CCE-CA-100224-F v.4 pt.1

Newhall Ranch

Resource Management and Development Plan and Spineflower Conservation Plan

Final
Joint Environmental Impact Statement and Environmental Impact Report

SCH No. 2000011025

Volume IV

Appendix F1.0 – Appendix F4.1

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TABLE OF CONTENTS

Section	Page

Section | Page

VOLUME IV

APPENDICES TO FINAL EIS/EIR

Appendix F1.0: Introduction*

Dudek, June 2010, Revised Spineflower Conservation Plan and appendices

U.S. Army Corps of Engineers, June 2010, Section 404(b)(1) Alternatives Analysis for the Newhall Ranch Resource Management and Development Plan and attachments

Appendix F4.1: Surface Water Hydrology and Flood Control*

Pacific Advanced Civil Engineering, Inc., June 2010, Revised Newhall Ranch Resource Management & Development Plan: River & Tributaries Drainage Analysis, Santa Clara River

VOLUME V

Pacific Advanced Civil Engineering, Inc., June 2010, Revised Newhall Ranch Resource Management & Development Plan: River & Tributaries Drainage Analysis, Santa Clara River **(continued)**

Pacific Advanced Civil Engineering, Inc., June 2010, Revised Santa Clara River and Tributaries Drainage Analysis: Newhall Ranch Resource Management & Development Plan, Major Tributary Watersheds

Appendix F4.3: Water Resources

AMEC Geomatrix, June 8, 2009, Letter from Hassan Amini, Ph.D., Project Coordinator to DTSC

AMEC Geomatrix, September 15, 2009, Progress Letter Report from Hassan Amini, Ph.D., Project Coordinator to DTSC

California Oak Foundation v. City of Santa Clarita, Second Appellate District, Division Eight, Appellate Case No. B175580 (Gate King I Opinion; certified for partial publication)

California Water Impact Network, Inc. v. Castaic Lake Water Agency, Second Appellate District, Division Five, Appellate Case No. B205622 (Buena Vista/Rio Bravo; Unpublished)

California Water Impact Network, Inc. v. Newhall County Water District/California Oak Foundation v. City of Santa Clarita, Second Appellate District, Division Eight, Appellate Case Nos. B203781 and B203782 (Gate King II Opinion; Unpublished)

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CLWA, October 1, 2009, Memorandum from Brian J. Folsom to CLWA Board of Directors

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Notices to SWP Contractors (2000-2006)

SWP Chloride Levels/Bromide in SWP Locations

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Kern County Municipal Code §§ 19.118 and 19.102.190

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VOLUME VI

Luhdorff & Scalmanini and GSI Water Solutions, Inc., 2009 Basin Yield Update

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VOLUME VII

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Letter from Alex Herrell (Newhall) to Sam Dea, dated April 7, 2009 and 2009 groundwater reporting attachments

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Additional Newhall Ranch Agricultural Well Water Quality Data (2000-2001)

Notice of Settlement and Dismissal of Appeal, filed April 1, 2004 (*United Water Conservation District v. County of Los Angeles*, 5th Civil No. F044638)

Declaration of Steven D. Zimmer in Support of the Class 5 Trust's Opening Brief to Objection to SCOPE Claim and exhibits

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Appendix F4.4: Water Quality

Geosyntec Consultants, May 28, 2008, Memorandum regarding Review of Investigation of the Feasibility and Benefits of Low-Impact Design Practices ("LID") for Ventura County

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Geosyntec Consultants, April 2, 2010, Memorandum regarding LID Equivalency Evaluation for the Newhall Ranch RMDP/SCP EIS/EIR Analysis Region

Appendix F4.5: Biological Resources

Compliance Biology, Inc., March 2010, Letter report from Dave Crawford to Matt Carpenter (Newhall) regarding Special Status Species in the NRMP area

ENTRIX, Inc., June 2010, Revised Focused Special-Status Fish Species Habitat Assessment -- Santa Clara River and Tributary Drainages, Newhall Ranch, Los Angeles County, California

Knudsen, Kerry, University of California, February 4, 2010, Newhall Ranch Lichen Survey

Laeger, Eve and Shevock, James R., February 4, 2010, Special Status Bryophyte Survey on Newhall Ranch

Appendix F4.6: Jurisdictional Waters and Streams

URS Corporation, 2009, Revised Preliminary Jurisdictional Determination

Appendix F4.7: Air Quality

Impact Sciences, Inc., March 2010, Revised Localized Significance Threshold Analysis for the Newhall Ranch Resource Management and Development Plan and Specific Plan

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Appendix F4.8: Traffic

Austin-Foust Associates, Inc., "Additional Trip Generation Tables"

California Department of Transportation, September 2009, "I-5 HOV/Truck Lanes Project -- SR-14 to Parker Road Final EIR/EA"

Los Angeles County Department of Public Works/City of Santa Clarita/Austin-Foust Associates, Inc., March 8, 2005, "Santa Clarita Valley Consolidated Traffic Model, 2004 Update and Validation"

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Appendix F8.0: Global Climate Change

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APPENDIX F1.0

Introduction*

Dudek, June 2010, Revised Spineflower Conservation Plan and appendices

REVISED

Spineflower Conservation Plan

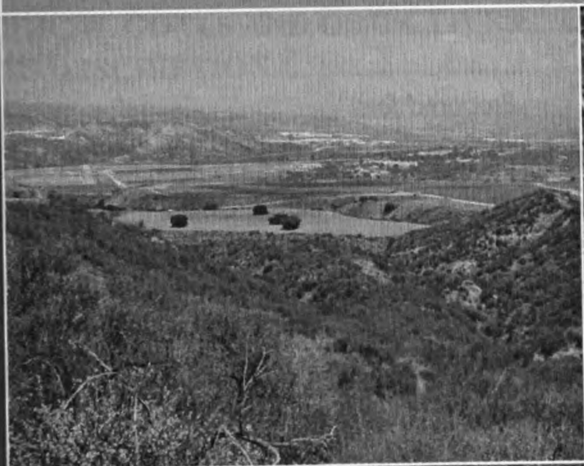

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TABLE OF CONTENTS

Section **Page No.**

TABLE OF CONTENTS (Continued)

Section **Page No.**

TABLE OF CONTENTS (Continued)

Section **Page No.**

TABLE OF CONTENTS (Continued)

APPENDICES

TABLE OF CONTENTS (Continued)

Page No.

LIST OF TABLES

TABLE OF CONTENTS (Continued)

Page No.

LIST OF FIGURES

ACRONYMS AND ABBREVIATIONS

AMSL	above mean sea level
ANOVA	analysis of variance
BMP	best management practice
Cal-IPC	California Invasive Plant Council
CDFG	California Department of Fish and Game
CEQA	California Environmental Quality Act
CESA	California Endangered Species Act
CNLM	Center for Natural Lands Management
CNOR	Candidate Notice of Review
Corps	U.S. Army Corps of Engineers
DEM	Digital Elevation Model
EIR	environmental impact report
EIS	environmental impact statement
FESA	federal Endangered Species Act
FTP	File Transfer Protocol
GIS	geographic information system
GPS	Global Positioning System
HOA	homeowner's association
HSI	habitat suitability index
I-5	Interstate 5
IPM	Integrated Pest Management
NEPA	National Environmental Policy Act
NLMO	Natural Land Management Organization
NOP	Notice of Preparation
RSABG	Rancho Santa Ana Botanic Garden
SCAQMD	South Coast Air Quality Management District
SEA	Significant Ecological Area

ACRONYMS AND ABBREVIATIONS (Continued)

SFVS	San Fernando Valley spineflower
SMA	Special Management Area
SR-126	State Route 126
SSURGO	Soil Survey Geographic Base
SWPPP	Stormwater Pollution Prevention Plan
USDA	U.S. Department of Agriculture
USFWS	U.S. Fish and Wildlife Service
USGS	U.S. Geological Survey
VCC	Valencia Commerce Center

1.0 INTRODUCTION

This Spineflower Conservation Plan (Plan) is a conservation and management plan to permanently protect and manage a system of preserves designed to maximize the long-term persistence of the San Fernando Valley spineflower (*Chorizanthe parryi* var. *fernandina*) (spineflower or SFVS) within the project study area described below. This Plan describes a preserve system proposed by the applicant, The Newhall Land and Farming Company (Newhall Land or applicant). The management and monitoring components of this Plan have been developed in consultation with the California Department of Fish and Game (CDFG).

The Plan is organized as follows:

1.1 Project Study Area Location

The proposed project study area addressed by this Plan includes portions of the Newhall Ranch Specific Plan area (Specific Plan area), Valencia Commerce Center (VCC) planning area, and Entrada planning area (together referred to as the "project study area"). The SCP project study area, depicted as the SCP boundary on figures in this Plan, is located in an unincorporated portion of the Santa Clara River Valley in northwestern Los Angeles County (*Figures 1 and 2*). The 11,999-acre Specific Plan area lies roughly 0.5 mile west of Interstate 5 (I-5) and largely southwest of the junction of I-5 and State Route 126 (SR-126), with portions of the Specific Plan area located in San Martinez Grande and Chiquito canyons north of SR-126. The Entrada planning area lies just west of I-5, south of SR-126, and just east of the Specific Plan area. The VCC planning area lies roughly in the northwest corner of the junction of I-5 and SR-126, generally northeast of the Specific Plan area and northwest of the Entrada planning area. Elevations in the project study area range from 825 feet above mean sea level (AMSL) in the Santa Clara River bottom at the Ventura County/Los Angeles County line to approximately 3,200 feet AMSL on the ridgeline of the Santa Susana Mountains along the southern boundary.

The City of Santa Clarita is located to the east of the project study area, and the Ventura County/Los Angeles County line is to the west. On a regional level, the Los Padres and Angeles National Forests are located to the north of the project study area; the Angeles National Forest lies to the east, and the Santa Susana Mountains are to the south.

1.2 Purpose and Need

The spineflower is the subject of this Plan. The SFVS is listed as an endangered species under the California Endangered Species Act (CESA) (California Fish and Game Code, Sections 2050–2097) and is a candidate species under the federal Endangered Species Act of 1973 (FESA) (16 U.S.C. Section 1531, et seq.).

The Plan encompasses the project study area (portions of the Specific Plan area and the VCC and Entrada planning areas) in order to address comprehensive conservation planning on Newhall Land properties within Los Angeles County supporting known spineflower populations. The information provided in this Plan will be used by the applicant in requesting a state permit authorizing the take of spineflower in the areas located outside designated spineflower preserves. Specifically, the applicant is requesting: (1) a Candidate Conservation Agreement from the U.S. Fish and Wildlife Service (USFWS) under FESA and (2) a section 2081(b) Incidental Take Permit from CDFG under CESA.

IMAGE SOURCE: USGS 24K Quad

FIGURE 1

DUDEK

Spineflower Conservation Plan

Regional Map

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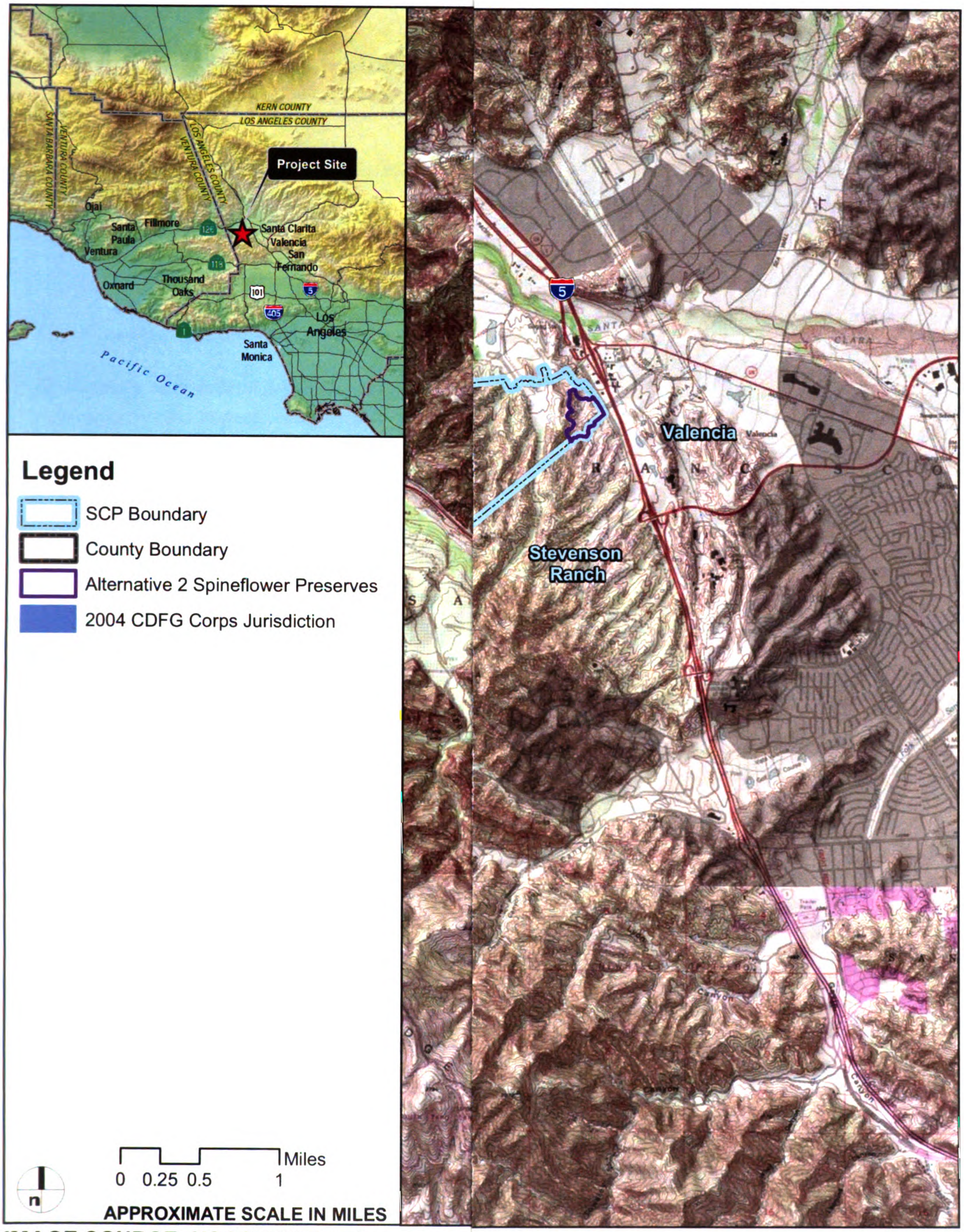

IMAGE SOURCE: USGS 24K Quad

FIGURE 2

Spineflower Conservation Plan

Vicinity Map

DUDEK

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The purpose and need for the Plan under the National Environmental Policy Act of 1969 (NEPA) (42 U.S.C. Section 4321, et seq.) and the Plan objectives under the California Environmental Quality Act (CEQA) (California Public Resources Code, Section 21000, et seq.) are:

> To develop and implement a practicable/feasible comprehensive spineflower conservation plan that provides for the long-term persistence of spineflower within Newhall Land properties containing known spineflower populations.

To comply with federal and state environmental review requirements under NEPA and CEQA, respectively, the impacts associated with this Plan are addressed in a joint Draft Environmental Impact Statement/Draft Environmental Impact Report (EIS/EIR). The U.S. Army Corps of Engineers (ACOE) and CDFG are the lead agencies in connection with preparation of the EIS/EIR.

2.0 BACKGROUND AND REGULATORY FRAMEWORK

In May 1999, there was only one known extant population of spineflower, located in Ventura County in the vicinity of Laskey Mesa on the Ahmanson Ranch property in the southeast edge of the Simi Hills.[1] Spineflower was thought to be extinct until it was rediscovered at Laskey Mesa in May 1999. It had last been collected in 1927 from the Castaic area of Los Angeles County (CDFG 2001). Subsequently, spineflower was discovered at Newhall Ranch in 2000.

In 2003, the Ahmanson Ranch property was acquired by the State of California through the Wildlife Conservation Board and transferred to the Santa Monica Mountains Conservancy (Conservancy) for the purposes of wildlife habitat preservation, corridor protection, restoration and management, wildlife-oriented education and research, and for compatible public uses, consistent with wildlife habitat preservation and protection of sensitive biological resources. It is now called the Upper Las Virgenes Canyon Open Space. Based on this acquisition, in 2007, the USFWS acknowledged that threats to the spineflower "from habitat destruction or modification are less than they were four years ago [2003], because one of the two populations (Ahmanson Ranch) is in permanent, public ownership and is being managed by an agency that is working to conserve the plant" (72 FR 69034, 69082). The USFWS further acknowledged that the other population (Newhall Land's holdings) is under threat of development; however, a Candidate Conservation Agreement is being developed between USFWS and Newhall Land. The USFWS further determined that, until the Candidate Conservation Agreement is finalized, the threat of development still exists, but the USFWS decided to retain the spineflower's listing priority to

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[1] Laskey Mesa is located within the former Ahmanson Ranch property in Ventura County.

reflect threats that are high but non-imminent in the 2007 Candidate Notice of Review (CNOR), which was published on December 6, 2007 (72 FR 69034, 69082).

Currently, spineflower is known from the Upper Las Virgenes Canyon Open Space in Ventura County and the applicant's land holdings in Los Angeles County. These two spineflower populations are approximately 17 miles apart (*Figure 3*).

At the state level, spineflower was listed as endangered under the CESA, effective as of September 8, 2002. At the federal level, the spineflower remains a federal candidate species.

3.0 BIOLOGICAL GOALS AND OBJECTIVES

The goal of this plan is to ensure the long-term persistence of spineflower within the project study area. As proposed by the applicant in this plan, the long-term conservation of spineflower will be achieved first by establishing a system of preserves to protect the core occurrences of spineflower in the project study area, and second, by implementing management and monitoring within an adaptive management framework to maintain or enhance the protected spineflower occurrences.

The preserve design and adaptive management framework proposed in this plan have been developed based on the following biological goals and objectives, which describe the desired conditions of (1) the spineflower populations, (2) the communities in which the spineflower occurs, and (3) the ecosystem processes known or hypothesized to maintain the spineflower populations and associated communities. For each goal, a set of objectives provides the steps for attaining the goals, and a short explanation or rationale is provided for each objective.

Population

Goal 1: Maintain or increase San Fernando Valley Spineflower populations within the preserves

Objective 1.1

Maintain or increase the distribution of the spineflower within each preserve. Persistence of an endangered plant is enhanced when it occupies a larger geographic area. The more extensive the distribution (i.e., areal extent), the lower the probability that localized events such as wildfire, pest outbreaks, or disease will remove the entire population. Therefore, it is anticipated that maintaining or increasing the distribution of spineflower within each preserve will reduce the probability that foreseen and unforeseen changes in habitat conditions will result in population declines that could threaten persistence throughout the preserve system.

IMAGE SOURCE: USGS 24K Quad

FIGURE 3

DUDEK

Spineflower Conservation Plan

Existing and Historical Locations of Spineflower

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Objective 1.2

Maintain or increase the abundance of the spineflower within each preserve. In general, more abundant populations (i.e., those comprising more individuals) will have a greater probability of persisting and maintaining genetic diversity necessary to adapt to a changing environment than smaller (less abundant) populations. Existing anthropogenic alterations to the habitat within the preserves, including the invasion and spread of exotic plants, may have reduced spineflower abundance. Management of preserves will be designed to remove unnatural barriers to spineflower populations and maintain conditions conducive to persistence of a viable seed bank, in order to increase abundance and enhance long term population persistence. It is important to note that this objective will be reached within the context of an ecological system so that maintaining or increasing spineflower abundance retains ecological functions as near to "natural" as possible rather than compromising other aspects of the ecosystem.

Objective 1.3

Reduce or prevent the increase of identified stressors or anthropogenic factors that negatively impact spineflower individual and population performance. Management of the preserves will be designed to address anthropogenic factors that are known or hypothesized to reduce spineflower individual and population performance, including exotic plants, Argentine ants (*Linepithema humile*), trampling or erosion due to trespass, and introduction of unseasonal runoff from off-site locations.

Objective 1.4

Increase understanding of the ecological factors influencing the distribution, abundance, and population persistence of the spineflower in order to inform management and monitoring within the preserves. Many gaps remain in the understanding of the ecology of the spineflower, making it difficult to devise management strategies to prevent its extirpation, and to design efficacious monitoring protocols. Studies, management, and monitoring will be designed and implemented to increase information about the spineflower needed to inform habitat management and increase the effectiveness of monitoring, thus facilitating Objectives 1.1 through 1.3.

Objective 1.5

Plan and conduct small scale experimental management trials to test the effects of proposed on-the-ground management treatments and evaluate effectiveness and spineflower's response. Tools and treatment methods needed to manage spineflower and its habitat, including measures to address excessive competition and implement weed control in occupied habitat, will be tested by implementing small scale experimental trials. The results will be monitored and evaluated, and those measures which produce a favorable spineflower response or otherwise do not result in adverse ecosystem effects, would then be implemented across larger areas over time.

Communities

Goal 2: Maintain or enhance the structure and native species composition of the native communities within the spineflower preserves.

Objective 2.1

Maintain a mosaic of naturally occurring native communities within the preserves. Under this objective, management would be implemented if a 25% or greater change is observed in the absolute cover of existing native plant communities within each preserve, as measured through a combination of remote sensing and aerial mapping at 10-year intervals. Land slated to be included within the spineflower preserves currently supports a mosaic of native plant communities likely reflecting different abiotic conditions (e.g., soils, topography, and microclimate) and disturbance history (time since fire, cultivation, grazing regime, and other land uses). The proposed preserves also include considerable acreage of disturbed land and non-native annual grassland, which can be restored to native vegetation types and perhaps even suitable spineflower habitat. The existing native plant communities differ in native plant species composition, including the presence and relative abundance of spineflower. As a result of their different plant species composition and physiognomy (structure), these communities likely differ in the habitat conditions (e.g., food availability, abiotic conditions) and thus animal species composition. Through a variety of direct and indirect mechanisms, these plants and animals could be essential to the long-term persistence of the spineflower populations (e.g., by maintaining populations of pollinators and/or seed dispersers).

Anthropogenic contributions to global climate change are generally accepted by the scientific community, and these changes over time may influence the type and composition of native vegetation communities as well as other aspects of the natural environment in Southern California. Although it is an objective of this plan to prevent anthropogenic changes to the naturally occurring communities within the preserves, management of the preserves is not intended to reverse or slow changes that are the result from global climate change.

Objective 2.1(a)

Restore damaged habitats potentially capable of supporting spineflower, within the preserves. Specific areas shall be restored where they appear capable of being potentially occupied by spineflower. A spineflower Habitat Characterization Study will be conducted prior to development. The results of the study will be used to inform the restoration of potentially suitable spineflower habitat, and maps will be produced showing the areas where such restoration will occur. Area-specific plans will be prepared for each location where restoration will occur and reviewed by the proposed adaptive management working group, and approved by CDFG.

Objective 2.1(b)

Revegetate areas within preserves that have been damaged and do not support native habitats but are unlikely to support spineflower in the future. Damaged habitats with deeper valley soils, for example, may not be suitable for spineflower, but may be capable of supporting other appropriate native habitats and pollinator habitat. These locations will also be identified and plans prepared, similar to Objective 2.1(a), to revegetate them and repair soil damage.

Objective 2.2

Maintain or increase the absolute cover of native plant species by 15% within each preserve every 10 years. Native plant species are important components of natural communities. Maintaining or increasing their relative abundance will facilitate the persistence of native plant populations and the maintenance of native plant communities to which native animals, fungi, and other organisms are adapted.

Because early successional stages characterized by sparse native plant cover provide the ideal habitat for some species, perhaps including the spineflower, increasing *total* native plant cover would be an inappropriate target. Instead, the objective will be to maintain and enhance the natural community structure and species composition, and to increase relative native plant cover—the proportion of the total plant cover that is composed of native plant species.

Objective 2.3

Maintain or increase the diversity of native plant species within each preserve by at least 15%, as measured within each preserve every 10 years. Maintaining the diversity of native plant species is also important for the persistence of native communities. A function of species richness and evenness, diversity is often created and maintained by natural ecological processes, including disturbances (e.g., fire) that enhance the diversity of habitat conditions for animals as well as other organisms. Species diversity will be examined at both at the landscape scale (i.e., total diversity), which is a function of community heterogeneity, and at the local or 'plot' scale (i.e., alpha diversity).

Though the abundance and diversity of other organisms including animals and fungi are also important, it can be difficult and costly to monitor all of the different groups of organisms. Native plant species can be used cautiously as indicators of native community structure for purposes of monitoring overall habitat conditions, unless research indicates this assumption is not met in this system.

Objective 2.4

Increase understanding of the ecology of the native communities needed to inform management of the preserves by undertaking the studies specified as part of the adaptive management program. Greater knowledge about the ecology of the natural communities within the preserves will facilitate management to attain the objectives designed to attain the population, community, and ecosystem goals. Information that could facilitate conservation and management includes: (1) ecological factors that influence the spatial variability in abiotic and biotic conditions within the communities, (2) species composition of various taxonomic groups (including mammals, birds, herpetofauna, insects, fungi, etc.), (3) components of the natural disturbance regimes, (4) ecological responses to disturbance, and (5) successional relationships among communities.

Ecosystem

Goal 3: Facilitate the natural ecological processes required to sustain the native populations and communities in the preserves.

Objective 3.1

Maintain or enhance opportunities for migration of plant and animal populations, including spineflower, between potentially isolated preserves. Following development, the preserves will contain remnant patches of native habitat. All else being equal, small areas are less likely to support persisting populations of endangered species than large areas. If extirpations occur, recolonization will be unlikely due to patch isolation. Genetic diversity is often lower in small, isolated habitat patches, due to genetic bottlenecks, inbreeding, and genetic drift.

Providing opportunities for plant and animal populations to migrate between protected areas can increase the probability of species persistence by increasing the size of populations, allowing recolonization following localized extinctions, and increasing genetic exchange among otherwise isolated populations.

Objective 3.2

Maintain the hydrologic conditions within the preserves. Direct and indirect impacts associated with adjacent development, particularly that which occurs upslope of the preserves, can alter hydrology and thus affect soil moisture and erosion processes. Increased moisture underneath and on the soil surface is predicted to facilitate the invasion and spread of Argentine ants—non-native arthropods that outcompete native ants that could be important spineflower pollinators and/or seed dispersers. Increases in soil moisture can also facilitate populations of native and non-native plants that can outcompete spineflowers, which are poor competitors. Preserves should be managed to prevent alterations to soil moisture by avoiding concentrated runoff, inhibiting drainage, and other factors that could increase soil moisture.

4.0 SPECIES DESCRIPTION

This section summarizes the biological data for the spineflower and includes a description of the results of previous and ongoing pollination, germination, and viability studies that have been conducted at Ahmanson Ranch in Ventura County and in the project study area in Los Angeles County.

4.1 Current Status

State: Endangered, September 2002
Federal: Candidate (Priority 6), May 2004
CNPS List 1B.1

4.2 Taxonomy

SFVS was first described as *Chorizanthe fernandina* by Watson in 1880. The type specimen was collected in 1879 from San Fernando Canyon near the San Fernando railroad station (Brown 1884 and Goodman 1934, as cited in Sapphos 2001). In 1923, Jepson revised the taxonomy of SFVS and renamed it *Chorizanthe parryi* var. *fernandina* (City of Calabasas 1999, 2000). SFVS is a member of the Polygonaceae family and is among 50 taxa in the genus *Chorizanthe* that occur in western North America and southwestern South America (Hickman 1993).

4.3 Distribution

SFVS is endemic to Southern California and is known from 10 historical locations and 2 current locations.

Historical Distribution

Historical records include specimens collected between 1879 and 1929 that represent at least 10 SFVS locations in Los Angeles and Orange counties (CDFG 2001; CDFG 2007) (*Figure 3*). In Los Angeles County, collections were made at nine locations within the San Fernando Valley along the foothills of the San Gabriel Mountains. Only one collection was made in Orange County from hills near Santa Ana. SFVS was thought to occur in San Diego and San Bernardino counties, but these locations were later determined to be mislabeled or misidentified (CDFG 2001).

Table 1 summarizes the 10 historical occurrences of SFVS previously located in Los Angeles County and Orange County (CDFG 2001; CDFG 2007). However, all of the historical occurrences listed in *Table 1,* except Element Occurrence 6, are considered extirpated (CDFG 2001; CDFG 2007). Element Occurrence 6 is in the San Martinez Grande Preserve Area; historical observations in the area made in 1893 are attributed to this occurrence.

Table 1
Summary of the Historical Locations of SFVS

Element Occurrence	County	Location	Last Year Observed
1	Los Angeles	Little Tujunga Wash, along the southwest base of the San Gabriel Mountains	1920
2	Los Angeles	Elizabeth Lake, on sandy banks	1929
5	Los Angeles	Near Castaic, sandy wash along Castaic Valley	1929
6	Los Angeles	Newhall, general vicinity	1893
7	Los Angeles	Chatsworth Park, general vicinity	1901
8	Orange	Hills near Santa Ana, believed to have been in the foothills of Lomas de Santiago (CDFG 2001)	1902
9	Los Angeles	Ballona Harbor, in the general vicinity of Ballona Creek	1901
10	Los Angeles	San Fernando, in the vicinity of lower San Fernando dam just downstream from Los Angeles reservoir and upper Van Norman Lake	1922
12	Los Angeles	Burbank, general vicinity	1890
13	Los Angeles	Tolucca, vicinity of North Hollywood[1]	Before 1930

[1] There is an additional historical collection of SFVS housed at the Rancho Santa Ana Botanical Gardens dated 1930 (CDFG 2001).

Current Distribution

Currently, SFVS is known from only two locations: the vicinity of Laskey Mesa in Ventura County (Element Occurrence 11; CDFG 2007) and in the project study area (Newhall Land property) in Los Angeles County (Element Occurrences 6, 14, 15, 16; CDFG 2007). The Laskey Mesa area and project study area locations are approximately 17 miles apart. The Laskey Mesa is within 1 mile of the historical collection sites at Chatsworth Park (Element Occurrence 7 in 1901).

Element Occurrence 6, collected in 1893, occurs within the project study area and is presumed to be the same as populations discussed herein in the San Martinez Grande Preserve Area (*Figure 3*).

The Laskey Mesa area is located on the southern edge of the Simi Hills near the City of Calabasas in an area formally known as Ahmanson Ranch. The Simi Hills are within the Transverse Ranges geographic subdivision of California (Hickman 1993). Following the rediscovery of SFVS at Ahmanson Ranch, biologists working with Sapphos Environmental Consulting conducted a directed search for SFVS that included historical localities, suitable habitat areas within the historical range of SFVS, and suitable habitat areas near the existing population at Laskey Mesa. A total of 7 historical locations and 21 other locations were surveyed with negative results in 1999 and 2000 (Sapphos 2001).

Section 5 provides a discussion of the current known distribution within the Specific Plan area and the Entrada and VCC planning areas on Newhall Land property holdings within the project study area in Los Angeles County.

4.4 Abundance

Historical records do not include information regarding the abundance of SFVS. Existing data on the abundance of SFVS and the area occupied are from annual surveys conducted at Ahmanson Ranch and in the project study area (Newhall Land property) (*Table 2*). Surveys of the Ahmanson Ranch population at Laskey Mesa were conducted in 1999, 2000, 2001, and 2002. The population has varied from a low of 23,000 SFVS individuals in 1999 (a relatively dry year) to 1.8 million individuals in 2001 (a year of relatively normal rainfall) (Glenn Lukos Associates and Sapphos 2000; Sapphos 2003a).

Table 2
Annual Population Estimates of SFVS and Area Occupied at Ahmanson Ranch and Property Owned by Newhall Land

	[illegible]	2000	2001	2002	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Ahmanson Ranch (Population)	23,000	1.46 million	1.8 million	220,935	—	—	—	—	—
Ahmanson Ranch (Acres Occupied)	6.7	10.5	12.9	3.6					
Newhall Land property (Population)	—	—	—	7,814	5.9 million	560,000	7.4 million	1.8 million	760
Newhall Land property (Acres Occupied)	—	—	—	0.59[1]	16.37	5.33	11.45	8.49	0.12

[1] The 2002 acres occupied number does not include VCC planning area; the VCC SFVS polygon boundaries were not mapped using Global Positioning System (GPS) units in 2002.

In the Specific Plan area, SFVS locations were first identified at Airport Mesa and Grapevine Mesa during limited surveys conducted in 2000. However, 2000 survey data did not include population estimates (URS 2002). In 2000, FL*x* and Katherine Rindlaub Biological Consulting recorded three polygons, representing 1,000 to 2,000 individuals of SFVS on the Entrada planning area (FL*x* 2004). In 2001, surveys of San Martinez Grande Canyon and the VCC planning area identified approximately 14,750 and 4,600 SFVS individuals, respectively (FL*x* 2002a, 2002b).

In 2002, 2003, 2004, 2005, 2006, and 2007, surveys were conducted throughout the Specific Plan area and Entrada and VCC planning areas (*Table 2*). The number of SFVS individuals has varied dramatically, from a low of 7,814 in 2002 to a high of 7.4 million in 2005 (Dudek and Associates 2002a, 2002b, 2002c, 2004a, 2004b, 2004c, 2004d, 2004e, 2004f, 2005a, 2005b, 2005c, 2006a, 2006b , 2006c; Dudek 2007a, 2007b, 2007c). The area occupied has also varied from year to year (*Table 2*). The total occupied footprint has increased each year since 2003. As of 2007, the total mapped footprint of spineflower occurrence in the project study area was 20.2 acres. In 2004, spineflower populations occupied 26% of the total mapped footprint of spineflower area. The area occupied varied in 2003, 2005, and 2006, but on average was more than double the area occupied in 2004, averaging about 60% occupancy. In 2007, only 0.12 (0.6%) acre was occupied by spineflower.

The variation of SFVS abundance and area occupied from year to year is typical of annual plant species. In the case of SFVS, it appears that climatic conditions influence SFVS abundance and area occupied. On the Newhall Land property, the estimated number of SFVS was lower in 2002, 2004, and 2007, compared to 2003 and 2005, with 2006 falling in between. Years 2002, 2004, and 2007 experienced below-average rainfall; in year 2003, rainfall was considered normal, according to the Western Regional Climate Center. Winter 2004/spring 2005 rainfall was considered to be above normal; in winter 2005/spring 2006, rainfall was slightly below average but not as low as it was in 2002, 2004, and 2007, according to the Western Regional Climate Center (WRCC 2006).

