration measures may stimulate the adaptive reuse, rehabilitation, or restoration of adjacent historic buildings and structures, however, associated economic development may encourage removal of historic buildings and structures or incompatible construction. Much of the current and future development would be subject to Federal, state, and local reviews that include some level of consideration and protection for cultural and paleontological resources which would lessen these impacts. The restoration measures, combined with cumulative developments in, and in the vicinity of, the study area would be conducted in the context of environmental and cultural resource compliance review as proscribed by Montebello, Pico Rivera, South El Monte, and Whittier ordinance provisions as well as state and Federal guidelines and regulations for the identification, handling, and preservation of cultural resources. Development of cumulative projects, including Los Angeles County Department of Public Works (LACDPW) projects and County of Los Angeles Department of Parks and Recreation (LACDP&R) projects in the reservoir, has already been subject to these multi-jurisdictional provisions. Cumulative developments in the planning stage within and in the vicinity of the study area, including San Gabriel River Discovery Center, the Emerald Necklace trail system, the LACDP&R Equestrian Center, and others, would be subject

to these provisions as these parklands are developed. These provisions are designed to identify cultural and paleontological resources, assess impacts, and avoid adverse effects.

RMP 5 could directly or indirectly impact 12 known historic age sites or structures, five of which are currently unevaluated (Rooks Road, Lincoln Ave., Rosemead Blvd., Pico Rivera Golf Course, Whittier Narrows Dam Recreation Area [P-19-186889]), one of which has been determined NRHP eligible (Los Angeles Dept. of Water & Power Boulder Lines 1 & 2 [P-19-188983]), and the remaining five have been determined not eligible for listing on the NRHP (Montebello Oil Field [P-19-003813], Rio Hondo-Amador-Jose-Mesa-Narrows 66kV [P-19-190504], SCE Mesa-Walnut 220 kV Transmission Line [P-19-190505], SCE Walnut-Hillgen-Industry-Mesa-Reno 66kV Transmission Line [P-19-190508], Whittier Narrows Dam [primary number pending]). One structure was replaced prior to analysis of this project (SCE Siphon Road Towers [P-19-190507]). The presence or absence of subsurface prehistoric archaeological deposits is unknown at this time, but based on the smaller volume of surface disturbance planned for RMP 5 as compared to RMPs 1 and 3E, the likelihood of impacting subsurface deposits is also proportionately lower, and the cumulative impacts would also be lower.

To the extent that other cumulative projects have caused or may cause cultural resource impacts, NEPA and the NHPA require consideration of mitigation for significant cultural impacts. After application of the mitigation measures identified in Section 5.7.1, the cumulative impacts would be less than significant. With adoption of these measures, the project's contribution to the cumulative impact is rendered less than cumulatively considerable, and cumulative cultural resources impacts are less than significant.

#### **6.2.6 Socioeconomics and Environmental Justice**

The California Department of Finance projects the population of southern California will increase from 24,361,642 in 2010 to 39,381,675 in 2051. Southern California is the area from the Mexican border to Las Vegas to Santa Barbara and back down the coast to the Mexican border.

In metropolitan areas such as Los Angeles, populations are likely to become more diverse, with younger populations moving in and contributing to more rapid growth (RPA). The California Department of Finance also projects that the population of Los Angeles County in 2050 will be 2,150,000 white, 710,000 black, 1,708,500 Asian or Pacific Islander, and 6,508,000 Hispanic and 336,000 of other or mixed races. The Land Use Plan from Los Angeles County shows the area is at a maximum horizontal capacity and any future development will be vertical in nature.

The impacts on socioeconomics and environmental justice are not expected to be exacerbated by any future projects. The known past and present impacts on the minority and low income communities in the area are described in Chapter 4. The temporary closures of and restricted access to recreational facilities as well as increased vehicle traffic and congestion during construction of the RMP's would affect recreation users and recreation expenditures in the area. This could result in a moderate incremental impact on the local and regional economy. However, implementation of potential mitigation measures such as adjusting the construction schedule to accommodate short-term spikes in recreation related traffic for Special Events



would reduce these potential short-term socioeconomic impacts, which would in turn reduce the contribution to adverse cumulative impacts on recreation expenditures.

#### **6.2.7 HTRW**

Potential HTRW impacts associated with implementation of the Preferred RMP would occur primarily as a result of construction activities at construction sites, and staging areas. These activities would include the maintenance of heavy equipment and vehicles. These activities have the potential for HTRW to be inadvertently released during fueling and maintenance operations, material hauling, and concrete production. These construction activities are sufficiently far away from any other construction activities that would be associated with the other relevant actions. Therefore, implementation of the Preferred RMP is not anticipated to contribute to cumulative HTRW impacts.

#### **6.2.8 Land Use**

Under the Preferred RMP, some of the land in the Reservoir and immediately downstream of the Dam would be used for staging areas, stockpiling of materials, and parking for construction equipment and workers. These impacts would be short term during the construction period. If the Montebello Hills Community Project were to overlap construction periods, while separated by a half mile or more, these projects could have a cumulative impact on area land use as a whole during that time period. There would not be any long term impacts on land use however. Land use classifications within the Reservoir would not change unless the Master Plan was to be revised.

#### **6.2.9 Traffic and Transportation**

Under the Preferred RMP, cumulative traffic impacts could occur as a result of short-term increased local traffic through and around the general vicinity of the Reservoir by construction vehicles transporting construction materials to the construction area and construction worker traffic. All other project-related activities would be confined of the project area. Construction is estimated to be completed over several years. Potential impacts to local traffic conditions associated with commuting workers would therefore be negligible with the implementation of a Traffic Control Plan and adherence to environmental commitments. If the Montebello Hills Community Project, and other proposed projects were to have overlapping construction schedules during the multi- year construction period for the DSM Project, there would be a moderate increase in local traffic during peak commuter-hours.

#### **6.2.10 Esthetic Resources**

Because construction activities associated with implementing any of the Preferred RMP would be visible from several viewing points in the Reservoir, adverse short-term visual impacts would result. This would be due to the visible presence of construction equipment, vehicles, materials, and traffic. These visual impacts would be temporary, lasting only the duration of the construction period. However, with regard to potential cumulative impacts, because the proposed Whittier Narrows DSM Project does not involve the same fields of view as any of the

other relevant actions analyzed, implementation of the Preferred RMP would not contribute to cumulative impacts on esthetic resources.

#### **6.2.11 Recreation**

The potential adverse recreation impacts from implementing the Preferred RMP would be temporary occurring only during the construction period within the Whittier Narrows DSM Project area. Such impacts would include temporary closures of Streamland Park, the Pico Rivera Golf Course, trails near and adjacent to the embankment, including the LARio Trail, and somewhat degraded recreation experiences from construction noise, lights, dust, and increased traffic, and possible over-crowding at optional sites. These impacts on recreation in the Whittier Narrows Dam Reservoir could result in some potential visitors leaving or bypassing Whittier Narrows and seeking recreation opportunities in other locations that may be within the project and plan areas of other relevant actions; which could result in greater demand (and stress) on recreation sites in these other locations. Because the Corps, the City of Pico Rivera and LACDP&R would maintain to the extent possible the quantity of recreation sites and the quality of the recreation experience during the Preferred RMP construction period, the potential cumulative impacts to recreation are anticipated to be low.

#### **6.2.12 Utilities**

The implementation of the Preferred RMP would have minimal impact on existing utilities within the Reservoir during construction or on any utilities that are carried through utility galleries through the embankment. During Phase 1 the utility galleries through the Dam would be temporarily relocated and then reconnected in the same location. None of the utility galleries would require permanent relocation for the Preferred RMP. Therefore the Preferred RMP would not contribute to cumulative impacts.

#### **6.2.13 Public Health and Safety**

Potential public health and safety impacts associated with implementation of the Preferred RMP would occur primarily as a result of construction activities at construction sites and staging areas. These activities would include heavy equipment use; heavy truck traffic; materials hauling; and work on steep slopes and dam infrastructure. These construction activities are sufficiently far away from any other construction activities. Therefore, the Preferred RMP is not anticipated to contribute to cumulative public health and safety impacts.

#### **6.2.14 Public Services**

Flooding from extreme events would cause a loss of vital services such as fire, ambulance, hospitals, water and wastewater treatment, public shelters, power production, and transportation systems. During peak flooding, many evacuation routes would be cut off and most evacuation centers would be inundated. This would make it difficult for emergency services and rescue workers to get to residents. Any prediction of significant spillway releases would trigger warnings and evacuations in the at-risk areas. The adverse impacts on public safety associated

with dam failure would be greatly reduced by the implementing a RMP that addresses the two (2) PFM's.

### **6.3 GROWTH INDUCING IMPACTS**

NEPA defines indirect effects as those that include growth-inducing effects or other effects related to induced changes in population density or growth rate (40 C.F.R § 1508.8). An action is defined as growth-inducing when it:

- Fosters economic growth, population growth, or the construction of additional housing, either directly or indirectly, in the surrounding environment;
- Removes obstacles to population growth;
- Results in further taxes to existing community service facilities; or
- Encourages or facilitates other activities that could significantly affect the environment, either individually or cumulatively.

Growth inducement is generally dependent upon the presence or lack of existing utilities and public services in an area. The provision of new utilities and services can induce growth in an un-developed area. Growth inducement can also occur if a Proposed Action makes it feasible to increase the density of development in surrounding areas.

The communities of Pico Rivera and other cities downstream to the Pacific Ocean are already very built out. New growth is expected to be vertical rather than horizontal and there are no expected changes in communities' general plans in the near future. Modification of the Whittier Narrows Dam as proposed would not exacerbate growth within the region especially in the communities downstream of the Dam. The construction would not cause additional housing needs within the region. The Dam modification would not in itself cause new services in the area that would lead to new growth in any of the communities.

### **6.4 RELATIONSHIP BETWEEN LOCAL SHORT-TERM USES OF THE ENVIRONMENT AND MAINTENANCE AND ENHANCEMENT OF LONG-TERM PRODUCTIVITY**

NEPA prescribes the discussion of "...the relationship between short-term uses of man's environment and the maintenance and enhancement of long-term productivity and any irreversible and irretrievable commitments of resources which would be involved in the project....". Also prescribed are "Energy requirements and conservation potential of various alternatives and mitigation measures." and "Natural or depletable resource requirements and conservation potential of various alternatives...." (40 C.F.R. 1502.16).

Short-term (construction-related) impacts caused by the Preferred RMP would be similar for any of the Proposed RMPs except for impacts to biological resources and recreation resources. RMP 5 does not include a borrow area, auxiliary spillway, coffer dam or associated structures, nor require raising of the local roadways. However, the long-term impacts that would occur over the life of the Preferred RMP would result in overall beneficial effects.

Implementation of any of the action RMPs would result in beneficial long-term impacts. The proposed Whittier Narrows DSM Project would address the seismic, seepage, and hydrologic deficiencies that exist with the Whittier Narrows Dam which currently threaten public safety and property downstream of the Whittier Narrows Dam. Failure of the existing Dam would result in extensive downstream flooding and loss of life. Whittier Narrows DSMS, once modified to address its potential failure modes, will help to protect, and therefore enhance, the long-term productivity of the communities downstream.

## **6.5 IRREVERSIBLE AND IRRETRIEVABLE ENVIRONMENTAL COMMITMENT OF RESOURCES**

NEPA regulations (40 CFR 1502.16) dictate that an EIS must consider irreversible or irretrievable commitments of resources. An irreversible commitment of a resource is one that, once committed to the proposed project, would continue to be committed throughout the life of the project (50 years). An irretrievable commitment of resources refers to those resources that, once used, consumed, destroyed, or degraded during construction or operation, would cause the resource to be unavailable for use by future generations.

An irreversible commitment of resources is one in which the ability to use and/or enjoy the resource is lost forever. An irretrievable commitment of resources is one in which, due to decisions to manage the resource for another purpose, opportunities to use or enjoy the resource as they presently exist are lost for a period of time. Construction of the Proposed Project would include many features considered permanent which may be deemed irreversible.

Construction of the preferred RMP, as well as the associated support actions, would result in an irretrievable and irreversible commitment of natural resources through the direct consumption of fossil fuels and use of materials. With completion of the Whittier Narrows DSM Project, that commitment of resources would end.

Materials used for construction would also be irretrievably lost, as they would no longer be available for other projects. This includes all materials such as cement, sand, gravel, and water (concrete) and fuel for construction equipment. An undetermined amount of energy (gasoline; diesel oil) would be spent on the Proposed Project, and for Operation and Maintenance (O&M). In addition, use of water for dust abatement will be irretrievable. These needed materials are not in short supply and would not limit other unrelated construction activities. These uses would constitute an irretrievable loss of energy. However, consumption of energy would not place a significant demand on energy in the region. The irretrievable loss of non-native and invasive vegetation is not significant. In other areas, loss of vegetation due to construction will be remedied with revegetation efforts.

Cultural resources such as prehistoric sites, historic properties, and cultural landscapes are non-renewable resources. Inadvertent or accidental destruction of cultural resources during construction that might occur despite mitigation actions would be an irretrievable commitment of resources.

Use of human resources during construction would be an irreversible loss of labor supply for other projects. However, labor opportunities are desired in the Proposed Project area and this use of human resources represents beneficial employment opportunities.

Financial resources have already been obligated by the Corps for the planning and review of the Proposed Project. The expenditure of funds would continue throughout the PED, permitting and construction phases of the project should the project be approved. Construction would require expenditure of Federal funds for the costs of construction. Resources to be committed if the project is approved include expenditure of Federal funding, labor, energy and project materials to build, operate, and maintain the proposed project. Such financial resources would not be available for other uses.

## **CHAPTER 7 SUMMARY AND COMPARISON OF RISK MANAGEMENT PLANS (RMPs)**

This chapter summarizes and compares the environmental impacts of each RMP described in Chapter 5. The purpose of this chapter is to help the public understand how the impacts and benefits of each plan differs from one another and to identify the environmentally preferred alternative.

The DSMS includes the identification of a Tentatively Selected Plan (TSP) from among the RMP's. As explained in Chapter 3, the two action RMPs have a similar order of magnitude risk reduction for both key metrics (Annual Percentage of Failure, and Average Annual Loss of Life). In other words, they both are effective at solving the structural failure modes in the Dam. However, RMP 5 meets the objectives more efficiently than RMP 3E from a cost perspective, while also presenting significantly less environmental, real estate, and surrounding infrastructure impacts. The conclusion of the evaluation and comparison process of the engineering and costs indicates RMP 5 would be the Preferred RMP based on dam safety requirements. From an environmental consideration standpoint, the comparison in the Chapter confirms that RMP 5 represents the plan with considerably less potential environmental impacts. RMP 5 presents less impacts, in part, because it does not call for borrow areas in the Reservoir, and also because it does not require the establishment of a permanent auxiliary run out channel through what is currently the Pico Rivera golf course.

### **Tentatively Selected Plan**

As explained in earlier Chapters, incremental risk exceeds the tolerable risk guidelines as a result of two PFMs: backward erosion piping in the foundation, and overtopping of the dam. The objective of the plans considered in this chapter is to reduce the life safety risk to tolerable levels. The No Action RMP does not comply with agency guidelines. In other words, an unacceptable risk to life safety would persist under the No Action RMP. RMPs 3E and 5 both comply with agency guidelines and have very similar results. Slightly higher average incremental life loss indicated for RMP 3E results from pools that exceed elevation 239.0 ft. as the increased pool elevations result in higher life loss potential upstream.

These higher pool elevations also result in heightened environmental impacts upstream to almost all resource areas. For example, Table 7-1 compares RMPs 1, 3E, and 5 with respect to other relevant concerns.