At Laskey Mesa, only 50% of the SFVS were observed to flower in 2002, a below-average rainfall year (Sapphos 2003a). In relatively natural habitat areas of Grapevine Mesa in the spring of 2002, only a handful of individuals survived to reproduce; these were typically at locations protected from wind, beneath the drip line of a shrub, or otherwise more protected from exposure. Failed, desiccated rosettes were commonly observed (Meyer 2004). With better climatic conditions in 2003 and 2005, the SFVS population on the Newhall Land property increased by several orders of magnitude.

It is important to emphasize that the population numbers described above are estimates: spineflower populations are highly aggregated and densities vary considerably within the same polygon. Preliminary studies indicate that variability between areas is lower than the variability from year to year (Dudek and Associates 2006d), although the exact area of occupancy has changed each year. For example, in 2002, 2004, and 2007—years of low abundance—spineflower occurred in some areas where they did not occur in 2003, a highly abundant year. These results need further analyses and will be addressed by future monitoring described in *Section 11.0*. Analysis of variance (ANOVA) tests of the density of spineflower individuals and acres occupied at the five core locations gave contrasting results. The area occupied varied more between sites than between years, while density varied more annually than between sites. There was no significant interaction between year and site when a two-way ANOVA was used, which means all of the sites tended to change year to year in a similar fashion. More data are needed, but the preliminary interpretation is that preferred spineflower location is controlled by intrinsic environmental characteristics (e.g., soil type), while population density (and, in turn, actual numbers of individuals) is controlled by extrinsic environmental characteristics (e.g., rainfall).

After mapping the boundaries of each polygon, the number of individuals was counted/ estimated in a rectangular "sample estimation area," which is a subset of the total polygon. The sample estimation area was between 200 centimeters^2 (10 by 20 centimeters) and 2 meters^2 (1 by 2 meters), depending on various factors (e.g., size of the polygon, plant densities, variations in plant densities within the polygon). The number of subsets within the total polygon was determined and added/multiplied, resulting in a total estimate of the number of individuals of the polygon (e.g., 4 × 125 = 500; 8 × 12 = 96; 9 × 100 = 900). This number was then rounded to the nearest magnitude or multiple of a magnitude (e.g., 500, 100, 1,000). Although the spineflower population numbers are expected to overestimate true population densities (Dudek and Associates 2006d), the area occupied should be accurate, as it represents completely mapped units. The general agreement between population estimates and occupied area indicates that, at least for general qualitative analyses, the population estimates are adequate.

Moreover, there is a substantial difference in the overall size of any given individual, which has a direct bearing on reproductive output. There is a positive logarithmic relationship between the size of SFVS individuals and involucre production, with smaller plants producing fewer involucres than larger plants (Sapphos 2003b). That is not to say that small individuals are less valuable. Small-size plants may be the result of poor conditions at a given micro-site where the plant was growing, but also may relate to timing of germination. Later-germinating plants may not achieve the same overall size as plants that have had more time to develop (Sapphos 2003b). However, later-germinating individuals likely contribute to the adaptability of the seed bank to respond to different environmental conditions. In rainfall years with multiple germination events, a mix of plant sizes may represent different ages of individual plants.

4.5 Description

SFVS is a low-growing herbaceous annual. Germination occurs following the onset of late-fall and winter rains and typically represents different cohorts emerging from the seed bank over the winter and early spring growing season. Spineflower initially forms a basal rosette. As day lengths increase in springtime, flowering stalks are produced. Flowering generally occurs between April and June. Overall size of spineflower can vary, ranging from small, button-sized erect plants with little branching to larger, decumbent plants up to 30.5 millimeters in height and between 5.1 and 40.6 millimeters across. Leaves are oblong to oblanceolate, between 5 and 40 millimeters, and they form a basal rosette. The involucre is urn shaped, with six bracts and straight awns enclosing its small white flower, which measures 2.5 to 3 millimeters (Hickman 1993). Each involucre produces a single flower that forms a single seed. SFVS can generally be differentiated from co-occurring spineflowers, including Turkish rugging (*Chorizanthe staticoides*) and lastarriaea (*Lastarriaea coriacea*), by its decumbent habit, white flowers, entire leaves, and straight-tipped involucral awns. Plants become desiccated and die by late summer, leaving branches brittle and dry but usually with intact involucres still attached and containing seed. SFVS disarticulates (breaks apart) with clumps of four to eight involucres that are rigidly held together. In contrast, the involucres of Turkish rugging and lastarriaea disarticulate readily and one by one. Seeds are eventually released from the involucre, but the exact mechanism and timing of this release has not been described.

4.6 Habitat at Existing and Historical Locations

Vegetation

For purposes of discussing vegetation, the Vegetation Classification and Mapping Program "List of California Terrestrial Natural Communities Recognized by the California Natural Diversity Database" (CDFG 2003a) was used, with a few exceptions. In certain instances, the vegetation communities observed in the field did not match the vegetation communities described by CDFG (2003a). In these instances, Dudek developed additional vegetation community classifications.

Historical accounts describe SFVS as occurring within scrub communities in washes, riverbeds, and upland sites. Although historical accounts do not provide specific information regarding local habitat conditions, based on their locations, occurrences described within upland areas probably occurred within California sagebrush scrub communities, while occurrences described as occurring within sandy washes were probably within Riversidean alluvial fan sage scrub communities (Sapphos 2001). Historically occupied habitat likely also included native grasslands (Meyer 2004). The interstitial spaces between bunchgrasses were likely occupied by annual forbs and geophytes, including various species of *Chorizanthe* (Keeley 1990).

At the two current known locations, SFVS generally occurs within sparsely vegetated grassland and scrub communities and associated ecotones. At Laskey Mesa, SFVS is described as occurring along the interface between California sagebrush scrub and grassland habitats. This observed distribution may be the result of past dryland farming of the mesa top, which likely removed any SFVS growing in the farmed area (CDFG 2001). Past farming and livestock grazing practices are likely to have modified the vegetation on Laskey Mesa; therefore, it is not known whether this area was native grassland, coastal scrub, or a mix of both prior to European contact. On the Newhall Land property, the majority of SFVS sites occur within California sagebrush scrub and California annual grassland but also occur on agricultural land. In this sense, agricultural land means areas recently subjected to terracing and grubbing for agricultural purposes, but which were not planted with actual crops or were planted with crops in the recent past. SFVS sites also occur within openings in southern coast live oak woodland, undifferentiated chaparral, and alluvial scrub. Sparsely vegetated areas with low overall cover of herbaceous vegetation and some bare ground are typical of existing SFVS sites at Ahmanson Ranch and on the Newhall Land property, although SFVS has also been observed in areas of dense annual grasses.

Soils and Geology

A geologic investigation of historical and existing locations indicated that SFVS sites are associated with two generic conditions: (1) alluvial deposits of riverine systems and (2) contact points between exposed bedding planes where the parent material is exposed at the surface (Sapphos 2000). These conditions are consistent with the observation that SFVS occurs in areas with thin, poorly developed soils that are relatively low in nutrients. On the Newhall Land property, SFVS occurs on eight geologic formations: Artificial Fill, Quaternary Alluvium, Quaternary Landslide, Quaternary Older Alluvium, Quaternary Slopewash, Quaternary Terrace Deposits, Undifferentiated Terrace Deposits, and Undifferentiated Saugus formation. The Saugus formation consists of interbedded sandstones, siltstones, and mudstones deposited during late-Pliocene and early-Pleistocene times, 2.5 to 0.7 million years before present. The Quaternary formations were deposited in the past 1.8 million years, during Pleistocene times (Allan E. Seward 2004). At Laskey Mesa, the underlying geology is Tertiary-aged unnamed shale and sandstone, about 5.1 million years before present (Dibblee 1992), which is older than the underlying geologic formations on the Newhall Land property.

Existing and historical SFVS sites are potentially associated with a variety of soil units. Soil units at historical sites were highly variable, and 7 of the 12 historical sites lacked adequate specificity as to location such that it is not possible to determine the historical geologic and soil composition at these locations. Five sites that could be correlated with geologic data did not match those occurring on Ahmanson Ranch (Sapphos 2001). At Laskey Mesa, SFVS is associated with San Andreas sandy loam (2% to 9% slopes), Zamora loam (2% to 9% slopes), and Santa Lucia shaly silty clay loam (15% to 30% slopes) (Glenn Lukos and Associates, Inc. and Sapphos 2000). On the Newhall Land property, although SFVS sites occur on a variety of soil units, approximately 90% of polygons occurred within Terrace escarpments, Castaic-Balcom silty clay loams (30% to 50% slopes), Castaic-Balcom silty clay loams (30% to 50% slopes, eroded), Zamora loam (2% to 9% slopes), and Saugus loam (30% to 50% slopes). The occupied soils at Ahmanson Ranch and on the Newhall Land property appear similar in that they are primarily loam or silty clay loam, with a much lower level of occurrence on sandy loams.

At both Laskey Mesa and the Newhall Land property, SFVS occurs primarily in areas of poorly developed soils with shallow depth to bedrock. At Laskey Mesa, soils in adjacent unoccupied areas with dense grasses were found to be more developed and have higher levels of nutrients. SFVS plants also frequently grew in areas of rock outcroppings in weathered, degraded parent material featuring poorly developed soils lacking true soil horizons (Sapphos 2001). SFVS distribution at Laskey Mesa is possibly influenced by past land use and invasion of European annual grasses and forbs and may be a response to a buildup of thatch, in light of the fact that livestock were removed from annual grasslands on Laskey Mesa about 8 years prior to the discovery of SFVS at Ahmanson Ranch (Meyer 2004). Similarly, plants occurring in undisturbed areas on the Newhall Land property consistently occur on soils lacking the organic soil horizon, whereas occupied mesa-tops typically consist of very well-developed soils (Allan E. Seward 2002).

SFVS sites also differ from adjacent unoccupied areas in the level of soil compaction. Soils at Ahmanson Ranch SFVS sites generally have higher bulk densities (dry weight of soil per unit of volume) than adjacent areas supporting non-native weedy species (St. John 1999, as cited in Sapphos 2001). SFVS is also in areas with disturbed soils, occurring along infrequently used dirt roads and trails at Ahmanson Ranch (Sapphos 2001). On the Newhall Land property, SFVS is found on recently created artificial fill slopes and in areas disturbed by fossorial rodent activity. Specifically, within the Entrada planning area, SFVS occurs along manufactured slopes adjacent to the golf course, and a number of the occurrences in the undisturbed sage scrub throughout Entrada are associated with fossorial rodent activity. Within the VCC planning area, SFVS occurs along the edges of dirt roads that have been in use for decades. Within the Specific Plan area, SFVS occurrences are associated with fossorial rodent activity in a number of areas of undisturbed sage scrub; in particular, San Martinez Grande Canyon and the areas within and surrounding Potrero Canyon, Grapevine Mesa, and Airport Mesa and in annual grasslands that have been used for grazing for decades.

Elevation, Slope, and Aspect

Existing SFVS populations in the vicinity of Laskey Mesa occur between 1,200 and 1,400 feet AMSL, while populations on the Newhall Land property occur between 960 and 1,320 feet AMSL (Sapphos 2001; Dudek and Associates 2002a, 2002b). SFVS occurs primarily on slopes with a south-facing aspect. These southern exposures experience more sunlight and heat, which leads to less dense herbaceous growth and/or less dense vegetation when compared to areas with a northern exposure. Therefore, SFVS's tendency to occur on these slope exposures may be due to the prevalence of more sparsely vegetated habitat areas on hotter, drier slopes.

At Laskey Mesa, site characteristics from 1999 to 2002 surveys indicated that 96% of occupied habitat had a predominantly south-facing aspect (Sapphos 2002). SFVS sites on the Newhall Land property are mostly on slopes with a south-facing component, with 50% of sites occurring on south-, southwest-, or southeast-facing slopes.

At Laskey Mesa, SFVS occurs on slopes with gradients between 4% and 47%, with an average slope of 20% (Sapphos 2001). These calculations may overestimate the slope because SFVS tends to occur in localized depressions or along narrow shelves and benches at Ahmanson Ranch (CDFG 2001). On the Newhall Land property, approximately 90% of SFVS occurrences are on slopes with gradients between 0% and 25%.

4.7 Competition

SFVS appears to occur most often in areas with little or no competing vegetation. This has also been reported for other species of *Chorizanthe* (Davis and Sherman 1992; McGraw and Levin 1998; Kluse and Doak 1999; Coppoletta and Moritsch 2002). Preliminary studies within the project study area found no correlation between spineflower densities and vegetation type (i.e., native or non-native herbs) or ground cover (e.g., thatch, bare ground, litter) when analyzed at the level of mapped polygons. The exception to this was a negative correlation, with the percentage of native shrubs indicating shading may be an inhibitor of spineflower occurrence (Dudek and Associates 2006d). Studies conducted on the Newhall Land property in 2007 found that compared to areas that typically contain spineflower (i.e., in years of average or above-average rainfall), areas containing spineflower in 2007 tended to have greater cover of bare ground, less cover of thatch, and thatch that was not as deep. In addition, the majority of co-occurring species in 2007 were non-native annual species, suggesting the similarity of ecological requirements and the potential that competitive effects of non-native plants may be especially important in years of below-average rainfall (Dudek 2007d).

Test-plot experiments at Laskey Mesa studied the effect of treatment combinations of vegetation removal and supplemental watering in both north- and south-facing plots by measuring mean number of plants, mean number of involucres, and mean plant size. Results indicated that maintaining subplots free of all competing vegetation produced spineflower plants of exceptional size and number of involucres by producing additional primary, secondary, and tertiary branching (Sapphos 2003c). This result is similar to the response of SFVS individuals that germinated on grubbed slopes in the Airport Mesa area of the Newhall Land property in 2002. Exceptionally large plants were frequently observed at this location, while SFVS plants in more typical habitat areas with normal levels of competing vegetation were very small and frequently failed to survive the hot, dry conditions found during the 2002 growing season (Meyer 2004). The Sapphos study also indicated that vegetation removal increased the number of seeds produced per plant; however, this was the result of an increase in the number of flowers produced and not of an increase in seed set (Sapphos 2003c).

The Sapphos study results indicated that any combination of vegetation removal, in which all vegetation other than spineflower was removed, had no significant effect in the west-/northwest-facing plot. However, in south-facing plots, vegetation removal had a significant effect on the mean number of plants within a plot and on the number of involucres produced per plant. Thus, when vegetation was removed, the number of involucres and mean plant size were significantly greater on south-facing plots than north-facing plots. Between north- and south-facing plots, there were no significant differences in plant number, number of involucres, or mean plant size when vegetation was not removed (Sapphos 2003c).

In a second Sapphos study at Laskey Mesa, vegetation removal was accomplished using a weed-whip or an herbicide (RoundUp). Following treatment, the vegetation and duff were removed from the plots, and the plots were seeded with SFVS. The plots treated with the herbicide experienced greater SFVS growth and reproductive output as compared to the weed-whipped plots (Sapphos 2003b). It is important to note that this outcome may have been influenced by rainfall conditions in 2003; rain fell through May 9, 2003. This could have resulted in regrowth of annual grasses within the weed-whipped plots. It is also important to note that the use of herbicides within SFVS preserves would require great caution and site-specific evaluation.

Furthermore, based on a study characterizing the habitat of slender-horned spineflower (*Dodecahema leptoceras*), a species closely related to SFVS, it was noted that soil in plots occupied by slender-horned spineflower had lower levels of nitrogen, phosphorous, electrical conductivity, and organic materials than distant unoccupied plots that appeared visually suitable.

In addition, the soil in the occupied plots had higher values of nitrogen and electrical conductivity than unoccupied adjacent suitable plots. The soil in occupied plots had lower values of phosphorus and organic material than unoccupied adjacent suitable plots (Allen 1996). Therefore, it is important to note that while unoccupied adjacent and distant plots appeared similar to occupied plots, there were differences in soil characteristics that may influence the success of slender-horned spineflower populations.

The results of the 2006 and 2007 pilot monitoring studies on the Newhall Land property (Dudek and Associates 2006d; Dudek 2007d) and the studies summarized above indicate that spineflower occurrence is controlled by a combination of environmental conditions and competition. SFVS tends to occur most often in open areas, particularly those lacking shrubs. Observed occurrences in settings with disturbed soils (i.e., road sides and burrows) could be interpreted as indicating spineflower is a successional specialist, but the consistent occurrence from 2002 to 2006 in the same areas indicates a highly environmentally controlled distribution.

4.8 Reproduction

Breeding System

SFVS flowers are protandrous (i.e., anthers release pollen prior to stigma becoming receptive to pollen), limiting the extent to which self-fertilization can occur within a flower. However, according to Jones et al. (2002), small flower size and a fruit set higher than expected for exclusively outcrossing systems (i.e., plants that must be pollinated by other plants) indicates that SFVS is likely a facultative selfer (i.e., a plant that can be pollinated by other plants or by itself). SFVS flowers produce a single achene (i.e., a one-seeded, dehiscent fruit), which apparently remains within the involucre even after the plant disarticulates (CBI 2000).

Germination and Viability

Germination and viability tests were conducted using SFVS seed collected from Ahmanson Ranch in 2000 and 2001 (RSABG 2000 and 2001, in Sapphos 2003b). Seeds collected in 2000 were determined to have germination rates between 68% and 73% and viability rates of 90% to 96%. Seeds collected in 2001 had germination rates of between 46% and 49% and viability rates of 90% to 96%. Seed set was between 58% and 72% in 2000 and approximately 60% in 2001. Experiments conducted by Rancho Santa Ana Botanic Garden (RSABG) found that dramatic increases in germination rates were obtained by clipping seed coats (Sapphos 2001). Although this would indicate the presence of a physical seed coat dormancy, the mechanism by which dormancy is overcome in naturally occurring populations remains unknown.

Pollinators

The majority of information regarding the pollination biology of SFVS is from the results of studies carried out at Ahmanson Ranch by Jones et al. (2002). Five species of arthropods were found to be responsible for more than 75% of visits to SFVS flowers: two ant species (*Dorymyrmex pyramicus* and *Solenopsis xylonii*), European honeybee (*Apis mellifera*), and two beetle species (*Dastyinae* sp. and *Zabrotees* sp.). Honeybees were the only species carrying sufficient amounts of pollen for analysis, but they were determined to have a high rate of floral constancy (94%). Floral constancy is a measure of how specific a floral visitor is to a given species on any single foraging flight (Jones et al. 2002). High floral constancy indicates that honeybees are capable of being effective SFVS pollinators.

Although the effectiveness of ants as SFVS pollinators remains uncertain, ants were among the most frequent visitors to SFVS in two different studies carried out at Ahmanson Ranch (LaPierre and Wright 2000; Jones et al. 2002). As observed by LaPierre and Wright (2000), the diameter of an SFVS flower is large enough to accommodate ant visitors, suggesting that pollination by ants is at least possible. In addition, Jones et al. (2002) found that SFVS exhibits relatively low nectar production per flower, which often forces floral visitors seeking nectar (such as ants) to visit many flowers while foraging, thereby ensuring the pollination of many flowers. Parasitic wasps and bean weevils were also noted as visitors to SFVS flowers, although it is unknown if either are effective pollinators (Jones et al. 2002).

On the Newhall Land property, Jones et al. (2004) conducted a pollination study at three locations: Grapevine Mesa (Site 1) and Airport Mesa (Site 2) within the Specific Plan area and one location at Entrada (Site 3). The most common visitors during the mid-season (April 23–25, 2004) to Sites 1 and 2 were flies (67% and 58.5%) and beetles (27% and 21.5%). The most common visitors to Site 3 during the mid-season were ants (43%) and beetles (42%). During the late season, May 7 through 9, 2004, the most common visitors at Site 1 were flies (83%) and beetles (12%). The most common visitors at Site 2 during the late season were beetles (31%), ants (28%), and flies (25.5%), and the most common visitors at Site 3 during the late season were ants (70%).

Jones et al. (2004) also evaluated the effectiveness of ants as pollinators. In the laboratory, spineflower was grown in two enclosures, one excluding all insects except ants (*Dorymyrmex insanus*), and one excluding all insects. The plants in the enclosure with ants experienced 64.6% seed set, while the plants in the enclosure without ants experienced 29.2% seed set. Thus, it would appear that ants can be effective pollinators and that spineflower is capable of self-pollination (however, viability studies have not yet been conducted for the seeds).

Plant Size

Based on the results of the 2007 Spineflower Monitoring Pilot Study conducted on the Newhall Land property, plant size was found to have a significant correlation with the number of involucres per plant (Dudek 2007d). Because SFVS produces a single seed per involucre, the number of involucres per plant is an indication of reproductive output. In 2007, plant size (i.e., diameter) ranged from a few millimeters across to as large as 12 centimeters across. The number of involucres per plant generally reached as high as 300 involucres per plant.

4.9 Seed Dispersal

Little is known about dispersal of SFVS seeds. Trapping studies conducted at Ahmanson Ranch in September 1999 investigated the potential role of small mammals in SFVS seed dispersal (Sapphos 2001). Four species were found in trap lines set within SFVS habitat: San Diego pocket mouse (*Chaetodipus fallax*), Pacific kangaroo rat (*Dipodomys agilis*), western harvester mouse (*Reithrodontomys megalotis*), and deer mouse (*Peromyscus maniculatus*). No SFVS seeds were found attached to the animals' pelage, and neither seeds nor seed heads were found in the cheek pouches of kangaroo rats or pocket mice. However, this is not surprising given that the SFVS seeds may not disarticulate from the involucre for some months, which would potentially protect the seed from direct herbivory during that stage. In the field, involucres have been observed to attach to human skin, clothing, and shoes, suggesting potential for involucres containing seed to be carried away from the parent plant if they lodge on humans or other animals.

Based on spineflower seed germination tests conducted at RSABG, it appears that the involucres may inhibit or delay germination. Two germination studies conducted in 1999 and 2000 of spineflower seeds still retained within the involucres resulted in germination rates of 34% and 30%. Subsequent germination studies conducted for spineflower seeds removed from the involucres resulted in germination rates of 65% to 100% (Wall 2004).

Ants may play a role in the dispersal of SFVS. LaPierre and Wright (2000) noted one species of harvester ant (*Messor andrei)* carrying SFVS flower parts containing seeds to nest sites, and SFVS parts were also evident in *M. andrei* midden piles. Harvester ants are capable of foraging for seeds as far as 330 feet from the nest, creating the possibility that seeds may be dropped en route.

4.10 Seed Banks and Genetics

The appearance of significant new SFVS populations from year to year in the vicinity of Laskey Mesa and the project study area is consistent with the presence of a seed bank. Ferguson and Ellstrand (1999) note that seed banks are critical to maintaining genetic diversity among isolated populations of slender-horned spineflower, a close relative of the SFVS. In studies of slender-horned spineflower, current-year germinating plants were found to have greater genetic variation than seeds produced during the previous year, indicating that seed banks make important contributions to the genetics and population biology. Genetic variation within populations and within the species as a whole was found to be higher in slender-horned spineflower than is generally expected for annuals or endemics. Similar investigations of the role of seed banks in SFVS genetics and population biology have not been conducted.

5.0 OCCURRENCE WITHIN PROJECT STUDY AREA

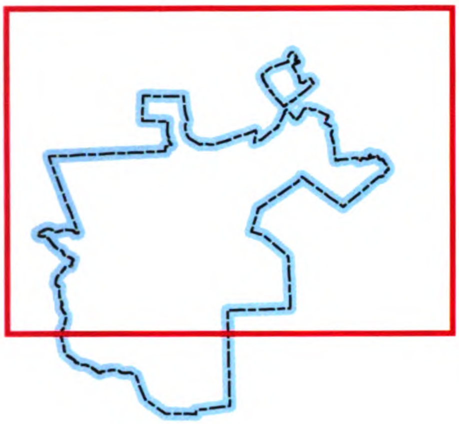
This section describes the results of the 2000, 2001, 2002, 2003, 2004, 2005, 2006, and 2007 surveys and the occurrence data within the project study area. The data discussed includes the number and distribution of occurrences and ecological indicators such as slope, aspect, vegetation, soils, and pollinators. The data also includes the results of the on-site geology and soils testing.

5.1 Description of Annual Survey Efforts

In 2000, URS surveyed portions of the Specific Plan area to the south of and along the Santa Clara River corridor (URS 2002). SFVS was detected at sites along Grapevine Mesa and in the vicinity of Airport Mesa. FL*x* and Katherine Rindlaub found SFVS within Entrada in 2000 (FL*x*, March 23, 2004, pers. comm.). In 2001, FL*x* surveyed portions of VCC and the Specific Plan area, including Long Canyon and San Martinez Grande Canyon, but excluded Grapevine Mesa and Airport Mesa (FL*x* 2002a, 2002b). At that time, SFVS was detected at sites on the north side of SR-126 at San Martinez Grande Canyon. In 2002, 2003, 2004, 2005, 2006, and 2007, Dudek conducted annual surveys throughout the Specific Plan area and the VCC and Entrada planning areas (Dudek and Associates 2002a, 2002b, 2002c, 2004a, 2004b, 2004c, 2004d, 2004e, 2004f, 2005a, 2005b, 2005c, 2006a, 2006b, 2006c; Dudek 2007a, 2007b, 2007c).

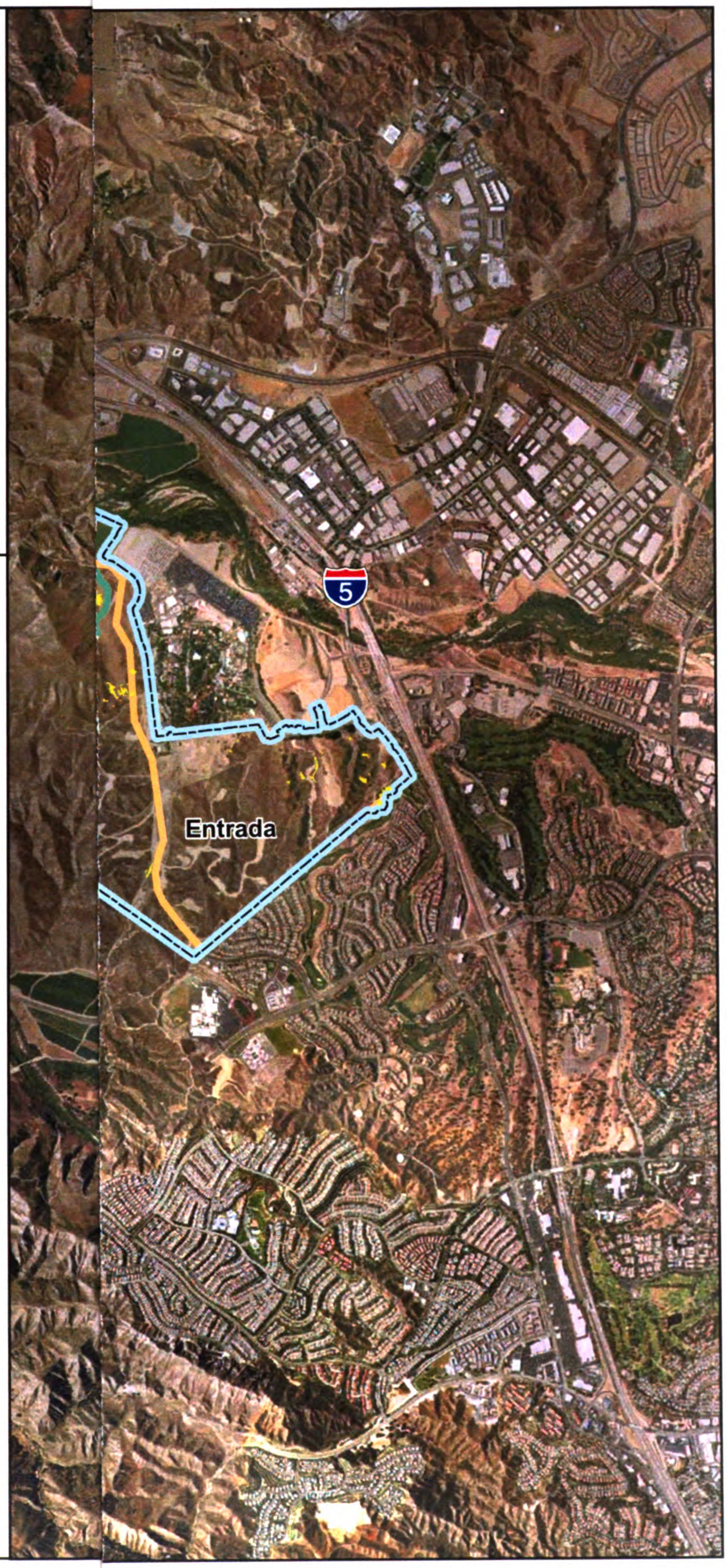
5.2 Distribution and Abundance

The distribution of SFVS on the Newhall Land property has been consistently documented across the entire planning area for six consecutive growing seasons (2002–2007). For planning and discussion purposes, populations have been aggregated geographically into six general occurrences. Each occurrence consists of SFVS polygons that are generally in proximity to each other within a particular vicinity and separated from others by distance or existing site features (e.g., ridgelines, roadways, SR-126). The distribution of SFVS from 2002, 2003, 2004, 2005, 2006, and 2007, and the geographic associations are shown in *Figure 4*.



Legend

- SCP Boundary
- Spineflower Geographic Association Boundaries
- Existing CDFG Conservation Easement
- Spineflower Cumulative Footprint 2002-2007



AERIAL SOURCE: DigitalGlobe, 2007

FIGURE 4

Spineflower Conservation Plan

ower Geographic Associations

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The Specific Plan area includes the Airport Mesa, Grapevine Mesa, Potrero Canyon, and San Martinez Grande Canyon occurrences. In 2003 and 2005, during years of average to higher-than-average rainfall, SFVS occurrences within the Specific Plan area accounted for approximately 77% and 87%, respectively, of all SFVS individuals observed on the Newhall Land property. The Entrada occurrence is located in the southeastern portion of the planning area. In 2003 and 2005, the Entrada occurrence accounted for approximately 20% and 10%, respectively, of SFVS observed on the Newhall Land property. The VCC occurrence is located on the slopes above Castaic Creek near Castaic Junction and accounted for approximately 3% of the known SFVS individuals on the Newhall Land property in both 2003 and 2005.

Table 3 summarizes occurrence data and area occupied on the Specific Plan area at Airport Mesa, Grapevine Mesa, Potrero Canyon, and San Martinez Grande Canyon and at the Entrada and VCC planning areas

Table 3
Annual SFVS Population Estimates and Area Occupied on Property Owned by Newhall Land

	2002		2003		2004		2005		2006		2007	
Area	Number	Acres	Number	Acres	Number	Acres	Number	Acres	Number	Acres	Number	Acres
Airport Mesa	463	0.42	1,114,559	6.84	38,236	2.11	1,706,335	4.37	1,216,612	4.13	226	0.07
Grapevine Mesa	7,256	0.11	2,121,160	4.07	458,235	1.55	4,261,660	2.86	33,596	1.40	76	<0.01
San Martinez Grande Canyon	75	0.03	1,124,388	2.10	1,387	0.62	123,527	1.39	1,050	1.02	73	0.02
Potrero Canyon	---	---	233,328	1.45	13,326	0.47	326,654	1.06	88,659	0.64	67	0.01
VCC	---	---	170,181	0.46	1,471	0.09	223,155	0.48	204,405	0.36	60	<0.01
Entrada	20	0.03	1,183,504	1.45	45,733	0.50	750,482	1.30	229,174	0.95	258	0.02
Total	7,814	0.59	5,947,120	16.37	558,388	5.33	7,391, 813	11.45	1,773,496	8.49	760	0.12

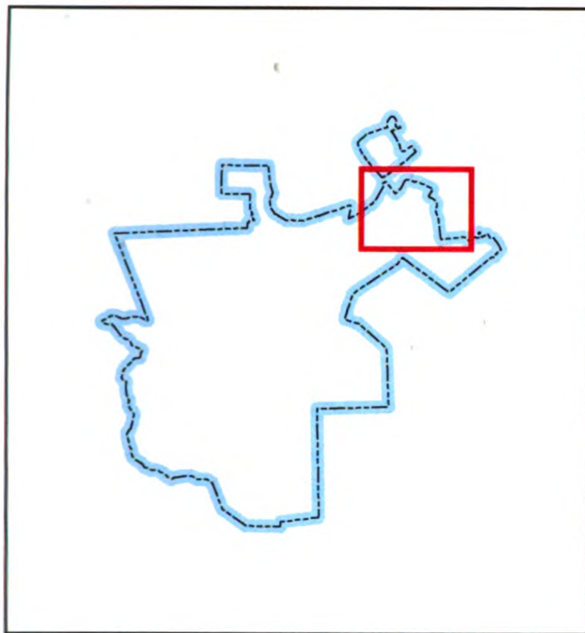
As described in *Section 4.4*, the number of SFVS individuals has varied dramatically from a low of 7,814 in 2002 to a high of 7.4 million in 2005 (Dudek and Associates 2002a, 2002b, 2002c, 2004a, 2004b, 2004c, 2004d, 2004e, 2004f, 2005a, 2005b, 2005c, 2006a, 2006b, 2006c; Dudek 2007a, 2007b, 2007c). The area occupied has also varied from year to year (*Table 3*). In 2004, spineflower populations occupied 26% of the total mapped footprint of spineflower area. The area occupied varied in 2003, 2005, and 2006 but, on average, was more than double the area occupied in 2004. Empirical data on plant size was not collected, but individual plants appeared to be larger in 2003 and 2005 than in 2002, 2004, and 2006. In 2007, only 0.12 (0.6%) acre was occupied by spineflower.

The variation of SFVS abundance and area occupied from year to year is typical of annual plant species. In the case of SFVS, it appears that climatic conditions may influence SFVS abundance and area occupied. On the Newhall Land property, the estimated number of SFVS was dramatically lower in 2002, 2004, and 2007, compared to 2003 and 2005, with 2006 falling in between. Years 2002, 2004, and 2007 experienced below-average rainfall, but, in 2003, rainfall was considered normal, according to the Western Regional Climate Center. Winter 2004/spring 2005 rainfall was considered to be above normal and in winter 2005/spring 2006 was slightly below average but not as low as 2002, 2004, and 2007, according to the Western Regional Climate Center (WRCC 2006).

5.2.1 Newhall Ranch Specific Plan

Airport Mesa

SFVS was first detected in the Airport Mesa vicinity in 2000. SFVS polygons were identified and mapped, but no population estimates were made at that time. In 2002, 463 SFVS individuals were observed in 36 polygons. Surveys conducted in 2003 identified 86 polygons and approximately 1.1 million individuals. In 2004, 137 polygons containing 38,236 individuals were detected. In 2005, 154 polygons containing 1.7 million individuals were detected. In 2006, 179 polygons containing 1.2 million individuals were detected. In 2007, 28 polygons containing 226 individuals were detected. The distribution of SFVS from 2002, 2003, 2004, 2005, 2006, and 2007 is shown on *Figure 5*.



Legend

SCP Boundary
Existing CDFG Conservation Easement
2002-2007 Cumulative Spineflower Occurrences

Feet
0 250 500 1,000
APPROXIMATE SCALE IN FEET

AERIAL SOURCE: DigitalGlobe, 2007

FIGURE 5

Spineflower Conservation Plan

DUDEK **ver Occurrences - Airport Mesa**

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Grapevine Mesa

SFVS was first detected in the Grapevine Mesa vicinity in 2000, but no population estimates were made at that time. The majority of SFVS sites at Grapevine Mesa are located along the slopes to the west and south of the mesa. SFVS was mapped by FL*x* in 2000 prior to cultivation of the mesa top, and, at that time, the mapped polygon extended onto the top of the west side of the south half of Grapevine Mesa for about 100 feet (the occurrence was mapped by hand rather than by a GPS unit with sub-meter accuracy, so exact limits of polygons are not known). In 2002, approximately 7,256 plants were observed in 11 polygons. Surveys conducted in 2003 identified 80 polygons and approximately 2,121,160 individuals (Dudek and Associates 2004a). In 2004, 97 polygons containing 458,235 individuals were detected. In 2005, 109 polygons containing 4,261,660 individuals were detected. In 2006, 87 polygons containing 33,596 individuals were detected. In 2007, 14 polygons containing 76 individuals were detected. The distribution of SFVS from 2002, 2003, 2004, 2005, 2006, and 2007 is shown on *Figure 6*.

San Martinez Grande Canyon

SFVS was first detected in the San Martinez Grande Canyon area in 2001 (FL*x* 2002b). Surveys conducted in May 2001 identified and mapped seven SFVS polygons totaling approximately 14,750 individuals. In 2002, only one polygon with 75 individuals was observed. Surveys conducted in 2003 identified 13 polygons totaling approximately 1.1 million plants. In 2004, 10 polygons were identified containing 1,387 individuals. In 2005, 11 polygons containing 123,527 individuals were detected. In 2006, 13 polygons containing 1,050 individuals were detected. In 2007, 15 polygons containing 73 individuals were detected. The distribution of SFVS from 2002, 2003, 2004, 2005, 2006, and 2007 is shown on *Figure 7*.

Potrero Canyon

SFVS was not observed during surveys conducted in the area in 2002. The 2003 Potrero Canyon occurrence consists of 16 polygons and approximately 233,328 individuals. In 2004, 32 polygons containing 13,326 individuals were detected. In 2005, 27 polygons containing 326,654 individuals were detected. In 2006, 32 polygons containing 88,659 individuals were detected. In 2007, 11 polygons containing 67 individuals were detected. The distribution of SFVS from 2003, 2004, 2005, 2006, and 2007 is shown in *Figure 8*.

5.2.2 Valencia Commerce Center Study Area

SFVS was first detected at the VCC study area in 2001. Seven polygons and approximately 4,600 individuals were observed in the VCC study area (FL*x* 2002b). SFVS was not observed during surveys conducted in the VCC study area in 2002. In 2003, a total of 27 polygons and approximately 170,181 individuals were observed in the VCC study area (Dudek and Associates 2004b). In 2004, 24 polygons containing 1,471 individuals were detected. In 2005, 45 polygons containing 223,155 individuals were detected. In 2006, 46 polygons containing 204,405 individuals were detected. In 2007, eight polygons containing 60 individuals were detected. The distribution of SFVS from 2003, 2004, 2005, 2006, and 2007 is shown on *Figure 9*.

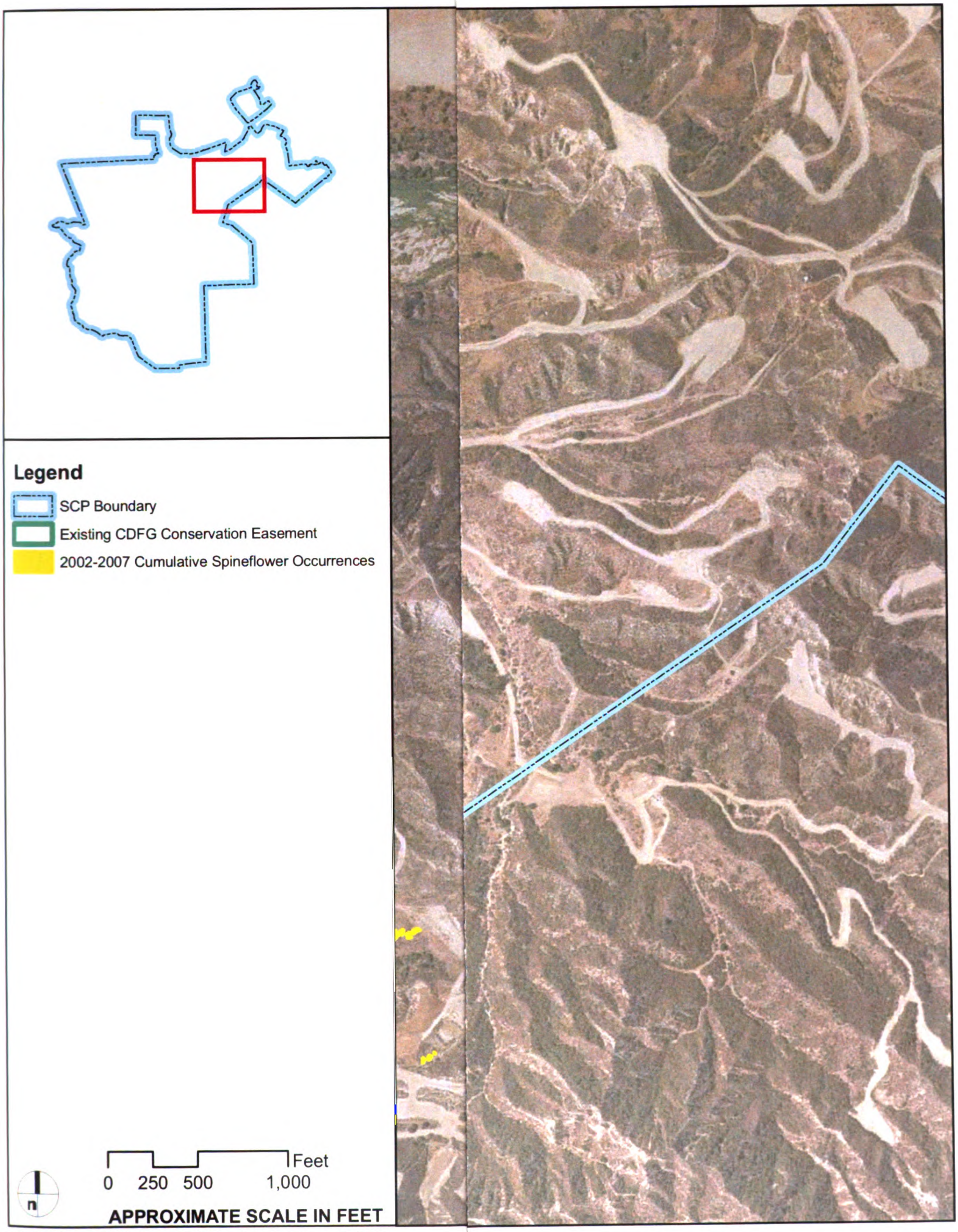
5.2.3 Entrada Study Area

SFVS was first detected at the Entrada study area in 2000. Three polygons representing 1,000 to 2,000 individuals were mapped (FL*x* 2004). Surveys conducted in May, June, and September 2002 identified 20 SFVS individuals in two polygons. Surveys conducted in 2003 identified approximately 1,183,504 individuals within 29 polygons (Dudek and Associates 2004c). In 2004, 26 polygons containing 45,733 individual were observed. In 2005, 29 polygons containing 750,482 individuals were detected. In 2006, 39 polygons containing 229,174 individuals were detected. In 2007, eight polygons containing 258 individuals were detected. The distribution of SFVS from 2002, 2003, 2004, 2005, 2006, and 2007 is shown on *Figure 10*.

5.3 Habitat at Project Study Area

5.3.1 Vegetation

On the Newhall Land property, SFVS sites occur predominantly within openings in sparsely vegetated California sagebrush, California buckwheat, and grassland communities. Approximately 89% of 2003 SFVS polygons on the Newhall Land property occur within California sagebrush scrub (62%) or California annual grassland (27%), while 11% of SFVS polygons occur within coast live oak woodland, mixed chaparral, chaparral, disturbed land, Great Basin scrub, valley oak grassland, and alluvial scrub. Similarly, approximately 93% of 2005 SFVS polygons on the Newhall Land property occur within California sagebrush scrub (67%) or California annual grassland (26%), while 7% of SFVS polygons occur within coast live oak woodland, mixed chaparral, chaparral, disturbed land, Great Basin scrub, valley oak grassland, and alluvial scrub. Characteristic site conditions include a low cover of grasses, herbs, and shrubs and a visible component of bare ground.



AERIAL SOURCE: DigitalGlobe, 2007

FIGURE 6

DUDEK

Spineflower Conservation Plan

Occurrences - Grapevine Mesa

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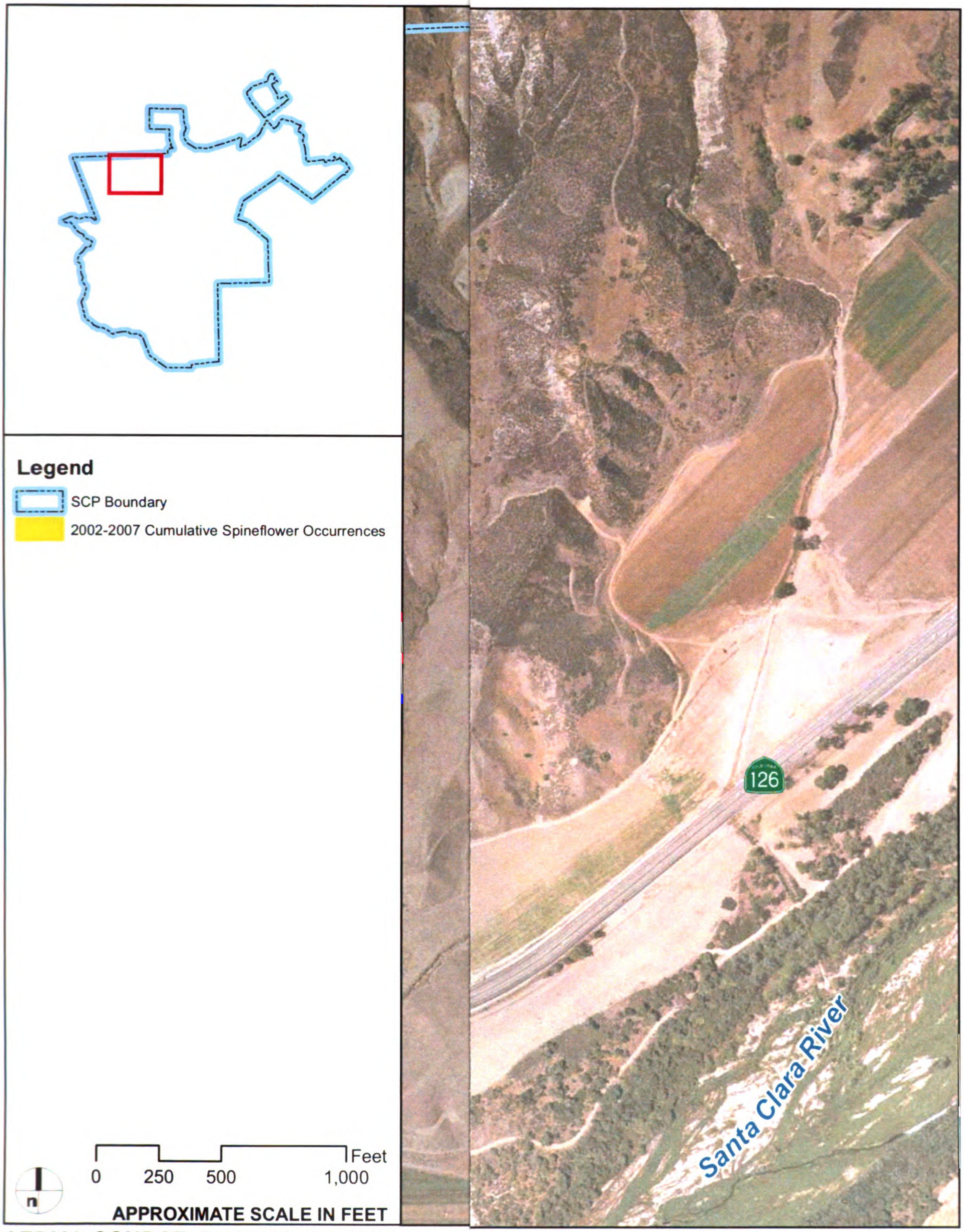

AERIAL SOURCE: DigitalGlobe, 2007

FIGURE 7

Spineflower Conservation Plan

DUDEK

- San Martinez Grande Canyon

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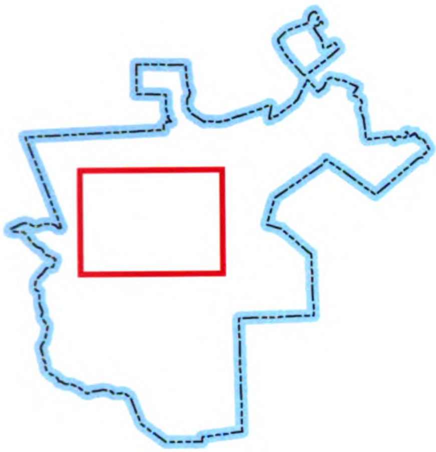

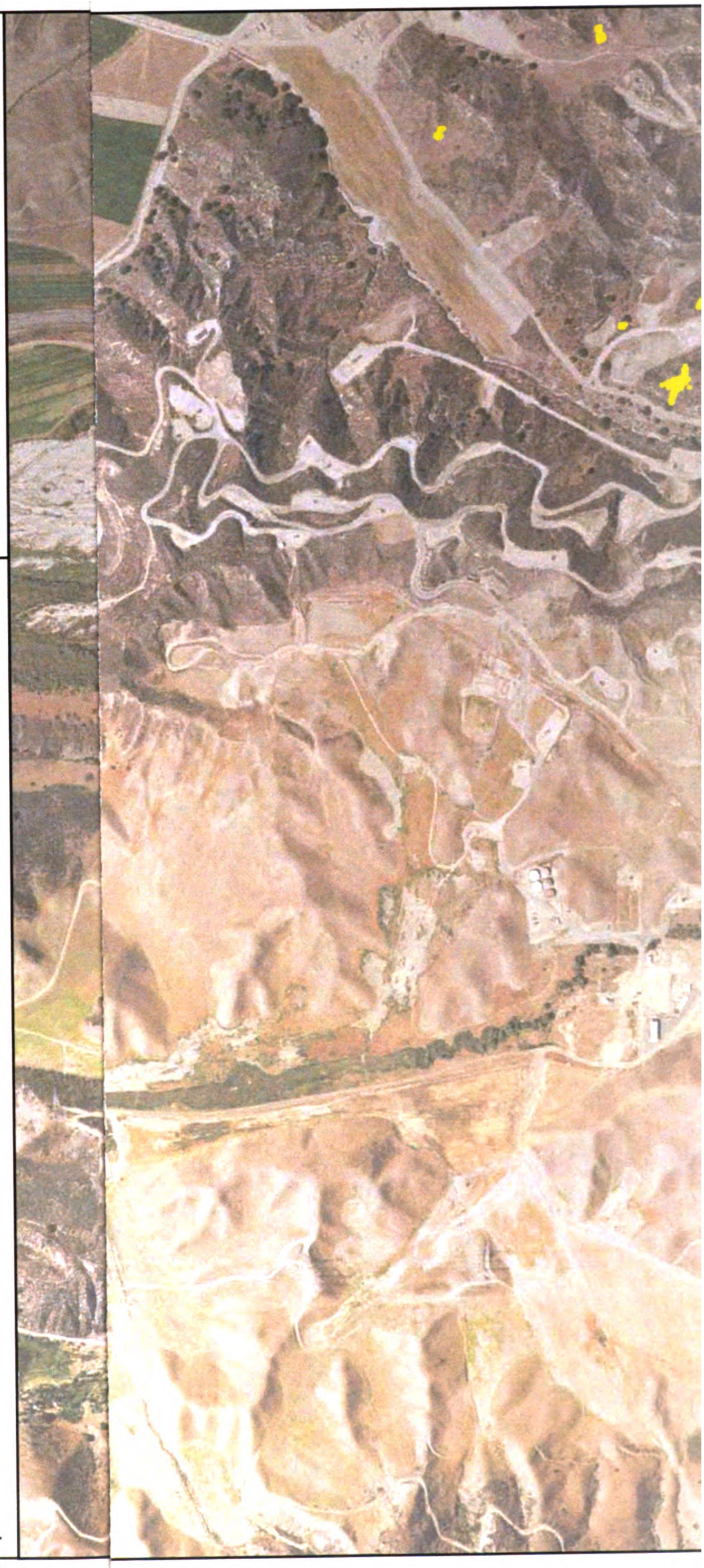

Legend

- SCP Boundary
- Existing CDFG Conservation Easement
- 2002-2007 Cumulative Spineflower Occurrences

0 250 500 1,000 Feet

APPROXIMATE SCALE IN FEET

AERIAL SOURCE: DigitalGlobe, 2007

FIGURE

DUDEK

Spineflower Conservation Pla

Occurrences - Potrero Canyo

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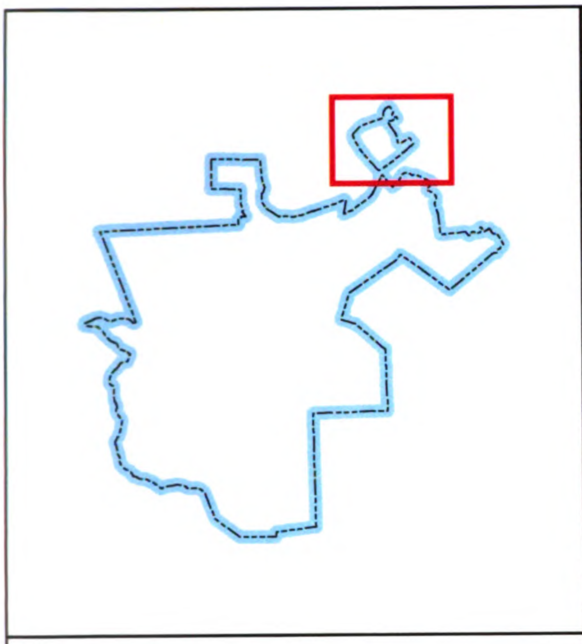

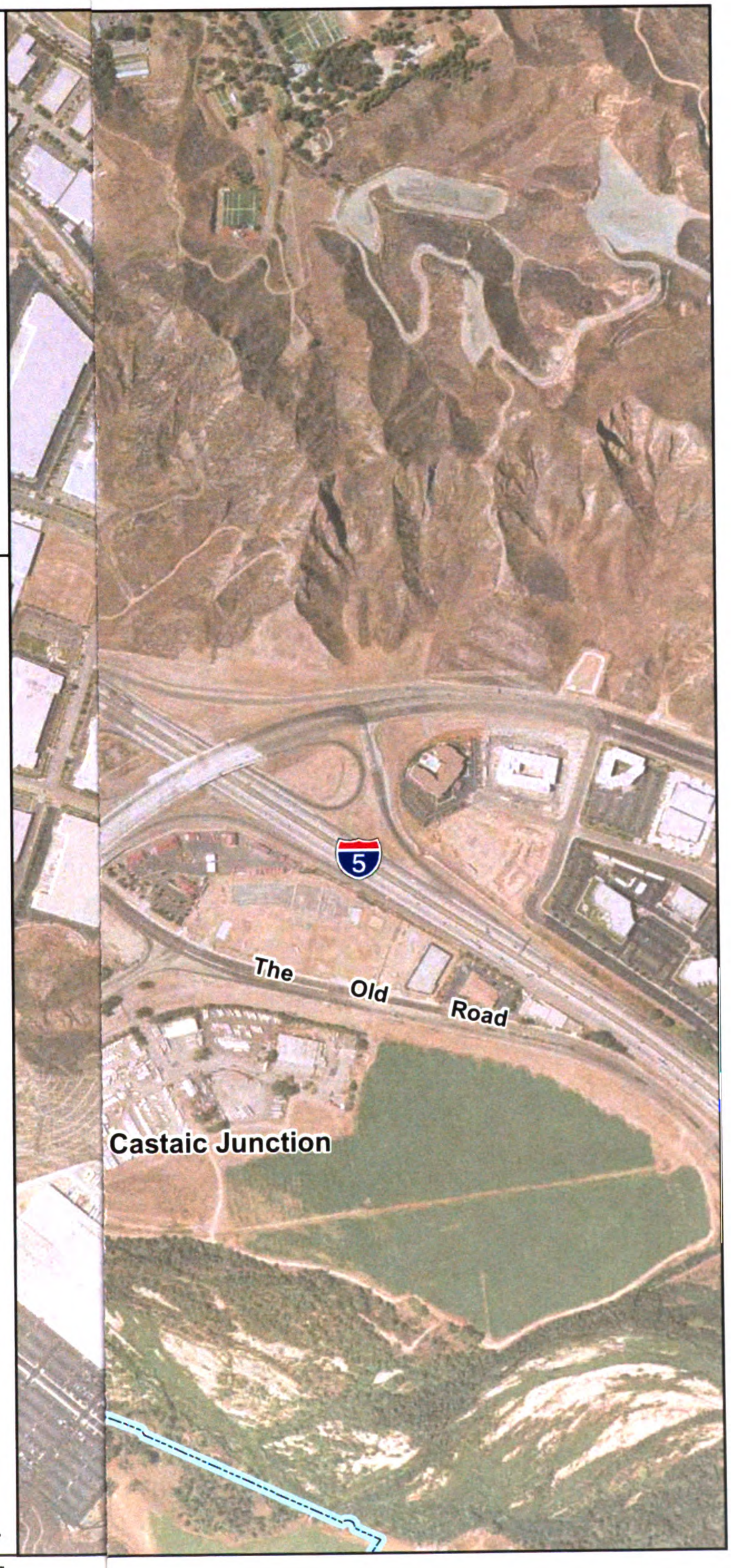

Legend

- SCP Boundary
- Existing CDFG Conservation Easement
- 2002-2007 Cumulative Spineflower Occurrences

0 250 500 1,000 Feet

n

APPROXIMATE SCALE IN FEET

AERIAL SOURCE: DigitalGlobe, 2007

FIGURE 9

Spineflower Conservation Plan

DUDEK **es - Valencia Commerce Center**

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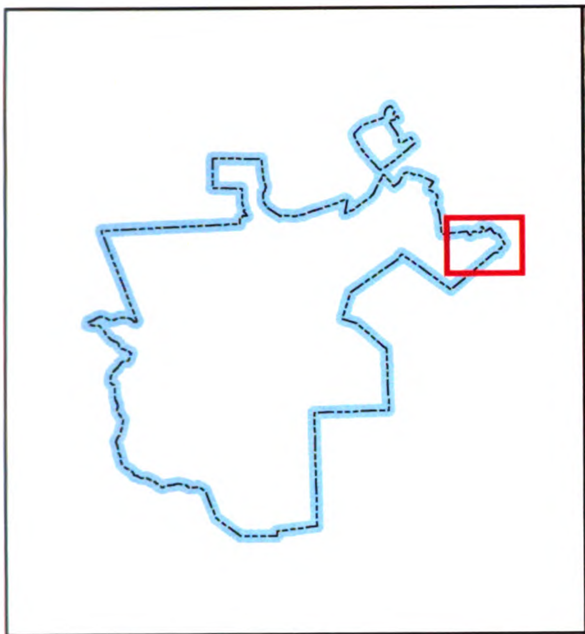

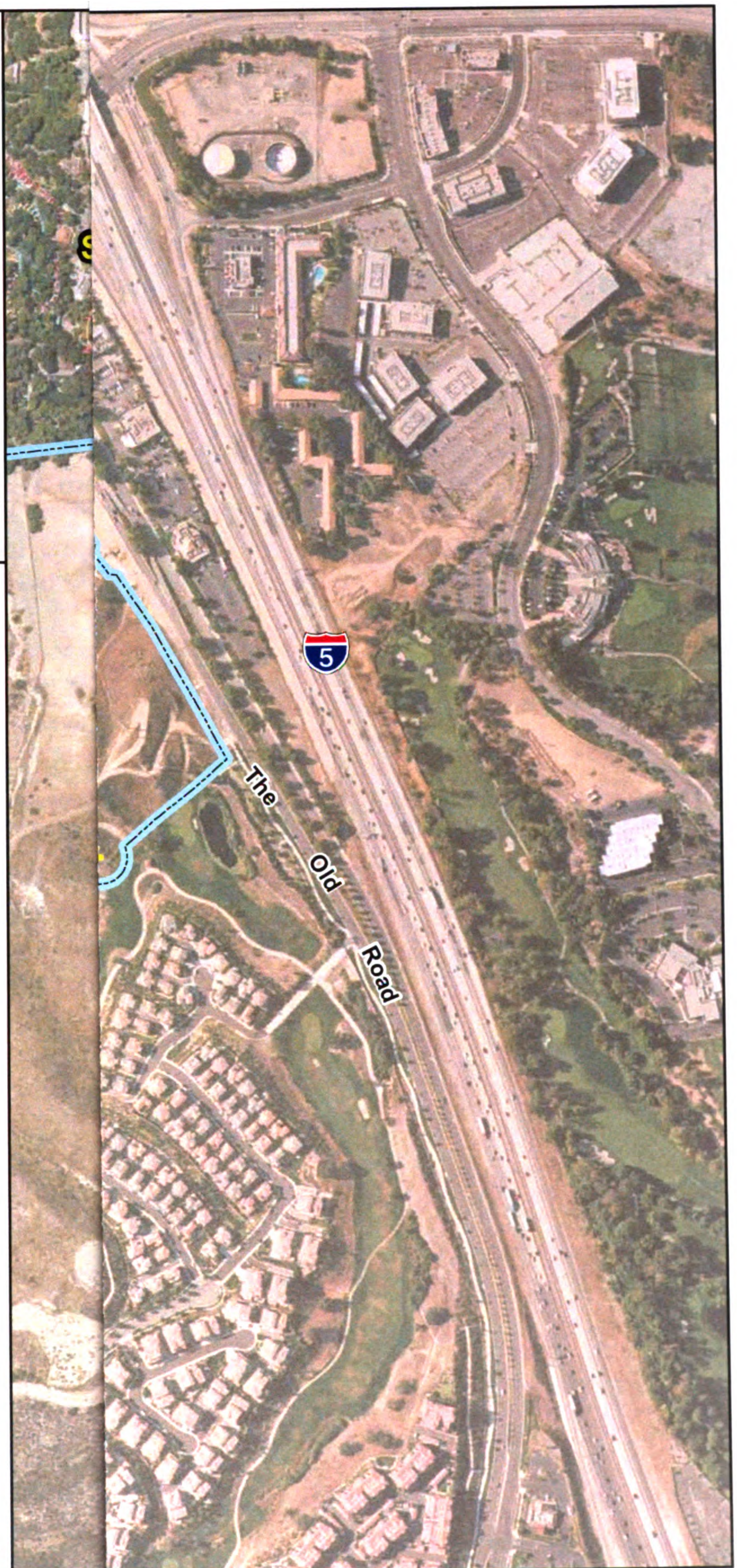

Legend

- SCP Boundary
- Existing CDFG Conservation Easement
- 2002-2007 Cumulative Spineflower Occurrences

0 250 500 1,000 Feet

n

APPROXIMATE SCALE IN FEET

AERIAL SOURCE: DigitalGlobe, 2007

FIGURE 10

Spineflower Conservation Plan

eflower Occurrences - Entrada

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5.3.2 Soils and Geology

Soils at SFVS sites varied among combinations of sandy and gravelly silt and clay loams. Approximately 89% of 2003 SFVS polygons occur on terrace escarpments, Zamora loam (2% to 9% slopes), Castaic-Balcom silty clay loams (30% to 50% slopes), Castaic-Balcom silty clay loams (30% to 50% slopes, eroded), and Saugus loam (30% to 50% slopes). Approximately 81% of 2005 SFVS polygons occur on terrace escarpments and Castaic-Balcom silty clay loams (30% to 50% slopes). Most of the plants at Grapevine Mesa and some at Airport Mesa are downslope of terrace surfaces capped by Zamora clay loam (2% to 9% slopes), with a few plants occurring on artificial fill or alluvium derived from adjacent terrace deposits. SFVS at San Martinez Grande Canyon occurs primarily on old landslide debris (Allan E. Seward 2002).

Soil chemistry was evaluated for 39 locations within the Specific Plan area, Entrada, and VCC sites (unpublished data). Twenty-seven of the locations were occupied by SFVS. The samples were taken using a shovel; multiple samples were taken at each location. Typically, the samples were taken from soil surface to a depth of 5 inches, between 1 and 2 inches deep, and between 6 and 12 inches deep. Each sample was assessed for 46 soil chemistry characteristics, including elements such as magnesium, nitrogen, phosphorus, calcium, and lead; soil texture categories such as sand, silt, and clay; and other characteristics such as moisture and pH. The data were evaluated using a forward, stepwise linear regression, which indicated that the following soil chemistry characteristics were significant indicators of a site being occupied by SFVS: magnesium, molybdenum, pH, lime, and tin. However, when these five characters were evaluated for occupied and unoccupied sample locations, there was overlap in the value ranges. Thus, it does not appear that soil chemistry is a good predictor of whether a site represents potentially suitable habitat for spineflower.

Soil texture was also evaluated at these 39 locations. The sand content at occupied spineflower sites ranged from 30% to 70%, with an average of 57%. The silt content ranged from 20% to 48%, with an average of 32%. The clay content ranged from 5% to 22%, with an average of 12%. The silt-to-clay ratio ranged from 1.82 to 5.79, with an average of 2.97 (Allan E. Seward 2004). Thus, it does not appear that soil texture will be useful in predicting whether a site represents potentially suitable habitat for spineflower.

Underlying geologic formations include artificial fill, Quaternary alluvium, Quaternary landslide, Quaternary older alluvium, Quaternary slopewash, Quaternary terrace deposits, undifferentiated terrace deposits, and undifferentiated Saugus Formation (Allan E. Seward 2004). The project study area is located within the Transverse Ranges geomorphic province of Southern California in the eastern portion of the Ventura depositional basin. This basin was produced by tectonic downwarping in the geologic past to produce a large-scale synclinal structure in which a thick sequence of Cenozoic sediments has accumulated. These sediments have been lithified into a sequence of sedimentary rock that has subsequently been uplifted, tilted, and tectonically deformed. They are cut by segments of the Del Valle and Salt Creek faults. Bedrock formations found on site include the Modelo, Towsley, Pico, Saugus, and Pacoima formations, as well as Quaternary terrace deposits. Surficial deposits include Quaternary alluvium, slopewash, soil, and artificial fill (Allan E. Seward 2002).

5.3.3 Elevation, Slope, and Aspect

The majority of 2003 and 2005 SFVS occurrences were found on gentle to moderate slopes with a south-facing aspect at elevations between 960 and 1,320 feet AMSL. More than 90% of 2003 SFVS occurrences and 98% of 2005 SFVS occurrences are on slopes with gradients between 0% and 25%. Approximately 50% of 2003 SFVS occurrences and 37% of 2005 SFVS occurrences occur on south-, southwest-, or southeast-facing slopes, with 10% of 2003 SFVS sites and 19% of 2005 SFVS sites on north-, northwest-, or northeast-facing slopes.

6.0 ENVIRONMENTAL SETTING AND LAND USE

This section describes the existing environmental setting in the project study area. In addition, the existing and planned land uses are described, including ongoing agricultural operations and planned land uses associated with the project study area.

6.1 Environmental Setting and Existing Land Uses

6.1.1 Newhall Ranch Specific Plan Area

Surrounding land uses to the north include rural residential uses in the Val Verde and San Martinez Grande Canyon areas, a landfill in Chiquito Canyon, commercial business parks at VCC, residential and commercial uses in the Castaic corridor, oil and natural gas production, and undeveloped land. To the west, land uses include agricultural operations, undeveloped land, and oil and natural gas production. To the east, land uses include commercial/recreational uses associated with Six Flags Magic Mountain Amusement Park (and associated hotels, restaurants, and gas stations), residential uses at Stevenson Ranch, the Valencia Water Reclamation Plant, a California Highway Patrol station, and undeveloped land. To the south, the land is undeveloped (County of Los Angeles 2003).

Native and naturalized habitats within the project study area are representative of those found in this region and include representative examples of those plant communities found in the Santa Susana Mountains and the Santa Clara River ecosystems. Upland habitats dominate the landscape within the Specific Plan area, both north and south of the Santa Clara River. The major upland plant communities include California sagebrush scrub, chamise and undifferentiated chaparral, southern coast live and valley oak woodlands, and California annual grassland. However, the site also contains valley oak/grass and California walnut woodland (Dudek and Associates 2006e). The Santa Clara River supports a variety of riparian plant communities, including southern cottonwood–willow riparian forest, southern willow scrub, mulefat scrub, arrow weed scrub, and herbaceous wetland. Intermittent and ephemeral drainages on site also provide habitat for alluvial and scalebroom scrubs.

The riparian habitat along the Santa Clara River has been designated as critical habitat by the USFWS for the state- and federally listed endangered least Bell's vireo (*Vireo bellii pusillus*) (59 FR 4845–4867) and provides habitat for the state- and federally listed endangered southwestern willow flycatcher (*Empidonax traillii extimus*). The River itself supports the state- and federally listed endangered and state fully protected unarmored threespine stickleback (*Gasterosteus aculeatus williamsoni*). There are two significant ecological areas (SEAs) in the Specific Plan area, including (1) diverse oak woodland habitats that function as a wildlife corridor/linkage between the San Gabriel Mountains and the Santa Monica Mountains (SEA 20) and (2) aquatic habitat within the Santa Clara River corridor that supports unarmored threespine stickleback (SEA 23) (County of Los Angeles 2003).