<b>Table 7-1 Final Array Comparison Summary</b>			
<b>Criteria</b>	<b>RMP 1</b>	<b>RMP 3E</b>	<b>RMP 5</b>
Total Project Cost (FY17)	N/A	\$440.7M	\$330.0M
O&M Costs (annual)	0	\$1,006K	\$611K
Contingency	N/A	41% (\$127.4M)	35% (\$86.4M)
Incremental risk	Exceeds threshold	Below threshold	Below threshold
Robustness	Low	Medium	High
Redundancy	Low	Medium	High
Resilience	Low	Medium	High
Completeness	No	Yes	Yes
Effectiveness	Low	High	High
Efficiency	3	2	1
Acceptability	N/A	Medium	High

### **Comparison of Plans and the Environmentally Preferred Alternative**

Both action alternatives RMP 3E and RMP 5 meet the purpose and need statement articulated in Section 1.4. RMP 1, the No Action Alternative, does not.

RMP 3E and RMP 5 have similar outcomes per NEPA significant thresholds across most environmental resources (see Summary Table 7-2). Both alternatives would result in less than significant impacts to Earth Resources, Air Quality and Greenhouse Gases, Water Quality, Cultural Resources, Hazardous, Toxic and Radioactive Waste, Land Use, Traffic and Transportation, Utilities, Public Health & Safety, Socioeconomics, Recreation (Streamland Park), and Public Services. Likewise, both action alternatives would result in potentially significant impacts to Recreation (Pico Rivera Golf Course), and significant impacts from Noise and Vibration. Impacts to biological resources could also be significant and unavoidable under RMP 3E, because of potential impacts to CAGN designated critical habitat, and LBVI. Under RMP 5, potential impacts to CAGN designated critical habitat and indirect impacts to LBVI could likely be minimized to a level of less-than-significant. Coordination with the USFWS is ongoing. From an environmental justice standpoint, both RMP 3E and RMP 5 could disproportionately, and therefore significantly, impact low-income and minority communities in Pico Rivera. Because the Dam location is fixed in place, it is not possible to completely avoid these impacts. This represents an environmental justice consideration, and the Corps is developing plans with environmental commitments to avoid or minimize these effects to the greatest extent practicable while performing the Dam modification.

There are differences between RMP 3E and RMP 5. Under Esthetics, RMP 5 would result in lesser impacts compared to RMP 3E due to the shorter height of the parapet wall under RMP 5. Likewise, RMP 5 would result in smaller construction footprint and lesser land disturbance compared to RMP 3E. Thus, RMP 3E would result in significant impacts whereas RMP 5 would result in less than significant impacts for both resources. Where both RMP 3E and RMP 5 result in less than significant impacts, RMP 5 would result in lesser impacts. For example, RMP 5 would result in lesser air quality impacts compared to RMP 3E due to a smaller amount of earthwork required. In a similar manner, RMP 5 would have a smaller probability of potential



impacts to cultural resources due to the absence of a borrow area. Likewise, RMP 5 would have a smaller probability of potential impacts to water quality due to the smaller construction footprint and earthwork. Last, Rosemead Boulevard, a major artery, would not need to be modified under RMP 5 due to the shorter parapet wall; in contrast, Rosemead Boulevard would need to be raised under RMP 3E leading to temporary road closure.

Resource	No Action RMP 1	RMP 3E	RMP 5
<b>EARTH RESOURCES</b>	<p><b>IRRM:</b> None</p> <p><b>Construction Impacts:</b> Crest Elevation Restoration is anticipated to have a direct and temporary impact on earth resources through the use of a borrow area but would not permanently alter the topography to the extent that it would impact operation of the Dam. Impacts are expected to be <i>less than significant</i>.</p> <p><b>Operation and Maintenance:</b> Regular and recurring operations do not include more than incidental earth movement, excavation, or grading. Impacts would be direct, temporary, and <i>less than significant</i>. No indirect impacts are anticipated.</p>	<p><b>IRRM:</b> Same as RMP 1</p> <p><b>Construction Impacts:</b> Soil erosion resulting from heavy equipment use would be controlled through environmental commitments and would be temporary. Components of the RMP would have direct, permanent impacts to topography, but these impacts would be related to addressing the PFMs and/or at the Dam structure itself. Impacts would be <i>less than significant</i>.</p> <p><b>Operation and Maintenance:</b> Impacts would be direct, temporary, and <i>less than significant</i>.</p>	<p><b>IRRM:</b> Same as RMP 1</p> <p><b>Construction Impacts:</b> Soil erosion resulting from heavy equipment use would be controlled through environmental commitments and would be temporary. Components of the RMP would have direct, permanent impacts to topography, but these impacts would be related to addressing the PFMs and/or at the Dam structure itself. Impacts would be <i>less than significant</i>.</p> <p><b>Operation and Maintenance:</b> Impacts would be direct, temporary, and <i>less than significant</i>.</p>

Resource	No Action RMP 1	RMP 3E	RMP 5
<b>AIR QUALITY, GREENHOUSE GASES AND CLIMATE CHANGE</b>	<p><b>IRRM:</b> None</p> <p><b>Construction:</b> Estimated emissions for the crest elevation restoration are not expected to exceed General Conformity <i>de Minimus</i>. Impacts would be <i>less than significant</i>.</p> <p><b>Operation and Maintenance:</b> Emissions from maintenance activities are exempt from the CAA General Conformity Rule per 40 C.F.R. 153(c)(2)(iv). Impacts would be <i>less than significant</i>.</p>	<p><b>IRRM:</b> Same as RMP 1</p> <p><b>Construction:</b> Estimated emissions from RMP 3E would not exceed General Conformity <i>de Minimus</i> thresholds. Impacts would be <i>less than significant</i>.</p> <p><b>Operation and Maintenance:</b> Emissions from maintenance activities are exempt from the CAA General Conformity Rule per 40 C.F.R. 153(c)(2)(iv). Impacts would be <i>less than significant</i>.</p>	<p><b>IRRM:</b> Same as RMP 1</p> <p><b>Construction Impacts:</b> Estimated emissions from RMP 5 would not exceed General Conformity <i>de Minimus</i> Thresholds. Impacts would be <i>less than significant</i>.</p> <p><b>Operation and Maintenance:</b> Emissions from maintenance activities are exempt from the CAA General Conformity Rule per 40 C.F.R. 153(c)(2)(iv). Impacts would be <i>less than significant</i>.</p>

Resource	No Action RMP 1	RMP 3E	RMP 5
<b>WATER QUALITY</b>	<p><b>IRRM:</b> None</p> <p><b>Construction Impacts:</b> Crest Elevation Restoration is anticipated to have both direct and indirect, temporary impacts to water quality. With implementation of environmental commitments as well as implementation the terms and conditions of the Clean Water Act Section 401 certification, water quality standards would be maintained and there would be no degradation of surface water quality. Impacts are expected to be <i>less than significant</i>.</p> <p><b>Operation and Maintenance:</b> Impacts would be direct, temporary, and <i>less than significant</i>.</p>	<p><b>IRRM:</b> Same as RMP 1.</p> <p><b>Construction Impacts:</b> Components of RMP 3E are expected to have direct and indirect, temporary impacts to water quality. With implementation of environmental commitments as well as implementation the terms and conditions of the Clean Water Act Section 401 certification, water quality standards would be maintained and there would be no degradation of surface water quality. Impacts are expected to be <i>less than significant</i>.</p> <p><b>Operation and Maintenance:</b> Impacts would be direct, temporary, and <i>less than significant</i>.</p>	<p><b>IRRM:</b> Same as RMP 1.</p> <p><b>Construction Impacts:</b> Components of RMP 3E are expected to have direct and indirect, temporary impacts to water quality. With implementation of environmental commitments as well as implementation the terms and conditions of the Clean Water Act Section 401 certification, water quality standards would be maintained and there would be no degradation of surface water quality. Impacts are expected to be <i>less than significant</i>.</p> <p><b>Operation and Maintenance:</b> Impacts would be direct, temporary, and <i>less than significant</i>.</p>

Resource	No Action RMP 1	RMP 3E	RMP 5
<b>NOISE AND VIBRATION</b>	<p><b>IRRM:</b> Largely administrative or technical exercises that are not expected to result in noise-producing activities. May include minor equipment use. Impacts would be direct, temporary, and <i>less than significant</i>.</p> <p><b>Construction:</b> Noise associated with crest raise elevation is expected to attenuate to approximately ambient conditions before reaching sensitive receptors. Impacts would be direct, temporary, and <i>less than significant</i>.</p> <p><b>Operation and Maintenance:</b> Regular/Recurring Operations and Maintenance activities are expected to have only minor temporary, direct impact on noise and vibration. Impacts would be <i>less than significant</i>.</p>	<p><b>IRRM:</b> Same as RMP 1.</p> <p><b>Construction:</b> Components such as the development of staging areas at Streamland Park and the Pico Rivera Golf Course and the construction of the runout channel, including the sheetpile placement that have the potential for significant noise impacts will be reduced to a level of <i>less than significant</i> with Environmental Commitments (ECs) N-1 through N-13.</p> <p><b>Operation and Maintenance:</b> Same as RMP 1.</p>	<p><b>IRRM:</b> Same as RMP 1.</p> <p><b>Construction:</b> Components such as the development of staging areas at Streamland Park and the Pico Rivera Golf Course and the roller compacted concrete placement that have the potential for significant noise impacts will be reduced to a level of <i>less than significant</i> with Environmental Commitments (ECs) N-1 through N-13.</p> <p><b>Operation and Maintenance:</b> Same as RMP 1.</p>

Resource	No Action RMP 1	RMP 3E	RMP 5
<b>BIOLOGICAL RESOURCES</b>	<p><b>IRRM:</b> Minor temporary, direct impacts that are <i>less than significant</i>.</p> <p><b>Construction:</b> Crest Elevation Restoration impacts expected to be similar to, but less than, the impacts described under RMP 3E. The activity may result in an effect to the federally endangered least Bell's vireo, the federally threatened California gnatcatcher and designated critical habitat for the gnatcatcher. Consultation with the USFWS under Section 7 of the Endangered Species Act would be undertaken prior to implementation.</p> <p><b>Operation and Maintenance:</b> No impacts to general biological resources or threatened and endangered species.</p>	<p><b>IRRM:</b> Same as RMP 1.</p> <p><b>Construction:</b> Development and use of the borrow area(s) in combination with the batch plant development and haul route use is expected to have direct and indirect, though temporary impacts on general wildlife in the basin for the period of active construction that are expected to be <i>less than significant</i>. The activity may result in a direct effect to the federally endangered least Bell's vireo, the federally threatened California gnatcatcher and designated critical habitat for the gnatcatcher. Consultation with the USFWS under Section 7 of the Endangered Species Act would be undertaken prior to implementation.</p> <p><b>Operation and Maintenance:</b> Same as RMP 1.</p>	<p><b>IRRM:</b> Same as RMP 1.</p> <p><b>Construction:</b> Development and use of batch plants and haul routes is expected to have direct and indirect, though temporary, impacts on general wildlife. Impacts would be <i>less than significant</i>.</p> <p>The activity may result in an indirect effect to the federally endangered least Bell's vireo and the federally threatened California gnatcatcher and a direct effect to designated critical habitat for the gnatcatcher. Consultation with the USFWS under Section 7 of the Endangered Species Act would be undertaken prior to implementation.</p> <p><b>Operation and Maintenance:</b> Same as RMP 1.</p>

Resource	No Action RMP 1	RMP 3E	RMP 5
<b>CULTURAL RESOURCES</b>	<p><b>IRRM:</b> None. As currently described, IRRMs would have no effect to historic properties.</p> <p><b>Construction:</b> Crest Elevation Restoration would not have a direct or indirect effect to historic properties as the Whittier Narrows Dam structure has been determined and concurred to be NOT eligible for listing on the National Register of Historic Places. Other project components including use of borrow area could potentially have an effect to currently unidentified historic properties and would be subject to consultation under the NHPA at prior to implementation.</p> <p><b>Operation and Maintenance:</b> None. As currently described, IRRMs would have no effect to historic properties.</p>	<p><b>IRRM:</b> Same as RMP 1.</p> <p><b>Construction:</b> RMP 3E has the potential to affect cultural resources known to be in the Project area. Improvements to the Dam itself would not have a direct or indirect effect to historic properties as the Whittier Narrows Dam structure has been determined and concurred to be NOT eligible for listing on the National Register of Historic Places.</p> <p><b>Operation and Maintenance:</b> Same as RMP 1.</p>	<p><b>IRRM:</b> Same as RMP 1.</p> <p><b>Construction:</b> Same as RMP 3E. Consultation with the State Historic Preservation Office is ongoing.</p> <p><b>Operation and Maintenance:</b> Same as RMP 1.</p>



Resource	No Action RMP 1	RMP 3E	RMP 5
<b>SOCIO-ECONOMICS AND ENVIRONMENTAL JUSTICE</b>	<p><b>IRRM:</b> IRRMs are composed of technical studies and administrative coordination and would not result in construction activities. There would be <b>no disproportionate adverse impacts</b> to minority and low-income populations. <b>No direct or indirect impacts</b> to socioeconomics are expected to occur.</p> <p><b>Construction:</b> The crest restoration and other construction activities would have <b>no direct or indirect impact on population, housing, and employment</b>. No direct or indirect impacts are anticipated. No staging areas atop Streamland Park or Pico River Golf Course would be required. <b>No disproportionate adverse impacts</b> such as would occur under RMP 3E for recreation or noise. Other Construction related impacts would be similar to those characterized for RMP 3E</p> <p><b>Operation and Maintenance:</b> Regular and recurring O&amp;M activities would be limited in extent. <b>No direct or indirect impacts</b> are anticipated for socioeconomics. <b>No disproportionate adverse impacts</b> to minority and low-income populations.</p>	<p><b>IRRM:</b> Same as RMP 1.</p> <p><b>Construction:</b> Development and use of the borrow area(s), batch plants, haul routes, and components of the auxiliary spillway would not have a direct or indirect impact on housing or community cohesion. Use of staging areas and other construction for the dam safety modification is not expected to affect population or housing. The use of the Streamland Park and the Pico Rivera Municipal Golf Course as staging areas could have an impact on community cohesion and result in adverse business impacts that may entail a potential permanent reduction in workforce. The overall construction activity is not expected to displace a substantial number of residents, businesses or employees. Effects would be direct and indirect, could be permanent, and would be <b>less than significant</b> for socioeconomics.</p> <p>Impacts associated with recreation could represent high and adverse disproportionate affects to minority or low-income populations in Pico Rivera. Environmental justice impacts could therefore be <b>significant</b>.</p> <p><b>Operation and Maintenance:</b> Same as RMP 1.</p>	<p><b>IRRM:</b> Same as RMP 1.</p> <p><b>Construction:</b> Development of the staging areas and other construction for the dam safety modification is not expected to affect population or housing. The use of the Streamland Park and the Pico Rivera Municipal Golf Course as staging areas could have an impact on overall community cohesion and could result in adverse business impacts that may entail a potential permanent reduction in workforce. The overall construction activity is not expected to displace a substantial number of residents, businesses or employees. Effects would be direct and indirect, could be permanent, and would be <b>less than significant</b> for socioeconomics.</p> <p>Impacts associated with recreation could represent high and adverse disproportionate affects to minority or low-income populations in Pico Rivera. Environmental justice impacts could therefore be <b>significant</b>.</p> <p><b>Operation and Maintenance:</b> Same as RMP 1.</p>

Resource	No Action RMP 1	RMP 3E	RMP 5
<b>HAZARDOUS, TOXIC, AND RADIO-ACTIVE WASTE</b>	<p><i><b>IRRM</b>s:</i> None</p> <p><i><b>Construction:</b></i> Similar to RMP 3E</p> <p><i><b>Operation and Maintenance:</b></i> None</p>	<p><i><b>IRRM</b>s:</i> Same as RMP 1</p> <p><i><b>Construction:</b></i> None</p> <p><i><b>Operation and Maintenance:</b></i> Same as RMP 1</p>	<p><i><b>IRRM</b>s:</i> Same as RMP 1</p> <p><i><b>Construction:</b></i> None</p> <p><i><b>Operation and Maintenance:</b></i> Same as RMP 1</p>