The Specific Plan area is topographically diverse, with slope gradients ranging from moderate to steep on the hillsides to very gentle in the Santa Clara River floodplain and in major tributary canyons. In addition, there are mesas adjacent to the Santa Clara River (e.g., Grapevine Mesa and Airport Mesa). Site elevations range from 825 feet AMSL in the Santa Clara River bottom at the Ventura County/Los Angeles County line to approximately 3,200 feet AMSL on the ridgeline of the Santa Susana Mountains along the southern boundary. The primary ridges are east-, west-, and northwest-trending, with secondary ridges trending north and south. There are many distinctive ridges in the Specific Plan area, including Sawtooth Ridge along the northeastern side of Long Canyon and Round Mountain at the northern edge of Potrero Canyon (County of Los Angeles 2003).

The applicant leases portions of the Specific Plan area for oil and natural gas production, as well as for cattle grazing, ranching, and agricultural operations (e.g., food crop production, dry land farming, honey farming). All such operations are currently ongoing. In addition, the applicant leases the site to the movie industry for set locations. Minor land uses include employee houses, an oil company office, and miscellaneous structures. In addition, there are several easements in the Specific Plan area, including oil, natural gas, electrical, telephone, and water easements (County of Los Angeles 2003). In particular, Southern California Edison and the Southern California Gas Company maintain distribution lines within on-site easements.

Grazing activities and oil and natural gas production have had an effect on much of the natural habitat on site. Scrub habitats have been displaced by annual grasslands as a result of grazing, land clearing for agriculture, and other historical land uses. In addition, the site has been fragmented by dirt and asphalt roads; graded oil well pads and pipelines; and pumping, storage, and transmission facilities.

6.1.2 Valencia Commerce Center Planning Area

The VCC site is dominated by north-/south-trending ridges that lie north of Castaic Creek near the confluence with Hasley Canyon. Site elevations range from just under 1,000 feet AMSL in the Castaic Creek bottom to just over 1,500 feet AMSL at the top of the western ridge. The ridges are generally rounded at the top with slopes that vary from steep to gentle. Aside from the ridges, the two major wash areas on the VCC planning area, Castaic Creek and Hasley Canyon, contain numerous benches and braided channels with associated riparian and wash scrub habitats.

Native and naturalized habitats within the VCC planning area include representative examples of those plant communities found in the Santa Susana, Topatopa, and Liebre mountains and the Santa Clara River and Castaic Creek ecosystems. Upland habitats dominate the landscape within the VCC planning area (e.g., California sagebrush scrub, valley oak woodland, California annual grasslands); however, Castaic Creek and Hasley Canyon support a variety of riparian plant communities (e.g., southern willow scrub, southern cottonwood–willow riparian forest, mulefat scrub). No observations were made of any freshwater marsh or seep areas in the VCC planning area (Dudek and Associates 2006f).

Historically, the applicant leased portions of the site for sand and gravel production, cattle grazing, and agricultural operations; only agricultural operations are currently ongoing. In addition, there is commercial/industrial development on the site. All of these activities have had an effect on much of the natural habitat on site (i.e., scrub habitats have been displaced by annual grasslands). Southern California Edison and the Southern California Gas Company also have distribution lines and access roads within on-site easements.

6.1.3 Entrada Planning Area

The southern portion of the Entrada site is dominated by several north-/south-trending ridges. A narrow panhandle (roughly 100 meters wide) extends along the western portion of the site (east of Airport Mesa) to an agricultural field adjacent to the Santa Clara River. Site elevations range from approximately 1,000 feet AMSL along the Santa Clara River to approximately 1,550 feet AMSL on the ridges in the southwestern portion of the site.

Slope gradients range from moderate to very steep in the hillside areas to very gentle within the Santa Clara River floodplain, drainages, and associated mesas. Distinctive geographic features include the north-/south-trending ridges on the southern portion of the site, a wash that drains north through the site to a concrete-lined drainage channel that passes through the Six Flags Magic Mountain Amusement Park, and the Santa Clara River on the northwestern portion of the site.

Native and naturalized habitats within the Entrada site are representative of those found in this region and include representative examples of those plant communities found in the Santa Susana Mountains and the Santa Clara River ecosystems. California sage scrub, chamise and mixed chaparral, valley oak and scrub oak woodlands, and native and annual grasslands are the major upland plant communities on the site. Ephemeral and intermittent drainages on site provide habitat for alluvial and scalebroom scrubs. The northeast portion of the site includes an agriculture field and some intact upland habitats. While upland habitats dominate the landscape within the site, immediately adjacent to the site are areas that support a variety of riparian plant communities. These include southern cottonwood–willow riparian forest, southern willow scrub, mulefat scrub, arrow weed scrub, and freshwater marsh and seeps (Dudek and Associates 2006g).

The applicant leases portions of the site for cattle grazing and agricultural operations. Grazing activities have had an effect on much of the natural habitat on site. Scrub habitats have been displaced by annual grasslands, apparently as a result of grazing. Southern California Edison and the Southern California Gas Company have transmission lines within easements along the southern portion of the site, all of which are actively maintained, pursuant to established utility easements. Maintenance activities may include, but are not necessarily limited to, recovery and repair of downed lines, towers, and poles; reconstruction/maintenance of access roads, observation footpaths, and tower footings; repair/replacement of buried gas lines or markers; maintenance of fencing; and response to regional and local emergencies. The Six Flags Magic Mountain Amusement Park is to the north of the site, and a residential development is located south of the site.

6.2 Planned Land Uses

The project study area is located within the Santa Clarita Valley Planning Area of the Los Angeles County General Plan (County of Los Angeles 1993). The Specific Plan area received final approvals in May 2003 (County of Los Angeles 2003). The VCC site, approved by the County of Los Angeles (the County) in 1990 (County of Los Angeles 1990), includes 12 million square feet of industrial/commercial buildings, and approximately 6 million square feet of buildings have been constructed to date. The Entrada site is planned for residential, commercial, non-residential, and open space uses; however, the County has not approved changes in the Entrada land use designations or zoning at this time.

This section addresses spineflower occurrences in the project study area in relation to approved and proposed development.

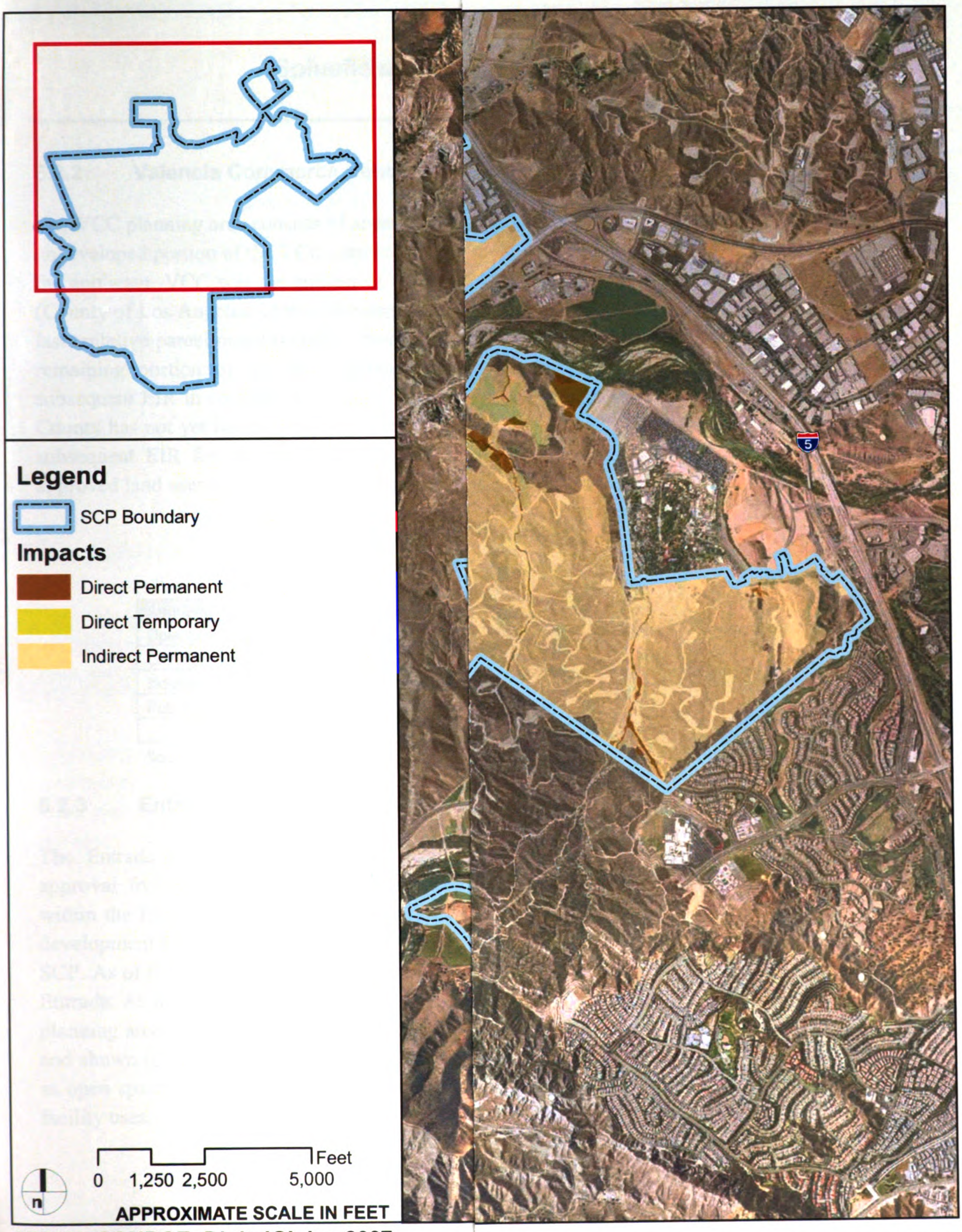
6.2.1 Newhall Ranch Specific Plan

The Specific Plan area contains approximately 11,999 acres. The acreages of the land uses within the Specific Plan area are listed in *Table 4* and shown in *Figure 11A*. The Specific Plan area includes residential (and associated school sites, parks, and other facilities), mixed-use development (e.g., commercial, residential, office), commercial development, business park uses, visitor-serving development, community facilities (e.g., fire stations, library, water treatment plant), and arterial roads and bridges on 3,763 acres. The 8,236 acres of open space includes the River Corridor Special Management Area (SMA), High Country SMA, Open Area, and spineflower preserves (Dudek 2008).

Table 4
Acreage of Each Approved Land Use in the Specific Plan Area

Approved Land Use	Acres
Open Area/River Corridor/Open Space	8,236
Residential/Commercial/Non-Residential Development	3,763
Total	**11,999**

Source: Dudek 2008.



AERIAL SOURCE: DigitalGlobe, 2007

FIGURE 11A

Spineflower Conservation Plan

cific Plan Approved Land Uses

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6.2.2 Valencia Commerce Center Planning Area

The VCC planning area consists of approximately 333 acres. This planning area is the remaining undeveloped portion of the VCC commercial/industrial complex currently under development by the applicant. VCC was the subject of an EIR certified by Los Angeles County in April 1990 (County of Los Angeles. 1990). The applicant has recently submitted to Los Angeles County the last tentative parcel map (Tentative Parcel Map No. 18108) needed to complete build-out of the remaining portion of the VCC planning area. The County will require preparation of a subsequent EIR in conjunction with the parcel map and related project approvals; however, the County has not yet issued a Notice of Preparation (NOP) of the subsequent EIR or released the subsequent EIR for the remaining portion of the VCC planning area. The acreages of the approved land uses for the VCC planning area are listed in *Table 5* and shown in *Figure 11B*.

Table 5
Acreage of Each Approved Land Use in VCC

Approved Land Use	[illegible]
Open Space	154.3
Commercial	72.5
Industrial	91.5
Public Facilities	14.5
Total	332.8

Source: Dudek 2008.

6.2.3 Entrada Planning Area

The Entrada planning area consists of approximately 392 acres. The applicant is seeking approval from Los Angeles County for planned residential and nonresidential development within the Entrada planning area. The applicant has submitted to Los Angeles County Entrada development applications, which cover the portion of the Entrada planning area facilitated by the SCP. As of this writing, the County has not yet issued an NOP of an EIR or released an EIR for Entrada. As a result, there is no underlying local environmental documentation for the Entrada planning area at this time. The acreages of the proposed Entrada land uses are listed in *Table 6* and shown in *Figure 11C*. It is projected that approximately 138 acres of land will be preserved as open space. The remaining 252.4 acres are proposed for residential, commercial, and public facility uses.

Table 6
Acreage of Each Projected Land Use in Entrada

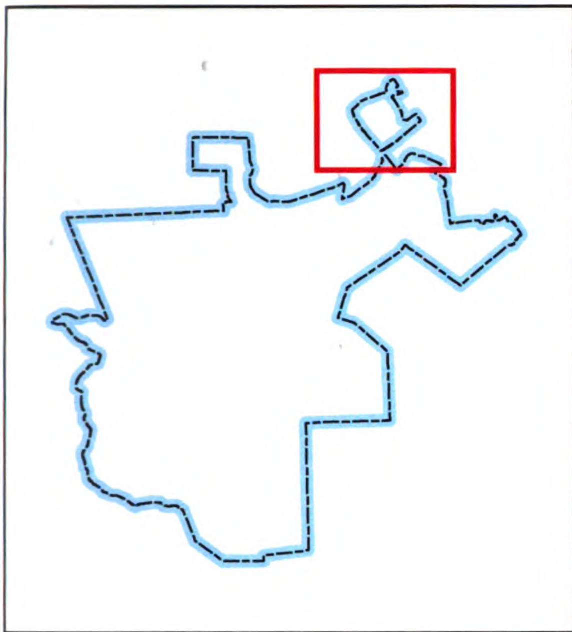
Projected Land Use	Acres
Open Space	138.3
Residential	
Single-Family	56.4
Multifamily	78.6
Commercial	45.6
Public Facility	71.8
Total	390.7

Source: Dudek 2008.

7.0 PRESERVE DESIGN APPROACH AND METHODOLOGY

This section describes the approach and methods used to identify and design the five proposed spineflower preserve areas within the Newhall Land project study area. This section discusses spineflower distribution data, habitat suitability, and ecological indicators. It also addresses accommodating fluctuations in spineflower populations and preserve connectivity. For purposes of this discussion, CDFG indicated that ecological indicators, such as soils, pollinators, and vegetation, would be informative in designing the proposed preserve areas.

A habitat suitability index (HSI) was used to evaluate the entire project study area and was based on frequency distributions of spineflower using the following ecological indicators: vegetation, soils, geology, elevation, slope, and aspect. The HSI did not produce statistically suitable data. As a result, an alternative method of evaluating the five identified preserve areas—a representative model—was selected. Both approaches are discussed in more detail below.



Legend

SCP Boundary

VCC Land Use

- Development
- Open Space Man Made
- Open Space Natural
- Water

Feet

0 250 500 1,000

APPROXIMATE SCALE IN FEET

AERIAL SOURCE: DigitalGlobe, 2007

FIGURE 11B

Spineflower Conservation Plan

ommerce Center Land Use Map

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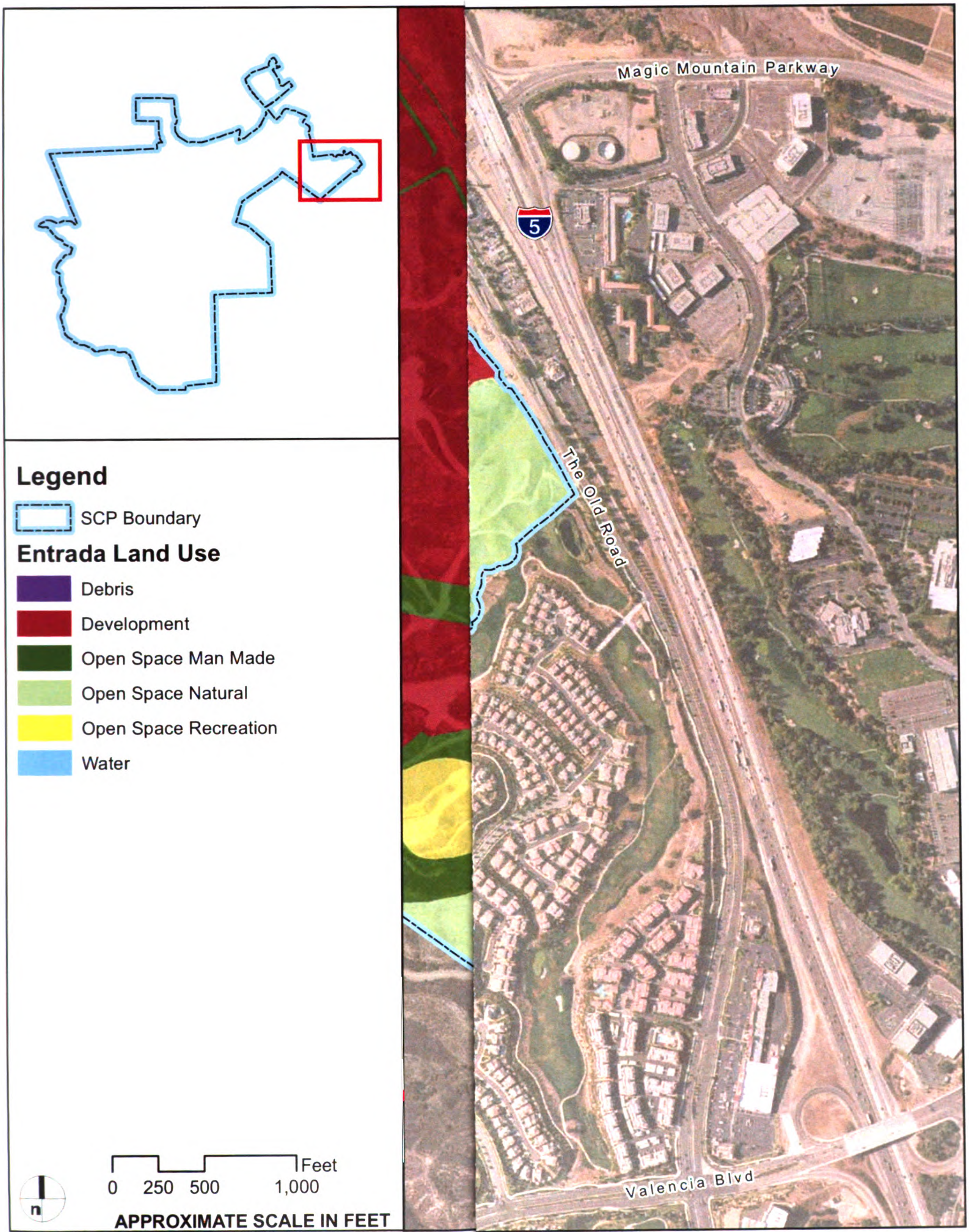

AERIAL SOURCE: DigitalGlobe, 2007

FIGURE 11C

Spineflower Conservation Plan

Entrada Land Use Map

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7.1 Habitat Suitability Index for the Entire Project Study Area

The HSI was computed using the following data sets: vegetation, soils, geology, elevation, slope, and aspect. The vegetation data set for the Specific Plan area was obtained in digital form from FORMA. The vegetation data set for Entrada and VCC was mapped by Dudek on February 13, 2004, on a 2002 aerial base and digitized into a geographic information system (GIS) format. At that time, Dudek also updated the vegetation mapping within and adjacent to the proposed preserves, including percent bare ground. The Soil Survey Geographic Base (SSURGO), which is designed for natural resource planning and management, was downloaded from the Soil Conservation Service web site. The statewide geologic data set was purchased from the California Geologic Survey, originally digitized from the 1977 geologic map of California by Charles W. Jennings. A Digital Elevation Model (DEM) was computed from the U.S. Geological Survey (USGS) 40-foot contours using ArcGIS spatial analyst. From that DEM, slope and aspect coverages were derived.

Each of the six data layers was intersected with the 2003 spineflower occurrence data to determine the number of spineflower individuals within each individual attribute of each data set (vegetation, soils, geology, elevation, slope, and aspect).

Dudek performed a categorical regression for the six data sets using the entire spineflower occurrence. The intent was to then use the weights of the individual attributes within each data set and the relative weights of each data set to generate an HSI. The R-squared value for the categorical regression is 0.14 (adjusted R-squared value of 0.07). That means that the category weighting explains only 7% of the variation of the SFVS occurrence data within the project study area. The category weighting does not account for the other 93% of the variation in the occurrence data. Due to the low R-squared value, Dudek attempted to increase resolution within the geology data set using an updated geologic layer produced by Allan E. Seward Engineering Geology, Inc. (Seward) for Newhall Land. Due to the significant efforts of transforming the new geology point data into polygons, it was decided to use a subset of the project study area for a first comparison. Thus, Seward created a new geology data set for a 430-acre area, including Airport Mesa, within the Specific Plan area. The new Seward geology layer had six geology categories for the 430-acre area, while the older California Geologic Survey had two geology categories for the same 430-acre area. Dudek ran two new categorical regressions for the 430-acre area using the original vegetation, soils, elevation, slope, and aspect data sets with the new geology layer and the old geology layer. The R-squared value for the categorical regression using the new geology layer was 0.40 (adjusted R-squared value 0.283) and the R-squared value for the categorical regression using the old geology layer was 0.46 (adjusted R-squared value 0.33). As the new geology layer actually decreased the R-squared value, it did not seem that the creation of a new geology layer for the entire project study area was warranted.

Given the low R-squared values for the weighted data sets (0.14 not adjusted; 0.07 adjusted), it did not seem prudent to use the data sets to produce an HSI to assist in the evaluation of the five proposed preserve areas or to develop management and monitoring recommendations and techniques within the preserve areas.

The results of this effort indicate that either existing habitat data may be too coarse to resolve the actual habitat features that SFVS selects or that habitat features are not predictive of spineflower occurrence. It is possible that further studies at a finer scale may better refine the various habitat parameters differentiating occupied SFVS habitat from unoccupied areas.

More detailed studies of habitat suitability will be conducted as part of the Adaptive Management Program to inform preserve managers on the potential for expansion of the population through a variety of methods (see *Section 10.5.4*, Spineflower Habitat Characterization Study).

7.2 Representative Model for the Preserve Areas

Dudek utilized a representative model to evaluate the proposed preserve areas and compared the distribution of the individual attributes within each data set for the entire project study area and for the five proposed preserve areas.

As shown in *Table 7*, the five proposed preserves would conserve approximately 68.6% of the cumulative SFVS occupied area. The following five tables (*Tables 8* through *12*) show the total area, in acres, of suitable spineflower habitat preserved according to each data set.

Table 7
2002–2007 Cumulative Spineflower Occupied Area by Vegetation Type

Vegetation Type	Number of Acres					
	Acres in Project Study Area	Percent of Existing Population	Preserved	Not Preserved	Preserved Population as Percent of Existing Population	Percent Conserved by Vegetation
Agricultural	0.04	0.19	0.01	0.03	0.04	22.27
Burned California Sagebrush Scrub	1.54	7.61	1.54	0.00	7.61	100.00
Big Sagebrush Scrub	0.40	1.99	0.00	0.40	0.00	0.00
California Annual Grassland	4.31	21.29	3.81	0.50	18.83	88.41
Undifferentiated Chaparral	2.81	13.90	2.33	0.48	11.54	83.00
California Sagebrush Scrub	7.71	38.11	4.09	3.62	20.21	53.04
California Sagebrush Scrub–Artemesia	0.03	0.14	<0.01	<0.03	0.01	4.15
California Sagebrush Scrub–Black Sage	0.10	0.48	0.00	0.10	0.00	0.00
California Sagebrush Scrub–California Buckwheat	0.49	2.41	0.11	0.38	0.56	23.12
California Sagebrush Scrub/Undifferentiated	0.11	0.56	0.02	0.09	0.11	20.16
California Sagebrush Scrub–Purple Sage	0.90	4.45	0.87	0.03	4.30	96.61
Disturbed California Sagebrush Scrub–Purple Sage	0.45	2.23	0.45	0.00	2.23	100.00
Disturbed Land	0.78	3.85	0.35	0.43	1.74	45.14
Coast Live Oak Woodland	0.29	1.41	0.15	0.13	0.75	53.40
River Wash	0.10	0.50	0.09	0.02	0.42	84.59
Valley Oak/Grass	0.18	0.88	0.05	0.13	0.25	28.13
Total	20.24	100	13.88	6.36	68.6%	

The majority (73%) of 2002 through 2007 cumulative spineflower occupied area (*Table 7*) occurred in California sagebrush scrub, undifferentiated chaparral, and California annual grassland. Approximately 53% of the area occupied would be preserved within California sagebrush scrub, 83% of area occupied would be preserved within undifferentiated chaparral, and 89% of area occupied would be preserved in the California annual grassland. The remaining 13 vegetation types contain approximately 27% of the occupied area. The proposed preserve areas would conserve, on average, 44% of the occupied area within these vegetation types.

As described in *Table 8,* the majority (43%) of 2002 through 2007 cumulative spineflower occupied area occur in Castaic-Balcom silty clay loams (30% to 50% slopes). Terrace escarpments account for 20% of occupied area. Castaic-Balcom silty clay loams (30% to 50% slopes eroded) account for 13% of the occupied area. Zamora loam (2% to 9% slopes) accounts for 8% of the occupied area. The proposed preserve areas would include approximately 68.6% of cumulative spineflower occupied area. By area, Castaic-Balcom silty clay loams (30% to 50%

slopes), combining the eroded and non-eroded category, and terrace escarpments contain 80% of the occupied area. The proposed preserve areas would conserve 73% of the occupied area in these three soil types.

Table 8
2002–2007 Cumulative Spineflower Occupied Area by Soil Type

Soil Type	Number of Acres					
	Acres in Project Study Area	Percent of Existing Population	Preserved	Not Preserved	Preserved Population as Percent of Existing Population	Percent Conserved by Soils
Castaic and Saugus Soils, 30% to 65% Slopes, Severely Eroded	0.63	3.11	0.00	0.63	0.00	0.00
Castaic-Balcom Silty Clay Loams, 30% to 50% Slopes	8.79	43.43	5.39	3.40	26.65	61.36
Castaic-Balcom Silty Clay Loams, 30% to 50% Slopes, Eroded	2.62	12.93	2.29	0.33	11.32	87.55
Hanford Sandy Loam, 2% to 9% Slopes	0.58	2.87	0.58	0.00	2.87	100.00
Metz Loam, 2% to 5% Slopes	0.56	2.79	0.01	0.56	0.03	0.98
Metz Loamy Sand, 2% to 9% Slopes	0.05	0.27	0.00	0.05	0.00	0.00
River Wash	<0.01	0.01	<0.01	0.00	0.01	100.00
Saugus Loam, 30% to 50% Slopes	1.08	5.34	1.02	0.06	5.05	94.48
Saugus Loam, 30% to 50%, Eroded	0.20	0.99	0.00	0.20	0.00	0.00
Sorrento Loam, 2% to 5% Slopes	<0.01	0.01	0.00	<0.01	0.00	0.00
Terrace Escarpments	4.11	20.30	3.59	0.52	17.74	87.37
Yolo Loam, 0% to 2% Slopes	0.01	0.05	0.00	0.01	0.00	0.00
Zamora Loam, 2% to 9% Slopes	1.60	7.90	1.00	0.60	4.93	62.42
Total	20.24	100	13.88	6.36	68.60%	

As depicted in *Table 9,* the majority (68%) of 2002 through 2007 cumulative spineflower occupied area occurs between 1,080 and 1,200 feet AMSL. The proposed preserve area would conserve 79% of this area. Each of the other elevation categories account for less than 1% to 10% of the area occupied. Conservation in these categories ranges from 0% to 100% and averages 47%.

Table 9
2002–2007 Cumulative Spineflower Occupied Area by Elevation

Elevation (in feet AMSL)	Acres in Project Study Area	Percent of Existing Population	Preserved	Not Preserved	Preserved Population as Percent of Existing Population	Percent Conserved by Elevation
920–960	<0.01	<0.01	<0.01	0.00	<0.01	100.00
960–1,000	0.23	1.11	0.20	0.02	1.00	89.88
1,000–1,040	1.93	9.54	1.20	0.73	5.94	62.28
1,040–1,080	1.51	7.48	0.71	0.81	3.48	46.58
1,080–1,120	3.60	17.81	2.94	0.67	14.51	81.48
1,120–1,160	6.23	30.80	5.59	0.64	27.63	89.71
1,160–1,200	3.87	19.12	2.29	1.58	11.29	59.06
1,200–1,240	1.83	9.03	0.45	1.38	2.20	24.41
1,240–1,280	0.82	4.07	0.40	0.42	2.00	49.07
1,280–1,320	0.11	0.53	0.11	0.00	0.53	100.00
1,320–1,360	<0.01	<0.01	0.00	0.00	0.00	0.00
1,360–1,400	0.01	0.07	0.00	0.01	0.00	0.00
1,400–1,440	0.09	0.44	0.00	0.09	0.00	0.00
Total	20.24	100%	13.88	6.36	68.60%	

As depicted in *Table 10*, 2002 through 2007 cumulative spineflower occupied area overlaps three geologic strata. The most common geologic substrate for spineflower occupied area is Plio-Pleistocene nonmarine, Pliocene nonmarine, accounting for 46% of the occupied area; 67% of this area would be conserved. The two remaining geologic substrates—Alluvium Quaternary nonmarine and marine and Pliocene marine—account for 38% (65% conservation) and 16% (81% conservation) of the occupied area, respectively.

As described in *Table 11*, the majority (94%) of 2002 through 2007 cumulative spineflower occupied area occurred on slopes of 20% or less. The preserves would conserve 67% of the occupied area in these categories. The three remaining slope ranges represented 6% of spineflower occupied area. The proposed preserves would conserve over approximately 89% of the occupied area for these remaining slope ranges.

Table 10
2002–2007 Cumulative Spineflower Occupied Area by Geology

	Number of Acres					
Geology Type	Acres in Project Study Area	Percent of Existing Population	Preserved	Not Preserved	Preserved Population as Percent of Existing Population	Percent Conserved by Geology
Alluvium Quaternary nonmarine and marine	7.62	37.63	4.97	2.65	24.55	65.24
Pliocene marine	3.27	16.14	2.66	0.61	13.14	81.42
Plio-Pleistocene nonmarine, Pliocene nonmarine	9.36	46.23	6.25	3.10	30.91	66.85
Total	20.24	100%	13.88	6.36	60.8%	

As described in *Table 11*, the majority (94%) of 2002 through 2007 cumulative spineflower occupied area occurred on slopes of 20% or less. The preserves would conserve 67% of the occupied area in these categories. The three remaining slope ranges represented 6% of spineflower occupied area. The proposed preserves would conserve over approximately 89% of the occupied area for these remaining slope ranges.

Table 11
2002–2007 Cumulative Spineflower Occupied Area by Slope

	Number of Acres					
% Slope	Acres in Project Study Area	Percent of Existing Population	Preserved	Not Preserved	Preserved Population as Percent of Existing Population	Percent Conserved by Slope
0–5	4.67	23.09	2.97	1.70	14.69	63.64
5–10	7.08	34.99	4.31	2.77	21.32	60.92
10–15	3.55	17.53	2.12	1.43	10.49	59.81
15–20	3.66	18.10	3.34	0.32	16.49	91.13
20–25	1.19	5.88	1.07	0.12	5.29	89.96
25–30	0.07	0.33	0.05	0.02	0.24	72.13
30–35	0.02	0.07	0.02	0.00	0.07	100.00
Total	20.24	100%	13.88	6.36	68.6%	

As described in *Table 12*, the majority (59%) of 2002–2007 cumulative spineflower occupied area occurred on slopes facing southwest, southeast, and west. The proposed preserve areas would conserve 74% of the occupied area on slopes with these aspects. Each of the remaining six aspect categories represent 11% or less of the occupied area. Between 23% and 91% of occupied area in these remaining six aspect categories would be included within the preserve areas.

Table 12
2002–2007 Cumulative Spineflower Occupied Area by Aspect

Aspect	Number of Acres					
	Acres in Project Study Area	Percent of Existing Population	Preserved	Not Preserved	Preserved Population as Percent of Existing Population	Percent Conserved by Aspect
East	2.21	10.93	1.45	0.76	7.16	65.57
Flat	1.15	5.68	0.67	0.48	3.31	58.25
North	0.55	2.72	0.50	0.05	2.48	90.95
Northeast	0.90	4.47	0.21	0.69	1.05	23.56
Northwest	2.00	9.89	1.44	0.56	7.12	71.93
South	1.38	6.84	0.67	0.71	3.31	48.42
Southeast	4.15	20.51	2.30	1.85	11.38	55.46
Southwest	4.00	19.79	3.24	0.76	16.02	80.99
West	3.88	19.17	3.39	0.49	16.77	87.44
Total	20.24	100%	13.88	6.36	68.6%	

The level of conservation across the environmental conditions described in the above tables (*Tables 7* to *12*) is considered to address a primary goal of this plan, which is to provide for the long-term persistence of spineflower within the project study area, and, in particular, this level of conservation addresses Goal 3, as described in *Section 3.0*.

7.3 Accommodating Population Fluctuation within Preserve Areas

The preserve areas have been designed to accommodate fluctuations in spineflower population levels over time. *Table 13* depicts the cumulative acreage (combined data from annual surveys conducted from 2002 through 2007) occupied by spineflower, and the cumulative acreage in the proposed preserves that is not occupied spineflower habitat. The proposed preserves will include 13.88 acres of occupied spineflower habitat and 153.68 acres of unoccupied habitat that may or may not be suitable for spineflower. Not all acres that are currently unoccupied should be defined as "buffer areas." In order to minimize edge effects and certain indirect impacts from development areas, a buffer zone has been incorporated within each preserve area. As shown in *Table 13*, 110.77 acres of that unoccupied habitat would be considered "buffer area." Unoccupied area not designated "buffer area" is considered "expansion area," and totals 42.90 acres. *Figure 12* depicts a typical preserve design with core habitat area, expansion area, and buffer area. Individual buffer distances are discussed for each preserve in *Section 8.0.* It should be noted that buffer widths vary by location due to site-specific factors, mitigating factors, site design, and management techniques.

Table 13
Cumulative Area Occupied by Spineflower within Preserves

Preserve	Area Occupied by Spineflower (Acres)	Buffer Area Provided (Unoccupied by Spineflower) (Acres)	Expansion Area Provided (Unoccupied by Spineflower) (Acres)
Airport Mesa	5.22	18.82	20.94
Grapevine Mesa	4.02	37.33	4.99
Potrero	1.32	10.43	3.05
San Martinez Grande	2.29	26.17	5.95
Entrada	1.03	18.02	7.97
Total	13.88	110.77	42.90

As described in *Section 7.1*, it is not possible at this time to identify suitable habitat for the spineflower, based on the unsatisfactory results of the HSI, which utilized currently available information. Further analysis is needed to better characterize the spineflower's physical and biological habitat requirements at a fine scale. As described in *Appendix A*, a spineflower Habitat Characterization Study will be implemented to quantify this information.