Resource	No Action RMP 1	RMP 3E	RMP 5
<b>LAND USE</b>	<p><b>IRRM:</b> None</p> <p><b>Construction:</b> The land use classification upstream of the central embankment would not change. Impacts are <i>less than significant</i>. No indirect impacts anticipated.</p> <p><b>Operation and Maintenance:</b> None</p>	<p><b>IRRM:</b> Same as RMP 1.</p> <p><b>Construction:</b> A majority of the proposed project will occur on property owned in fee by the United States and managed by the Corps. Some of the necessary lands owned by the United States are currently under lease or easement to non-federal entities for recreation and other purposes. While no permanent acquisition of land is expected to be required, real estate agreements within the proposed RMP action area may require modification. Land leased to LACDP&amp;R and land leased to the City of Pico Rivera for recreational purposes, including Pico Rivera Municipal Golf Course, a portion Streamland Park, Bicentennial Park will be needed during construction. Land leased to the City of Pico Rivera and subleased to the Whittier Fertilizer Company and a private parcel at San Gabriel Blvd. and Lincoln Ave. may also be required. Impacts are direct, may be permanent, and <b>less than significant</b>.</p> <p><b>Operation and Maintenance:</b> Same as RMP 1</p>	<p><b>IRRM:</b> Same as RMP 1</p> <p><b>Construction:</b> Same as RMP 3E.</p> <p><b>Operation and Maintenance:</b> Same as RMP 1</p>

Resource	No Action RMP 1	RMP 3E	RMP 5
<b>TRAFFIC AND TRANSPORTATION</b>	<p><b>IRRM:</b> None</p> <p><b>Construction:</b> Traffic generated by employees or contractors during crest elevation activities would result in a negligible increase in traffic in the area. Impacts would be direct, temporary, and <i>less than significant</i>.</p> <p><b>Operation and Maintenance:</b> Impacts would be direct, temporary, and <i>less than significant</i>.</p>	<p><b>IRRM:</b> Same as RMP 1</p> <p><b>Construction:</b> Delivery or removal of materials from the interior of the Reservoir are expected to result in only a negligible increase in traffic in the vicinity of the Project. Impacts would be direct, temporary, and <i>less than significant</i>. No indirect impacts are anticipated.</p> <p><b>Operation and Maintenance:</b> Same as RMP 1</p>	<p><b>IRRM:</b> Same as RMP 1</p> <p><b>Construction:</b> Delivery or removal of materials from the interior of the Reservoir are expected to result in only a negligible increase in traffic in the vicinity of the Project. Impacts would be direct, temporary, and <i>less than significant</i>. No indirect impacts are anticipated.</p> <p><b>Operation and Maintenance:</b> Same as RMP 1</p>

Resource	No Action RMP 1	RMP 3E	RMP 5
<b>ESTHETICS</b>	<p><b>IRRM:</b> None</p> <p><b>Construction:</b> Although the Dam crest would be raised to its design elevation by restoring 1.8 ft. of material on top of the crest, the overall appearance of the Dam would not change as this increase in Dam elevation would be unnoticeable close up or from a difference compared to the overall height of the Dam. Therefore, the long-term visual impacts would be direct, permanent, and <i>less than significant</i>.</p> <p><b>IRRM:</b> None</p>	<p><b>IRRM:</b> None</p> <p><b>Construction:</b> The 12 foot high wall on top of the embankment crest would block views of the San Gabriel Mountains as well as the Nature Area and views of the Whittier Narrows Recreation Area in the Reservoir. This would be considered a direct, permanent, <i>significant and unavoidable</i> visual impact. No indirect impacts are anticipated.</p> <p><b>IRRM:</b> Same as RMP 1</p>	<p><b>IRRM:</b> None</p> <p><b>Construction:</b> The 5 foot high parapet wall between Lincoln Ave, and the Montebello Hills would not be visible from the surrounding area. Impacts would be direct, temporary, and <i>less than significant</i>.</p> <p><b>IRRM:</b> Same as RMP 1.</p>

Resource	No Action RMP 1	RMP 3E	RMP 5
<b>RECREATION</b>	<p><b>IRRM:</b> None</p> <p><b>Construction:</b> For the crest elevation restoration, Bicentennial Park would be used as a batch plant for the crest elevation restoration. Upon completion of construction the Park would be left cleared and graded to be ready for development. Since the area is not used as designed, impacts would not result in construction or operational activities that permanently conflict with recreational uses. Impacts would be direct, temporary, and <i>less than significant</i>. No indirect impacts are anticipated.</p> <p><b>Operation and Maintenance:</b> None</p>	<p><b>IRRM:</b> None</p> <p>Construction; Pico Rivera Golf Course and Streamland Park are leased to the City of Pico Rivera for Recreational Purposes. These lands will be used as temporary construction areas. Upon completion of construction, the area of Streamland Park would remain Recreation, though the footprint of the area would be reduced. Impacts would be direct, permanent, and <i>less than significant</i>. The area of the Pico Rivera Golf Course would be developed as the runout channel and a portion of the area re-classified as Operations. Impacts would be direct and permanent, <i>significant and unavoidable</i>.</p> <p><b>Operation and Maintenance:</b> Same as RMP 1.</p>	<p><b>IRRM:</b> None</p> <p>Construction; Pico Rivera Golf Course and Streamland Park are leased to the City of Pico Rivera for Recreational Purposes. These lands will be used as temporary construction areas. Upon completion of construction, the area of Streamland Park would remain Recreation, though the footprint of the area would be reduced. Impacts would be direct, permanent, and <i>less than significant</i>. The Pico Rivera Golf Course would be closed during construction. At completion of construction, the Golf Course would be left cleared for future development. <i>Impacts would be direct, temporary and less than significant.</i></p> <p><b>Operation and Maintenance:</b> Same as RMP 1.</p>

Resource	No Action RMP 1	RMP 3E	RMP 5
UTILITIES	<p><b>IRRM:</b> None</p> <p><b>Construction:</b> None</p> <p><b>Operation and Maintenance:</b> None</p>	<p><b>IRRM:</b> Same as RMP 1</p> <p><b>Construction:</b> Short term interruption due to disconnect and reconnections of the utilities. Impacts are direct, temporary, and <i>less than significant</i>. No indirect impacts are anticipated.</p> <p><b>Operation and Maintenance:</b> Same as RMP 1</p>	<p><b>IRRM:</b> Same as RMP 1</p> <p><b>Construction:</b> Same as RMP 3E.</p> <p><b>Operation and Maintenance:</b> Same as RMP 1.</p>



Resource	No Action RMP 1	RMP 3E	RMP 5
<b>PUBLIC HEALTH AND SAFETY</b>	<p><b>IRRM:</b> No direct impact on public health and safety as they are mainly administrative or technical exercises and no construction activity is anticipated. The IRRMs could have beneficial indirect effects, however, as they may aid in the reduction of risk as a result of Dam failure from Dam breach.</p> <p><b>Construction:</b> Impacts for the crest elevation restoration would be direct, temporary and <i>less than significant</i>. No indirect impacts are anticipated. Because this alternative does not address the PFMs, the risk of Dam failure through Dam breach would remain higher than under RMP 3E or RMP 5.</p> <p><b>Operation and Maintenance:</b> Impacts for operations and maintenance activities would be direct, temporary and <i>less than significant</i>. No indirect impacts are anticipated.</p>	<p><b>IRRM:</b> Same as RMP 1</p> <p><b>Construction:</b> The construction of an auxiliary spillway is a means to increase spillway capacity so as to prevent failure of the dam due to overtopping during extreme storms; it is possible that under extreme conditions, this would result in an earlier increase of flow into the San Gabriel River over existing conditions. The increase release in water from behind the Dam is not expected to significantly add to downstream inundation. The addition of the parapet walls on top of the Dam crest would raise the elevation of the Dam crest from 239.0 ft. to 251.0 ft. Water impoundment upstream of the Dam could be increased to this higher elevation. Elevation 251.0 ft. would also expand the upstream water inundation boundary beyond the current upstream, probable maximum flood line. These impacts are direct, permanent, and <i>less than significant</i>.</p> <p><b>Operation and Maintenance:</b> Same as RMP 1.</p>	<p><b>IRRM:</b> Same as RMP 1</p> <p><b>Construction:</b> Impacts involved in adding RCC and other components of RMP 5 would be direct, permanent, and <i>less than significant</i>.</p> <p><b>Operation and Maintenance:</b> Same as RMP 1</p>

Resource	No Action RMP 1	RMP 3E	RMP 5
<b>PUBLIC SERVICES</b>	<p><b>IRRM:</b> No direct impacts are anticipated. Indirect impacts could entail a need for additional emergency services or reallocation of existing services due to Emergency Action Plan planning and coordination activities. Indirect impacts would be temporary and <i>less than significant</i>.</p> <p><b>Construction:</b> None</p> <p><b>Operation and Maintenance:</b> None</p>	<p><b>IRRM:</b> Same as RMP 1.</p> <p><b>Construction:</b> Indirect effects of the construction and operation of RMP 3E could include the need to reallocate emergency services including police and fire protection to areas above the Reservoir and below the auxiliary spillway that may be subject to changes in inundation. No direct effects are anticipated. Indirect effects are expected to be temporary and <i>less than significant</i>.</p> <p><b>Operation and Maintenance:</b> Same as RMP 1</p>	<p><b>IRRM:</b> Same as RMP 1</p> <p><b>Construction:</b> None</p> <p><b>Operation and Maintenance:</b> Same as RMP 1.</p>

A summary of each RMP's impacts by resource area follows.

**Earth Resources:** RMP 5 would not require construction of a coffer dam or raising of the roadways, so no borrow area is required compared to the need for the approximately 55-acre borrow area (and possible second borrow area) for RMP 3E. More impacts to earth resources result from the borrow area under RMP 3E, which increases the potential for adverse impacts.

**Water Resources:** Since RMP 5 would not require borrow material, the crossover channel would not need to be realigned, culverts in the crossover channel would not be needed, and a portion of the San Gabriel River levee would not be removed for the runout channel. This results in less potential impacts to water resources from RMP 5.

**Air Quality and Greenhouse Gases:** Since RMP 5 would require less hauling of borrow or fill material, there would be less pollutant emissions than RMP 3E. Similarly, neither alternative is expected to have an impact on climate change.

**Noise and Vibration** Construction impacts associated with both noise and vibration for all RMP's are expected to be less than significant, with implementation of Environmental Commitments to reduce these impacts to a level of less than significant for certain activities.

**Biological Resources:** RMP 5 is expected to have direct, though temporary, impact on 21 acres (including batch plants and haul routes on the Central and Western Embankments) of designated critical habitat for CAGN within the Reservoir. RMP 3E is estimated to have direct, though temporary, impact on 117 acres of DCH for CAGN within the Reservoir. However, due to indirect impacts associated with construction noise and activity, and the intensity of activity in the construction area, the approximate 169 acres south of Siphon Road are expected to be largely unusable by CAGN for dispersal for a majority of the 2.5-year construction period inside the Reservoir. Under RMP 3E, there is expected to be a direct loss of 4 current vireo territories due to the activities associated with the construction of the crossover weir/crossover channel, the potential loss of 1 current vireo territory in the San Gabriel River as the result of construction of the auxiliary spillway, and the potential loss of an additional 4 territories along Siphon Road due to the continual traffic along the haul routes and the operation of the batch plants, as well as activity in the borrow area. Under RMP 5, no LBVI territories will be directly affected by project construction activities. Eight current LBVI nesting territories along Siphon Road may be indirectly effected due to impacts from noise of truck and other vehicle traffic along Siphon Road and the cross over weir over as well as noise from the batch plants over the 2.5-year construction period inside the Reservoir.

**Cultural Resources:** RMP 3E is likely to have a greater impact than RMP 5 because of the proposed borrow area's disturbance on known and unknown sites.

**Socioeconomics and Environmental Justice:** Both RMP 3E and RMP 5 are not expected to displace substantial number of residents, businesses, or employees. Both RMP 3E and 5 may contribute to the local economy through buying power of construction workers. Neither RMP is expected to displace important community institutions.

For site specific resources such as recreation, however, RMP 3E would result in significant and unavoidable impacts because the runout channel would be constructed over the area of the current Pico Rivera Golf Course and a portion of the area would be re-classified as an O&M area. The area of Streamland Park to be used as a staging area would also be removed, but would likely be available for recreation development following construction closeout. Nonetheless, impacts to recreation would likely be long term. Both Streamland Park and the Golf Course will be slightly reduced in size by the construction of the trench drain. These impacts may result in disproportionate impact to residents in the city of Pico Rivera that may utilize the golf course and park. RMP 5 would not result in a reclassification of the Pico Rivera Golf Course area as an O&M area, but the disruption to recreation activities in this area would be similar.

Impacts associated with recreation resources, deemed to be significant under NEPA, would disproportionately affect residential developments in Pico Rivera, east of Rosemead Boulevard and the San Gabriel River which are immediately adjacent to the construction.

**Hazardous, Toxic and Radioactive Waste:** The borrow area(s) in RMP 3E would be designed to avoid excavation to depths that would encounter contaminated groundwater and the location of the site would not interfere with on-going groundwater extraction and treatment operations. Because of the need for borrow, however, RMP 3E has a greater potential for exposure of contaminants than RMP 5.

**Land Use:** RMP 3E would require changes to land use classifications of the Federal Project due to the change from Recreation-Low Density to Operations with the construction of the runout channel over the Pico Rivera Golf Course.

**Traffic and Transportation:** Rosemead Blvd., a major artery, would not need to be modified under RMP 5 due to no significant Dam crest raise; in contrast, Rosemead Blvd., Lincoln Ave., and Rooks Road would need to be raised under RMP 3E leading to road closure.

**Esthetics:** RMP 5 would result in lesser impacts compared to RMP 3E as RMP 5 would not require the 12 foot high parapet wall on the Dam crest. Impacts to esthetics are expected to be significant while, because of the limited height of the parapet wall and other factors, the impacts from RMP 5 are expected to be less than significant.

**Recreation:** While both RMP 3E and RMP 5 would result in closure and dismantling of Streamland Park, the Pico Rivera Golf Course for staging areas and a permanent loss of 90 ft. for the trench drain, and closure of the San Gabriel River and LARio Trails, RMP 3E would result in the permanent loss of a portion of the Pico Rivera Golf Course for Operational use with the runout channel, and thus have a greater potential impact.

**Utilities:** Temporary relocation and restoration of utilities under both RMP 3E and RMP 5 would have similar impacts, except under RMP 3E one high power transmission tower located in the Pico Rivera Golf Course would be relocated.

**Public Health and Safety:** Impacts would be similar under both RMP 3E and RMP 5.

**Public Services:** Impacts would be similar under RNP 3E and RMP 5.

### **Summary of Environmental Impacts**

Under the No Action RMP, the project would continue to operate in its current state, with ongoing maintenance and the foreseeable restoration of the dam's crest to its original elevation. Regular and recurring maintenance activities are expected to have only minor impacts on human health and the environment. The dam crest restoration is expected to have temporary construction impacts similar to those described in Chapter 3. These construction impacts would not be as extensive as those under either RMP 5 or 3E. However, under the No Action RMP, the Whittier Narrows Dam will continue to present an unacceptable risk to downstream populations, and the incremental risk associated with dam failure through dam breach would not be addressed, endangering economic and environmental conditions in the area. The No-Action RMP includes an elevated risk of dam failure because it does not decrease the likelihood of dam failure through breach caused by overtopping or backward erosion piping. Because of the potential consequences of dam failure that have a higher likelihood of occurring under the No-Action Alternative, the Dam Safety Modification Study has determined that this plan is not acceptable under the Corps' TRGs. This is primarily due to the life safety risk presented by the dam in its current state. In addition to the unacceptable risks to life safety, the environmental effects of a dam breach are expected to be high and adverse across nearly all resource areas. Because the environmental impacts of dam failure cannot be reasonably isolated from general storm impacts, beyond the consequence of unacceptable life safety risk, the environmental effects of dam failure are not described in specific detail as an effect of dam operations under the no action RMP in this Draft EIS.

RMP 3E and 5 each involve major structural modifications to the Dam and are expected to have many similar construction impacts on the environment across the 15 resource areas that were reviewed in the Draft EIS. Similar construction impacts between 3E and 5 are related to the development of temporary batch plants, haul routes, and staging areas during the construction periods of both RMP's. Concrete is the primary construction material to be used these proposals, and is made out of aggregate, water, and cement and mixed, or "batched," at a batch plant and typically needs to be placed within 90 minutes of being batched. As a result, on site batch plants were deemed necessary. Three batch plant locations are designated upstream of the Dam within the Reservoir as shown on Figure 3.7-1. The construction of batch plants and attendant haul routes is described in section 3.7.2. Areas would be, cleared, grubbed, and leveled as necessary and then dismantled, re-graded and hydroseeded. The construction impacts associated with batch plants and haul roads is similar under both RMP 3E and RMP 5. RMP 5 would not require development of "new" haul roads to access the borrow areas.

One temporary source of potential impacts under both RMP's is the development of the two staging areas using Corps-managed federal lands that are currently occupied by Streamland Park and Pico Rivera Golf course. This element of the construction plan represents the source of some temporary impacts to recreation, with attendant environmental justice consideration due to the disruption of the use of lands currently leased for recreational or light industrial uses as shown in Figure 3.7-1. The use of these sites is necessary because the staging areas cannot be safely constructed in the reservoir or in any other area within the Project. For example, there is not sufficient room along the downstream toe of the dam to locate all of the facilities for the staging

area. Placement of the staging areas within the reservoir was also not feasible because the areas were either too low an elevation to safely locate offices (western portion), or they did not provide sufficient access to and from the construction areas (central and eastern portions). Also, any further use of the reservoir area beyond the borrow areas, batch plants and haul roads would have added potential effects to critical habitat for listed species. The Corps intends to take steps to mitigate for these impacts through communication with the local community and minimizing effects to the greatest extent practicable. However, there are certain unavoidable effects that will arise. A notable and permanent impact will arise under RMP 3E with the installation of the auxiliary spillway causing the permanent reclassification of a portion of the current Pico Rivera golf course from recreation to operations. Under RMP 5 and 3E, the installation of the Trench Drain will require permanent use of a narrow portion of the land along the embankment, which may have permanent impacts to the existing fertilizer company adjacent to the central embankment and will reduce the footprint of the golf course and Streamland park.

Under all alternatives, on-going operations and maintenance activities as well as IRRMs would be implemented. Impacts would be less than significant for all alternatives.

In addition to RMP 5 being the TSP as described in Chapter 3, taking into account the balance of impacts summarized above, the Corps has also determined that RMP 5 is the environmentally preferred alternative.

## **CHAPTER 8 COORDINATION, CONSULTATION, AND COMPLIANCE WITH ENVIRONMENTAL LAWS**

### **8.1 PUBLIC INVOLVEMENT PROGRAM**

Public involvement is a process by which interested parties and affected individuals, organizations, and government agencies are consulted and included in the decision-making process of a planning effort. In providing public service, the Federal role in water resources planning is to respond to what the public perceives as problems and opportunities and to formulate and select alternative plans that reflect public preferences. The Administrative Procedures Act and the National Environmental Policy Act (NEPA), among other Federal laws and regulations mandate public involvement. Federal planning policies and Corps' regulations and practices have consistently required and encouraged this practice. All this must occur, however, with the awareness that the Corps cannot relinquish its legislated decision-making responsibility.

The purpose of public involvement is to ensure that the Corps' programs are responsive to the needs and concerns of the public. The objectives of public involvement are to provide information about proposed Corps activities to the public; to make the public's desires, needs, and concerns known to the decision makers; to provide for consultation with the public before decisions are reached; and to take into account the public's views for reaching decisions.

NEPA, among other Federal laws and regulations, mandates public involvement. The purpose is to ensure inclusion of the needs and concerns of the other jurisdictional agencies including government agencies (Federal, state, and local), organizations, stakeholders, interested parties, affected individuals, and the public are included and addressed in the decision making process (40 C.F.R. 1503.1 and 1506.3.6). Federal planning regulation and Corps policies and guidance have consistently required and encouraged this practice. All this must occur however, with the awareness that the Corps cannot relinquish its legislated decision-making responsibility.

Three recognized agency and interested public periods of direct involvement include: (1) the public scoping process in the early Draft EIS preparation stage; (2) the review period of the Draft EIS when the draft is complete; and (3) following completion of the Final EIS, a review period before the Record of Decision is signed.

#### **8.1.1 Public Scoping Process**

A Notice of Intent (NOI) was published in the *Federal Register* on Monday, July 22, 2013, Vol. 78, No. 140, 43686 (Appendix A) describing the Corps' intent to prepare a Draft EIS in conjunction with the engineering report for the Whittier Narrows Dam Safety Modification Project.

Several letters were received in response to the publication of the NOI. These letters and are included in Appendix A. Comments were received from the U.S. Environmental Protection



Agency (EPA) and the Water Replenishment District of Southern California (WRD), Department of Homeland Security, Floodplain Management and Insurance Branch (FEMA), and South Coast Air Quality Management District (SCAQMD). A summary of comments received includes:

- **EPA—Supports the proposed project**
  - Address cumulative air quality impacts
  - Address impacts on ongoing groundwater cleanup in Project area
  - Address impacts on Waters of the US by preferred plan
  - A 404 permit will not be required, but should be in compliance with 404 (b)(a)
  - Address climate change impacts
  - As the project site is located in one of the five Biogeographic Population Units of the Southern California Steelhead Recovery Plan, coordinate with USFWS and NOAA/NMFS
- **SCAQMD**
  - If project generates significant adverse air quality impacts, implement measures to minimize or eliminate these impacts.
- **WRD—Supports Proposed Project**
  - Address impacts by Proposed Project on Water Conservation
  - Address Environmental Justice for the No Action Alternative.
- **FEMA**
  - Form letter regarding building requirements in the floodplain

### **8.1.2 Public Scoping Meeting**

The Public Scoping Meeting was held at the Pico Rivera Golf Course in Pico Rivera, California on September 11, 2013. This meeting was to inform the public on the deficiencies identified for the Whittier Narrows Dam facilities and to report on the ongoing investigations and activities being conducted at the facility, to outline the process moving forward, and to provide an opportunity to submit questions and general comments on the proposed Whittier Narrows DSM Project.

The Corps presented a general overview of the history of the Project, the potential failure modes and consequences, and the NEPA process and study schedule. The meeting attendees asked questions and raised issues (see Public Scoping Meeting Notes, Appendix A) on resource concerns, alternatives and potential impacts that should be considered in the Draft EIS.

Public interest in the project is high and the Corps will continue agency and public participation efforts throughout the study and construction phases of the DSM Project. Mailing and e-mail distribution lists are being maintained to communicate and coordinate with various government entities and officials, tribal groups, and other stakeholders. The Corps also maintains a public website at <http://www.spl.usace.army.mil/Media/Fact-Sheets/Article/793627/whittier-narrows-dam>

### **8.1.3 Stakeholder Meeting**

A meeting with a variety of stakeholders and interested parties was held on 18 May 2013 at the Whittier Narrows Dam Baseyard conference room. Meeting attendees included representatives from the City of Whittier (landowners within the Basin), Los Angeles County Department of Public Works (LACDPW), City of Pico Rivera, Los Angeles County Department of Parks and Recreation (LACPR), Cook Hill Properties (Developer of Montebello Hills), and Southern California Edison (SCE). Topics discussed included:

- Land ownership areas
- Where will borrow sites be
- Water well locations
- Sedimentation in Rio Hondo
- Over-banking of Rio Hondo north of SR-60 and Triple B areas
- Impacts to Nature Center and in particular gnatcatcher critical habitat
- Project timeline and costs
- Communication Plan and Project website

### **8.1.4 Emergency Managers Meeting**

During a meeting of the Lower San Gabriel Valley city emergency managers on December 2013, the Corps gave a presentation about the on-going Whittier Narrows Dam Safety Modification Study. As part of the presentation, inundation maps depicting various scenarios of flooding as a result of San Gabriel River spillway discharges and Dam failure were presented. The attendees broke into groups in order for the Corps to solicit current information regarding the status of City Evacuation Plans. Only two cities had a plan being prepared. Most others had a website with limited instructions with only Pico Rivera having a plan with evacuation routes. A summary is included in Section 4.15.

### **8.1.5 Review of Draft Environmental Impact Statement**

NEPA provides guidance for the consultation and public involvement by inviting comments after preparing a Draft EIS and before preparing a Final EIS by: (1) Obtaining comments of any Federal agency which has jurisdiction by law or special expertise with respect to any environmental impact involved or which is authorized to develop and enforce environmental standards; (2) Requesting the comments of appropriate state and local agencies which are authorized to develop and enforce environmental standards, Indian tribes, any agency which has requested that it receive statements on actions proposed; and (3) Requesting comments from the public, affirmatively soliciting comments from those persons or organizations that may be interested or affected. An agency may request comments on a final EIS before the decision is finally made. In any case, other agencies or persons may make comments before the final decision, unless a different time is provided (40 C.F.R. 1506.10).

Notice of Availability and/or a cd of the Draft EIS has been sent to agencies, stakeholders, and general public for review. The Mailing List is located in Appendix A. The weblink to the draft EIS is [www.fws.gov](http://www.fws.gov)

#### **8.1.6 Public Review Meeting**

After a Notice of Availability and the Draft EIS is released, a public meeting will be scheduled during the 45-day comment period to be held in the vicinity of the Proposed Project to receive public comments on the Draft EIS. A transcript of the meeting and comment letters received from agencies and stakeholders will be included as part of the Final EIS. Comments will be considered by the Corps in the preparation of the Final EIS and in its decision on how to reduce risk to the public and property from Dam safety issues and safely meet authorized Project purposes.

#### **8.1.7 Final EIS Review Period**

The Final EIS will be published and made available to agencies and interested parties for a period of 30 days when responses have been prepared to all comments received and revisions to the Final EIS have been made. An agency also may request to make comments on a Final EIS before the decision is finally made. In any case, other agencies or persons may provide comments before the final decision is made unless a different time is provided (40 C.F.R. 1506.10). Additional comments would be responded to and included prior to the ROD being signed by the Assistant Secretary of the Army, Civil Works (ASA (CW)).

### **8.2 AGENCY COORDINATION**

#### **8.2.1 U.S. Fish and Wildlife Service (USFWS)**

Informal coordination with the U.S. Fish and Wildlife Service (USFWS) commenced in August 2013 with a field visit to Whittier Narrows Dam Reservoir with the Corps' environmental team members. Coordination under the Endangered Species Act is ongoing.

#### **8.2.2 California State Historic Preservation Officer (SHPO)**

Consultation with the SHPO, consulting Tribes, and other interested parties is being conducted concurrently with public review of this EIS. Areas within and adjacent to the footprint of the preferred RMP 5 have been re-surveyed to inventory historic properties. Consultation includes determinations of eligibility and effect for three sites that would be directly impacted by the preferred alternative, the Montebello Oil Field (P-19-003813), the Whittier Narrows Dam, the Pico Rivera Golf Course, and one that may be subject to indirect impacts, the concrete slab foundation with associated other features (P-19-004221). If any of these sites is determined to be an historic property and will be adversely affected by the project, then consultation will include resolution of these impacts.

### **8.3 ENVIRONMENTAL LAWS AND EXECUTIVE ORDERS**

The status of the preferred RMP compliance with applicable Federal environmental laws, Executive Orders, and Corps' regulations is summarized below. Prior to initiation of construction, the Proposed Project would be in compliance with all applicable laws, regulations, and Executive Orders.

#### **8.3.1 National Environmental Policy Act (NEPA) of 1969 (Public Law 91-190), as amended**

NEPA applies to all Federal agencies and most of the activities they manage, regulate, or fund that affect the environment. This act requires full disclosure of the environmental effects, alternatives, potential mitigation, and environmental compliance procedures of proposed actions. NEPA requires the preparation of an appropriate document to ensure that Federal agencies accomplish the law's purposes. Full compliance with NEPA is achieved with the filing of the final EIS/EIR with USEPA and with the Corps' issuance of a Record of Decision

#### **CEQ Regulations for Implementing the Procedural Provision of NEPA (40 CFR Part 1500 et seq.)**

The Council on Environmental Quality has prepared regulations for implementing NEPA, including those pertinent to NEPA and agency planning, preparation and distribution of an EIS, procedures for the open comment period, resolution of environmentally unsatisfactory actions, agency responsibilities, and other requirements of NEPA. This document has been prepared in compliance with these regulations.

#### **U.S. Army Corps of Engineers Procedures for Implementing NEPA (33 C.F.R., part 230, ER 200-2-2)**

This regulation provides guidance for implementation of the procedural provisions of NEPA for the Civil Works Program of the U.S. Army Corps of Engineers. It supplements Council on Environmental Quality (CEQ) regulations 40 CFR 1500-1508, in accordance with 40 C.F.R. 1507.3, and is intended to be used in conjunction with the CEQ regulations. This regulation is applicable to all HQUSACE elements and all Field Operating Activities (FOAs) having responsibility for preparing and processing environmental documents in compliance with these regulations.

#### **8.3.2 Clean Water Act (33 U.S. C. 1251 et seq.)**

Section 401 of the Clean Water Act (CWA) requires every applicant for a Federal license or permit that may result in a discharge into navigable waters to obtain a State Water Quality Certification (Certification) or waiver that the proposed activity will comply with state water quality standards (*i.e.* beneficial uses, water quality objectives, and anti-degradation policy). The Los Angeles Regional Water Quality Control Board (RWQCB) issues section 401 Water Quality Certifications for activities within Los Angeles County.

Section 402 of the CWA prohibits the discharge of pollutants into "Waters of the US" from any point source unless the discharge is in compliance with the National Pollution Discharge

Elimination System (NPDES) Permit. Section 402 requires a NPDES Permit for the discharge of storm water from municipal storm sewer systems (MS4) serving urban areas with a population greater than 100,000; construction sites that disturb one acre or more; and industrial facilities. The RWQCB administers these permits with oversight provided by the SWRCB and USEPA, Region IX.

Section 404 authorizes the Secretary of the Army acting through the U.S. Army Corps of Engineers to issue permits for the discharge of dredged or fill materials into the Waters of the US, including wetlands at specified disposal sites. The selection and use of disposal sites must be in accordance with guidelines developed by the Administrator of the USEPA in conjunction with the secretary of the Army and published in 40 C.F.R. Part 230 (known as the 404(b) (1) guidelines). Under the Section 404(b) (1) guidelines, the Corps shall examine practicable alternatives to the proposed discharge and permit only the Least Environmentally Damaging Practicable Alternative (LEDPA).

For Corps actions, the Corps does not issue permits to itself, but demonstrates compliance with Section 404 through a Section 404(b) (1) analysis. The requirements and conditions of nationwide permits and regional permits may be applied to Corps actions and thus considered when addressing compliance with Section 404.

The potential effects of the proposed project on water quality have been evaluated and are discussed in Section 5.2. Those sections of the CWA most relevant to this project are described as follows:

Section 401 requires compliance with water quality standards. The Corps will continue to coordinate with the RWQCB throughout the remaining study, design and construction phases of this project. This Draft EIS contains sufficient information regarding water quality effects, including consideration of the Section 404(b)(1) Guidelines, to meet the EIS content requirements of Section 404(r), should that exemption be invoked.

The Corps does not issue itself permits for Corps Civil Works projects but must comply with the 404(b)(1) guidelines. A Section 404(b)(1) evaluation has been prepared and is found in Appendix F. With implementation of the avoidance and minimization measures listed therein, the proposed discharges of fill will be in compliance with Section 404 of the Clean Water Act

To comply with Section 402 of the CWA, coverage under the National Pollution Discharge Elimination System (NPDES) General Permit for Storm Water Discharges Associated with Construction and Land Use Disturbance Activities (Order No. 2010-0014-DWQ, as amended) would be obtained prior to construction. A Stormwater Pollution Protection Plan (SWPPP), which would establish best management practices for storm water and non-storm water source control and pollutant control, would be prepared and implemented by the construction contractor.