The Spineflower Monitoring Program described in *Section 11.2* is designed to track the distribution and abundance of spineflower populations within the preserves and will document population expansion events that may occur in the future. Implementing the general management measures described in *Section 9.2* will improve growing conditions within the preserves and create opportunities for existing spineflower populations to expand into currently unoccupied portions of the preserves. Restoring damaged, cultivated, or disked habitats, which may have previously supported spineflower, is planned for some locations and could allow future population expansion if conditions suitable for spineflower can be created.

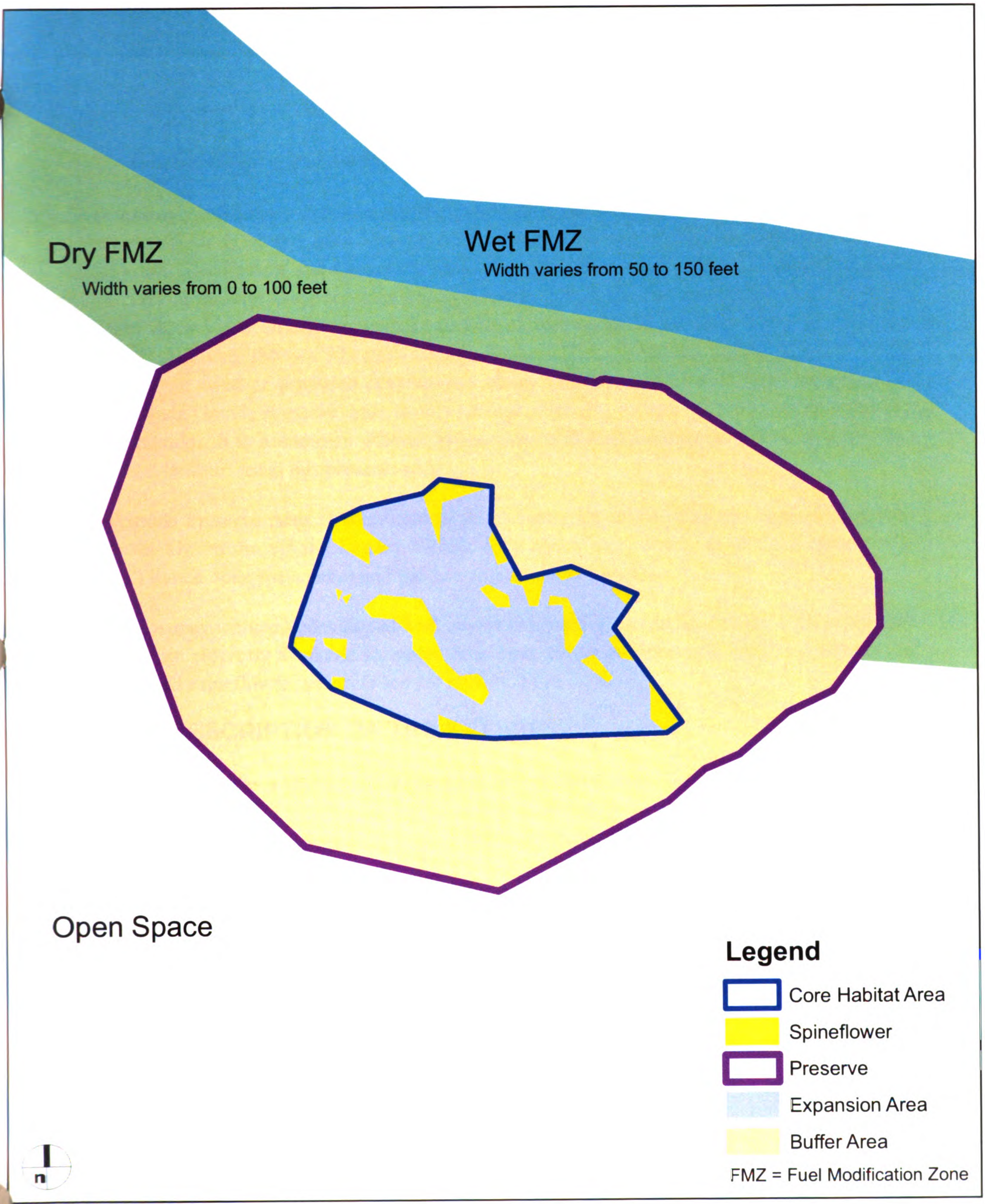

FIGURE 12

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Spineflower Conservation Plan

Typical Spineflower Preserve Design

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7.4 Connectivity between the Preserve Areas

Maintaining connectivity between the five preserve areas addresses the ecosystem goals and objectives (Goal 3) of this plan. *Figure 13* depicts the five preserve areas in relation to open space areas. The Potrero and Grapevine Mesa Preserve Areas each connect to the Santa Clara River corridor through lands designated as open areas. The Airport Mesa Preserve Area connects to Open Area via a wildlife-movement arched culvert under Street GG. There is no direct connectivity linking the San Martinez Grande Preserve Area to natural habitat areas. A 50- to 100-foot-wide band of proposed development along San Martinez Grande Road separates the San Martinez Grande Preserve Area from a narrow open area located east of the road along the stream corridor. It is not known whether pollinators or dispersal agents would be able to cross developed lands to reach this preserve area.

The Entrada Preserve Area is connected to a 175-foot-wide utility easement corridor that runs southwest toward the off-site Legacy Village open space area, which, in turn, connects to the Newhall Ranch open space areas and the Santa Clara River corridor.

Open areas may include undeveloped land, passive and active use parks, and trails. Development plans are not currently available for open areas, and, therefore, open area land uses adjacent to the proposed spineflower preserves are not known at this time.

8.0 DESCRIPTION OF THE PRESERVES

This section provides a discussion of the proposed preserve areas, including location, size, and setting; the number and distribution of occurrences; and various ecological indicators, such as aspect, slope, soils, vegetation, and potential pollinators present.

The proposed Airport Mesa, Grapevine Mesa, Potrero, San Martinez Grande, and Entrada Preserve Areas would conserve spineflower locations at five out of the six known occurrences within Newhall Land property holdings in the project study area. The five preserve areas total approximately 167.56 acres and include approximately 68.6% of the 2002 through 2007 cumulative spineflower occupied area.

The sections below include a general evaluation of the potential for spineflower within each preserve area. *Figures 14* through *18* depict the proposed preserve areas with existing vegetation and 2002 through 2007 cumulative spineflower occupied area.

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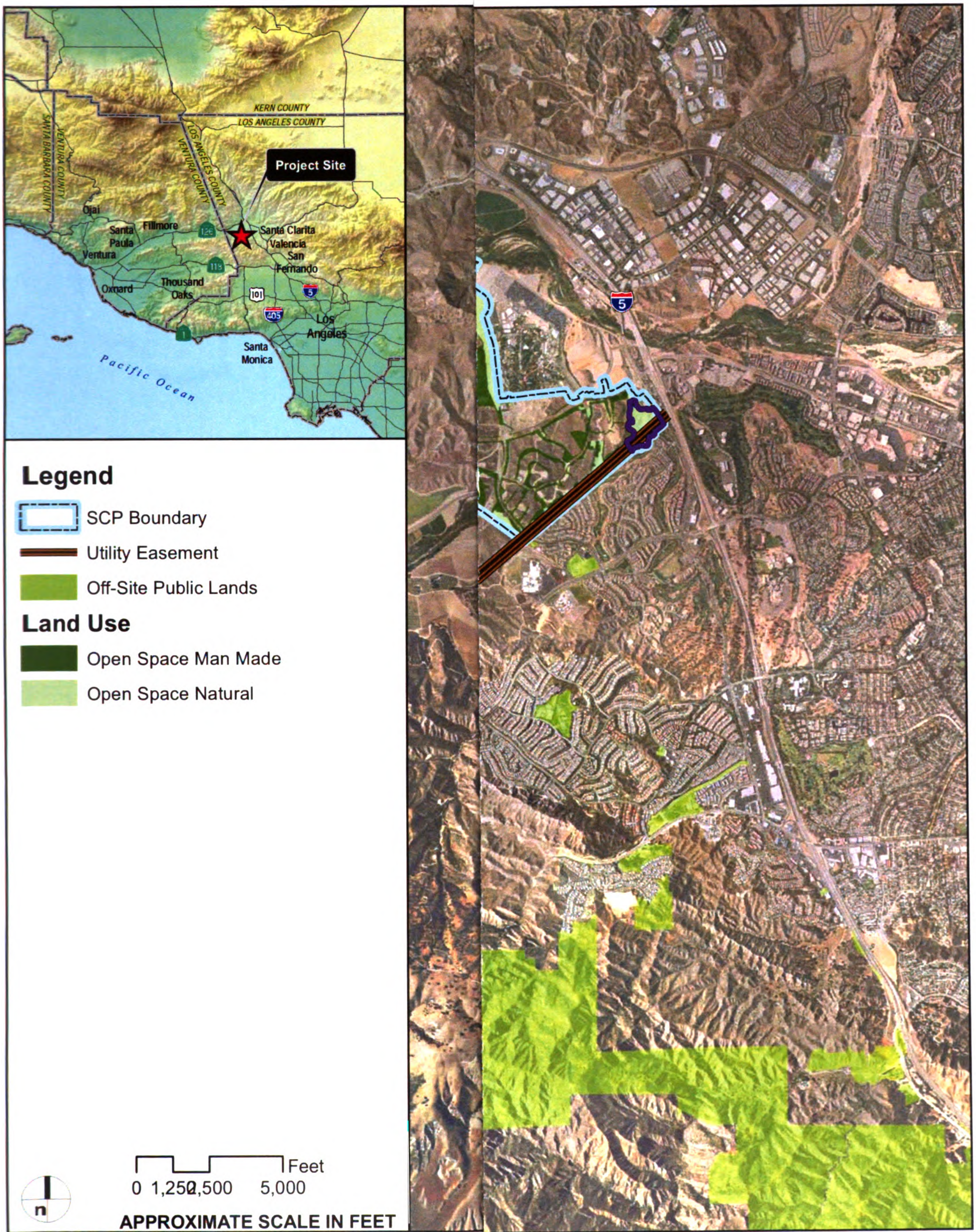

AERIAL SOURCE: DigitalGlobe, 2007

FIGURE 13

Spineflower Conservation Plan

Proposed Open Space

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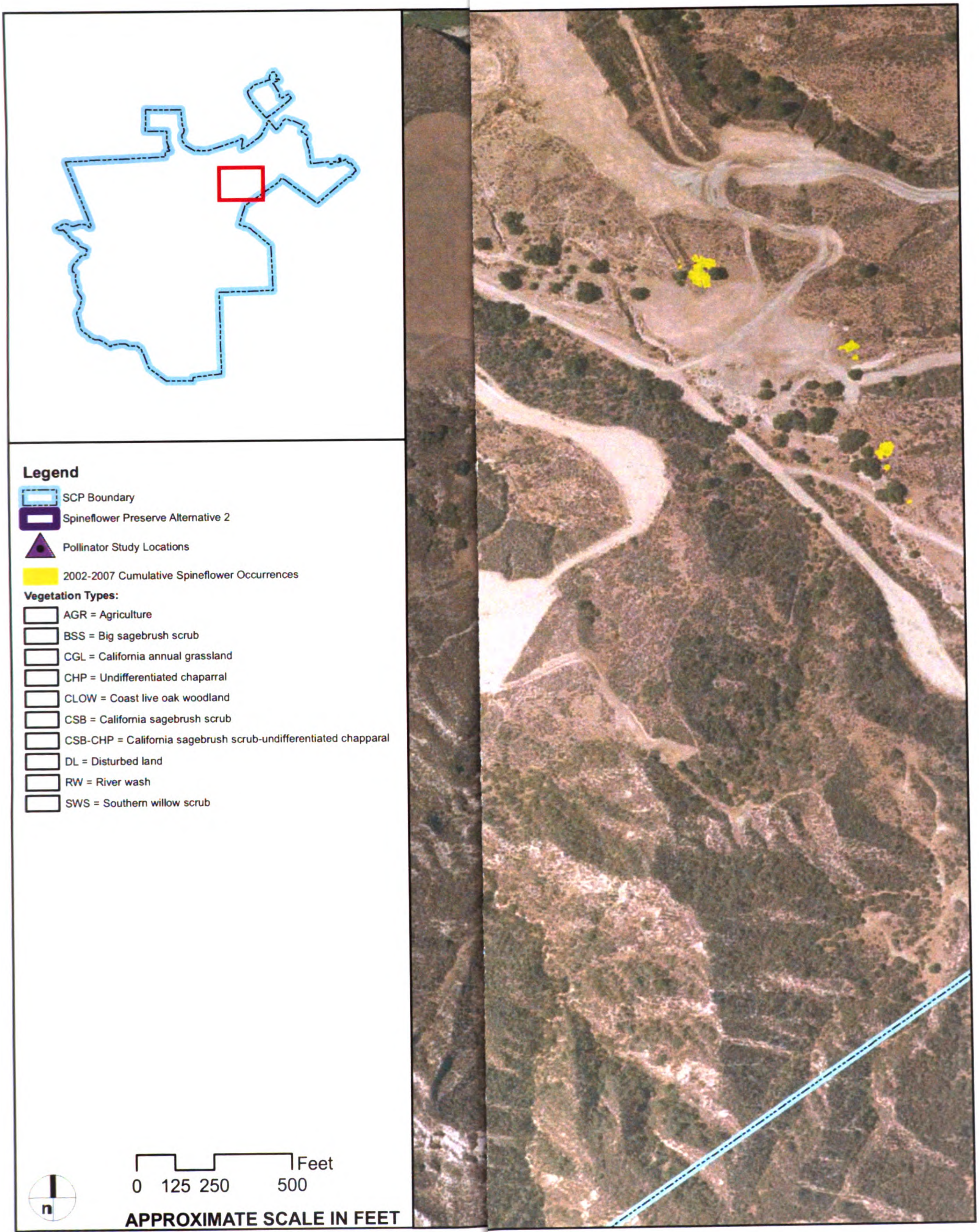

AERIAL SOURCE: DigitalGlobe, 2007

FIGURE 15

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Spineflower Conservation Plan

Communities - Grapevine Mesa

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8.1 Airport Mesa Preserve Area

The Airport Mesa Preserve Area is located toward the eastern end of the Specific Plan area, to the west of the Six Flags Magic Mountain Amusement Park and south of the Santa Clara River (*Figure 14*). The preserve includes 44.98 acres dominated by California annual grassland and California sagebrush scrub communities along south- and west-facing slopes surrounding Airport Mesa. The preserve extends along the north side of Middle Canyon to the existing gated access road on the east side of the mesa.

Ecological Indicators (Vegetation, Soils, Geology, Slope, Aspect, Elevation)

Vegetation communities and 2002 through 2007 cumulative spineflower occupied area within the Airport Mesa Preserve Area are listed in *Table 14*. There are 5.22 acres of cumulative spineflower occupied area within the Airport Mesa Preserve Area.

Table 14
Vegetation Communities and Land Covers within the Airport Mesa Preserve Area

Vegetation Type	Acres in Preserve	Cumulative 2002-2007 SFVS Occupied Acres
Agriculture	2.73	0.01
Big Sagebrush Scrub	0.23	0.00
California Annual Grassland	6.68	1.14
California Sagebrush Scrub	30.60	3.70
Disturbed Land	3.85	0.32
Mexican Elderberry	0.18	0.00
Valley Oak/Grass	0.71	0.05
Total	**44.98**	**5.22**

California sagebrush scrub and California annual grassland are the dominant vegetation communities within the Airport Mesa Preserve Area. There are approximately 30.60 acres of California sagebrush scrub and approximately 6.68 acres of California annual grassland. Although California sagebrush scrub and California annual grassland are generally the primary habitat for spineflower, it does occur within areas that experienced surface grubbing and/or mass soil grading in the recent past, and seed bank was presumably present in the vicinity prior to disturbance. Spineflower also occurs on the margins of infrequently used dirt roadbeds, especially where populations occur upslope and are producing seed. Besides California annual grassland and California sagebrush scrub, spineflower has been observed on agricultural land, disturbed land, and valley oak/grass. Other vegetation communities and land covers within the Airport Mesa Preserve Area include big sagebrush scrub and Mexican elderberry; no spineflower occurrences were recorded on such land. Agricultural land and disturbed land will be restored as described in *Section 9.2.10*.

The Airport Mesa Preserve Area soils include Castaic-Balcom silty clay loams (30% to 50% slopes), terrace escarpments, and Hanford sandy loam (2% to 9% slopes). Out of the three geologic units that occur within the project study area, two are present within the Airport Mesa Preserve Area: (1) alluvium (mostly Holocene, some Pleistocene) Quaternary non-marine and marine and (2) Plio-Pleistocene non-marine, Pliocene non-marine.

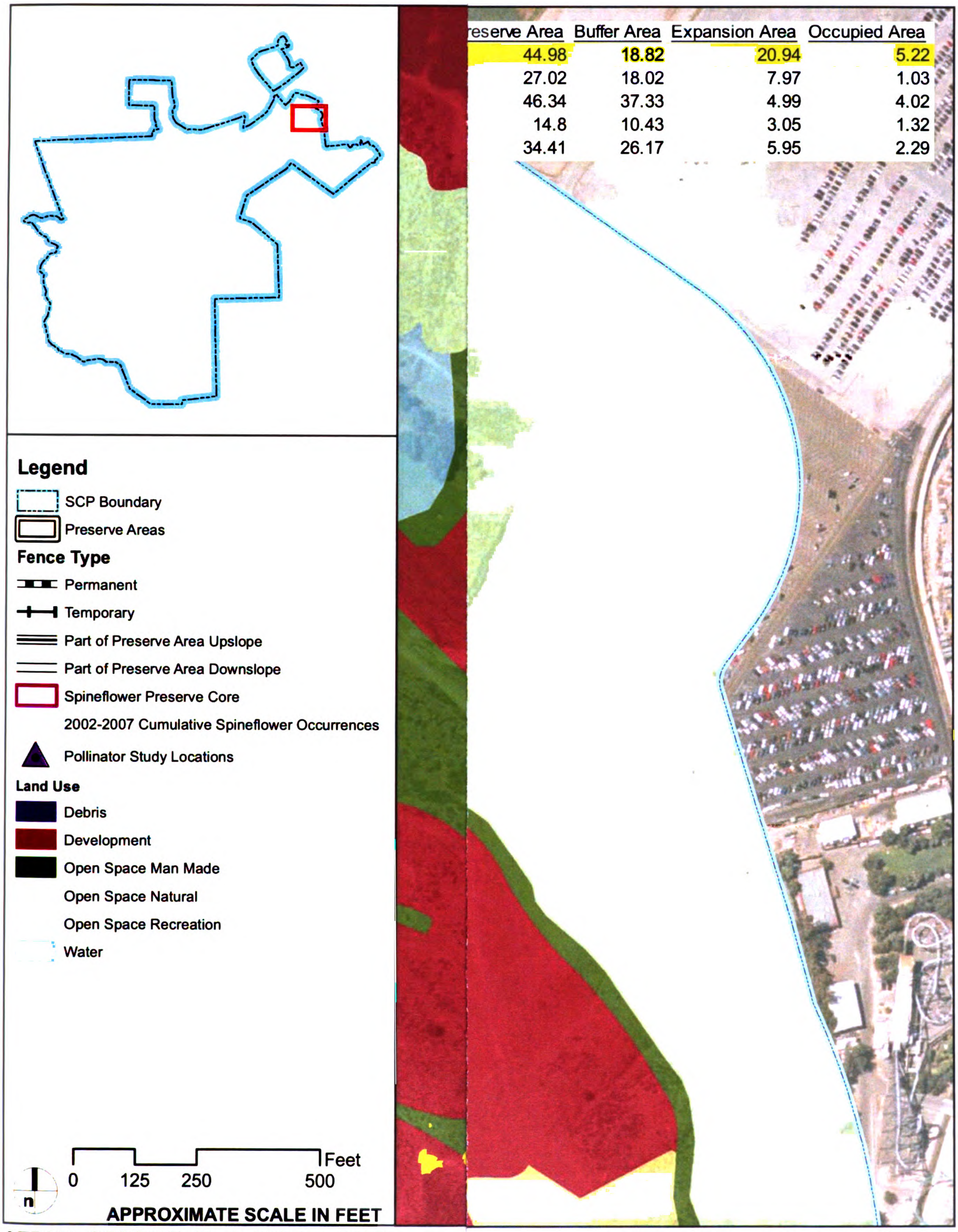
Slopes within the Airport Mesa Preserve Area are gentle to moderate, with 91% of the preserve area occurring on slopes less than 10° and 100% of the preserve area occurring on slopes less than 20°. Approximately 78% of the slopes in the preserve area have a southwest-, northwest-, or west-facing aspect. Elevations range from 1,080 to 1,160 feet AMSL.

Adjacent Land Uses

The areas surrounding the Airport Mesa Preserve Area (*Figure 19*) have been historically used for agriculture (irrigated row crops and dry-farmed row crops) and grazing. Currently, adjacent land uses include staging for agricultural operations on the graded mesa-top above the preserve area and active cultivation in the canyon bottom below the preserve area. Open space along the Santa Clara River corridor is located to the north of the preserve area, while the Six Flags Magic Mountain Amusement Park is located to the southeast of the preserve area. Planned land uses adjacent to the Airport Mesa Preserve Area include mixed use primarily to the north and south, and high-density residential development to the southwest of the preserve area. Undeveloped areas along the Santa Clara River corridor northwest of the preserve area would remain in open space, as would open space areas to the east and northeast. The preserve would be connected to open space by a culvert under Street GG.

Buffer Areas within Airport Mesa Preserve Area

Where the Airport Mesa Preserve Area is adjacent to development, spineflower occurrences would generally be separated from development by 80 to 200 feet or more. Where the preserve would be upslope of the adjacent mixed-use development, the distance from the nearest spineflower occurrence to the preserve boundary is approximately 80 feet. Where the preserve would be downslope of the adjacent mixed-use development, the distance from the nearest spineflower occurrence to the preserve boundary varies from 80 to 200 feet or more. In combination with these buffer widths, implementing the management measures described in *Section 9.0*, and developing new management measures as a part of the adaptive management process described in *Section 10.0*, the proposed preserves are designed to address various stressors and threats from adjacent changes in land use and contribute to achieving the biological goals and objectives of this plan.



reserve Area	Buffer Area	Expansion Area	Occupied Area
44.98	18.82	20.94	5.22
27.02	18.02	7.97	1.03
46.34	37.33	4.99	4.02
14.8	10.43	3.05	1.32
34.41	26.17	5.95	2.29

AERIAL SOURCE: DigitalGlobe, 2007

FIGURE 19

Spineflower Conservation Plan

eserve with Adjacent Land Use

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Pollinators Present

Flies and beetles were the dominant visitors to spineflower populations at Airport Mesa during the mid-season survey (April 23–25, 2004). There were 633 visits during the mid-season survey. Flies, ants, and beetles were the dominant visitors during the late-season survey (May 7–9, 2004). There were 372 visits during the late-season survey. However, insect visitors to spineflower populations were very diverse at all three survey locations (Airport Mesa, Grapevine Mesa, and Entrada) and reflected the relative abundance of insects in the community (Jones et al. 2004). Seven orders of insects were observed visiting spineflower populations, including Hymenoptera (bees and ants), Coleoptera (beetles), Homoptera (cicadas), Diptera (flies), Hemiptera (true bugs), Mantodea (mantids), and Lepidoptera (moths). The California sagebrush scrub, alluvial scrub, valley oak grassland, and California annual grassland within the preserve may continue to provide habitat for the above-described insects, especially flies, ants, and beetles.

8.2 Grapevine Mesa Preserve Area

The Grapevine Mesa Preserve Area encompasses 46.34 acres dominated by agricultural land (irrigated row crops), disturbed land, California annual grassland, and chaparral on south- and west-facing slopes along the western margin of Grapevine Mesa (*Figure 15*). The preserve varies in width from approximately 250 to 600 feet and is 1 mile in length, extending from the Santa Clara River in the north to the southern end of Grapevine Mesa. The eastern margin of the preserve area includes agricultural lands along the mesa-top, but the majority of the preserve area occurs on slopes surrounding the mesa that are dominated by California sagebrush scrub and chaparral. Humble Canyon drainage, a tributary to the Santa Clara River, occurs along the western boundary of the preserve area.

Ecological Indicators (Vegetation, Soils, Geology, Slope, Aspect, Elevation)

Vegetation communities and 2002 through 2007 cumulative spineflower occupied area within the Grapevine Mesa Preserve Area are listed in *Table 15*. There are 4.02 acres of cumulative spineflower occupied area within the Grapevine Mesa Preserve Area. Of the cumulative spineflower occurrence area, 0.33 acre (approximately 8% of the total occupied area within the Grapevine Mesa Preserve Area) is within the utility easement.

While chaparral is the primary habitat for spineflower within the Grapevine Mesa Preserve Area, spineflower also occurs in fairly high numbers within California annual grassland and California sagebrush scrub; limited occurrences are located within disturbed land, river wash, and coast live oak woodland. Other vegetation communities and land covers within the Grapevine Mesa

Preserve Area include agricultural land, big sagebrush scrub, and southern willow scrub; no spineflower occurrences were recorded on such land. The agricultural land and disturbed land would be restored as described below, in accordance with *Section 9.2.10*.

Table 15
Vegetation Communities and Land Covers within the Grapevine Mesa Preserve Area

[illegible]	Acres in Preserve	Cumulative 2002-2007 SFVS Occupied Acres
Agriculture	5.61	0.00
Big Sagebrush Scrub	0.12	0.00
California Annual Grassland	7.93	1.02
California Sagebrush Scrub	4.74	0.39
California Sagebrush Scrub/Undifferentiated	0.83	0.02
Coast Live Oak Woodland	4.49	0.15
Disturbed Land	8.18	<0.01
River Wash	1.36	0.09
Southern Willow Scrub	0.07	0.00
Undifferentiated Chaparral	13.00	2.33
Total	**46.34**	**4.02**

The Grapevine Mesa Preserve Area soils consist mostly of Zamora loam (2% to 9% slopes) and terrace escarpments but also include severely eroded Castaic and Saugus soils (30% to 65% slopes). The majority of the preserve area consists of Plio-Pleistocene non-marine, Pliocene non-marine deposits. There are less than 2 acres of alluvium (mostly Holocene, some Pleistocene) Quaternary non-marine and marine deposits within the preserve area.

Slopes within the preserve area are gentle to moderate, with more than 90% of the preserve area occurring on slopes less than 20°. More than 80% of the slopes in the preserve area are west-, southwest-, or northwest-facing. Elevations range from 1,000 to 1,320 feet AMSL, with a relatively even distribution of elevations occurring throughout the preserve area.

Adjacent Land Uses

Existing land uses adjacent to the Grapevine Mesa Preserve Area are limited to ongoing agricultural activities located on Grapevine Mesa within and above the preserve area. Open space within the Santa Clara River corridor is located to the north of the preserve area, and additional undeveloped land occurs to the south and west.

Adjacent to the northern portion of the Grapevine Mesa Preserve Area, planned land uses include medium-density residential uses to the northeast of the preserve area, low- to medium-density residential uses and existing undeveloped land to the northwest, and open space along the Santa Clara River corridor to the north (*Figure 20*). In the southern portion of the Grapevine Mesa Preserve Area, planned adjacent land uses include commercial development to the east and west of the preserve area and high-density residential uses to the south of the preserve area.

Buffer Areas within Grapevine Mesa Preserve Area

Where the Grapevine Mesa Preserve Area is adjacent to development, spineflower occurrences would generally be separated from development by 80 to 200 feet or more. Where the Grapevine Mesa Preserve Area is adjacent to open space in the northwest, the preserve is upslope, and the distance between the nearest spineflower occurrence and the preserve boundary varies from 80 to approximately 200 feet. On the east side of the preserve, the distances between spineflower occurrences and the preserve boundary (and adjacent development) vary from 105 feet to over 200 feet. On the west side of the preserve, the distances between spineflower occurrence and the preserve boundary (and adjacent development) vary from 80 to 170 feet. In combination with these buffer widths, implementing the management measures described in *Section 9.0*, and developing new management measures as a part of the adaptive management process described in *Section 10.0*, the proposed preserves are designed to address various stressors and threats from adjacent changes in land use and contribute to achieving the biological goals and objectives of this plan.

Pollinators Present

Flies, beetles, and ants were the dominant visitors to spineflower populations at Grapevine Mesa during the mid-season survey (April 23–25, 2004). The number of visits during the mid-season survey was 2,021. Flies and beetles were the dominant spineflower visitors during the late-season survey (May 7–9, 2004). The number of visits during the late-season survey was 1,483. However, insect visitors to spineflower populations were very diverse at all three survey locations (Airport Mesa, Grapevine Mesa, and Entrada) and reflected the relative abundance of insects in the community (Jones et al. 2004). Seven orders of insects were observed visiting spineflower populations, including Hymenoptera (bees and ants), Coleoptera (beetles), Homoptera (cicadas), Diptera (flies), Hemiptera (true bugs), Mantodea (mantids), and Lepidoptera (moths). The California sagebrush scrub, chaparral, Great Basin scrub, alluvial scrub, coast live oak woodland, and California annual grassland within the preserve may continue to provide habitat for the above-described insects, especially flies and beetles.

8.3 San Martinez Grande Preserve Area

The San Martinez Grande Preserve Area encompasses 34.41 acres dominated by burned California sagebrush scrub and California annual grassland communities on slopes below the primary north-/south-trending ridgeline on the west side of San Martinez Grande Canyon (*Figure 16*). This preserve area would conserve one of the two known occurrences of spineflower on Newhall Land property that are located north of the Santa Clara River.

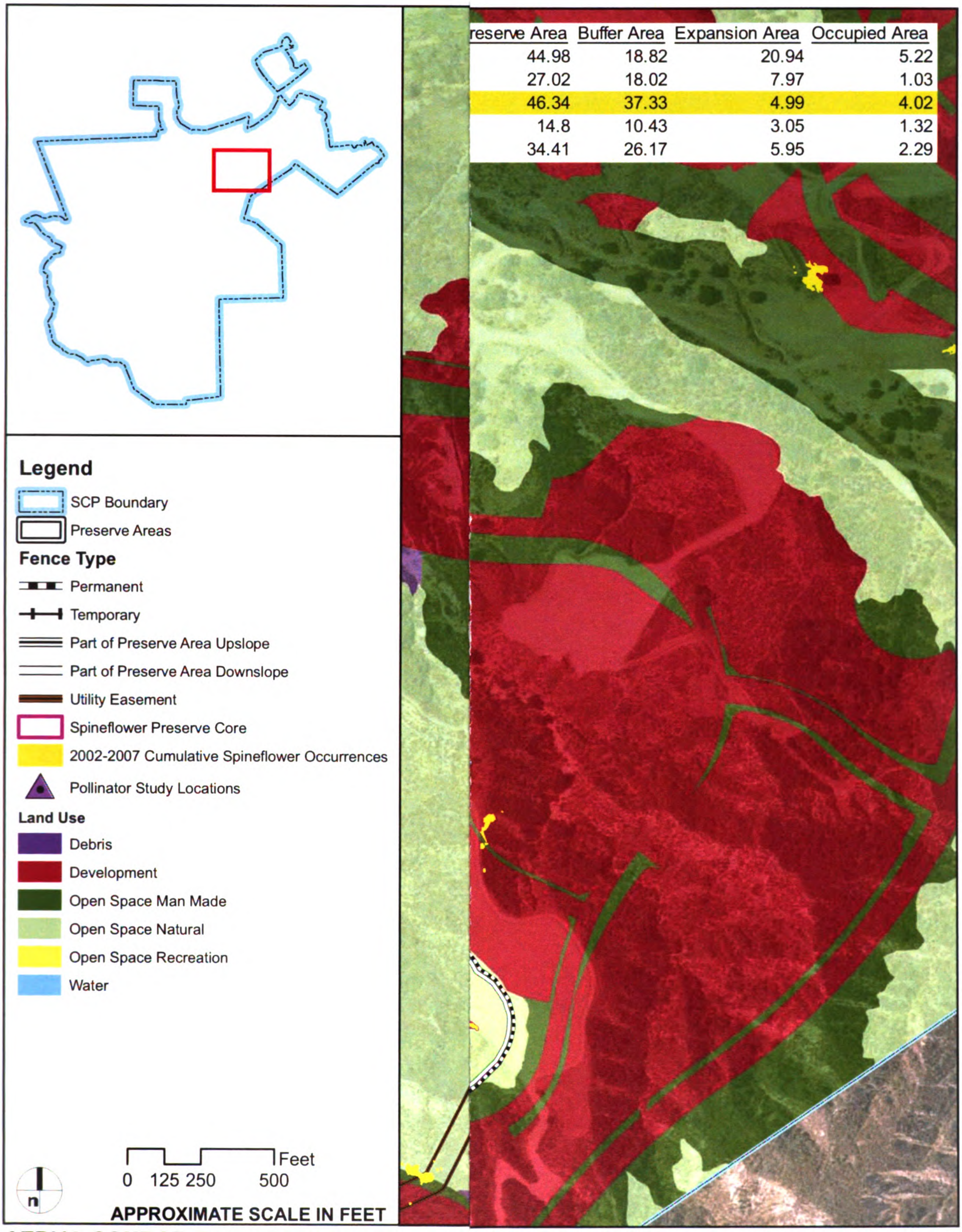
Ecological Indicators (Vegetation, Soils, Geology, Slope, Aspect, Elevation)

Vegetation communities and 2002 through 2007 cumulative spineflower occupied area within the San Martinez Grande Preserve Area are listed in *Table 16*. There are 2.29 acres of cumulative spineflower occupied area within the San Martinez Grande Preserve Area.