The Preferred RMP is located within the jurisdiction of the Los Angeles RWQCB, and would be implemented in compliance with this Act.

### **8.3.3 Clean Air Act of 1970 (42 U.S.C. 7401 et seq.)**

*The 1977 Amendments to the Clean Air Act* enacted legislation to control seven toxic air pollutants. The USEPA adopted National Emission Standards for Hazardous Air Pollutants, which have been designed to control Hazardous Air Pollutants and emissions to prevent adverse health effects in humans.

*1990 Amendments to the Clean Air Act* determine the attainment and maintenance of NAAQS (Title I), motor vehicles and reformulation (Title II), hazardous air pollutant (Title III), acid deposition (Title IV), operating permits (Titles V), stratospheric ozone protection (Title VI), and enforcement (Title VII).

*General Conformity.* Under Section 176(c) of the Clean Air Act Amendments (CAAA) of 1990, the Lead Agency is required to make a determination of whether the Proposed Action “conforms” to the State Implementation Plan (SIP). Conformity is defined in Section 176(c) of the CAAA as compliance with the SIPs purpose of eliminating or reducing the severity and number of violations of the NAAQS and achieving expeditious attainment of such standards. However, if the total direct and indirect emissions from the Proposed Action are below the General Conformity Rule “*de minimis*” emission thresholds, the Proposed Action would be exempt from performing a comprehensive Air Quality Conformity Analysis, and would be considered to be in conformity with the SIP.

The Preferred Risk Management Plan (RMP) does not include any stationary sources that would be subject to permitting or recordkeeping requirements of the Clean Air Act; however, under Section 176(c) of the Clean Air Act Amendments (CAAA) of 1990, the Lead Agency is required to make a determination of whether the Preferred RMP “conforms” to the State Implementation Plan (SIP). Conformity is defined in Section 176(c) of the CAAA as compliance with the SIP’s purpose of eliminating or reducing the severity and number of violations of the NAAQS and achieving expeditious attainment of such standards. However, if the total direct and indirect emissions from a proposed project are below the General Conformity Rule “*de minimis*” emission thresholds, the Preferred Alternative would be exempt from performing a comprehensive Air Quality Conformity Analysis and would be considered to be in conformity with the SIP.

Based upon the analysis of air quality impacts, a conformity determination for a specific pollutant is not required because for each criteria pollutant or precursor the total of direct and indirect emissions of the criteria pollutant or precursor in the nonattainment area caused by the Preferred RMP would not equal or exceed any of the rates in 40 C.F.R. 93.153(b)(1) or (20). With approval of the Preferred RMP, the Corps would implement environmental commitments (AQ-1 to AQ-9) to ensure that impacts to air quality would not be considered to be regionally significant, such that construction emissions would not violate NAAQS or state standards and emissions would be below the *de minimis* thresholds. The Preferred RMP would have no long-term impacts on local or regional air quality.

Based upon a recent U.S. Supreme Court decision (*Massachusetts v. EPA* (2007) 549 U.S. 497), the USEPA has been given the authority to regulate CO<sub>2</sub> or GHG emissions as an air pollutant

under the Federal Clean Air Act (42 U.S.C. §7602(g)). The USEPA has adopted *40 CFR Part 98 – Mandatory Reporting of Greenhouse Gases Rule* which requires mandatory reporting of GHG emissions for facilities that emit more than 25,000 metric tons of CO<sub>2</sub> equivalent (CO<sub>2</sub>e) emissions per year (USEPA, 2009) and *40 CFR Part 52 – Proposed Prevention of Significant Deterioration and Title V Greenhouse Gas Tailoring Rule* which mandates Prevention of Significant Deterioration (PSD) permitting to facilities whose stationary source CO<sub>2</sub>e emissions exceed 75,000 tons per year (USEPA, 2011). Neither of these regulations is applicable to the Preferred RMP because it has no operating stationary emission sources that are subject to these regulations.

Section 5.3 and Appendix B of this Draft EIS characterize the estimated air emissions associated with all action alternatives for both construction and operations. The project is in compliance with the Clean Air Act.

#### **8.3.4 Noise Control Act of 1972, as amended (42 U.S.C. 4901 et seq.)**

Noise generated by any activity, which may affect human health or welfare on Federal, state, county, local, or private lands must comply with noise limits specified in the Noise Control Act of 1972. Major sources of noise include transportation vehicles and equipment, machinery, appliances, and other products in commerce. The Noise Control Act of 1972 establishes a national policy to promote an environment for all Americans free from noise that jeopardizes their health and welfare. Primary responsibility for control of noise rests with state and local governments, although the USEPA is directed by Congress to coordinate the programs of all Federal agencies relating to noise research and noise control.

The Preferred RMP would result in temporary construction-related noise emissions. The Corps would reduce noise impacts through implementation of environmental commitments (N-1 through N-13). Operation and maintenance of the Preferred RMP would not alter the existing noise environment, as operation and maintenance activities would remain unchanged.

#### **8.3.5 Endangered Species Act, as amended (16 U. S. C. 1531 et seq.)**

The Endangered Species Act (ESA) protects threatened and endangered species and their designated critical habitat from unauthorized take. Section 9 of the Act prohibits such take, and defines take as to harm, harass, pursue, hunt, shoot, wound, kill, trap, capture, collect, or attempt to engage in such conduct. Section 7 of the ESA requires Federal agencies to insure that any action authorized, funded or carried out by them is not likely to jeopardize the continued existence of listed species or modify their critical habitat.

Coordination under ESA Section 7(a)(2) continued up to present time with field meetings in early 2018. Effects and minimization measures to CAGN critical habitat were discussed with initial agreement. Effects and minimization measures to LBVI due to project actions were also included.



### **8.3.6 Migratory Bird Treaty Act (MBTA) (16 U. S. C. 715- 715s)**

The Migratory Bird Treaty Act prohibits the taking or harming of any migratory bird, its eggs, nests, or young without an appropriate Federal permit. Almost all native birds are covered by this Act and any bird listed in wildlife treaties between the United States and several countries, including Great Britain, Mexican States, Japan, and countries once part of the former Soviet Socialist Republics. A “migratory bird” includes the living bird, any parts of the bird, its nest, or eggs. The take of all migratory birds is governed by the MBTA’s regulation of taking migratory birds for educational, scientific, and recreational purposes and requiring harvest to be limited to levels that prevent over-utilization.

Under the Preferred RMP, and with implementation of the environmental commitments detailed in Section 5.5, there would be no significant adverse impacts to migratory bird breeding or nesting activity.

### **8.3.7 National Historic Preservation Act (Public Law 89-665; as amended by Public Law 113-287, 54 U.S.C. 300101 et seq.)**

The National Historic Preservation Act (NHPA), as amended, establishes the National Register of Historic Places (or “National Register”) and defines the Section 106 process requiring Federal agencies to consider the effects of an action on cultural resources in or eligible for listing in the National Register. Criteria for determining eligibility of cultural resources are provided in 36 C.F.R. Part 800. Even cultural resources that have not yet been discovered are subject to Section 106 review. Under § 106, Federal agencies are prohibited from approving any Federal “undertaking” (including the issuance of any license, permit or approval), without (1) taking into account the effects of the undertaking on the historic property, and (2) affording the Advisory Council on Historic Preservation (ACHP) a reasonable opportunity to comment on the undertaking. The NHPA requires an agency to stop and consider the consequences of its undertakings on any historic property, and assures that the agency does so by requiring it to receive comment from the ACHP, or agencies acting in its stead, and from the public before proceeding with any such undertaking.

In order to comply with the NHPA, a Federal agency considering an undertaking must go through the process outlined in the ACHP’s regulations at 36 C.F.R. Part 800.

In compliance with section 106 requirements, the SHPO and consulting Tribes will be consulted regarding the identification of historic properties and the effects of this undertaking on historic properties. As discussed in Section 5.6 (Environmental Commitments), if any unanticipated cultural resources are discovered during earth-disturbing activities associated with construction or operation and maintenance, they will need to be evaluated for their eligibility for inclusion in the National Register of Historic Places pursuant to 36 C.F.R. 800.13(b), post-review discoveries. Adverse effects to historic properties will be resolved through execution of a Programmatic Agreement.

### **8.3.8 Native American Graves Protection and Repatriation Act (25 U.S.C. § 3001, et seq.)**

The Act establishes rights of Indian tribes and Native Hawaiian organizations to claim ownership of certain cultural items, including human remains, funerary objects, sacred objects, and objects of cultural patrimony. Permits for the excavation or removal of cultural items protected by the act require Native American consultation, as do discoveries of cultural items found on, or taken from Federal or tribal lands, and requires repatriation of cultural items controlled by Federal agencies or museums receiving Federal funds. As discussed in Section 5.6 (Environmental Commitments), if any items covered by NAGPRA are discovered during earth-disturbing activities associated with construction or operation and maintenance, notification of the NAHC, County Coroner, and affiliated Tribes is required.

### **8.3.9 Federal Water Project Recreation Act of 1965, as amended**

The Federal Water Project Recreation Act of 1965, as amended requires that any Federal water project must give full consideration to opportunities afforded by the project for outdoor recreation and fish and wildlife enhancement.

### **8.3.10 National Trails System Act**

The Act acknowledges the increasing popularity of outdoor recreation and the need to promote access to and enjoyment of outdoor areas, both urban and more remote areas.

### **8.3.11 Occupational Safety and Health Act (29 U.S.C. § 651, et seq.)**

The Occupational Safety and Health (OSH) Act was enacted to ensure safe and healthful conditions for working men and women. The OSH Act created the Occupational Safety and Health Administration (OSHA) at the federal level and provided that states could run their own safety and health programs as long as those programs were at least as effective as the federal program. Under the OSH Act, OSHA has adopted regulations designed to protect workers against the effects of occupational noise exposure. These regulations list permissible noise level exposure as a function of the amount of time during which the worker is exposed. The regulations further specify a hearing conservation program that involves monitoring the noise to which workers are exposed, ensuring that workers are made aware of overexposure to noise, and periodically testing the workers' hearing to detect any degradation. In addition, OSH Act specifies requirements for a workplace free from serious recognized hazards, including employee training, availability of safety equipment, accident-prevention programs, and hazardous substance exposure warnings. Implementation of the Proposed Project would be in compliance with the Act and these regulations, as all applicable working conditions requirements would be followed.

### **8.3.12 Comprehensive Environmental Response, Compensation, and Liability Act**

The Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) provided the EPA with the authority to identify and clean up contaminated hazardous waste sites.

In 1986, the act was amended by the Superfund Amendment and Reauthorization Act Title III (community right-to-know laws). Title III states that past and present owners of land contaminated with hazardous substances can be held liable for the entire cost of the cleanup, even if the material was dumped illegally when the property was under different ownership (also known as Superfund).

No CERCLA-regulated waste is anticipated on site. During implementation (construction and operation/maintenance) of the proposed project, conformance with CERCLA would only be engaged if unforeseen waste is found or abandoned on-site in the future. The proposed project would be in compliance with this Act.

#### **8.3.13 Executive Order (EO) 11514, Protection and Enhancement of Environmental Quality, amended by Executive Order 11991, Relating to Protection and Enhancement of Environmental Quality**

This EO mandates that the Federal government provide leadership in protecting and enhancing the quality of the nation's environment to sustain and enrich human life. Federal agencies must initiate measures needed to direct their policies, plans and programs so as to meet national environmental goals. Corps regulations advocate early NEPA preparation and require impact statements to be concise, clear, and supported by evidence that agencies have made the necessary analyses.

#### **8.3.14 Executive Order 11593, Protection and Enhancement of the Cultural Environment**

This EO directs Federal agencies to inventory cultural properties under their jurisdiction, to nominate to the National Register all Federally-owned properties that meet the criteria, to use due caution until the inventory and nomination processes are completed, and to ensure that Federal plans and programs contribute to preservation and enhancement of non-Federal properties. The Preferred RMP would be consistent with the EO.

#### **8.3.15 Executive Order 11988, Floodplain Management**

Executive Order 11988 was signed into law on May 24, 1977, requiring that Federal agencies provide leadership and take action to restore and preserve the natural and beneficial values served by floodplains. Before proposing, conducting, supporting, or allowing an action in the floodplain, each Federal agency must determine if planned activities would affect the floodplain and evaluate the potential effects of the intended action on the floodplain's functions.

Guidelines for compliance with Executive Order 11988 identify an eight-step process for agencies to use in determining how projects would have potential impacts to or within the floodplain. As described in this guidance, if a proposed action is located within the base floodplain (Step 1), where the "base floodplain" is the area which has a one percent or greater chance of flooding in any given year (also referred to as the "100-year Flood Zone," "Flood Hazard Area," or "0.1 Exceedance Area"), agencies should conduct early public review (Step 2), identify and evaluate practicable alternatives to locating in the base floodplain (Step 3), identify

impacts of the proposed action (Step 4), develop measures to minimize the impacts and restore and preserve the floodplain as appropriate (Step 5), reevaluate alternatives (Step 6), and present the findings and a public explanation (Step 7), with the final step being to implement the action (Step 8) (FEMA, 2012).

Based on the above discussion, it has been determined that the Preferred Alternative would be in compliance with Executive Order 11988. The Preferred Alternative would have no adverse effects on floodplain function, and the Preferred Alternative is recommended as the most responsive option to planning objectives and requirements established by Executive Order 11988.

In accordance with this EO, the Corps shall take action to "...avoid to the extent possible the long and short term adverse impacts associated with the occupancy and modification of floodplains and to avoid direct or indirect support of floodplain development wherever there is a practicable alternative."

This EO requires that Federal Agencies take action to manage the risk and/or impacts of floods on human safety, health, and welfare; and restore and preserve natural and beneficial values served by the floodplains. Each agency also has the responsibility to evaluate potential effects of Federal actions that may be made within floodplains.

Compliance with this EO requires proper implementation of engineering regulations (ER) 1165-2-26, which states that the policy of the Corps with respect to floodplain management is to formulate projects which, to the extent possible, avoid or minimize adverse impacts associated with use of the base (100-year) floodplain and avoid inducing development in the base floodplain unless there is no practicable alternative.

EO 11988, Floodplain Management, signed 24 May 1977, revoked and replaced Executive Order 11296 issued 10 August 1966. EO 11988, as amended by EO 13960, requires Federal agencies to avoid to the extent possible the long and short-term adverse impacts associated with the occupancy and modification of natural flood plains and to avoid direct and indirect support of floodplain development wherever there is a practicable alternative. In accomplishing this objective, "each agency shall provide leadership and shall take action to reduce the risk of flood loss, to minimize the impact of floods on human safety, health, and welfare, and to restore and preserve the natural and beneficial values served by flood plains in carrying out its responsibilities." To comply with EO 11988, projects are formulated and recommended that, to the extent possible, avoid, minimize and/or mitigate adverse effects associated with use of the floodplain, and avoid inducing incompatible development in the floodplain unless there is no practicable alternative. Under the Order, the Corps is required to provide leadership and take action to:

- a. Avoid development in the base flood plain unless it is the only practicable alternative;
- b. Reduce the hazard and risk associated with floods;
- c. Minimize the impact of floods on human safety, health and welfare; and
- d. Restore and preserve the natural and beneficial values of the base flood plain.

The Water Resources Council Floodplain Management Guidelines for implementation of EO 11988 as referenced in the Engineer Regulation 1165-2-26, 30 March 1984, identify an eight-step process to determine how projects would have potential impacts to or within the floodplain. Each of the eight steps are discussed below. As described in this guidance, if a proposed action is located within the base floodplain (Step 1), where the “base floodplain” is the area which has a one percent or greater chance of flooding in any given year (also referred to as the “100-year Flood Zone,” “Flood Hazard Area,” or “0.1 Exceedance Area”), agencies should conduct early public review (Step 2), identify and evaluate practicable alternatives to locating in the base floodplain (Step 3), identify impacts of the proposed action (Step 4), develop measures to minimize the impacts and restore and preserve the floodplain as appropriate (Step 5), reevaluate alternatives (Step 6), and present the findings and a public explanation (Step 7), with the final step being to implement the action (Step 8) (FEMA, 2012).

**1. Determine if the proposed action would be in the base (1% ACE or 100-year) floodplain.**

The Proposed Project is located within the defined base floodplain.

**2. If the proposed action would be in the base floodplain, identify and evaluate practicable alternatives to the action or to locating the action in the base floodplain.**

Through the plan formulation process (see Chapter 3) only two (2) viable alternatives or risk management plans (RMPs) were carried forward as meeting the objectives identified. These RMPs are analyzed and compared in Chapter 5. Practicable alternatives are those capable of being done within existing constraints. The decision of whether a practicable alternative exists is based on weighing the advantages and disadvantages of floodplain sites and non-floodplain sites. The test of practicability applies to both the proposed action and to any induced development likely to be caused by the action.

**3. If the action must be in the floodplain, advise the general public in the affected area and obtain their views and comments.**

Federal, state, and local agencies and the general public were informed of the Proposed Project including its location in the base floodplain. A Notice of Intent was published in the Federal Register on Monday, July 22, 2013, Vol. 78, No. 140, 43686. The Public Scoping Meeting was held at the Pico Rivera Golf Course in Pico Rivera, California on September 11, 2013. The general public, local municipalities, state government agencies, Federal agencies, and Tribal Governments were invited to attend. In addition, this draft EIS is being circulated for public review and comment.

**4. Identify beneficial and adverse impacts due to the action and any expected losses of natural and beneficial floodplain values. Where actions proposed to be located outside the base floodplain will affect the base floodplain, impacts resulting from these actions should also be identified.**

Construction of project features would result in mostly minor and temporary impacts to the natural environment, as fully described in Chapter 5 of this Draft EIS.

**5. If the action is likely to induce development in the base floodplain, determine if a practicable non-floodplain alternative for the development exists.**

There are no direct or indirect impacts to the floodplain that are likely to induce development in the floodplain or outside it. The Preferred RMP does not include construction of any new, permanent housing or commercial activities, and is not expected to induce any new residential or commercial growth. The floodplain downstream of the Dam is considered built-out and any new development is considered to be vertical in nature.

**6. As part of the planning process under the Principles and Guidelines, determine viable methods to minimize any adverse impacts of the action including any likely induced development for which there is no practicable alternative and methods to restore and preserve the natural and beneficial flood plain values. This should include reevaluation of the "no action" alternative.**

During the environmental analysis of the RMPs, wherever there were potential adverse impacts identified, appropriate environmental commitments were identified. The Preferred RMP would not induce development in the floodplain. The Preferred RMP is site-specific and would not aggravate current hazards of the floodplain and would not disrupt the natural and beneficial floodplain values. The “no action” alternative was carried through the entire assessment and selection process. The no action alternative would not address the two PFMs, and therefore would not reduce the risks of dam failure associated with those PFMs..

**7. If the final determination is made that no practicable alternative exists to locating the action in the flood plain, advise the general public in the affected area of the findings.**

The Draft EIS is being released for public review, the release posted by EPA in the Federal Register, and a public meeting will be held to receive comments on the Draft EIS. Comments received will be responded to and included in the Final EIS.

**8. Recommend the plan most responsive to the planning objectives established by the study and consistent with the requirements of the Executive Order 11988.**

Based on the above decision-making process, the Preferred RMP Plan 5 is anticipated to be the most responsive option to planning objectives and requirements established by Executive Order 11988, as amended.

**8.3.16 Executive Order 12088, Federal Compliance with Pollution Control Standards**

Under Executive Order 12088, Federal agencies are required to ensure compliance of agency decisions with all applicable pollution control standards, laws, and regulations, including but not limited to the following: Toxic Substances Control Act; Federal Water Pollution Control Act; Public Health Service Act; Clean Air Act; Noise Control Act of 1972; Solid Waste Disposal Act; Radiation guidance pursuant to Section 274(h) of the Atomic Energy Act of 1954; Marine

Protection, Research, and Sanctuaries Act of 1972; and Federal Insecticide, Fungicide, and Rodenticide Act. The head of each Executive agency is responsible for ensuring that all necessary actions are taken for the prevention, control, and abatement of environmental pollution with respect to Federal facilities and activities under control of the agency. Implementation of the Preferred RMP would be in compliance with this EO.

#### **8.3.17 Executive Order 12898, Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations**

This EO states that Federal agencies are responsible for conducting their programs, policies, and activities that substantially affect human health of the environment in a manner that ensures such programs, policies, and activities do not have the effect of excluding persons from participation in, denying persons the benefits of, or subjecting persons to discrimination because of their race, color, or national origin. The objectives of this EO include identifying and addressing disproportionately high and/or adverse impacts of Federal programs, policies, or activities on minority and/or low-income populations. The required analysis has been conducted, and no disproportionately high and/or adverse impacts to minority and/or low-income populations have been identified. Additional information is provided in section 5.8. The Preferred RMP would be in compliance with this EO.

#### **8.3.18 Executive Order 13045, Protection of Children From Environmental Health Risks and Safety Risks**

EO 13045 requires Federal agencies to the extent permitted by law and within its mission shall make it a high priority to identify and assess environmental health risks and safety risks that may disproportionately affect children and shall ensure that its policies, programs, activities, and standards address disproportionate risks to children that result from environmental health risks or safety risks. These risks arise because children's neurological, immunological, digestive, and other bodily systems are still developing; children eat more food, drink more fluids, and breathe more air in proportion to their body weight than adults; children's size and weight may diminish their protection from standard safety features; and children's behavior patterns may make them more susceptible to accidents because they are less able to protect themselves. The Preferred RMP would not disproportionately impact children. Potential impacts were identified with regard to biology, air quality, esthetics, noise, transportation, and recreational uses. Environmental commitments were identified to reduce these potential impacts. While there was no specific study conducted to assess impacts to children, there is no indication that any impacts would disproportionately affect children. The Preferred RMP would be in compliance with the EO.

#### **8.3.19 Executive Order 13112, Invasive Species and Landscaping**

The EO directs Federal agencies to expand and coordinate their efforts to combat the introduction and spread of plants and animals not native to the United States. Requirements are to prevent the introduction of invasive species; provide for their control; and take measures to minimize economic, ecological, and human health effects. The Preferred RMP includes removal of invasive species and habitat restoration with native plants and efforts to prevent the re-

establishment of invasive plant species. The Preferred RMP would be in compliance with the EO.

#### **8.3.20 Executive Order 13148, Greening the Government through Leadership in Environmental Management**

This EO mandates that environmental management considerations must be a fundamental and integral component of Federal government policies, operations, planning, and management. The goal of this EO is for each agency to strive to promote the sustainable management of Federal facility lands through the implementation of cost-effective, environmentally sound landscaping practices, and programs to reduce adverse impacts to the natural environment.

#### **8.3.21 Executive Order 13175, Consultation and Coordination with Indian Tribal Governments**

The EO further defines and clarifies the government-to-government relationship with Federally-recognized tribes and consultation requirements for Federal actions. The Corps has initiated consultation with local Tribes. The Preferred RMP would be consistent with the EO.

#### **8.3.22 Executive Order 13186, Responsibilities of Federal Agencies to Protect Migratory Birds**

The EO directs Federal agencies to take action to implement the Migratory Bird Treaty Act within the provisions of its mission. Restoration of riverine habitat during implementation of the Preferred RMP and the creation of additional habitat suitable for migratory birds would be consistent with the EO.

#### **8.3.23 Executive Order 13195, Trails for America in the 21<sup>st</sup> Century**

The Act directs Federal agencies to the extent permitted by law and where practicable to protect, connect, promote, and assist trails of all types. The existing trail within the Wilderness Park would be resurfaced as an element of the Proposed Project. The Preferred RMP would be consistent with the EO.

### **8.4 CORPS REGULATIONS**

#### **8.4.1 Engineer Regulation 200-2-2, *Procedures for Implementing NEPA*, published at 33 C.F.R. part 230**

This regulation provides requirements for implementation of the procedural provisions of NEPA for the Civil Works Program of the Corps. It supplements CEQ regulations 40 C.F.R. Parts 1500-1508, in accordance with the CEQ regulations. Wherever the guidance in this regulation is unclear or not specific, the reader is referred to the CEQ regulations. This regulation is applicable to all Corps responsibilities for preparing and processing environmental documents in support of civil works functions. Full compliance with NEPA is achieved with the filing of the final EIS with USEPA and the Corps' issuance of a Record of Decision.



**8.4.2 Engineer Regulation 1105-2-100, *Planning Guidance Notebook*,  
as amended**

ER 1105-2-100 provides guidance for conducting Civil Works planning studies and related programs by the Corps. Guidance provided in this regulation has been followed in the preparation of this Draft EIS. The Preferred RMP has been developed consistent with the ER.

## CHAPTER 9 LIST OF PREPARERS

Preparers	Education (degrees, field)	Years of Experience	Role/Area of Expertise
Deborah Lamb, RLA, #3115	BA,; Certificate in Landscape Architecture, Registered Landscape Architect	25 years	Environmental Coordinator—Land Use, Esthetics, Recreation, Public Health and Safety, Public Services, Noise and Vibration, Socioeconomics and Environmental Justice, Earth Resources,
Gail Campos	MS Biology	20 years	Project Biologist,
John Killeen	MA, Anthropology	30 + years	Archaeologist
Thomas Keeney	BS Biology	35 years	Senior Biologist, Agency Coordination, Restoration Ecologist
Meg McDonald	Ph.D., Anthropology	30 years	Archaeology
Kirk C. Brus	BS, Chemistry Master, Environmental Planning	30 years	Air Quality Specialist
Kenneth Wong	MS, Environmental Health Science	15 years	Air Quality, Water Quality, HTRW, Socioeconomics and Environmental Justice,
Eric Kim	DA Engineering Intern	1 year	Field Work, Sound Measurements
Emmanuel Chavez	DA Engineering Intern	1 year	GIS assistance
Joseph Lamb	B.S Economics-Education	24 years	Regional Economist Economics and Emergency Evacuation Planning
Willie Starks			Real Estate
Kathleen Anderson			Project Manager
Robert Castle, P.E.	B.S.	35 years	Civil design of flood control structures
Quana Higgins			Plan Formulator
Brenna Smith	B.A.	5 years	Technical Editor

## CHAPTER 10 REFERENCES

- Air Quality Management District (AQMD), 2008 Air Quality. South Coast Air Quality Management District, 20008, Internet website located at:  
<http://www.aqmd.gov/smog/historicaldata.htm>.
- AMEC Geomatrix, Inc., Oakland, CA, Ground Motion Hazard Evaluation, Whittier Narrows Dam Outlet Works and Spillway, 2009
- American Heart Association. "A rising tide of heart attacks followed Hurricane Katrina." ScienceDaily. ScienceDaily, 15 November 2016. Accessed at  
[www.sciencedaily.com/releases/2016/11/161115150911..](http://www.sciencedaily.com/releases/2016/11/161115150911..)
- Applied Earthworks, Inc. 2009. Confidential Cultural Resources Specialist Report for the Tehachapi Transmission Project. Report prepared by Applied Earthworks, Inc., Fresno, for Southern California Edison Company, Rosemead. On file at Angeles National Forest, Arcadia.
- ArchaeoPaleo Resource Management, Inc. 2007. Cultural Resource Monitoring and Mitigation Report Upper San Gabriel Valley Municipal Water District, San Gabriel Valley Water Recycling Project, Phase IIA, Whittier Narrows Recreation Area, Los Angeles County, California. Prepared by ArchaeoPaleo Resource Management, Inc., Los Angeles, for Upper San Gabriel Valley Municipal Water District, Monrovia. On file at the South Central Coastal Information Center, California State University, Fullerton.
- Ashkar 1999. Bontrager, D.R., (1991). Habitat requirements, home range and breeding biology of the California Gnatcatcher (*Poliophtila californica*) in south Orange County, California, Unpublished report prepared for the Santa Margarita Company, Rancho Santa Margarita, California
- Bass, Byron. 2003. Los Angeles Air Force Base RV Storage Relocation Project. Letter report prepared by URS Corporation for U.S. Army Corps of Engineers, Los Angeles. On file, Planning Division, U.S. Army Corps of Engineers, Los Angeles.
- Bean, Lowell J., and C. R. Smith. 1978 Gabrielino. In California, edited by R. F. Heizer, pp. 538-549. Handbook of the Indians of North America, Volume 8. W. C. Sturtevant, general editor. Smithsonian Institution, Washington, D.C.
- Bischoff, Wayne. 2010. Historic Property Treatment Plan for Site PL-SCE-SEG7-07, Segment 7, Southern California Edison (SCE) Tehachapi Renewable Transmission Project (TRTP). Report prepared by Pacific Legacy, Inc., Berkeley, for Southern California Edison Company, Rosemead. On file at Angeles National Forest, Arcadia

- Brackett, Robert W. 1951. The History of San Diego County Ranchos: The Spanish, Mexican, and American Occupation of San Diego County and the Story of the Ownership of Land Grants Therein. Union Title Insurance and Trust, San Diego.
- Bornette, G., and C. Amoros. 1996. Disturbance regimes and vegetation dynamics: role of floods in riverine wetlands. *Journal of Vegetation Science* 7:615–622.
- California Air Resources Board, *Preliminary Staff Report -- Recommended Approaches for Setting Interim Significance Thresholds for Greenhouse Gases under the California Environmental Quality Act*. October 24 2004
- California Air Resources Board, Ambient Air Quality Standards.  
<http://www.arb.ca.gov/research/aaqs/aaqs2.pdf>. Accessed February 10, 2013.
- California Air Resources Board (CARB). 2013b. 2011 State Area Designations.  
<http://www.arb.ca.gov/desig/adm/adm.htm>. Accessed February 11, 2013
- California Department of Conservation Division of Mines and Geology (CDCDMG, Open File Report 97-17., Seismic Hazard Evaluation of the El Monte 7.5 quadrangle California, 1999, Internet website is located at:  
[http://gmw.consrv.ca.gov/SHMP/html/pdf\\_maps\\_so.html](http://gmw.consrv.ca.gov/SHMP/html/pdf_maps_so.html).
- California Department of Finance, 2013, Summary Population Projections, Accessed at [www.dof.ca.gov/research/demographics/reports/prjectionns](http://www.dof.ca.gov/research/demographics/reports/prjectionns)
- California Department of Fish and Wildlife (CDFW): California Natural Diversity Database (CNDDDB). (2010). [www.dfg.ca.gov/biogeodata/cnddb/plants.asp](http://www.dfg.ca.gov/biogeodata/cnddb/plants.asp). CNDDDB Report for Project Area, 2010, Received 30 March 2010.
- Center for Immigration Studies, 1996, *Quality of Life in the 21<sup>st</sup> century*, Accessed at [www.cis.org/censusbureau/](http://www.cis.org/censusbureau/)
- City of El Monte, *City of El Monte General Plan*, Accessed March 2013 at [www.ci.el-monte.ca.us/Government/EconomicDevelopment/Planning.aspx](http://www.ci.el-monte.ca.us/Government/EconomicDevelopment/Planning.aspx)
- City of Irwindale, *City of Irwindale General Plan 2020*, 2008, accessed at [www.ci.irwindale.ca.us/government](http://www.ci.irwindale.ca.us/government)
- City of Pico Rivera, *General Plan*, Accessed at [www.pico-rivera.org/documents](http://www.pico-rivera.org/documents)
- City of Pico Rivera. Pico Rivera Municipal Code, Chapter 15.50, Floodplain Management accessed at [http://qcode.us/codes/picorivera/view.php?topic=15-15\\_50&showAll=1](http://qcode.us/codes/picorivera/view.php?topic=15-15_50&showAll=1)
- City of Montebello, *City of Montebello General Plan*, Accessed March 2013 at [www.cityofmontebello.com/depts/planning\\_n\\_community\\_development/...](http://www.cityofmontebello.com/depts/planning_n_community_development/)