Table 16
Vegetation Communities and Land Covers within the San Martinez Grande Preserve Area

Vegetation Type	Acres in Preserve	Cumulative 2002–2007 SFVS Occupied Acres
California Annual Grassland	17.29	0.75
Burned California Sagebrush Scrub	17.12	1.54
Disturbed Land	<0.01	0.00
Total	34.41	2.29

Prior to burning in the fall of 2003, vegetation consisted mostly of California annual grassland and California sagebrush scrub. Although approximately 95% of the preserve area burned, the area was observed to be quickly re-vegetating in the spring of 2004 with filaree (*Erodium* spp.), giant ryegrass (*Leymus condensatus*), and slender mariposa lily (*Calochortus clavatus* var. *gracilis*).



reserve Area	Buffer Area	Expansion Area	Occupied Area
44.98	18.82	20.94	5.22
27.02	18.02	7.97	1.03
46.34	37.33	4.99	4.02
14.8	10.43	3.05	1.32
34.41	26.17	5.95	2.29

AERIAL SOURCE: DigitalGlobe, 2007

FIGURE 20

DUDEK

Spineflower Conservation Plan

eserve with Adjacent Land Use

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The San Martinez Grande Preserve Area soils are almost entirely Castaic-Balcom silty clay loams (30% to 50% slopes, eroded). Yolo loam (2% to 9% slopes), Hanford sandy loam (2% to 9% slopes), and Castaic-Balcom silty clay loams (50% to 60% slopes, eroded) also occur but make up less than 5% of this preserve area. Geology within the preserve area is limited to Pliocene marine deposits. A portion of the occupied habitat area is located on landslide debris.

Slopes within the preserve area are moderate to steep, with approximately 68% of the preserve area occurring on slopes between 10° and 30°. Approximately 94% of the spineflower in the preserve occurs on slopes ranging from 15° to 25°, and 97% occurs on slopes ranging from 10° to 30°. As the San Martinez Grande Preserve Area occurs on the east-facing side of a north-/south-trending ridgeline, the majority of slopes within the preserve have a southeastern or eastern aspect. Elevations range from 920 to 1,360 feet AMSL, with the majority of the preserve area occurring between elevations of 960 and 1,120 feet AMSL.

Adjacent Land Uses

Historically, areas in the vicinity of the San Martinez Grande Preserve Area have been used for agriculture and grazing. Currently, a single-family residence and a barn used for hay storage are located to the south of the preserve area on the west side of San Martinez Grande Canyon Road. The Santa Clara River and SR-126 are located to the south of the San Martinez Grande Preserve Area, and San Martinez Grande Canyon Road is located to the east. Undeveloped areas occur to the north and west of the preserve area.

Buffer Areas within San Martinez Grande Preserve Area

The preserve area would be surrounded on all sides by estate and low-density residential development, with the exception of a small sliver of Open Area on the east boundary between the spineflower preserve and the roadway. The buffer varies from 100 feet to more than 600 feet. Open space along San Martinez Grande Canyon is located approximately 100 feet to the east but not immediately next to the preserve (*Figure 21*). Where the preserve is downslope of adjacent land uses, the minimum distance between spineflower occurrences and the preserve boundary is 200 feet, with a maximum buffer of approximately 600 feet. Where the preserve is upslope of adjacent land uses (the east side of the preserve), the minimum distance between spineflower occurrences and the preserve boundary is 100 feet, with a maximum buffer of over 600 feet. In combination with these buffer widths, implementing the management measures described in *Section 9.0*, and developing new management measures as a part of the adaptive management process described in *Section 10.0*, the proposed preserves are designed to address various stressors and threats from adjacent changes in land use and contribute to achieving the biological goals and objectives of this plan.

8.4 Potrero Preserve Area

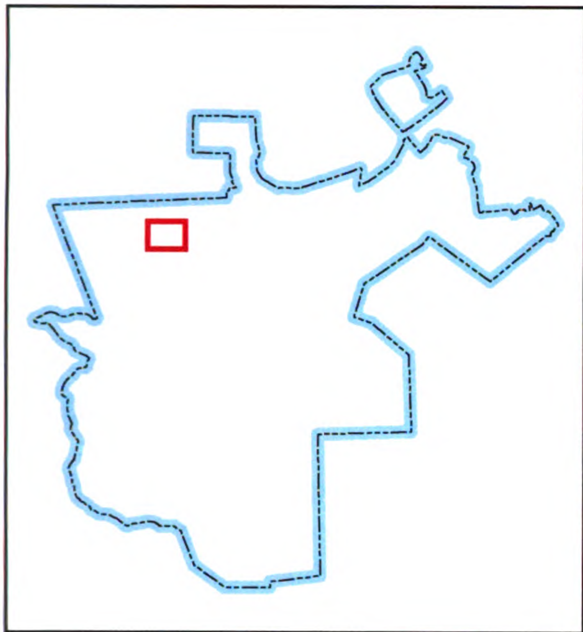
The Potrero Preserve Area is located at the mouth of Potrero Canyon in the southwestern portion of the Specific Plan area (*Figure 17*) and contains the westernmost population of spineflower within the Newhall Land property holdings in the project study area. The preserve area is 14.80 acres, dominated by California sagebrush scrub–purple sage, disturbed California sagebrush scrub–purple sage, and agricultural land and is located on the west side of Potrero Canyon near Windy Gap.

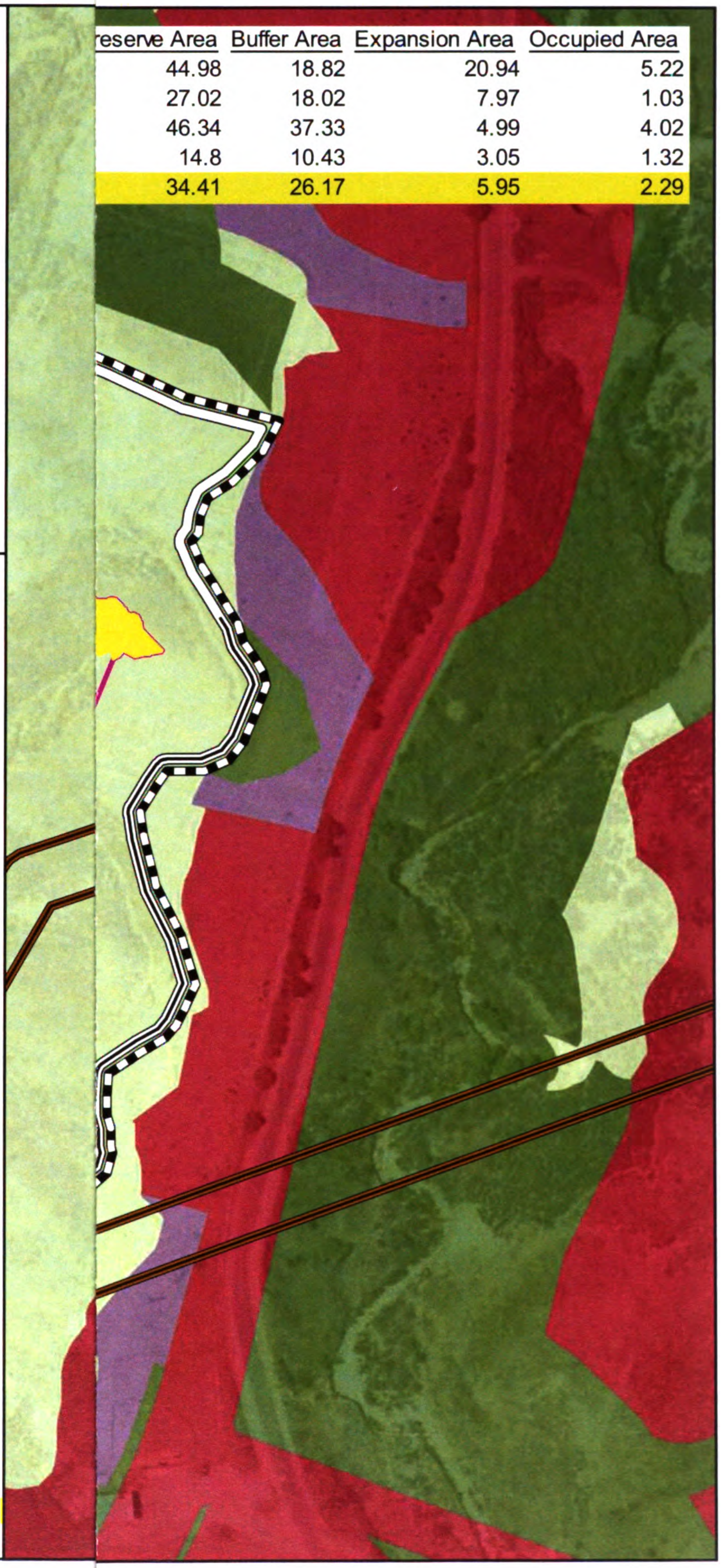
Ecological Indicators (Vegetation, Soils, Geology, Slope, Aspect, Elevation)

Vegetation communities and 2002 through 2007 cumulative spineflower occupied area within the Potrero Preserve Area are listed in *Table 17*. There are 1.32 acres of cumulative spineflower occupied area within the Potrero Preserve Area.

Table 17
Vegetation Communities and Land Covers within the Potrero Preserve Area

Vegetation Types	Acres in Preserve	Cumulative 2002–2007 SFVS Occupied Acres
Agriculture	2.87	0.00
California Annual Grassland	0.03	0.00
California Sagebrush Scrub	1.74	0.00
California Sagebrush Scrub–Artemisia	1.45	<0.01
California Sagebrush Scrub–Purple Sage	4.81	0.87
Disturbed California Sagebrush Scrub–Purple Sage	3.49	0.45
Disturbed Land	0.43	0.00
Total	14.80	1.32





reserve Area	Buffer Area	Expansion Area	Occupied Area
44.98	18.82	20.94	5.22
27.02	18.02	7.97	1.03
46.34	37.33	4.99	4.02
14.8	10.43	3.05	1.32
34.41	26.17	5.95	2.29

Legend

- SCP Boundary
- Preserve Areas

Fence Type

- Permanent
- Temporary
- Part of Preserve Area Upslope
- Part of Preserve Area Downslope
- Utility Easement
- Spineflower Preserve Core
- 2002-2007 Cumulative Spineflower Occurrences

Land Use

- Debris
- Development
- Open Space Man Made
- Open Space Natural
- Open Space Recreation
- Water

Feet
0 50 100 200

APPROXIMATE SCALE IN FEET

AERIAL SOURCE: DigitalGlobe, 2007

FIGURE 21

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Spineflower Conservation Plan

eserve with Adjacent Land Use

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The Potrero Preserve Area soils are predominantly Castaic-Balcom silty clay loams (20% to 50% slopes, eroded). Terrace escarpments and Yolo loam (2% to 9% slopes) also occur within this preserve but account for only 14% and 2% of the preserve area, respectively. Geology within the Potrero Preserve Area is roughly two-thirds alluvium (mostly Holocene, some Pleistocene) Quaternary non-marine and marine and one-third Pliocene marine.

The majority of slopes in the Potrero Preserve Area are gentle to moderate, with approximately 79% of the slopes having an incline of less than 20°. Slopes in this preserve area are predominantly southeast-, east-, and south-facing. Elevations range from 820 to 1,080 feet AMSL, with the majority of the preserve area occurring between 1,000 and 1,080 feet AMSL.

Adjacent Land Uses

Current land uses within Potrero Canyon include ongoing agricultural and ranching operations. Immediately adjacent to the preserve area are actively farmed fields. Open space along the Santa Clara River corridor is located to the north of the preserve area, while additional undeveloped areas along the slopes and ridges of Potrero Canyon are in open space to the east of the preserve area.

Buffer Areas within Potrero Preserve Area

The Potrero Preserve Area is currently adjacent to open area on the north and east. To the south and west of the Potrero Preserve Area, planned land uses include low- and low-medium-density residential development; estate residential development would occur farther to the southwest (*Figure 22*). The Santa Clara River corridor and the mouth of Potrero Canyon would remain in open space to the north, while planned uses farther up the canyon include medium-density residential development and a community/neighborhood park. The preserve area is entirely upslope of adjacent lands. The minimum distance between the nearest spineflower occurrences and the preserve boundary is 80 feet, with a maximum buffer of 400 feet. However, the open space to the north and east extends several hundred feet beyond the preserve boundaries. In combination with these buffer widths, implementing the management measures described in *Section 9.0*, and developing new management measures as a part of the adaptive management process described in *Section 10.0*, the proposed preserves are designed to address various stressors and threats from adjacent changes in land use and contribute to achieving the biological goals and objectives of this plan.

California sagebrush scrub–purple sage, disturbed California sagebrush scrub–purple sage, and agricultural land are the primary vegetation communities within the Potrero Preserve Area. Disturbed California sagebrush scrub occurs when the primary constituents of a California sagebrush scrub community are present, but the overall cover of non-native vegetation exceeds 20%. The predominance of non-native species within California sagebrush scrub in the preserve area is likely a combination of disturbance from past grazing activities and proximity to ongoing agricultural activities in adjacent areas. Spineflower occurrences within the Potrero Preserve Area are located predominantly within disturbed and undisturbed California sagebrush scrub–purple sage; California sagebrush scrub–Artemisia also contains a small amount of spineflower. Spineflower has not been observed within the other vegetation communities—disturbed land, California sagebrush scrub, California annual grassland, and agricultural land—that occur within the preserve area. Acreages of vegetation communities and land covers within the Potrero Preserve Area are listed in *Table 17*. The disturbed land and disturbed California sagebrush scrub will be restored as described below, in accordance with *Section 9.2.10*.

8.5 Entrada Preserve Area

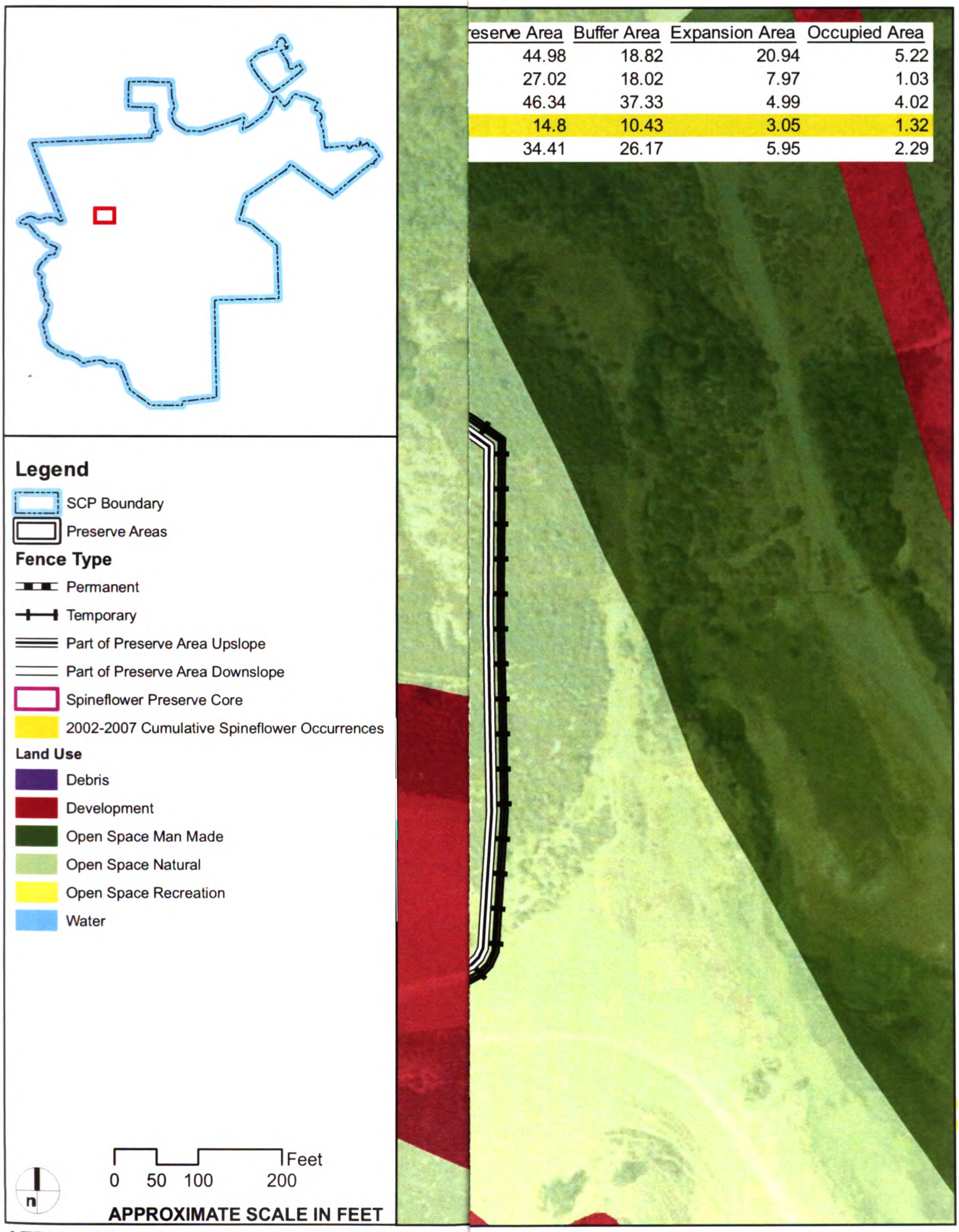
The Entrada Preserve Area includes the easternmost occurrence of spineflower on Newhall Land property holdings within the project study area (*Figure 18*). This preserve area encompasses 27.02 acres located in the southeastern corner of the Entrada planning area. The Old Road and I-5 are located to the east of the preserve area, and the existing Westridge golf course is located to the south of the preserve area.

Ecological Indicators (Vegetation, Soils, Geology, Slope, Aspect, Elevation)

Vegetation communities and 2002 through 2007 cumulative spineflower occupied area within the Entrada Preserve Area are listed in *Table 18*. There are 1.03 acres of cumulative spineflower occupied area within the Entrada Preserve Area.

Table 18
Vegetation Communities and Land Covers within the Entrada Preserve Area

Vegetation Types	Acres in Preserve	Cumulative 2002–2007 SFVS Occupied Acres
California Annual Grassland	23.07	0.89
California Sagebrush Scrub–California Buckwheat	1.96	0.11
Developed Land	0.31	0.00
Disturbed Land	1.68	0.02
Total	27.02	1.03



eserve Area	Buffer Area	Expansion Area	Occupied Area
44.98	18.82	20.94	5.22
27.02	18.02	7.97	1.03
46.34	37.33	4.99	4.02
14.8	10.43	3.05	1.32
34.41	26.17	5.95	2.29

AERIAL SOURCE: DigitalGlobe, 2007

FIGURE 22

Spineflower Conservation Plan

eserve with Adjacent Land Use

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The Entrada Preserve Area consists of approximately 23.07 acres of California annual grassland, while California sagebrush scrub–California buckwheat, developed land, and disturbed land account for approximately 1.96 acres, 0.31 acres, and 1.68 acres, respectively. The predominance of non-native species within California sagebrush scrub in the preserve area is likely a combination of disturbance from past grazing activities and ongoing physical disturbances in adjacent areas (e.g., maintenance of access roads). Acreages of vegetation communities and land covers within the Entrada Preserve Area are listed in *Table 18*. Approximately 5 acres within the preserve lie within an existing utility easement, of which approximately 0.25 acre (less than 25% of the total occupied area within the Entrada Preserve Area) is occupied by spineflower. The developed land and disturbed land will be restored, as described in accordance with *Section 9.2.10*.

The Entrada Preserve Area soils are predominantly Saugus loam (30% to 50% slopes). Approximately 5% of the preserve consists of Hanford sandy loam (2% to 9% slopes), Metz loam (2% to 5% slopes), and Yolo loam (0% to 2% slopes). Geology within the preserve area includes alluvium (mostly Holocene, some Pleistocene) Quaternary non-marine and marine.

Slopes are gentle to moderate, with none of the preserve area occurring on slopes greater than 15°. More than half of the preserve area includes northeast- and east-facing slopes, with flat areas and north-facing slopes accounting for approximately one-third of the preserve area. Elevations range from 1,080 to 1,240 feet AMSL, with the majority of the preserve area occurring between 1,160 and 1,200 feet AMSL.

Adjacent Land Uses

Existing land uses adjacent to the Entrada Preserve Area include a golf course to the south of the preserve area, The Old Road and I-5 to the east, undeveloped land to the west, and the Six Flags Magic Mountain Amusement Park to the north. In addition, Southern California Edison and Southern California Gas Company transmission lines run along the southeastern boundary inside of the proposed preserve area, and these companies actively maintain dirt roads and utility facilities through the preserve area.

Buffer Areas within Entrada Preserve Area

Planned land uses adjacent to the Entrada Preserve Area include residential uses to the west and open space to the north and southwest. Areas immediately to the south of the preserve area would remain as existing golf course, while the planned westward extension of Magic Mountain Parkway would be located several hundred feet to the north of the preserve area (*Figure 23*).

The Entrada Preserve Area consists of approximately 23.07 acres of California annual grassland, while California sagebrush scrub–California buckwheat, developed land, and disturbed land account for approximately 1.96 acres, 0.31 acres, and 1.68 acres, respectively. The predominance of non-native species within California sagebrush scrub in the preserve area is likely a combination of disturbance from past grazing activities and ongoing physical disturbances in adjacent areas (e.g., maintenance of access roads). Acreages of vegetation communities and land covers within the Entrada Preserve Area are listed in *Table 18*. Approximately 5 acres within the preserve lie within an existing utility easement, of which approximately 0.25 acre (less than 25% of the total occupied area within the Entrada Preserve Area) is occupied by spineflower. The developed land and disturbed land will be restored, as described in accordance with *Section 9.2.10*.

The Entrada Preserve Area soils are predominantly Saugus loam (30% to 50% slopes). Approximately 5% of the preserve consists of Hanford sandy loam (2% to 9% slopes), Metz loam (2% to 5% slopes), and Yolo loam (0% to 2% slopes). Geology within the preserve area includes alluvium (mostly Holocene, some Pleistocene) Quaternary non-marine and marine.

Slopes are gentle to moderate, with none of the preserve area occurring on slopes greater than 15°. More than half of the preserve area includes northeast- and east-facing slopes, with flat areas and north-facing slopes accounting for approximately one-third of the preserve area. Elevations range from 1,080 to 1,240 feet AMSL, with the majority of the preserve area occurring between 1,160 and 1,200 feet AMSL.

Adjacent Land Uses

Existing land uses adjacent to the Entrada Preserve Area include a golf course to the south of the preserve area, The Old Road and I-5 to the east, undeveloped land to the west, and the Six Flags Magic Mountain Amusement Park to the north. In addition, Southern California Edison and Southern California Gas Company transmission lines run along the southeastern boundary inside of the proposed preserve area, and these companies actively maintain dirt roads and utility facilities through the preserve area.

Buffer Areas within Entrada Preserve Area

Planned land uses adjacent to the Entrada Preserve Area include residential uses to the west and open space to the north and southwest. Areas immediately to the south of the preserve area would remain as existing golf course, while the planned westward extension of Magic Mountain Parkway would be located several hundred feet to the north of the preserve area (*Figure 23*).

The entire preserve area is located downslope of adjacent lands. Where adjacent to the proposed residential development, the buffer varies from 80 to 100 feet. Where adjacent to open space, the minimum buffer is 80 feet. Where adjacent to the existing golf course, the minimum distance between spineflower occurrences and the adjacent land use is 80 feet. In combination with these buffer widths, implementing the management measures described in *Section 9.0*, and developing new management measures as a part of the adaptive management process described in *Section 10.0*, the proposed preserves are designed to address various stressors and threats from adjacent changes in land use and contribute to achieving the biological goals and objectives of this plan.

Pollinators Present

In contrast to spineflower visitors observed at Airport Mesa and Grapevine Mesa, ants and beetles (rather than flies and beetles) were the dominant visitors to spineflower populations at the Entrada planning area during the mid-season survey (April 23–25, 2004). There were 2,488 visits during the mid-season survey. During the late-season survey (May 7–9, 2004), ants were more dominant among spineflower visitors, while bees, beetles, and flies occurred with relatively similar frequency among spineflower visitors during the late season. There were 1,009 visits during the late-season survey. However, insect visitors to spineflower populations were very diverse at all three survey locations (Airport Mesa, Grapevine Mesa, and Entrada) and reflected the relative abundance of insects in the community (Jones et al. 2004). Seven orders of insects were observed visiting spineflower populations, including Hymenoptera (bees and ants), Coleoptera (beetles), Homoptera (cicadas), Diptera (flies), Hemiptera (true bugs), Mantodea (mantids), and Lepidoptera (moths). The California sagebrush scrub and California annual grassland within the preserve may continue to provide habitat for the above-described insects, especially ants and beetles.

reserve Area	Buffer Area	Expansion Area	Occupied Area
44.98	18.82	20.94	5.22
27.02	18.02	7.97	1.03
46.34	37.33	4.99	4.02
14.8	10.43	3.05	1.32
34.41	26.17	5.95	2.29

AERIAL SOURCE: DigitalGlobe, 2007

FIGURE 23

Spineflower Conservation Plan

eserve with Adjacent Land Use

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9.0 MANAGEMENT ACTIVITIES

The management activities outlined herein have been designed to minimize or eliminate various risk factors from adjacent changes in land use and contribute to achieving the biological goals and objectives of this Plan. This will be achieved in part by implementing the measures listed in *Sections 9.1* and *9.2*, most of which are based on the adopted Newhall Ranch Specific Plan EIR mitigation measures (County of Los Angeles 2003), with modifications worked through with CDFG. *Section 9.1* identifies general management measures that are to be implemented for spineflower populations adjacent to agricultural areas and during project development and construction activities. *Section 9.2* describes general long-term management measures for permanent spineflower preserve areas, and *Section 9.3* describes specific management measures for each preserve.

A preserve manager will be contracted with and funded by Newhall Land to perform environmental monitoring, oversee the spineflower preserve areas, and ensure that the monitoring and management activities outlined herein are carried out. The preserve manager will be a qualified biologist or land management entity/biological firm with qualified biologists on staff, approved by the County and CDFG (in accordance with Newhall Ranch Specific Plan EIR (County of Los Angeles 2003) Mitigation Measures SP-4.6-66 and SP-4.6-77).

For the purposes of this report, a qualified biologist shall have a bachelor's degree or higher in biology, botany, or a similar field; be intimately familiar with spineflower ecology, local plant communities, invasive plant and animal control methods, and biological data collection and assessment; and have verifiable experience (a minimum of 3 years) performing similar types of environmental monitoring, reporting, and natural lands management. The preserve manager will be responsible for submitting the reports indicated herein, and will have the authority to stop work and to take reasonable steps to avoid the take of, and minimize the disturbance to, spineflower populations within the preserve(s).

9.1 General Management Measures

9.1.1 Management Measures for Existing Agricultural Areas

Agriculture is defined for purposes of this Plan as the practice of cultivating the soil, producing irrigated and non-irrigated crops, and raising livestock. Grazing has occurred and/or is occurring within the project study area. Spineflower populations located adjacent to and within existing agricultural areas will be protected and preserved, as outlined in this section, to ensure a successful coexistence of agricultural activities and spineflower populations. *Figures 14* through *18* show where spineflower populations occur within and adjacent to agricultural areas. Potential threats to spineflower from adjacent agricultural activities include physical intrusion (i.e., damage by equipment and agricultural personnel), introduction of opportunistic pest plants (weeds), insect pests, irrigation runoff, fertilizer runoff, pesticide runoff or drift, farm animal grazing, trash accumulation, and accelerated erosion. A decline in pollinators due to poorly performed insecticide spraying or trapping is possible. Agricultural activities within the VCC planning area are expected to cease at the time of project construction, which is expected to occur within 10 years, while agricultural activities within the Specific Plan area and the Entrada area are expected to cease at the time of full build-out, which is expected to occur within 25 years. Agricultural activities in areas designated as spineflower preserves will cease when easements are recorded to CDFG (see *Section 9.2.1*, Easements). Regular and ongoing consultation must be maintained with the County and CDFG in connection with ongoing agricultural operations in order to avoid or minimize significant direct impacts to the spineflower. Consultation with CDFG and the preserve manager will be the responsibility of the land owner. Additionally, 30 days advance written notice shall be provided to the County and CDFG of the proposed conversion of its ongoing rangeland operations on Newhall Ranch to more intensive agricultural uses (see Newhall Ranch Specific Plan EIR Mitigation Measure SP-4.6-79). The purpose of the advance notice requirement is to allow the applicant, or its designee, to coordinate with the County and CDFG to avoid significant impacts to the spineflower prior to the applicant's proposed conversion of its ongoing rangeland operations to more intensive agricultural uses. This coordination component will be implemented by or through the County's Department of Regional Planning and/or the Regional Manager of CDFG. Implementation will consist of the County and/or CDFG conducting a site visit of the proposed conversion area(s) within the 30-day period, and making a determination of whether the proposed conversion area(s) would destroy or significantly impact spineflower population adjacent to those areas. If it is determined that the conversion area(s) do not destroy or significantly impact spineflower populations, then the County and/or CDFG will authorize such conversion activities in the proposed conversion area(s). However, if it is determined that the conversion area(s) may destroy or significantly impact spineflower populations, then the County and/or CDFG will issue a stop work order to the applicant, or its designee. If such an order is issued, the applicant, or its designee, shall not proceed with any conversion activities in the proposed conversion area(s). However, the applicant, or the designee, may take steps to relocate the proposed conversion activities to an alternate conversion area(s). In doing so, the applicant, or its designee, shall follow the same notice and coordination provisions identified above. This conversion shall not include ordinary pasture maintenance consistent with rangeland management (see Newhall Ranch Specific Plan EIR Mitigation Measure SP-4.6-79).

Agricultural Management Practices

Certain limited uses related to agricultural activities will be allowed within existing agricultural areas adjacent to the spineflower preserves, provided that such uses do not significantly impair, interfere with, or adversely affect the conservation values of the property. This will be ensured in part by requiring Newhall Land representatives to meet with existing or future tenants to specifically educate them about these limitations on activities within existing agricultural areas adjacent to the spineflower preserves. The following limited uses may be allowed within existing agricultural areas adjacent to the spineflower preserves:

- Watering
- Use of fertilizers, pesticides, biocides, herbicides or other agricultural chemicals
- Weed abatement activities

Fire protection activities, which will be limited to the areas on the Property that (i) are subject to existing agricultural activities, (ii) do not exceed the existing water uses to support those agricultural activities, and (iii) will not be expanded or intensified for any reason. Non-agricultural fire protection activities (e.g., mowing, discing, herbicide application, or other vegetation management for weed abatement or fuel management) shall be prohibited within spineflower preserves. Where these activities are planned within 500 feet of spineflower preserves, they shall be restricted as described above for agricultural practices adjacent to the preserves and subject to the same reporting requirements.

Newhall Land representatives will provide written instruction to the agricultural tenant to ensure that the use and application of fertilizers, pesticides, herbicide, and irrigation do not exceed the area subject to existing agricultural activities. The written instructions will include specific guidelines and requirements to ensure that no irrigation water or other agricultural runoff (including stormwater) enters the spineflower preserves; no pesticides, herbicides, or other agricultural chemicals reach the spineflower preserves via overspray or drift; and no agricultural equipment or workers enter the preserve boundaries. Newhall Land will provide CDFG with a copy of written guidelines, and Newhall Land or its successor will be responsible for monitoring to ensure compliance and reporting to CDFG (see *Section 13*). Newhall Land's duty to prepare an erosion control plan for the agricultural operations shall specifically include provisions that preclude any excessive water runoff from the areas subject to existing agricultural activities.

Limiting the agricultural operations in these ways will ensure that spineflower populations are not adversely affected by ongoing agricultural activities.

9.1.2 Management Measures during Construction

Construction Plans and Specifications

Spineflower preserve temporary fencing shall be shown on construction plans and installed prior to initiating construction clearing and grubbing activities within 500 feet of spineflower preserves. The spineflower preserve manager or qualified biologist shall monitor fence installation. Vegetation clearing for fence installation shall be minimized to what is necessary to install the fence, and, where possible, shall leave the roots of native plants in place to allow regrowth. As necessary, native vegetation will be restored and weed management shall be performed in the preserve areas, buffer areas, and open space connections following fence installation to ensure that temporarily cleared native plant areas do not become weed dominated after installation. Revegetation seed mix shall be reviewed and approved by the County and CDFG (see *Section 9.2.10*). General project clearing and grubbing within 500 feet of the fence may commence upon verification by the spineflower preserve manager or the qualified biologist that protective fencing is in place and is adequate. Appropriate best management practices (BMPs) shall be installed at the edge of development manufactured slopes, when the spineflower preserve is within 500 feet and downslope of proposed development (see Mitigation Measure BIO-27).

Construction documents shall indicate that the grading contractor is responsible for protecting spineflower preserves during construction work. The construction documents shall indicate that the contractor is responsible for informing all employees and subcontractors of the environmentally sensitive areas and the proper conduct of work when working near (e.g., within 500 feet of) these areas. The construction documents shall require a pre-construction meeting to perform an "environmental education session" with the grading contractor/contractor's employees, subcontractors, and equipment operators, prior to commencing construction work within 500 feet of the spineflower preserves. The environmental education session shall be conducted by the spineflower preserve manager or qualified biologist and focus on informing workers of the location and sensitivity of the spineflower and the requirements to protect it. The construction documents shall indicate that the grading contractor shall be responsible for mitigating any impacts to spineflower preserves due to the negligence of the grading contractor/contractor's employees, subcontractors, or equipment operators. If accidental trespass into a spineflower preserve occurs during construction, the violation shall be documented by the preserve manager and immediately reported to CDFG. Follow-up action will be taken in accordance with the Section 2081 of the Fish and Game Code, Incidental Take Permit issued by CDFG (see Mitigation Measure BIO-28).

Construction plans shall include necessary design features and construction notes to demonstrate consistency of development in the vicinity of spineflower preserves with the Spineflower Conservation Plan. In addition to applicable erosion control plans and performance under South Coast Air Quality Management District (SCAQMD) Rule 403d dust control (SCAQMD 2005), the Project stormwater pollution prevention plan (SWPPP) shall include the following minimum BMPs. Together, the implementation of these requirements shall ensure that spineflower preserve populations are protected during construction. At a minimum, the following measures/restrictions shall be incorporated into the SWPPP, and noted on construction plans where appropriate, to avoid impacting spineflower preserves during construction:

- Avoid planting or seeding invasive species in development areas during construction phases.
- Do not use erosion control devices that may contain weeds, such as hay bales, etc., within 200 feet of spineflower preserves or anywhere upstream of spineflower preserves.
- Do not windrow or stockpile soil within 200 feet of spineflower preserve boundaries or anywhere upstream of spineflower preserves.
- Do not locate staging areas, maintenance, or concrete washout areas within 500 feet (unless otherwise authorized by CDFG, and no closer than 200 feet in any instance), where adjacent to or anywhere upstream of spineflower preserves.
- Do not store toxic compounds, including fuel, oil, lubricants, paints, release agents, or any other construction materials that could damage spineflower habitat if spilled near spineflower preserve areas, or anywhere upstream of spineflower preserves or along spineflower preserve boundaries.
- Provide location and details for any fencing for temporary and permanent access control along preserve boundaries.
- Provide location and details for any dust control fencing along preserve boundaries.
- Provide location and details for any stormwater run-on controls/BMPs coming from development area to spineflower preserve (see Mitigation Measure BIO-29).