- Cooper, D.S., (2004), Important Bird Areas of California. Pasadena, CA: Audubon California
- Council on Environmental Quality (CEQ), 2010, *Draft NEPA Guideline on Consideration of the Effects of Climate Change and Greenhouse Gas Emissions*,  
<http://www.whitehouse.gov/sites/default/files/microsites/ceq/20100218-nepa-consideration-effects-ghg-draft-guidance.pdf>
- Crandall, R. M., C. R. Hayes, and E. N. Ackland. 2003. Application of the intermediate disturbance hypothesis to flooding. *Community Ecology* 4:225– 232.
- CRM Tech. 2004. Identification and Evaluation of Historic Properties Upper San Gabriel Valley Municipal Water District Direct Reuse Project, Phase I. Prepared by CRMTech, Colton, California, for Upper San Gabriel Valley Municipal Water District, Monrovia. On file at the South Central Coastal Information Center, California State University, Fullerton.
- 2009 Identification and Evaluation of historic properties - Whittier Narrows Dam Deviations Study. On file at the South Central Coastal Information Center, California State University, Fullerton.
- Dakin, Susanna Bryant. 1939. A Scotch Paisano in Old Los Angeles: Hugo Reid's Life in California, 1832-1852, Derived from His Correspondence. University of California, Berkeley.
- Dillon, B. 1990, Archaeological Record Search and Impact Evaluation for the Los Angeles Wastewater Program Management (NOS-NCOS) Project, Los Angeles, California. Prepared for Dr. Janet Fahey, James M. Montgomery, Consulting Engineers, 250 N. Madison Ave., P.O. Box 7009, Pasadena, CA 91109-7009.
- ERCE (ERC Environmental and Energy Services Company), (1990), Phase I report Amber Ridge California gnatcatcher study, Unpublished Report Prepared by ERC Environmental and Energy Services Co., San Diego, California
- Environmental Data Resources, Inc. (EDR), *The EDR Radius Map Report with GeoCheck, Whittier Narrows Dam Basin, Los Angeles County, South El Monte, CA*
- Environmental Defense Fund, "Southern California Faces Increased Threat from Global Warming", 2001
- Federal Highway Administration (FHWA). 2007. Construction Noise Handbook. FHWAHEP-06-015. Final Report August 2006.  
<https://www.fhwa.dot.gov/environment/noise/highway/hcn06.htm>.
- Flinn de Frate, Julia. 1952. This Was Yesterday. Reprint. East San Diego Press, San Diego. Originally published 1951.

- Franzreb, K. E. 1989. Ecology and conservation of the endangered least Bell's vireo. U.S. Fish Wildlife Service, Biological. Report. 89(1).
- Geomatrix, Inc., San Francisco, CA, Phase II Evaluation of Seismic Stability of Whittier Narrows Dam, 1999
- Grant, T. J., D. L. Otis, and R. R. Koford. 2015. Short-term anuran community dynamics in the Missouri River floodplain following an historic flood. *Ecosphere* 6(10):197
- Greenhouse Gas Reporting Rule, April 10, 2009
- Greenwood, Roberta S., John M. Foster, and Anne Q. Duffield. 1989. The First Historical Settlement in Los Angeles County: Investigations at Whittier Narrows. Greenwood and Associates, Pacific Palisades, California. Submitted to the U.S. Army Corps of Engineers, Los Angeles District.
- Hanes, T. L., R. D. Friesen, and K. Keane, (1989), Alluvial Scrub Vegetation in Coastal Southern California, USDA Forest Service Gen. Tech. Rep. PSW-110, 1989
- Hendricks, Bonnie J.; Rieger, John P. 1989. Description of Nesting Habitat for Least Bell's Vireo in San Diego County. In: Abell, Dana L., Technical Coordinator. 1989. Proceedings of the California Riparian Systems Conference: protection, management, and restoration for the 1990s; 1988 September 22-24; Davis, CA. Gen. Tech. Rep. PSW-GTR-110. Berkeley, CA: Pacific Southwest Forest and Range Experiment Station, Forest Service, U.S. Department of Agriculture; p. 285-292
- Holland, R. F., (1986), Preliminary descriptions of the terrestrial natural communities of California, California Department of Fish and Game, Sacramento, California, 156 pp.
- ICF Jones & Stokes, Inc. 2009. Archaeological Survey Report for Southern California Edison Company Weed Abatement Project, Whittier Narrows Dam Recreation Area, Los Angeles County, California. Report prepared by ICF Jones & Stokes, Inc., Sacramento, for Southern California Edison Company, Rosemead. On file at the South Central Coastal Information Center, California State University, Fullerton.
- Johnston, Bernice Eastman. 1962. California's Gabrielino Indians. Southwest Museum, Los Angeles.
- JRP Historical Consulting, LLC. 2003. North Spring Street Bridge Seismic Retrofitting and Widening Historic Resources Evaluation Report. Prepared for URS Corporation for submittal to the City of Los Angeles Department of Public Works. On file at JRP Historical Consulting, LLC, Davis, California.
- Interagency Climate Change Adaptation Task Force, National action plan: Priorities for managing freshwater resources in a changing climate. Washington, DC: Interagency

- Climate Change Adaptation Task Force, 2011 Retrieved from CAKE:  
<http://www.cakex.org/virtual-library/national-action-plan-priorities-man...>
- Intergovernmental Panel on Climate Change (IPCC), Climate Change 2001: The Scientific Basis, Contribution of Working Group I to the Third Assessment Report of the Intergovernmental Panel on Climate Change, 2001
- Junk, W. J., P. B. Bayley, and R. E. Sparks. 1989. The flood pulse concept in river-floodplain systems. Canadian Special Publication of Fisheries and Aquatic Sciences 106:110–127
- KCET. 2013. “Elias ‘Lucky’ Baldwin: Land Baron of Southern California.” Accessed at: <https://www.kcet.org/shows/departures/elias-lucky-baldwin-land-baron-of-southern-california?55=>
- Kus, Barbara E.; Miner, Karen L. 1989. Use of Non-Riparian Habitats by Least Bell's Vireos. In: Abell, Dana L., Technical Coordinator. 1989. Proceedings of the California Riparian Systems Conference: protection, management, and restoration for the 1990s; 1988 September 22-24; Davis, CA. Gen. Tech. Rep. PSW-GTR-110. Berkeley, CA: Pacific Southwest Forest and Range Experiment Station, Forest Service, U.S. Department of Agriculture.
- Long, M.C., (1993), *Birds of Whittier Narrows Recreation Area, Los Angeles County, California*,. South El Monte, CA: Whittier Narrows Nature Center Association
- Los Angeles Homeless Services Authority. 2017. <https://www.lahsa.org/documents?id=1353-homeless-count-2017-countywide-results.pdf>
- Luomala, Katharine. 1978. Tipai and Ipai. In California, edited by Robert F. Heizer, pp. 592–609. Handbook of North American Indians, vol. 8, William C. Sturtevant, general editor. Smithsonian Institution, Washington, D.C.
- 2011a National Register of Historic Places and California Register of Historic Resource Evaluation of PL-SCE-SEG7-12, Southern California Edison, Tehachapi Renewable Transmission Project, Segment 7, Los Angeles County, California. Report prepared by Pacific Legacy, Inc., Berkeley, for Southern California Edison Company, Rosemead. On file at Angeles National Forest, Arcadia.
- 2011b Archaeological Mitigation and National Register of Historic Places and California Register of Historic Resources Evaluation of Archaeological Site PL-SCE-SEG7-07, Southern California Edison, Tehachapi Renewable Transmission Project, Segment 7, Los Angeles County, California. Report prepared by Pacific Legacy, Inc., Berkeley, for Southern California Edison Company, Rosemead. On file at Angeles National Forest, Arcadia.
- McCawley, *The First Angelinos: The Gabrielino Indians of Los Angeles*, Malki Press and Ballena Press, Los Angeles. 1996

- MacKenzie, D. I., J. D. Nichols, J. E. Hines, M. G. Knutson, and A. B. Franklin. 2003. Estimating site occupancy, colonization, and local extinction when a species is detected imperfectly. *Ecology* 84:2200–2207.
- Medina, Daniel. 2014. Life at Marrano Beach, the Lost Barrio Beach of the San Gabriel Valley. Accessed at <https://www.kcet.org/shows/departures/life-at-marrano-beach-the-lost-barrio-beach-of-the-san-gabriel-valley>
- Meighan, Clement W. 1954 A Late Complex in Southern California Prehistory. *Journal of Anthropological Research* 10(2):215-227.
- Messick 2003
- Miner, K. L. 1989. Foraging ecology of the Least Bell's Vireo, **Vireo bellii pusillus**. Unpubl. M.S. thesis, San Diego State University, San Diego, CA.
- Moratto, Michael J. 1984. California Archaeology. Florida: Academic Press.  
Mold. <https://www.cdc.gov/disasters/mold/https://www.cdc.gov/disasters/mold/>
- National Weather Service, Available at <http://www.nws.noaa.gov>
- Nilsson, C., C. A. Reidy, M. Dynesius, and C. Revenga. 2005. Fragmentation and flow regulation of the world's large river systems. *Science* 308:405–408
- Northwest Habitat Institute (NWHI), (2014), CHAP Registry. <http://www.nwhi.org/index/hab>.
- Ornduff, Robert. 1974. An Introduction to California Plant Life. University of California Press, Berkeley.
- Pacific Legacy, Inc. 2007 Confidential Report: Cultural Resources Inventory of the Southern California Edison Company Tehachapi Renewable Transmission Project, Kern, Los Angeles and San Bernardino Counties, California. Report prepared by Pacific Legacy, Inc., Berkeley, for Southern California Edison Company, Rosemead. On file at Angeles National Forest, Arcadia.
- Panich, Lee, and John Holson. 2010. Supplemental Archaeological Survey Report, 66kV Transmission Lines Access Roads, Tehachapi Renewable Transmission Project Segments 7 and 8, Los Angeles and San Bernardino Counties, California. Report prepared by Pacific Legacy, Inc., Berkeley, for Southern California Edison Company, Rosemead. On file at Angeles National Forest, Arcadia.
- Parks, Marion. 1929 In Pursuit of Vanished Days. *Annual Publications of the Historical Society of Southern California* 14:7–64, 135–208.



- phys.org, Air Pollution Worsened by Climate Change Set to be Potent Killer in 21<sup>st</sup> Century, <http://phys.org/newds/2013-09-air-pollution-worsened-climate-change-present>, Oct 2014
- Poff, N. L. 2002. Ecological response to and management of increased flooding caused by climate change. *Philosophical Transactions of the Royal Society of London A* 360:1497–1510.
- Queensland University of Technology. "Flood aftermath linked to post-traumatic stress, study shows." *ScienceDaily*. 27 May 2015. Accessed at [www.sciencedaily.com/releases/2015/05/150527103104.htm](http://www.sciencedaily.com/releases/2015/05/150527103104.htm).
- QUEST Structures, Inc., Orinda, CA, Seismic Assessment of Spillway Structure and Outlet Works at Whittier Narrows Dam, Phase-I: Linear-Elastic Time-History Evaluation, 2009
- Reese, Elena, Lee Panich, and John Holson. 2011. Excavation Report For Site PL-SCE-SEG7-13 Segment 7, Tehachapi Renewable Transmission Project (TRTP), Los Angeles County, California. Report prepared by Pacific Legacy, Inc., Berkeley, for Southern California Edison Company, Rosemead. On file at Angeles National Forest, Arcadia.
- Regional Planning Association, *America 2050, Southern California*, Accessed at [www.america2050.org/southerncalifornia](http://www.america2050.org/southerncalifornia)
- Reid, David. 2015. Whittier Narrows Parks: A Story of Water, Power and Displacement. Accessed at <https://www.kcet.org/history-society/whittier-narrows-parks-a-story-of-water-power-and-displacement>
- Reid, Hugo. 1968. The Indians of Los Angeles County: Hugo Reid's Letters of 1852. Edited by Robert F. Heizer. Southwest Museum Papers No. 21. Los Angeles.
- Roach, J. D., (1989), The influence of vegetation structure and arthropod abundance on the reproductive success of California black-tailed gnatcatchers (*Polioptila melanura californica*), Masters Thesis presented to San Diego State University, San Diego, California.
- Roberts, Lois, and James Brock. 1987. Cultural Resources Archival Study: Whittier Narrows Archaeological District. Archaeological Advisory Group, Newport Beach, California. Submitted to the U.S. Army Corps of Engineers, Los Angeles District.
- Rohas, Edgar, personal communication, [edgarr@ci.irwindale.us](mailto:edgarr@ci.irwindale.us)
- Romani, Gwen R. 2000. Archaeological Survey Report: Los Angeles - San Diego Fiber Optic Project: Mesa Substation to Chino Hills State Park Segment. On file, South Central Coastal Information Center, California State University, Fullerton.
- Rose Hills Memorial Park. About Us. [www.rosehills.com/en-us/about-us/memorial-park.page](http://www.rosehills.com/en-us/about-us/memorial-park.page)

- Sawyer, J., T. Keeler-Wolf, and J. Evens, *A Manual of California Vegetation*, Second Edition. California Native Plant Society, 2009
- Sawyer, J.O., and T. Keeler-Wolf, (1995), *A Manual of California Vegetation*, California Native Plant Society, Sacramento, California.
- Schneider, Tsim D., and John Holson. 2010. Supplemental Archaeological Survey Report #2, Tehachapi Renewable Transmission Project Segment 7, Los Angeles County, California. Report prepared by Pacific Legacy, Inc., Berkeley, for Southern California Edison Company, Rosemead. On file at Angeles National Forest, Arcadia.
- South Coast Air Quality Management District (SCAQMD). 1993. *CEQA Air Quality Handbook*. Last updated in 2012. <http://www.aqmd.gov/ceqa/hdbk.html>..
- Southern California Association of Governments (SCAG), *Regional Transportation Plan*, 2008
- Southern California Association of Governments (SCAG), Growth Forecast, Regional Transportation Plan, 2012-2035
- SCAG, *Regional Comprehensive Plan, Security and Emergency Preparedness*
- SCAG, *Security and Emergency Management*, accessed at [www.scag.ca.gov/rtptac/pps](http://www.scag.ca.gov/rtptac/pps)
- Spencer, W., Maintaining Ecological Connectivity Across the “Missing Middle” of the Puente-Chino Hills Wildlife Corridor. Final Report prepared for the Conservation Biology Institute, 2005
- Spitzerri, Paul. 2016. Sharing the History of Old Mission at the Whittier Narrows Nature Center. <https://homesteadmuseum.wordpress.com/2016/10/29/sharing-the-history-of-old-mission-at-the-whittier-narrows-nature-center/>
- Spitzerri, Paul. 2018. On This Day, Getting Schooled, A Rural Life Survey of the La Puente School District, 1930. <https://homesteadmuseum.wordpress.com/2018/02/05/on-this-day-getting-schooled-a-rural-life-survey-of-the-la-puente-school-district-1930/>
- Spitzerri, Paul. 2018. Remnant Landscapes At Mission Vieja (Old Mission), El Monte and Montebello. <https://homesteadmuseum.wordpress.com/2018/10/22/remnant-landscapes-at-mision-vieja-old-mission-south-el-monte-and-montebello/>
- Stanke C, Murray V, Amlôt R, Nurse J, Williams R. The Effects of Flooding on Mental Health: Outcomes and Recommendations from a Review of the Literature. PLOS Currents Disasters. 2012 May 30. Edition 1. doi: 10.1371/4f9f1fa9c3cae. Accessed at: <http://currents.plos.org/disasters/article/the-effects-of-flooding-on-mental-health-outcomes-and-recommendations-from-a-review-of-the-literature/>

State Water Resources Control Board (SWRCB). *Geotracker*  
<http://geotracker.waterboards.ca.gov>.