The spineflower preserve manager, or qualified biologist (specifically defined in the introduction to *Section 9.0*, above), shall review construction plans and specifications, SWPPP, and, where appropriate, erosion control plans and implementation of SCAQMD Rule 403d dust control measures (SCAQMD 2005), prior to construction within 500 feet of spineflower preserves for compliance with the SCP and associated permits and project-related environmental documents. A copy of the SWPPP and associated monitoring reports will be provided to CDFG (see Mitigation Measure BIO-30).

Construction Fencing and Signage

Spineflower preserves shall be protected prior to clearing and during construction with temporary construction fencing and prohibitive signage. Openings shall be included in the fence when located within wildlife corridors and vegetation communities connectivity areas, to allow for the safe passage of wildlife. The spineflower preserve manager or qualified biologist shall indicate the location and width of each of these openings. The fencing shall be a three-strand non-barbed wire fence or bright orange U.V.-stabilized, polyethylene construction "snow" fencing, attached to metal t-posts that extend at least 4 feet above grade or equivalent. Protective fencing shall be maintained in good condition until completion of project construction. Where construction activities occur within 500 feet of a spineflower preserve, the spineflower preserve manager or qualified biologist shall review fencing weekly during construction monitoring visits and note any fencing that is in need of repair. Repairs shall be completed within 3 days of notification by the spineflower preserve manager or qualified biologist (see Mitigation Measure BIO-31). The spineflower preserve areas behind the temporary fencing shall not be accessed by construction personnel or equipment for any reason and shall not be used for the storage of any equipment, materials, construction debris, or anything associated with construction activities.

Dust Control

Development areas shall have dust control measures implemented and maintained to prevent dust from impacting vegetation within the spineflower preserve areas. Dust control shall be implemented during construction in compliance with SCAQMD Rule 403d (SCAQMD 2005). Where construction activities occur within 100 feet of a spineflower location, chemical dust suppression shall not be utilized. Where determined necessary by the spineflower preserve manager, a screening fence (i.e., a 6-foot-high chain link fence with green fabric up to a height of 5 feet) shall be installed to protect spineflower locations (see Mitigation Measure BIO-32).

Water Control and Erosion Control

Development areas shall have water-control measures implemented and maintained to minimize changes in surface water flows to the spineflower preserve areas and to avoid indirect impacts to the spineflower during construction. Watering of graded areas will be controlled to prevent discharge of construction water into the spineflower preserve areas and on ground sloping toward the preserve areas. Diversion ditches will be constructed to redirect stormwater flows from graded areas away from the spineflower preserve areas. To the extent practicable, grading of areas adjacent to the preserves will be limited to spring and summer months (May through September), when the probability of rainfall is lower. Both irrigation plans and a stormwater flow redirection plan will be prepared and submitted for approval to the County prior to the initiation of grading operations. Also prior to issuance of a grading permit, the Project applicant, or its designee, shall submit plans and specifications that ensure implementation of the following design measures, for approval to the County:

- During construction activities, drainage ditches, piping, or other approaches will be put in place to convey excess stormwater and other surface water flows away from the Newhall Ranch spineflower preserve(s) and connectivity/preserve design/buffers.
- Final grading and drainage design that do not change the current surface and subsurface hydrologic conditions within the spineflower preserve areas will be developed (see Newhall Ranch Specific Plan EIR Mitigation Measure SP-4.6-73).

Construction Monitoring and Reporting

The spineflower preserve manager or qualified biologist shall perform weekly construction monitoring for all construction activities within 500 feet of spineflower preserve areas. The spineflower preserve manager or qualified biologist's construction monitoring tasks shall include reviewing and approving protective fencing, dust control measures, and erosion control devices before construction work begins; conducting a contractor education session at the pre-construction meeting; reviewing the site weekly (minimum) during construction to ensure that the fencing, dust control and BMP measures are in place and functioning correctly, and that work is not directly or indirectly impacting spineflower plants; and quarterly monitoring shall be initiated for Argentine ants along the construction–open space interface at sentinel locations where invasions could occur (e.g., where moist microhabitats that attract Argentine ants may be created). A qualified biologist shall determine the monitoring locations. Ant pitfall traps will be placed in these sentinel locations and operated on a quarterly basis to detect invasion by Argentine ants. If Argentine ants are detected during monitoring, direct control measures will be implemented immediately to help prevent the invasion from worsening. These direct controls may include but are not limited to nest/mound insecticide treatment, or available natural control methods being developed. A general reconnaissance of the infested area would also be conducted to identify and correct the possible source of the invasion, such as uncontrolled urban runoff, leaking pipes, or collected water. Each site visit shall be followed up with a summary monitoring report sent electronically to Newhall Land indicating the status of the site. Monthly monitoring reports, as needed, shall be submitted to CDFG and the County of Los Angeles (in accordance with Mitigation Measure BIO-33). Monitoring reports shall include remedial recommendations when necessary. A sample monthly monitoring report is included as *Appendix B*.

9.2 General Management Measures for Preserve Areas

9.2.1 Easements

To ensure long-term protection, the proposed spineflower preserve areas shall be offered to CDFG as a permanent conservation easement, within 1 year after issuance of the requested spineflower section 2081(b) Incidental Take Permit. The conservation easement shall be to the CDFG and contain appropriate funding and restrictions to help ensure that the spineflower preserve lands are protected in perpetuity (see Mitigation Measure BIO-23).

9.2.2 Management Entities

The spineflower preserves shall be managed by Newhall Land and their preserve manager and/or natural lands management organization(s) (NLMO). Newhall Land shall submit a statement of qualifications for their proposed preserve manager(s)/NLMO(s) for approval by CDFG (see Mitigation Measure BIO-24).

9.2.3 Land Uses and Design Adjacent to Preserves

Plant palettes proposed for use on landscaped slopes, street medians, park sites, and other public landscaped and fuel modification zone areas within 200 feet shall be reviewed by the spineflower preserve manager or qualified biologist to ensure that the proposed landscape plants will not naturalize and cause maintenance or vegetation community degradation in the spineflower preserve and buffer areas. Container plants to be installed within public areas within 200 feet of the spineflower preserves shall be inspected by the spineflower preserve manager or qualified biologist for the presence of disease, weeds, and pests, including Argentine ants. Plants with pests, weeds, or diseases shall be rejected. In addition, landscape plants shall not be on the California Invasive Plant Council (Cal-IPC) California Invasive Plant Inventory (most recent version) or on the list of Invasive Ornamental Plants listed in *Appendix C* of this Plan. The current Cal-IPC list can be obtained from the Cal-IPC web site (http://www.cal-ipc.org/ip/inventory/index.php) (see Mitigation Measure BIO-34).[2] See *Appendix D* for a discussion of Argentine ants, associated threats, preserve design, and mitigation and management measures.

Where manufactured slopes are necessary adjacent to preserves, native vegetation will be utilized wherever possible to stabilize these slopes, consistent with the requirements of fuel

[2] At the time of this Plan's publication, the most recent information is contained in "New Weeds Added to Cal-IPC Inventory" (Cal-IPC 2007), an update to the *California Invasive Plant Inventory* (Cal-IPC 2006), which is an updated version of *Exotic Pest Plants of Greatest Ecological Concern in California* (CalEPPC 1999).

modification zones. One example might be where a raised roadway provides adequate fire protection and access to fire equipment. In this case, the manufactured slope on the preserve side of the roadway should be planted with native vegetation.

9.2.4 Access

In order to help ensure the preservation of the spineflower, as well as the other native plant communities and wildlife, all portions of the spineflower preserves shall be closed, with the exception of pre-identified existing dirt roads and utility easements. The pre-identified existing dirt roads and utility easement access roads shall function as access for the spineflower preserve manager, spineflower preserve maintenance personnel, utility personnel, and emergency services vehicles (e.g., police, fire, and medical). The dirt roads shall be gated and locked at the outside edges of the buffer zone. Signs discouraging unauthorized access shall be posted. The only persons or entities issued gate keys shall be the spineflower preserve manager and their employees, easement holding utility companies, emergency services, Newhall Land or its designee, and CDFG (see Mitigation Measure BIO-35).

9.2.5 Fencing

Fencing shall be installed along the outside edge of the spineflower preserve and buffer areas adjacent to proposed developments, parks, golf courses, or other "active land uses" to prevent unauthorized access to the preserve areas. Specific areas that are adequately protected by steep terrain (1.5:1 or steeper) and/or dense vegetation may not require fencing but would require signage. The determination of the need for fencing in these areas will be subject to the approval of the County or qualified biologist. If monitoring determines that slope and/or vegetation is not effective at deterring unauthorized access, the preserve manager or qualified biologist may require that additional fencing be installed. Fencing is not required in areas bordered by large parcels of dense native vegetation (subject to monitoring by the parcel manager and/or CDFG), conserved natural open space areas, or the Santa Clara River riparian corridor, as installing fencing in these areas would be unnecessary and damaging to existing vegetation and wildlife corridors.

Fencing must extend a minimum of 4 feet above grade and include wood-doweled split rail fencing, exterior-grade heavy-duty vinyl three-railed fencing, three-strand non-barbed wire (subject to limitations and electrical grounding requirements near power lines), or similar. Fencing, installed adjacent to native habitat and natural open space areas, will allow for the passage of animals (see Mitigation Measure BIO-36).

The fencing shall be maintained in perpetuity by the preserve manager through funding provided by the Applicant or its designee, as further described in *Section 12.0*, Funding.

9.2.6 Signage

Outdoor, all-weather signs measuring approximately 12 by 16 inches shall be posted on all spineflower preserve access gates and along spineflower preserve fencing at approximately 800 feet on center, except adjacent to road crossings, where signs will be posted. The placement will take topography into account, emphasizing placement on ridgelines where they will be visible to emergency fire personnel and others. Signs shall state in English and Spanish that the area is a biological preserve that hosts a state-listed endangered and federal candidate plant species and that trespassing is prohibited (in accordance with Newhall Ranch Specific Plan EIR Mitigation Measure SP-4.6-68). Signs shall indicate that fuel modification and management work is not allowed within the spineflower preserve (including buffer areas). The signage shall state that people not abiding by these rules or who damage the protected species will be subject to prosecution, including fines and/or imprisonment. All signage shall include emergency contact information and shall be reviewed and approved by the spineflower preserve manager or qualified biologist (see Mitigation Measure BIO-37).

9.2.7 Water Control

Project-specific design measures will be implemented in order to minimize changes in surface water flows to the spineflower preserve areas. Roadways will be constructed with slopes that convey water flows within the roadway easements and away from spineflower preserve areas. French drains will be installed along the edge of any roadways and fill slopes that drain toward the preserve areas. Where manufactured slopes drain toward the preserve(s) and in other fuel modification zones adjacent to preserves, a temporary drip irrigation system would be installed to the satisfaction of the County in order to establish the vegetation in these area(s). This system shall continue only until the slope vegetation is established and self-sustaining. A smart irrigation system will be employed so that irrigation rates are tied to rainfall, humidity, and soil moisture. This will limit the amount of water distributed in the drip irrigation system.

Underground utilities, other than existing buried utilities (e.g., The Gas Company), will not be located within or through the preserve areas. Fencing or other structural-type barriers that will be installed to reduce intrusion of people or domestic animals into the preserve areas shall incorporate footing designs that minimize moisture collection (see Newhall Ranch Specific Plan EIR Mitigation Measure SP-4.6-73). Access roads for utilities located within preserve areas shall be maintained, and road runoff shall be directed away from spineflower areas or otherwise managed to prevent erosion of occupied spineflower areas.

Storm Drains

Any surface water entering a spineflower preserve area from development areas during construction is required to pass through BMP measures, which will be described in the SWPPP. Storm drain outlets must contain hydrologic controls (e.g., adequate energy dissipaters) to prevent downstream erosion and stream channel down-cutting. Additionally, storm drain outlets must be designed based on pre- and post-construction hydrologic studies (in accordance with Newhall Ranch Specific Plan EIR Mitigation Measure SP-4.6-69). Storm drains and permanent structural BMPs shall be designed by a licensed civil engineer. Required BMPs, where applicable, shall be incorporated into the facility design and shall be subject to approval by the spineflower manager or qualified biologist. Long-term maintenance of storm drain BMPs will be the responsibility of the designated maintenance entity.

- Storm drains must not impact spineflower either directly or indirectly.
- Under no circumstances shall storm drains daylight onto steeply sloped areas or other areas that would cause erosion (see Mitigation Measures BIO-38 and BIO-39).

9.2.8 Fuel Modification

Limited fuel modification activities within the spineflower preserves would be restricted to selective thinning with hand tools, to allow the maximum preservation of spineflower populations, and to the extent necessary to protect utility structures within or adjacent to preserve areas. No other fuel modification or clearance activities shall be allowed in the spineflower preserve areas. All fuel modification zones associated with the adjacent development shall be located outside of proposed spineflower preserves. Controlled burning may be allowed in the future within the Newhall Ranch preserve areas and buffers, provided that it is based upon a burn plan approved by the County Fire Department and CDFG. Annual maintenance of adjacent fuel modification zones, such as the removal of undesirable non-native plants and other activities that ensure the long-term survival of spineflower, will be the responsibility of the preserve manager. The homeowners' association (HOA) or utility company, as applicable, will be responsible for any fuel modification that occurs in designated fuel modification zones outside the spineflower preserves (see Newhall Ranch Specific Plan EIR Mitigation Measure SP-4.6-72).

9.2.9 Argentine Ants

Argentine ants are a high priority for management within and adjacent to the preserves, as invasions by Argentine ants have the potential to impact the demographic performance of spineflower populations. Argentine ants are likely to displace native ants and other arthropod species that may provide important ecological functions for spineflower, including pollination and seed dispersal, as well as for other native plant species (Holway et al. 2002). Argentine ants are not currently known to occur within the proposed preserve areas (Jones et al. 2004), but are known to occur at Middle Canyon Spring at the mouth of Middle Canyon. Argentine ants, which are attracted to moist habitats, frequently invade disturbed areas and, sometimes, undisturbed areas adjacent to urban developments, and it is assumed that they will occur within development areas and Open Areas adjacent to the preserves in the future.

Invasion of native areas by Argentine ants has been shown to reduce or displace native ants and other arthropods, which could function as pollinators and seed dispersers. The extent to which this may directly impact the spineflower has not been studied directly and remains uncertain, but the impact is assumed to be adverse. Studies by Jones et al. (2004) found reduced seed set in spineflower where pollinators were excluded (i.e., through self-pollination), suggesting that open, uninhibited pollination results in the production of considerably more seed. Further discussion on Argentine ants and their potential biological effects is provided in *Appendix D*.

The goal of management is to preclude the invasion of Argentine ants into the preserves and their associated buffers. Per Mitigation Measure BIO-34, container plants to be installed within public areas within 200 feet of the spineflower preserves shall be inspected by the spineflower preserve manager or qualified biologist for the presence of disease, weeds, and pests, including Argentine ants. Plants with pests, weeds, or diseases shall be rejected. Controls will be implemented using an Integrated Pest Management (IPM) approach and will likely require a combination of methods, include cultural (e.g., planting pest-free stock plants), mechanical (e.g., weeding, trapping), and biological controls (e.g., natural predators or competitors of pest species, insect growth regulators, natural pheromones, or biopesticides), and the judicious use of chemical controls, as appropriate (e.g., targeted spraying versus broadcast applications). The IPM will establish management thresholds (i.e., not all incidences of a pest require management); prescribe monitoring to determine when management thresholds have been exceeded; and identify the most appropriate and efficient control method that avoids and minimizes risks to natural resources. Preparation of the CC&Rs for each tract map shall include language that prohibits the use of anticoagulant rodenticides in the Project site. (see Mitigation Measure BIO-64). The primary management strategy focuses on prevention by maintaining an inhospitable habitat condition in the buffer between the development edge and the preserve. Argentine ants are sensitive to moisture gradients and are more likely to invade mesic areas and avoid xeric areas. Menke and Holway (2006) noted that the abundance of Argentine ants changes dramatically across soil moisture gradients. They suggest that interception and diversion of urban runoff from naturally xeric areas could restrict invasions by Argentine ants and that "even small reductions in urban runoff may act to limit *L. humile* in areas that are otherwise too dry" (Menke and Holway 2006, p. 374). Thus, a "dry zone" between urban and natural habitats, where there is naturally little moisture, may act as a barrier for the ants and inhibit them from invading the natural areas.

The following project design features and management measures will be implemented to prevent the invasion of Argentine ants in the preserves:

1. Providing "dry zones" between urban development and spineflower populations, where typical soil moistures are maintained at levels below about 10% soil saturation, which will deter the establishment of nesting colonies of ants; and providing dry zone buffers of sufficient width to reduce the potential for Argentine ant activity within core habitat areas.
2. Where feasible, and/or appropriate, dry areas such as parking lots and roadways shall be built next to preserve boundaries. These will be designed to slope away from the preserve to avoid runoff entering the preserve.
3. Pedestrian pathways placed next to preserves shall consist of decomposed granite or other gravel to minimize the holding of moisture, thereby preventing establishment of suitable habitat for Argentine ant colonies.
4. Ensuring that landscape container plants installed within 200 feet of preserves are ant-free prior to installation, to reduce the chance of colonies establishing in areas close to the preserves.
5. Maintaining natural hydrologic conditions in the preserves through the project design features for roadways, French drains, irrigation systems, underground utilities, drainage pipes and fencing, storm drains, and any other BMP measures that apply to surface water entering the preserve areas
6. Using drought-resistant plants in fuel modification zones and minimizing irrigation to the extent feasible (see Mitigation Measure BIO-85).

Although the project design features described above will help control Argentine ant invasion into the spineflower preserves, there is still a potential for invasions to occur where typical soil moisture increases above about 10% saturation. Invasions by Argentine ants, if they occur, are reversible under appropriate conditions. Menke and Holway (2006) demonstrated that Argentine ant abundance systematically declined in experimentally irrigated areas over a few months once the irrigation was terminated. If soil moisture can be restored to 10% saturation or less, Argentine ant abundances will decrease. In areas where Argentine ant invasions have occurred, soil moisture will be required to be reduced to 10% saturation or less.

The threat of Argentine ants and the associated control measures are discussed in more detail in *Appendix D*. Monitoring will be implemented to evaluate the effectiveness of the proposed project design features and management activities. Monitoring activities related to management of Argentine ants is described in *Section 11.5*.

9.2.10 Restoration Activities within Preserve Areas

Disturbed portions (i.e., agricultural lands, disturbed lands, and developed lands) of the preserves, including buffers, will be restored through revegetation with native plant communities. In summary, areas that have greater than 30% relative cover by weeds will be restored to have relative cover comparable to that of existing occupied spineflower habitat. Habitat restoration and enhancement plans (including restoration plans) for areas within the preserves shall be prepared at the direction of the preserve manager by a qualified biologist and submitted to the County and CDFG for approval prior to implementation. In addition, Cal-IPC List A and B plants that are present within the preserve will be controlled. Restoration and enhancement efforts within the preserve areas shall be informed by the results of the Spineflower Habitat Characterization Study to be conducted (see *Section 10.5.4*, Spineflower Habitat Characterization Study) (see Mitigation Measure BIO-25). In addition, where suitable as an alternative to fuel modification, clear zones around utility structures may be revegetated with low-growing ground cover native plant communities. Spineflower shall not be negatively impacted directly or indirectly by restoration or enhancement. Therefore, proposed restoration and enhancement projects shall be reviewed by CDFG and will not be implemented without CDFG approval.

Restoration and enhancement projects shall utilize only locally indigenous plants appropriate to the habitat being restored or enhanced. Plants and seed shall be from the local region and from similar elevations; that is, no more than 20 miles from the site and no more than 300 feet elevational difference. Seed shall be tested prior to delivery to ensure it is free of problematic weeds, pests, and disease. Restoration efforts will focus on the use of seed and only include container plants when seed is not available or able to be collected in a reasonable amount of time or if germination of a particular species from seed is documented as difficult and/or typically requires specific conditions, such as fire, scarification, or acidification.

Habitat restoration sites may be temporarily irrigated to establish native plants and seed. If irrigation is utilized, it shall not alter pre-existing hydrologic conditions within the preserve areas and shall utilize drip irrigation to eliminate runoff. In addition, the system shall be used to establish plants and be scheduled to acclimate them to natural rainfall cycles. Temporary irrigation systems, which will be subject to pre-approval by the CDFG, shall be removed after a maximum of 5 years. Temporary erosion-control devices may be used during restoration and enhancement work to prevent rills and gullies from forming and associated sedimentation and/or stream turbidity. Erosion-control devices may include native, locally indigenous hydroseed mix, fabric silt fences, biodegradable burlap sand bags, or other pre-approved devices. Hay and straw bales, wattles, and other devices that often host weed seeds shall be avoided. Erosion-control devices shall be removed once the site is adequately vegetated.

Habitat restoration and enhancement plans (including restoration plans) for areas within the preserves shall be prepared at the direction of the preserve manager by a qualified biologist and submitted to the County and CDFG for approval prior to implementation. Restoration and enhancement plans shall include the following information at a minimum:

1. Maps showing the exact location and acreage of the site
2. A description of the restoration project and proposed methodology
3. Project proponent
4. Name of biologist that prepared the plan
5. Map and description of the existing habitat, adjacent habitat, and proposed habitat
6. List of proposed plant and seed species
7. Plant origins
8. Container sizes
9. Species composition
10. Weed control
11. Fertilizers/nutrient immobilization
12. Installation schedule
13. Proposed monitoring and maintenance schedule and activities
14. Performance standards.

Seeds shall meet the requirements indicated herein and container plants shall be inspected by the preserve manager for weeds, disease, and the presence of pests, including Argentine ants, prior to delivery to the site and during delivery. Plants with pests, weeds, or diseases shall be rejected and immediately removed from the site. Mycorrhizal inoculation shall be used in areas where the soil is damaged.

Performance Standards for Restoration Areas

- Percent cover by native species shall meet the following absolute cover criteria following restoration work:
  - Up to 30% herbaceous (less than 1 meter in height) cover and up to 50% bare ground by the end of year 1
  - Up to 30% herbaceous, 10% shrub (greater than or equal to 1 meter in height) cover, and up to 40% bare ground by the end of year 2
  - Up to 30% herbaceous, 20% shrub cover, and up to 30% bare ground by the end of year 3
  - Up to 30% herbaceous, 30% shrub cover, and up to 20% bare ground by the end of year 4
  - Up to 30% herbaceous, 40% shrub cover, and up to 10% bare ground by the end of year 5.
- Non-native annual grass cover shall be kept below 10% cover.
- Non-native vegetation (excluding annual grasses) must be kept below 10% cover.
- Thatch shall be kept below 10% cover.
- Each preserve shall be free of plant species on Cal-IPC List A and B, non-native plants listed by the U.S. Department of Agriculture (USDA) as noxious weeds, and any other highly invasive species that pose a direct threat to spineflower, as indicated by the preserve manager.
- See *Appendix E*, Spineflower Conservation Plan Adaptive Management Program Module, which discussed threats to spineflower, including non-native plant species, and describes experimental studies, which will be designed to examine the effects of various treatments intended to reduce the abundance and competitive effects of non-native plants on spineflower. Experimental studies will evaluate available non-native plant management techniques that are appropriate for use within portions of the preserves occupied by spineflower. Such experiments will involve establishing replicated plots in which various treatments are tested, including, for example: soil disturbance, weed whipping or mowing, raking (i.e., to remove accumulated thatch, if identified as a potential impediment), small-scale burning under controlled conditions, direct hand weeding, and carefully timed selective herbicide application. Management techniques and metrics will differ depending on the existing conditions of specific areas within the preserves. Management in areas dominated by non-native plant species will be intended to convert these areas back to native

vegetation types; in areas with existing native vegetation, management will be intended to retain native character and reduce or prevent invasion by non-native plants. These should be based on available outside research examining effective control techniques (e.g., the use of Fusilade to control annual grasses; see work by Allen (2006)) and will be tested and refined through on-site experimental trials designed to evaluate their effectiveness and effects on spineflower in this system. Those techniques that are proven to be successful would be implemented across a larger scale to achieve broader goals and objectives.

9.2.11 Management Response to Wildfire/Geologic Events

Emergency Fire Response Plan

An emergency fire response plan will be prepared (in accordance with Newhall Ranch Specific Plan EIR Mitigation Measure SP-4.6-72) prior to the establishment of the spineflower preserves and approved by CDFG and Los Angeles County Fire Department. The preserve manager will contact the LACFD at least once every 5 years to review the plan and consult with them on implementation of the plan.

Post-Fire/Landslide Damage Assessment

In the event that a preserve or a portion of a preserve burns in a wildfire or sustains mass movements (e.g., landslides, slope sloughing, or other geologic events), the preserve manager and Newhall Land shall promptly review the site and determine what action, if any, should be taken. The primary anticipated post-fire preserve management activity involves monitoring the site and controlling annual weeds that may invade burned areas following a fire event, especially when such weeds that were not previously present or not present in similar densities present an imminent threat to the survival of spineflower populations. If fire-control lines or other forms of bulldozer damage occur in the preserves, these areas would be repaired and revegetated to pre-burn conditions (see Mitigation Measure BIO-26).

Restoration of Burned or Landslide Areas

Management responses to wildfire and/or geologic events will be informed by the results of adaptive management activities related to non-native plants, fire suppression, fire exclusion, and the disruption of natural soil-disturbance regime. In general, however, a burned site will be left to recover naturally from wildfire or geologic events. The California sagebrush scrub habitat types within the preserve are well adapted to recover from wildfires, unless the fire frequency is artificially increased (Holland 1986). Rundel (2007) reports that there are differential resprouting rates that have been observed, with light fires allowing for more resprouting and heavier fires resulting in more limited resprouting. Post-fire recovery may also depend on seed dispersal from outside the burn areas, from wind-dispersed sage scrub species (Rundel 2007). Given the fire protection in the surrounding areas, it is anticipated that any fires in the preserves would be lighter rather than heavier. Therefore, it is not anticipated that burned areas would be seeded or sprayed with soil stabilizer, straw, or hay. The latter two items are usually contaminated with various problematic weed seeds and often include noxious weed seed. It should be noted that several species of weeds not considered to be noxious by the USDA may be considered noxious weeds in natural preserve areas and, if introduced, would be very expensive to control/eradicate. Following a fire or landslide, the preserve manager will assess habitat damage and the likelihood of natural recovery. As needed, the preserve manager may implement reseeding, erosion control, or other measures.

Erosion (including ash distribution) is an expected and naturally occurring event following a wildfire and is part of the ecological cycle. Therefore, erosion-control devices, including seeding, straw wattles, and soil tackifiers, should be avoided following a fire event for the aforementioned reasons. An exception to this would be fires that occur at a higher-than-average frequency, which may artificially accelerate erosion processes. This situation is to be evaluated by the preserve manager. Imminent and unavoidable threats to human health, safety, and welfare represent another exception to this passive management approach in post-fire conditions. Whenever possible, erosion control upstream and downstream from preserve boundaries would be given priority, and physical erosion control barriers would be utilized outside the boundaries of the preserve areas wherever feasible. Fire frequencies have a tendency to increase at the urban–wildland interface. If the preserves are subject to a greater-than-natural fire frequency, the guidelines outlined herein shall be followed to help ensure that the preserves recover to a natural state.

When deemed necessary for the aforementioned reason (i.e., fires that occur at a higher-than-average frequency that may artificially accelerate erosion processes) the preferred erosion-control devices to be used include fabric silt fencing, gravel or sand bags (made of biodegradable burlap), straw wattles certified as weed free (not just free of "USDA noxious weeds" but free of all weeds), and judicious seeding with locally indigenous native species free of weed seed. The preserve manager or qualified biologist shall identify the appropriate seed mix, seed source, and application rates and submit this information to CDFG prior to implementation. Seed shall be tested by a certified laboratory, and all weed seeds identified by species. The quantity of weed seed shall be indicated in units of quantity of weed seed per pound of native seed and sorted by size and weight to eliminate weed seeds determined to be noxious or problematic by the preserve manager. Items that often include problematic noxious or invasive weed seeds should be avoided. These include hay and straw bales; non-certified wattles; and non-native, non-locally indigenous seed species.

The same passive successional regeneration holds true for mass-movement, landslide, or slope-sloughing types of events. Some plant species, quite possibly including spineflower, have evolved and/or adapted to recruit into these types of geologically disturbed areas.

9.3 Specific Management Activities for Each Preserve

The specific management activities discussed in this section are designed to help achieve the goals and objectives identified in *Section 3.0. Table 19* summarizes the proposed specific management activities for each preserve area and lists the specific biological goals and objectives being addressed through management.

Table 19
Specific Management Activities and Related Biological Goals and Objectives

Management Activity	Preserves	Objectives
Converting existing disturbed areas (e.g., agricultural areas) to California sagebrush scrub	Airport Mesa Grapevine Mesa Potrero	Population: 1.1, 1.3 Community: 2.1, 2.2, 2.3 Ecosystem: 3.1
Reducing or preventing an increase in cover of non-native plants within existing native vegetation communities	Airport Mesa San Martinez Grande Entrada	Population: 1.1, 1.2, 1.3 Community: 2.1, 2.2, 2.3 Ecosystem: 3.1, 3.2
Management of non-native annual grass cover and thatch buildup	Airport Mesa San Martinez Grande Potrero	Population: 1.1, 1.2, 1.3, 1.5 Community: 2.1, 2.2, 2.3
Precluding invasion of Argentine ants from preserve and preserve buffers	Airport Mesa Grapevine Mesa San Martinez Grande Potrero Entrada	Population: 1.3 Community: 2.3
Maintaining or enhancing conditions for pollination, seed dispersal, and migration	Airport Mesa	Population: 1.3 Community: 2.2, 2.3 Ecosystem: 3.1
Preparing an Emergency Fire Response Plan	Airport Mesa Grapevine Mesa San Martinez Grande Potrero Entrada	Population: 1.3
Fencing, signage, access restrictions, easements, and other protections	Airport Mesa Grapevine Mesa San Martinez Grande Potrero Entrada	Population: 1.3
Management and monitoring of the irrigation system	Airport Mesa	Population: 1.3

Table 19 (Continued)

Management Activity	Preserves	Objectives
		Community: 2.1, 2.2, 2.3 Ecosystem: 3.2
Installing storm drain outlets to retain existing hydrologic conditions and vegetation	Grapevine Mesa San Martinez Grande Entrada	Population: 1.3 Ecosystem: 3.2
Installing culvert to retain existing hydrologic conditions	Airport Mesa	Population: 1.3 Ecosystem: 3.2

9.3.1 Management of Airport Mesa Preserve Area

The specific management strategy for the Airport Mesa Preserve Area focuses on repair and restoration of previously disturbed areas within the preserve, management of non-native plants, and, in particular, management of non-native annual grass cover and thatch buildup. Much of the preserve supports habitats with considerable annual grass cover. If thatch levels build up over time and/or annual grass density and cover exceed the spineflower's tolerances, which have yet to be clearly defined, this could pose a threat to spineflower occurrence. The Spineflower Habitat Characterization Study (see *Section 10.5.4*) is intended to quantify the habitat requirements of the spineflower and, among other things, will provide pertinent information about the tolerance of spineflower with respect to cover of annual grasses and thatch. Low levels of shrub cover on previously grubbed and/or terraced slopes and farm fields also may adversely affect pollinator habitat requirements. Therefore, management will also include enhancement in these areas by planting appropriate native species and restoring damaged soils. Proximity to adjacent development also is a threat to the preserve and will create management challenges. To help reduce threats from the adjacent development, fencing, signage, access restrictions, easements, and other protections shall be implemented as outlined in *Sections 9.2.1* through *9.2.10*.

To the west of the preserve, relatively small manufactured slopes and a fuel modification zone will lead up to Street GG, a mixed-use/commercial development area and water quality control basin. Immediately west of Street GG and the development area (off site), there is a large contiguous open space that leads to the Santa Clara River corridor. There is a culvert proposed to run below Street GG that will allow drainage from the preserve to continue west, which will help convey runoff and retain the existing hydrologic conditions within and downstream of the preserve. The culvert under Street GG will be sized to accommodate project storm flows.

The southern, eastern, and northern boundaries of the preserve will be bordered by fuel modification zones leading down from development areas, as shown in *Figure 19*. Some habitat upslope from the preserved spineflower populations will therefore be removed and modified by development. In addition to the management measures described above, the fuel modification zones will be planted with native and non-native, non-invasive, drought-tolerant plant species that do not naturalize, as indicated in *Section 9.2.3*. These plants require only limited water, which, when combined with the brow ditches and swales, and the careful managing and monitoring of the irrigation system and program scheduling, will prevent irrigation runoff from entering into the preserves.

All plants and seeding proposed for use on manufactured slopes and other landscaped areas and fuel modification zones adjacent to the preserve areas are required to be in conformance with *Section 9.2.3*.

Non-native plants in the preserve will be managed in accordance with a Preserve System Non-Native Management Plan to be developed as part of the adaptive management program described in *Section 10.0*.

9.3.2 Management of Grapevine Mesa Preserve Area

The specific management strategy for the Grapevine Mesa Preserve Area focuses on restoring the previously cultivated farm field on the mesa top, while managing weeds and annual grasses within the adjacent natural habitat areas. Some habitat upslope from the preserved spineflower populations will therefore be removed and modified by development. This may threaten the downslope habitats by altering runoff, sheet flow, and sedimentation. Fencing, signage, access restrictions, easements, and other preserve protections will be implemented as outlined in *Sections 9.2.1* through *9.2.10* to address impacts associated with development of the surrounding western, eastern, and southern boundaries, as shown in *Figure 20*.

The northern boundary is adjacent to the Santa Clara River and associated dense riparian vegetation that protects this area and precludes the need for fencing and signage at this location.

The eastern boundary will be adjacent to a development area and associated fuel modification zone. To the southwest of the preserve, an open space band will separate the preserve from a proposed development area and associated fuel modification zone. The area located south and west of the preserve contains sizeable portions of the preserve's existing watershed area and, therefore, storm drain outlets will be needed to daylight in the preserve canyon bottom area in order to sustain the current hydrology and vegetation in that location. This will be assessed by the civil engineers and qualified biologist/preserve manager as the development plans become more definitive and will require approval by CDFG through the permitting processes. Any proposed storm drains to be daylighted in the preserve shall be designed in conformance with

Section 9.2.7. Beyond the northwestern boundaries of the preserve, slopes will lead down to open space area.