Stein, E.D., S. Dark, T. Longcore, N. Hall, M. Beland, R. Grossinger, J. Casanova, & M. Sutula. (2007, February). Historical Ecology and Landscape Change of the San Gabriel River and Floodplain. Southern California Coastal Water Research Project (SCCWRP). SCCWRP Technical Report # 499. Accessed online at [http://www.rmc.ca.gov/grants/resources/499\\_historical\\_ecology.pdf](http://www.rmc.ca.gov/grants/resources/499_historical_ecology.pdf), May 15, 2016.

Stickel, E. Gary. 1976. An Archaeological and Paleontological Resource Survey of the Los Angeles River, Rio Hondo River and the Whittier Narrows Flood Control Basin, Los Angeles, California. Prepared by Environmental Research Archaeologists for the U.S. Army Corps of Engineers, Los Angeles District.

Sundberg, Frederick A., and Nancy A. Whitney-Desautels. 1991. Cultural and Paleontological Resource Assessment of Nine Planning Areas within the Whittier Narrows Flood Control Area, Los Angeles County, California. Scientific Resource Surveys, Inc., Huntington Beach, California.

Tinsley Becker, Wendy, and Heather Crane. 2010. RHP/CRHR Review Southern California Edison Company Mesa-Walnut 220 kV Transmission Line. Report prepared by Urbana Preservation & Planning, LLC, San Diego, for Southern California Edison Company, Rosemead. Report on file at the Angeles National Forest, Arcadia.

U. S. Army Corps of Engineers and Bureau of Reclamation, *Addressing Climate Change in Long-Term Water Resources Planning and Management*, 2011

U.S. Census, <http://quickfacts.census.gov/qfd/states>

U.S. Conference of Mayors, U.S. Conference of Mayors Climate Protection Agreement, 2005, <http://www.usmayors.org/climateprotection/agreement.htm>

U. S. Housing and Urban Development (HUD). 1984. 24 CFR Part 51 - Environmental Criteria and Standards Sec. 51.103 Criteria and standards 44 FR 40861, July 12, 1979, as amended at 49 FR 12214, Mar. 29, 1984.

U.S. Environmental Protection Agency (USEPA). 1974. *Information on Levels of Environmental Noise Requisite to Protect Public Health and Welfare with an Adequate Margin of Safety*. Report 550/9-74-004.

U.S. Environmental Protection Agency, *Our Nation's Air, Status Through 2010*, 2012

USEPA, Climate Change Impacts, accessed at <http://www.epa.gov/climatechange/impacts-adaptation/southwest.html>

USEPA, GHG Emissions, access at [www.epa.gov/climatechange/emissions/GHGemissions-calculator](http://www.epa.gov/climatechange/emissions/GHGemissions-calculator)

USEPA, *The Green Book Nonattainment*, Areas for Criteria Pollutants. Federal designation as of December 14, 2012. [www.epa.gov/air/oaqps/greenbk/index.html](http://www.epa.gov/air/oaqps/greenbk/index.html).

USEPA, *Mandatory Reporting of Greenhouse Gases*, EPA-HQ-OAR-2008-0508, 2009a

USEPA. 2016. Environmental Assessment for the City of El Monte, California Garvey Avenue Stormwater System Improvement Project, Los Angeles County, California. Electronic document, <https://www.epa.gov/ca/city-el-monte-stormwater-system-improvement-project-fonsi-and-ea>, accessed August 10, 2017.

U.S. Fish and Wildlife Service (USFWS), Endangered and threatened wildlife and plants: Special rule concerning take of the threatened coastal California Gnatcatcher, Final Rule. Federal Register 58: 65088-65096, 1993

U.S. Fish and Wildlife Service (USFWS). (1994, February 2). Endangered and Threatened Wildlife and Plants; Designation of Critical Habitat for the Least Bell's Vireo. Department of the Interior. Federal Register 59(22):4845-4867.

U.S. Fish and Wildlife Service (USFWS), (1994, February 2), Endangered and Threatened Wildlife and Plants; Designation of Critical Habitat for the Least Bell's Vireo, Department of the Interior, *Federal Register* 59(22):4845-4867

U.S. Fish and Wildlife Service (USFWS), Endangered and Threatened Wildlife and Plants; Revised Designation of Critical Habitat for the Coastal California Gnatcatcher (*Polioptila californica californica*), Federal Register 74:57803-52878 2007

U.S. Fish and Wildlife Service (USFWS), Threatened and Endangered Species; Lists by County (Local in the Greater Los Angeles Area), Internet website located at: [http://www.fws.gov/carlsbad/TEspecies/CFWO\\_Species\\_List.htm](http://www.fws.gov/carlsbad/TEspecies/CFWO_Species_List.htm). Accessed April 2010

U.S. Fish and Wildlife Service (USFWS), (2007, December 19), Endangered and Threatened Wildlife and Plants; Revised Designation of Critical Habitat for the Coastal California Gnatcatcher (*Polioptila californica californica*), Department of the Interior, *Federal Register* 72(243):72010-72213

USFWS. 2018. National Wetland Inventory Data. <https://www.fws.gov/wetlands/>.

Urbana Preservation & Planning, LLC. 2010a. Southern California Edison Company's Tehachapi Renewable Transmission Project Historic Infrastructure Eligibility Evaluation—NRHP/CRHR Review Antelope-Vincent No. 1 Transmission Line. Report prepared by Urbana Preservation & Planning, LLC, San Diego, for Southern California Edison Company, Rosemead. Report on file at the Angeles National Forest, Arcadia.

- 2010b Southern California Edison Company's Tehachapi Renewable Transmission Project Historic Infrastructure Eligibility Evaluation Walnut-Hillgen-Industry-Mesa-Reno 66kV Transmission Line. Report prepared by Urbana Preservation & Planning, LLC, San Diego, for Southern California Edison Company, Rosemead. Report on file at the Angeles National Forest, Arcadia.
- Van Apeldoorn, R. C., W. T. Oostenbrink, A. van Winden, and F. F. van der Zee, (1992), Effects of Habitat Fragmentation on the Bank Vole, *Clethrionomys glareolus*, in an Agricultural Landscape. *Oikos* 65:265-274
- Van Wormer, Stephen. 1985. Historical Resource Overview and Survey for the Los Angeles County Drainage Area Review Study. Archaeological Resource Management Corp., Fullerton, California.
- Wagner, H.R. 1929 Spanish Voyages to the Northwest Coast of America in the Sixteenth Century. California Historical Society Special Publications - 4. San Francisco.
- Wallace, William J. 1955. A Suggested Chronology for Southern California Coastal Archaeology. *Southwestern Journal of Anthropology* 11:214-130.
- Warren, Claude N. 1968. Cultural Tradition and Ecological Adaptation on the Southern California Coast. In *Archaic Prehistory in the Western United States*, edited by C. Irwin-Williams, pp. 1–14. Eastern New Mexico University Contributions in Anthropology 1(3):1–14.
- Weaver, K. L. (1998). Coastal sage scrub variations of San Diego County and their influence on the distribution of the California gnatcatcher. *Western Birds* 29:392-405.
- Westman, W.E. (1983). Xeric Mediterranean-type shrubland associations of Alta and Baja California and the community/continuum debate. *Vegetatio* 52: 3-19.
- Wetherbee, Matthew, Thomas Jackson, and Wendy Tinsley-Becker. 2010 Supplemental Cultural Resources Survey Report for the Southern California Edison Tehachapi Renewable Transmission Project Segment 7 Rio Hondo-Amador-Jose-Mesa 66kv Line Relocation, Los Angeles County, California. Prepared by Pacific Legacy, Inc., Berkeley, and Urbana Preservation & Planning, LLC, Berkeley, for Southern California Edison Company, Rosemead. On file at Angeles National Forest, Arcadia.
- White-Newsom, Jalonnie, Marie S. O'Neill, et al. (eds.), "Climate Change, Heat Waves, and Environmental Justice: Advancing Knowledge and Action", *Environmental Justice*, Vol. 2, No.4, 2009
- Williams, Brian. 2015 Cultural Resources Inventory of Five Proposed Modifications to the Southern California Edison Company Mesa Substation 500 Kilovolt Project, Los Angeles County, California. Prepared by ASM Affiliates, Inc., Carlsbad, for Southern California Edison, Rosemead. On file at Angeles National Forest, Arcadia.

## CHAPTER 11 INDEX

- Air Quality ... iii, iv, xxxii, xxvii, 4-16, 4-17, 4-18, 4-20, 4-21, 5-27, 5-28, 5-31, 5-34, 5-36, 5-90, 6-14, 7-3, 7-7, 8-2, 8-7, 8-16,
- Air Resources ..... 5-36
- Amphibian ..... 4-38, 4-41, 4-43, 4-38
- Annual Benefits ..... 2-6, 3-17
- Biological Resources .. iii, iv, xxx, xli, 4-32, 5-49, 5-50, 5-51, 5-52, 5-53, 5-58, 5-59, 5-60, 5-61, 5-62, 5-65, 5-90, 6-15, 6-22, 7-2, 7-5, 7-16
- California gnatcatcher viii, xxx, 4-32, 4-43, 4-44, 4-45, 4-47, 4-48, 4-49, 5-62, 6-12, 7-5, 10-3, 10-11
- Carbon Monoxide ..... 4-19
- CEQ ..... 4-24
- Clean Air Act ...vi, 4-17, 27, 31, 34, 36, 8-7, 8-8, 8-15
- Clean Water Act (CWA).. vi, xxviii, 4-13, 5-14, 5-15, 5-16, 5-17, 5-19, 5-20, 5-22, 5-24, 5-25, 6-14, 7-3, 8-5, 8-6
- Climate Change.xxvii, 4-24, 5-29, 7-2, 7-16, 8-2, 10-7
- Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) ..... vii, 4-72, 5-93, 8-11
- Consultation ..... 8-10, 8-16
- Cultural Resources ...iii, iv, v, x, xi, xxxi, xli, 4-53, 4-61, 4-62, 4-64, 5-66, 5-68, 5-70, 5-71, 5-72, 5-74, 5-78, 5-83, 5-84, 5-90, 5-127, 6-17, 6-18, 6-23, 7-3, 7-6, 8-9, 8-10
- Cumulative Impacts .. v, 6-1, 6-2, 6-12, 6-13, 6-14, 6-15, 6-18, 6-19, 6-20
- Earth Resources .. iii, iv, v, xxvi, xl, 4-1, 6-3, 6-4, 6-5, 6-6, 6-7, 6-8, 6-9, 6-10, 6-11, 6-12, 6-13, 6-90, 7-1, 7-16
- Endangered Species xxx, vi, ix, xxx, xliii, 4-13, 4-43, 4-50, 5-49, 5-56, 5-58, 5-61, 5-62, 5-66, 6-12 7-5, 8-4, 8-8, 10-10
- Endangered Species Act xxx, xliii, 49, 12, 7-5, 8-4, 8-8
- Environmental Justice** . iii, v, vii, xxxii, xli, 4-69, 5-85, 5-86, 5-87, 5-88, 5-89, 5-91, 5-92, 5-93, 6-18, 7-7, 7-17, 8-2, 8-15, 9-1, 10-11
- Environmental Quality ..... 5-50, 5-118
- Esthetics ..... xxxv, xli, 4-86, 5-118, 5-119, 5-120, 5-122, 7-2, 7-11, 7-17, 8-16, 9-1
- Executive Order 11988 . vii, 5-15, 8-12, 8-15
- Executive Order 12898 . vii, 5-85, 5-86, 8-15
- Federal Water Pollution Control Act ..... 8-15
- Federal Water Project Recreation Act .vii, 5-127, 8-10
- Fish and Wildlife Coordination Act..... 5-49
- Ground Water..... 4-12, 4-72, 5-139, 6-11
- Growth Inducing Impacts ..... v, 6-21
- Hazardous Material ... 3-31, 5-90, 5-94, 5-95, 5-96, 5-97, 5-98, 5-99, 5-100, 5-101, 5-102, 5-143
- Impact Analysis ..... xlii, 1-12
- Invasive Species ..... 4-42, 5-50, 8-16
- Land Use ...iv, xxxiv, 4-28, 4-77, 4-78, 4-82, 4-86, 5-103, 5-104, 5-105, 5-106, 5-107, 5-119, 5-126, 5-137, 5-138, 5-139, 6-19, 7-9, 7-17
- Landslides ..... 5-3
- Least Bell's Vireo .. xxx, 4-43, 4-50, 5-55, 5-56, 5-62, 7-5
- Least Environmentally Damaging Practicable Alternative ..... 8-6
- Mammals 4-39, 4-41, 4-43, 4-55, 5-53, 5-57, 5-60
- Migratory Bird Treaty Act . vi, 5-49, 5-50, 8-9, 8-17
- National Environmental Policy Act (NEPA) .... i, vi, xi, 1-11, 4-24, 5-29, 5-50, 5-86, 5-118, 8-1, 8-5
- National Historic Preservation Act .. vi, 4-53, 5-66, 8-9
- Noise iii, v, vi, ix, xxix, xli, 4-24, 4-25, 4-28, 4-29, 5-37, 5-38, 5-39, 5-41, 5-44, 5-45, 5-47, 5-48, 5-90, 6-15, 7-2, 7-4, 7-16, 7-17, 8-8, 8-15, **9-1, 10-3, 10-9**

---

Noise Control Act .....	5-37, 8-8, 8-15	Special Status Species .....	4-43
Preparers .....	9-1	State Historic Preservation Officer (SHPO)	
proposed action .....	xlii, 1-11, 1-12, 3-35, 4-24, 5-3, 6-1, 6-12, 6-13, 8-12, 8-13	...vi, 4-63, 4-64, 67, 68, 69, 70, 71, 73, 74, 75, 76, 78, 79, 80, 81, 82, 83, 85, 8-4, 8- 10	
Public Health and Safetyv, xxxviii, 4-106, 5- 3, 5-141, 5-142, 5-143, 5-145, 5-152, 6- 20, 7-14		Surface Water.xxviii, 4-33, 4-54, 5-15, 5-16, 5-17, 5-19, 5-20, 5-21, 5-22, 5-24, 5-25, 6-17, 7-3	
Public Involvement .....	xliii, 8-1, 8-3	US Fish and Wildlife Service (USFWS) .....	
Public Services .....		vi, viii, xxx, 4-44, 4-45, 4-50, 49, 5-63, 5- 64, 5-65, 7-2, 7-5, 8-2, 8-4, 10-10	
v, x, xli, xxxix, 4-107, 4-112, 4-113, 5-89, 5-92, 5-152, 5-153, 5-154, 6-21, 7-2, 7-15, 7-18, 9-1		Utilities. v, xli, 4-28, 4-100, 4-101, 4-102, 5- 6, 5-11, 5-18, 5-25, 5-42, 5-46, 5-53, 5-59, 5-73, 5-80, 5-96, 5-101, 5-110, 5-115, 5- 121, 5-124, 5-132, 5-135, 5-137, 5-139, 5- 140, 5-144, 5-150, 5-20, 7-2, 7-18, 7-13	
Purpose and Need ..i, xii, xl, xlii, 1-10, 1-12, 3-8, 7-2		Vegetation Types ..4-32, 4-34, 4-36, 4-39, 4- 47, 4-50, 5-62	
Reptile .....	4-38	Water Resourcesiii, iv, 4-6, 4-16, 4-24, 4-86, 5-14, 5-15, 5-18, 5-24, 5-26, 5-87, 5-95, 5-119, 5-128, 5-11, 7-16, 8-1	
SCAQMD .....	4-18		
Seismicity.....	5-5		
Socioeconomic.... xi, xxxii, xl, 5-86, 5-87, 5- 88, 5-91, 5-93, 7-7			
Soils... 4-3, 4-7, 4-35, 4-44, 4-76, 5-16, 5-17, 5-18, 5-19, 5-20, 5-21, 5-22, 5-23, 5-24, 5-25, 5-26, 5-54, 5-98, 5-100, 6-12			