The existing dirt road located within the preserve will function as a preserve maintenance access road; public access will be prohibited. Signage and fencing will be installed along the dirt road, as indicated in *Section 9.2.6.*

Agricultural areas within the preserve will be restored to California sagebrush scrub, and restoration plans will address suppression of the weed seed bank, repair of soil micro-organisms, sequestering of nutrients, and other methods to achieve the restoration goals.

Non-native plants in the preserve will be managed in accordance with a Preserve System Non-Native Management Plan to be developed as part of the adaptive management program described in *Section 10.0.*

9.3.3 Management of San Martinez Grande Preserve Area

The specific management strategy for the San Martinez Grande Preserve Area focuses on management of annual grass cover, density and thatch, and weed management. Extensive areas dominated by annual grasses may be a threat if thatch levels buildup, and bare areas are reduced in extent. The adjacent development area is a significant threat with respect to edge effects and successfully managing and protecting the preserve. Most of the preserve perimeter will be downslope of development (*Figure 21*). Fencing, signage, access restrictions, easements, and other preserve protections will be implemented as outlined in *Sections 9.2.1* through *9.2.10.*

This preserve is surrounded by estate and low-density development and fuel modification zones. The area located north, south, and west of the preserve contains sizeable portions of the preserve's existing watershed area, and, therefore, storm drain outlets will be needed to daylight in the preserve canyon bottom area in order to sustain the current hydrology and vegetation in that location. This will be assessed by the civil engineers and qualified biologist/preserve manager as the development plans become more definitive and will require approval by CDFG through the permitting processes. Any proposed storm drains to be daylighted in the preserve shall be designed in conformance with *Section 9.2.7.*

Non-native plants in the preserve will be managed in accordance with a Preserve System Non-Native Management Plan to be developed as part of the adaptive management program described in *Section 10.0.*

The preserve will be closed to the public. The preserve will be maintained and monitored as outlined in *Section 11.0.*

9.3.4 Management of Potrero Preserve Area

The specific management strategy for the Potrero Preserve Area focuses on restoring habitat damaged by past disking; performing weed management; and managing annual grass cover, density, and thatch. Development would occur along the western and southern boundaries, as shown on *Figure 22*. Preserve boundaries located adjacent to proposed development areas will have fencing, signage, access restrictions, easements, and other protections outlined in *Sections 9.2.1* through *9.2.10*.

The preserve is surrounded by open space to the east and north. The entire preserve is located at elevations above the development area, so the existing hydrologic regime within the preserve should be unchanged, and runoff from the development area will not reach the preserve.

Fencing and signage are not anticipated to be necessary along the northern and eastern preserve boundaries, due to dense vegetation and steep elevations. Fencing and signage will be installed along the western and southern boundaries, as outlined in *Sections 9.2.5* and *9.2.6*. There are no public access trails proposed within this preserve. The existing dirt road will be retained to function as a preserve maintenance access road only.

Non-native plants in the preserve will be managed in accordance with a Preserve System Non-Native Management Plan to be developed as part of the adaptive management program described in *Section 10.0*.

9.3.5 Management of Entrada Preserve Area

The specific management strategy for the Entrada Preserve Area addresses the open space area along the northern and southwestern boundaries, the proposed development area along the western boundary, the existing golf course located along the southern boundary, and Magic Mountain Parkway located along portions of the eastern boundary, as shown on *Figure 23*.

The existing and proposed development areas and Magic Mountain Parkway may result in adverse edge effects. Fencing, signage, access restrictions, easements, and other protections outlined in *Sections 9.2.1* through *9.2.10* are intended to address these adverse effects.

Fencing will extend along those portions of the preserve boundary that are adjacent to proposed and existing development and approximately 150 feet beyond the development areas to make a clear distinction between the fuel modification zone and the preserve boundary.

The proposed development area includes portions of the watershed area of the preserve. Therefore, some storm drain outlets from the proposed development area may be necessary within the preserve to maintain pre-construction hydrologic conditions in the preserve. Hydrologic conditions will be maintained in conformance with *Section 9.2.7*.

This preserve contains a utility easement that is not under the control of Newhall Land, and, as described in *Section 6.1.3* above, maintenance activities may occur within the preserve boundary pursuant to existing utility easements. These activities include, but are not necessarily limited to, (1) recovery and repair of downed lines, including air-crane operations; (2) repair/replacement of towers and poles, including air-crane operations; (3) reconstruction/maintenance of access roads; (4) maintenance of fuel modification zones around tower footings; (5) maintenance of drainage from access roads; (6) erosion control; (7) cleaning, painting, coating, and debris removal from power lines, towers, or footings; (8) repair/replacement of buried gas lines or markers; (9) installation of retaining walls and maintenance of visual observation footpaths; (10) maintenance of fencing, if present; (11) maintenance of electrical grounding systems on towers and fencing, if necessary; and (12) Emergency Response operations. A good-faith effort will be made to coordinate with the easement holder to install non-barbed wire or similar fencing with appropriate signage around any existing spineflower locations within the easement. Newhall Land cannot be responsible for spineflower within an easement held by others.

Non-native plants in the preserve will be managed in accordance with a Preserve System Non-Native Management Plan to be developed as part of the adaptive management program described in *Section 10.0*.

10.0 ADAPTIVE MANAGEMENT PROGRAM

10.1 Development of the Adaptive Management Framework

Development of an adaptive management framework to support the conservation goal of this Plan began after preliminary attempts to develop management based upon performance standards and remedial-action triggers proved to be premature. The combination of natural variability inherent with spineflower populations and the lack of more complete information regarding the taxon's biology and ecology required the adoption of a more flexible, programmatic approach.

As described in *Section 4.0*, the spineflower is an annual, spring-blooming plant exhibiting dramatic fluctuations in aboveground populations apparently tied to annual climatic variability and other poorly understood stochastic (random) environmental variables. Population levels vary from very small numbers of plants in severe drought years to millions of plants when growing conditions are more favorable. From a management and monitoring perspective, therefore, the natural variability in the observed population levels can interfere with detecting the effects of non-natural factors. In particular, population declines due to anthropogenic factors can be difficult to differentiate from the natural variability of the system. Furthermore, annual plant seed banks are difficult to study because a potentially large and significant portion of the population resides below ground in a seed bank that is otherwise difficult to directly quantify. The need to balance this natural uncertainty with the demands for developing scientifically based and timely conservation and management methods calls for a flexible adaptive management approach.

The adaptive management framework proposed in the Plan thus is designed to balance natural sources of uncertainty with the demands and finite timescale associated with the conservation planning process. The adaptive management planning team was expanded in 2007 with the addition of scientific experts Jodi McGraw, PhD, and John Willoughby to the existing team of resource agency staff, land managers, landowners, and consultants representing CDFG, the Center for Natural Lands Management (CNLM), and Newhall Land. Since that time, development of the adaptive management framework has proceeded steadily, through iterations of strategy and design, using available information.

10.2 The Concept of Adaptive Management

McEachern et al. (2006) provide a description of the concept of adaptive management. The description is provided in the context of multiple-species conservation planning, but it applies equally well to this situation, given the similar issues of uncertainty and incomplete information that are often inherent in the conservation planning process (McEachern et al. 2006, p. 18).

> [Adaptive management] is an iterative process of strategy, design, implementation, monitoring, evaluation and adjusting management to maximize conservation success. It evaluates decisions or actions through carefully designed monitoring and proposed subsequent modification to management, threat abatement and monitoring. The modifications are in turn tested with an appropriate, perhaps redesigned, monitoring protocol. At each turn of the cycle, active learning through monitoring and evaluation reduces management uncertainty. Adaptive management is logical, can deal with uncertainty and data gaps, and is similar to the scientific process of hypothesis testing.

10.3 Components of the Adaptive Management Framework

Using the McEachern et al. (2006) description as a foundation, the proposed adaptive management framework includes the following key elements:

- Biological goals and objectives (*Section 3.0*)
- Description of the programmatic approach (*Section 10.4*)

- Identification and evaluation of threats (*Section 10.4* and *Appendix E*)
- Reporting and plan adjustments (*Section 10.5*)
- Monitoring protocols (*Section 11.0*).

These key elements form the basis of the proposed adaptive management program and thus provide the framework that will be augmented and modified as the adaptive management program progresses.

10.4 Programmatic Approach

The proposed adaptive management framework is being developed partly as a stressor-based plan that focuses on managing anthropogenic threats and partly as a series of study designs to inform and improve future management. Monitoring will be tied directly to management actions (i.e., "effectiveness" monitoring), such that management can be evaluated as having the desired effect of maintaining or enhancing spineflower populations. Management actions are categorized as near-, intermediate-, and long-term (i.e., 0 to 1 year, 1 to 5 years, and 5 to 20 years; time frames are set based on the timing of Annual Program Review) and are linked to (1) the characterization of threats as low, medium, or high priorities for management and (2) how studies can be linked to the potential for future positive enhancement activities. For example, near-term actions would address high-priority threats, such as existing and anticipated invasion by non-native species. Annual review, near-term adjustment, long-range planning and experimentation, and the development of annual work plans are incorporated as features of the adaptive management framework.

Adjustments to the annual work plans will rely on feedback from monitoring activities and on the newly available information (e.g., scientific research) to guide changes in management activities or overall strategy. Adjustments to management will also be made based upon the response of spineflower to experimentally designed small scale management trials. Decision-making responsibilities and ongoing development of the adaptive management process are the responsibility of an Adaptive Management Working Group comprising land managers, stakeholders, and scientific experts. The Adaptive Management Working Group is responsible for evaluating completed management actions and defining explicit objectives for future management actions.

A total of 10 threats and two studies were initially identified and evaluated during the development of the adaptive management program. Seven threats, including non-native plants, the loss of genetic diversity, fire suppression, trampling, fire exclusion, herbivory and seed predation, and the disruption of the natural soil-disturbance regime, are being carried forward as a focus of the adaptive management program, and detailed evaluations are provided in *Appendix E*. Drought, nitrogen deposition, and Argentine ants were originally considered to be addressed through adaptive management, but were eliminated for different reasons: Drought and nitrogen were eliminated from the adaptive management program because direct management is not considered feasible and since their potential effects are manifested in changes (i.e., increased cover of non-native grasses, changes in vegetation communities) that are already being addressed by adaptive management. Because Argentine ants can be effectively managed within and adjacent to the preserves through general aspects of preserve design with a limited need for active management and human mediation, it is not necessary to address Argentine ants through adaptive management. Two experimental designs were evaluated and adopted as part of the adaptive management program. These designs involve a spineflower habitat characterization study (see *Section 10.5.4*, Spineflower Habitat Characterization Study, below) and a seed sowing and germination experiment based on seeds salvaged from development areas (see *Section 10.5.3*, Spineflower Enhancement Program, below).

10.5 Management Framework

This section describes the basic organizational structure of the proposed management framework based on the model provided by McEachern et al. (2006). The basic organizational elements include an Adaptive Management Working Group and a Technical Advisory Subgroup, an Annual Program Review, and a Spineflower Information Center that provides centralized storage and facilitates a structured flow of information related to all aspects of the adaptive management program.

10.5.1 Adaptive Management Working Group and Technical Advisory Subgroup

The Adaptive Management Working Group will consist of land managers, resource agency staff, and scientific experts. The Adaptive Management Working Group is the ultimate decision-making entity that will guide the management, monitoring, and planning activities of the adaptive management program. Management actions will be implemented using annual work plans developed by the Adaptive Management Working Group. Annual work plans will be developed based on the priority level assigned to individual threats and will incorporate the corresponding recommended management actions that are to be implemented in the upcoming year based on the results of monitoring.

The Technical Advisory Subgroup will consist of a subset of the Adaptive Management Working Group, specifically responsible for addressing technical scientific issues associated with management, monitoring designs, and data analysis.

10.5.2 Annual Program Review

A fundamental element of the adaptive management program is a repeating process of periodic review, short-term adjustment, and long-range planning. The goal of Annual Program Review is to evaluate the success of completed management actions to date, to develop new management actions and objectives as necessary, and to prepare annual work plans for the implementation of management actions in the upcoming year. Annual Program Review will be conducted by the Adaptive Management Working Group in September or October of each year, once spineflower is dehiscent, but before the onset of germination associated with seasonal fall and winter rains, which typically begin in October. The timing of Annual Program Review also must provide sufficient time to compile and analyze the monitoring data from the current year's activities, to incorporate that data into decision making, and to prepare the annual work plan for the upcoming year. As proposed by McEachern et al. (2006), Annual Program Review may include peer presentations and external review but will ultimately evaluate monitoring data to determine the success of management actions that have been implemented.

Annual Program Review will allow short-term adjustments to be made to the adaptive management program based on the results of implemented management actions. Short-term adjustments may result in changes to ongoing or planned management actions. Consideration of long-range planning will be done annually but will likely involve an overall evaluation of management activities over several years (e.g., over a 5-year horizon). Long-range planning pertains more broadly to the ongoing refinement of the biological goals and objectives of the Plan.

10.5.3 Spineflower Enhancement Program

A spineflower enhancement program will be implemented at the direction of CDFG. The program will involve experimentation utilizing salvaged seed sown into new non-preserve areas. Results of those experiments will inform managers of the potential for future use of banked seeds to expand preserve populations.

10.5.3.1 Salvaged Seed Experimental Program.

Salvaged material (e.g., soils, seeds) taken from development areas will be used experimentally to attempt to establish new spineflower occurrences in open space areas, in the Salt Creek corridor and in an area north of the proposed San Martinez Grande Preserve. Sowing and monitoring these salvaged seeds should improve the overall understanding of SFVS' ecology and life history. This increased understanding may inform future SFVS management decisions within the Newhall Ranch preserve areas. The results of these experiments and their potential contribution to future conservation management are not known at this time. However, the experimental activities will improve understanding of SFVS and may provide valuable information that could be used to inform adaptive management decisions on whether banked preserve seeds could be utilized to expand preserve populations.

The direct seeding plan, which will include proposed monitoring and maintenance schedules and activities, shall be submitted to CDFG for input and approval prior to implementation.

In general, direct seeding will include identifying locations within the receiver areas with appropriate soils, geology, aspect, slope, and vegetation conditions. Once the appropriate area(s) is identified and approved by CDFG, the site shall be adequately prepared by staking the boundaries, removing weeds and debris, and applying seeds. Seeding shall be performed at the onset of the rainy season (October through early December).

Seeding will be applied using two methods. The first method will use a calibrated hand or "belly" spreader and mix the seed with clean masonry sand or inert bran fiber for better distribution. Immediately following application, the seed shall be lightly raked into the soil to a depth of 5 millimeters (maximum) using a steel rake. This method will be used for approximately 60% of the spineflower creation areas. The second method will use a seed imprinting device that has ripping teeth in front of the imprint wheel and a calibrated seed bin. This method shall be used for approximately 40% of the direct seeded area. This method mimics a natural disturbance situation and has proven to be highly effective for seeding native plants in non-irrigated situations. Imprints shall be parallel with the contours, "v" in shape, and between 3 and 4 inches deep. Imprinting teeth shall be offset to prevent channeling of water. Imprinting shall not occur on slopes steeper than 3:1. Imprinted areas shall be covered with blown straw certified as weed-free at the rate of 2,000 pounds per acre.

The rate of seeding will be dependent on the seed purity, percent germination, individual site conditions, and the quantity of seed available. Therefore, the seeding rate (to be expressed in pounds per acre) will be calculated by the project biologist and submitted to CDFG for review. Fifty percent of the seed shall be pretreated by clipping the seed coats, as previous studies (Sapphos 2001) have determined that germination rates were dramatically increased by clipping seed coats.

In areas where herbivores, including birds, are known or expected to be problematic, the seeded areas should include temporary exclusion fencing and/or bird deterrents, such as silver tape attached to posts, artificial owls, or other pre-approved devices. All spineflower direct seeding work shall be monitored and reported to CDFG.

10.5.3.2 Seed Banking from Preserves

Spineflower seed shall be collected from spineflower preserves. Seed collection shall follow the approved seed collection protocol described in the October 8, 2003, CDFG letter to Newhall Land authorizing collection of spineflower seed (CDFG 2003b). Two-thirds of the collected seed will be sent to RSABG for storage (one-third for short-term and one-third for long-term storage), and one-third will be sent to the USDA National Seed Storage Lab in Fort Collins, Colorado, for long-term storage. Approximately 5% of seed will be collected in each preserve area each year, only in years of within 20% of normal rainfall, or greater than normal, for 10 years, beginning in the year the preserves are established. Collected seed maintained at RSABG may potentially be used for seeding, as discussed in *Section 10.5.3.3*, below.

10.5.3.3 Potential Expansion of Preserve Populations through Seeding

Pending the outcome of the Salvage Seed Experimental Program, seeding of spineflower in the preserves may be performed to create additional spineflower occurrences. Direct seeding in a preserve area would only utilize seeds from that preserve area; it would not involve seeds collected from development areas or other preserves. Prior to utilizing banked seeds from any preserve, a direct seeding plan shall be developed for spineflower mitigation/creation areas that includes the following data:

1. Scaled topographic maps showing the accurate locations and acreages of the proposed seeding areas
2. A detailed description of proposed (site-specific) methodology
3. Name of biologist that prepared the plan
4. Map and description of the habitat(s) adjacent to the seeding area
5. List of plant species and densities present within the seeding area
6. The project schedule
7. Plans and specifications for site preparation, seed application, and maintenance methods developed from the salvaged seed experimental program (see Newhall Ranch Specific Plan EIR Mitigation Measure SP-4.6-78).

10.5.4 Spineflower Habitat Characterization Study

- The following are specific questions that will be addressed through a habitat characterization study to be undertaken upon issuance of a 2081(b) Incidental Take

Permit, and no later than two years after issuance, and prior to proposed development, at such time as favorable rainfall conditions occur.

- Are the distribution, abundance, and/or performance of spineflower (positively or negatively) correlated with the occurrence of:
  - One or more non-native plant species?
  - Guilds (or functional groups) of non-native plant species (e.g., annual grasses, annual forbs)?
  - Non-native plant species overall?
- What are the distribution and abundance of non-native plant species within occupied spineflower habitat?
- Are there any observable and consistent patterns in the occurrence of non-native plants and abiotic characteristics of the habitat (e.g., soil conditions) or disturbance (e.g., soil disturbances, time since fire) that might indicate the microhabitats in which non-native plants are most likely to occur in general and/or to compete with spineflower?

10.5.5 Centralized Information

Information sharing is a critical component of the adaptive management program. A Spineflower Information Center web site or File Transfer Protocol (FTP) server will be established to serve as a repository for annual work plans, monitoring data, and findings of Annual Program Reviews. Regional weather data, local weather information, and raw monitoring data will also be stored and accessible through the Spineflower Information Center. In addition, the Spineflower Information Center may also be configured to provide an Internet-based forum to facilitate discussion among Adaptive Management Working Group members outside of scheduled Annual Program Review meetings.

11.0 MONITORING ACTIVITIES

11.1 Qualifications

Monitoring shall be conducted under the direction of the preserve manager or the NLMO, as approved by the CDFG. The preserve manager, NLMO, and/or staff collecting data shall meet the qualifications described in *Section 9.0* and be familiar and experienced with the monitoring and data collection techniques outlined herein.

11.2 Spineflower Monitoring Program

The Spineflower Monitoring Program is an integral part of the adaptive management program, and will measure the success of management in achieving the biological goals and objectives pertaining to spineflower populations (Goal 1) described in *Section 3.0.* The Spineflower Monitoring Program is described briefly here, but is presented in detail as an accompanying document to the Plan included as *Appendix F.* Specifically, the Spineflower Monitoring Program includes two distinct protocols for monitoring the distribution and abundance of spineflower populations within the preserves. To monitor spineflower distribution, areal extent mapping (i.e., mapping of the extent of spineflower distribution) will be conducted to delineate all spineflower patches within the preserves. To reduce the potential for inter-annual variability in density to influence areal extent, areal extent mapping will occur approximately every 10 years, and will be conducted only during years with weather conditions appropriate for establishment and survival (i.e., years with above-average rainfall). To monitor spineflower abundance, spineflower abundance sampling will occur annually and will involve plot sampling (i.e., within quadrats) to estimate the absolute cover of spineflower within the preserves.

The goal of the Spineflower Monitoring Program is to provide objective, repeatable methods for collecting, analyzing, and interpreting ecologically meaningful information that can be used to evaluate the status of spineflower populations, the effectiveness of the conservation strategy, and the design of future management and monitoring, using the most cost-effective methods possible. The Spineflower Monitoring Program includes quantitative thresholds to detect declines in spineflower distribution (areal extent) and abundance (absolute cover). Observed declines meeting the identified thresholds would trigger implementation of appropriate remedial actions, beginning with efforts to asses the causes(s) of the observed decline. Monitoring, management, and, if necessary, the implementation of remedial actions would occur as part of the adaptive management process described above in *Section 10.0.*

11.3 Monitoring of Preserve Area Vegetation

Vegetation communities within the preserve areas will be monitored to measure the success of management toward achieving the biological goals and objectives pertaining to community-level aspects of spineflower ecology as defined by Goal 2 in *Section 3.0.* Changes in vegetation communities within the preserve areas will be monitored using a combination of remote sensing, aerial interpretation, and field mapping at approximately 10-year intervals.

Monitoring of landscape-level changes in vegetation communities will be supplemented with the implementation of the CNPS "Vegetation Rapid Assessment Protocol" (CNPS 2004). This protocol has been adopted by CDFG, USFWS, and the National Park Service to assist them in effectively and efficiently updating the location, distribution, species composition, and disturbance information of vegetation types identified in *A Manual of California Vegetation* (Sawyer and Keeler-Wolf 1995). Vegetation types are classified by general physical location, general habitat, alliance, and association. Mapping will be conducted to the association level, the most refined level within *A Manual of California Vegetation* (Sawyer and Keeler-Wolf 1995). The protocol, in summary, includes assessing stands of vegetation by field-analyzing it, photographing it from at least two vantage points, and filling out a field data form for each stand. As defined by *A Manual of California Vegetation* (Sawyer and Keeler-Wolf 1995), a stand is a basic physical unit of vegetation in the landscape that has compositional and structural integrity (homogeneity).

11.4 Quantitative Monitoring of Habitat Restoration Areas

Quantitative monitoring of habitat restoration areas will include 50-meter-long point-intercept transects, at approximately the rate of one per acre. Transect data will be collected in the spring, as the vast majority of the restoration areas will be sage scrub or native grasslands (spring is typically the time of year that yields the greatest species diversity and cover for these vegetation communities). Data will be collected using the point-intercept method at each 0.5 meter along the transect line. At every 0.5 meter, a point will be projected vertically into the vegetation. Species intercepted at each point will be recorded, providing a tally of intercepts for each species in the herb and shrub layers. A column will be included to indicate if a non-native thatch layer is present and, if so, the depth in centimeters. In addition, grass species intercepted will be recorded according to their appropriate height range (i.e., 0 to 1.0 decimeters, 1.01 to 2.00 decimeters, 2.01 to 3.00 decimeters 3.01 to 4.00 decimeters, 4.01 to 5.00 decimeters, 5.01 decimeters up to the maximum height).

Transect data will be analyzed to determine the percent vegetative cover of each species, species composition, species frequency, distribution, percent bare ground, percent and depth of non-native thatch, and average grass height along each transect. Quantitative transect data will be tabulated, graphed, analyzed, and compared to the previous year's data in each annual report.

11.5 Qualitative Monitoring of Preserve Areas

Qualitative monitoring will be performed quarterly and include an overall review of the spineflower populations and habitats within the preserve and preserve buffer. The monitoring will note physiognomic changes and potential problems, such as invasion or increase in cover by exotic species or weeds, plant pests, Argentine ants, gophers, squirrels, plant diseases, erosion, sedimentation, trash accumulation, unauthorized access, and vandalism. The monitoring will also make recommendations as necessary to help ensure that spineflower populations remain in a healthy state. Special attention shall be placed on examining preserve edges, as these locations are where new weed invasions and other problems are often first detected. Quarterly assessments will also include a review of the preserve's physical features, including the condition of protective fencing, preserve signage, access gates, locks, adjacent storm-drain outfalls, and BMPs.

Upon initiating landscaping within a development area, quarterly monitoring shall be initiated for Argentine ants along the urban–open space interface at sentinel locations where invasions could occur (e.g., where moist microhabitats that attract Argentine ants may be created). Based on a study by Suarez et al. (2001), Argentine ant populations disperse at a rate of about 15 to 270 meters per year; therefore, quarterly monitoring for Argentine ants should be adequate to detect incipient invasions. A qualified biologist shall determine the monitoring locations. Ant pitfall traps would be placed in these sentinel locations and operated on a quarterly basis to detect invasion by Argentine ants. If Argentine ants are detected during monitoring, the qualified biologist shall distinguish between foraging ants versus nesting ants and implement appropriate direct control measures immediately to help prevent the invasion from worsening. These direct controls may include but are not limited to nest/mound insecticide treatment and focused broadcast application of insecticides over large infested areas, or available natural control methods being developed. A general reconnaissance of the infested area would also be conducted to identify and correct the possible source of the invasion, such as uncontrolled urban runoff, leaking pipes, and collected water (see Mitigation Measure BIO-87).

Qualitative monitoring will include quarterly qualitative reports that are prepared by the preserve manager (based on direct observation) and submitted to Newhall Land and CDFG. The reports will summarize the monitoring site visit, identify potential problems, and prescribe appropriate remedial actions when necessary, to protect spineflower populations. Quarterly reports will be included as appendices of the annual reports.

11.5.1 Fencing and Access

Monitoring will be conducted periodically along the preserve boundaries to evaluate whether fencing, signage, and current levels of enforcement (i.e., patrols) are successful in preventing unauthorized access into the preserves. Monitors will search specifically for typical signs of unauthorized access including damaged fencing, vandalism, creation of foot trails, and litter. Monitoring the preserves for unauthorized access that could lead to trampling impacts will initially be conducted on a quarterly basis, but the frequency of monitoring may be increased depending on the proximity and type of adjacent land uses.

11.5.2 Monitoring for Argentine Ants

Monitoring will be necessary to determine the effectiveness of management strategies and techniques in controlling invasions by Argentine ants within the preserves. The following monitoring activities are proposed:

1. Quarterly monitoring along the urban–preserve edge to detect incipient Argentine ant invasions, remedying any inadvertent sources of moisture from outside the preserves that could create suitable ant habitat
2. Wet-season monitoring within core areas of the preserves to detect and remedy inadvertent introductions into naturally wet areas created within the preserves during and after winter rains
3. Quarterly monitoring within preserves to determine the presence or absence of native ant species. If native ant species are determined to be absent, further research into the cause of their disappearance will be conducted, and management measures will be developed to mitigate this effect.

11.6 Local and Regional Weather Conditions

Rain gauges and possibly other basic measurement devices for measuring temperature and soil moisture will be installed on the preserves to ensure that local environmental conditions are being accurately monitored. Because Santa Ana winds may play a role in interacting with drought conditions to reduce survival at critical times, data on wind conditions will also be tracked.

11.7 Monitoring Results

Monitoring results will be reported each year through the preparation of annual reports. Annual reports will be prepared and submitted to Newhall Land, the County, CDFG, and the Adaptive Management Working Group by December 31 each year for 10 continuous years and/or until management activities have successfully achieved the biological goals and objectives of the Plan. One comprehensive report will be submitted for all spineflower preserve areas.

Annual reports will include a summary of qualitative data, including the condition of protective fencing, signage, erosion, trash accumulation, unauthorized access, and vandalism, and will indicate the presence of ants, gophers, squirrels, or other potentially problematic species. Annual reports will include color photographs from pre-determined permanent and temporary photo-points to be established in conjunction with the proposed spineflower monitoring protocols. In addition, the reports will include at least 10 photos of each preserve from different vantage points. Photos will be analyzed and compared to the previous year's photos to help further identify qualitative changes in preserve vegetation.

Monitoring of spineflower distribution is proposed to occur approximately every 10 years, and only during years of above-average rainfall. Therefore, quantitative data from monitoring spineflower distribution (i.e., areal extent mapping) will be reported approximately every 10 years following the completion of spineflower distribution monitoring activities. Vegetation monitoring within the preserve areas is also proposed to occur once every 10 years and will be reported once every 10 years following the completion of vegetation monitoring activities. Monitoring of spineflower abundance is proposed to occur annually. Quantitative data from spineflower abundance sampling (i.e., plot sampling to estimate absolute cover) will be included in the annual reports.

Annual reports, the results of 10-year spineflower distribution and vegetation monitoring activities, the results of annual spineflower abundance sampling, and the annual results of adaptive management activities implemented during the year will be stored and made accessible through a centralized information system as described in *Section 10.5*.

12.0 FUNDING

Funding requirements will be identified in the section 2081(b) Incidental Take Permit at the time of permit issuance. Funding will be implemented in accordance with the conditions required by the section 2081(b) Incidental Take Permit. Newhall Land, or a designee, would post short-term bonds (or other CDFG-approved financial assurance mechanisms) and fund an endowment in perpetuity for the management, monitoring, and reporting measures described in *Sections 9.0, 10.0, and 11.0.* Two bonds (or other CDFG-approved financial assurance mechanisms) would be posted: one for costs during construction and one-time start-up costs, and one for initial restoration activities. An endowment will be funded for long-term management, monitoring, and reporting costs to be expended in perpetuity.

13.0 RESPONSIBLE PARTIES

Newhall Land, or a designee, would be responsible for implementing this Plan. Newhall Land, or a designee, would post bonds for the management, monitoring, and reporting measures described in *Sections 9.0, 10.0,* and *11.0.* The assigned party may include the CNLM or another assigned party responsible for overseeing the open area and River corridor portions of the Specific Plan area. Bonds shall be released by CDFG upon reaching identified milestones and/or upon receipt of verification of grants or special assessments obtained to implement this Plan.

14.0 REPORTING

This section identifies the reporting requirements associated with the five preserve areas of this Plan. It is anticipated that the five preserve areas will be established within 1 year of issuance of the section 2081(b) Incidental Take Permit (California Fish and Game Code, Section 2081) by CDFG under CESA, but that the assigned party (such as the CNLM) will accept oversight in a phased manner linked to the phased build-out of the project study area. Newhall Land, or a designee, shall install adequate signage and provide oversight to ensure that the preserves are not inadvertently damaged.

Initial reporting will be performed quarterly as described in *Section 11.5*, and annually as described in *Section 11.7* for 10 continuous years from the year of section 2081 Permit issuance. Annual reports will be prepared and submitted to Newhall Land, the County, CDFG, and the Adaptive Management Working Group by December 31 each year for 10 continuous years and/or until management activities have successfully achieved the biological goals and objectives of the Plan. In the event that annual status reports indicate that the biological goals and objectives outlined herein are not met 10 years following delineation of the spineflower preserves, the Project applicant, or its designee, shall continue to submit annual status reports to the County and CDFG for a period of no less than an additional 5 years, as required by Newhall Ranch Specific Plan EIR Mitigation Measures SP-4.6-66 and SP-4.6-77 (County of Los Angeles 2003). Newhall Land will provide CDFG with a copy of written agricultural guidelines, and Newhall Land or its successor will be responsible for monitoring of agricultural activities to ensure compliance and reporting to CDFG. One comprehensive report will be submitted for all the established spineflower preserve areas. *Section 11.7* lists the contents of the reports.

15.0 SCHEDULE

Table 20 shows an estimated schedule for implementing this Plan, including establishment of the preserve areas, management activities for existing and proposed land uses, maintenance, monitoring, and reporting. The actual schedule will be based on the date/year that all project approvals described in the Newhall Ranch RMDP-SCP EIS/EIR are adopted by CDFG and Corps. Conservation easements shall be established at the preserves within 12 months of issuance of the Incidental Take Permit and prior to any impact to spineflower populations.

Table 20
Schedule for Monitoring and Management Responses

Activity	Frequency
Management Measures for Existing Agricultural Activities (Fall 2011 until Agricultural Activities are Discontinued)	
Installation of signs (82 signs)	At the issuance of the spineflower Incidental Take Permit
Erosion control (silt fence; 10,395 linear feet)	At the issuance of the spineflower Incidental Take Permit
Management Measures during Construction (Fall 2013 through Fall 2033)	
Installation of orange snow fencing (32,685 linear feet)	Prior to starting construction
Erosion control (silt fence; 10,395 linear feet)	Prior to starting construction
Training construction personnel about the spineflower	Prior to starting construction
Construction monitoring	Prior to starting construction
General Management Measures for the Preserves (Beginning in Spring 2012 and Extending in Perpetuity)	
Restoration planting within preserves	Approximately September 2012 through 2019
Installation of signs (42 signs)	Approximately September 2012 through 2033
Airport Mesa and Grapevine Mesa Preserve Areas	At initiation of development in the Mission Village planning area, or impact to VCC population, whichever occurs first
San Martinez Grande Preserve Area	At initiation of development in the Homestead Village development area north of SR-126, or development in the Entrada planning area, whichever occurs first
Potrero Preserve Area	At initiation of development in the Potrero Village planning area
Entrada Preserve Area	At initiation of development in the Entrada planning area
Installation of split-rail fencing (17,090 linear feet)	Approximately September 2012 through 2033
Airport Mesa and Grapevine Mesa Preserve Areas	At initiation of development in the Mission Village planning area, or impact to VCC population, whichever occurs first
San Martinez Grande Preserve Area	At initiation of development in the Homestead Village development area north of SR-126, or development in the Entrada planning area, whichever occurs first
Potrero Preserve Area	At initiation of development in the Potrero Village planning area
Entrada Preserve Area	At initiation of development in the Entrada planning area
Spineflower seed collection and storage	
Airport Mesa and Grapevine Mesa Preserve Areas	At initiation of development in the Mission Village planning area, or impact to VCC population, whichever occurs first, and then annually for 10 years
San Martinez Grande Preserve Area	At initiation of development in the Homestead Village development area north of SR-126, or development in the Entrada planning area, whichever occurs first, and then annually for 10 years
Potrero Preserve Area	At initiation of development in the Potrero Village planning area, and then annually for 10 years
Entrada Preserve Area	At initiation of development in the Entrada planning area, and then annually for 10 years
Quantitative monitoring (177 acres)	Annually, beginning approximately Spring 2013
Qualitative monitoring (177 acres)	Quarterly, beginning approximately Spring 2013
Reporting (quarterly and annual)	Annually, beginning approximately Spring 2013
Maintenance activities (repairing fencing, signage, etc.; weeding; trash removal)	Quarterly, beginning approximately Spring 2013

Table 20 (Continued)

Activity	Frequency
Maintenance Measures (Beginning in Spring 2013 through and Extending in Perpetuity)	
Pest control	Annually, beginning approximately Spring 2013
Weed control	Quarterly, beginning approximately Spring 2013
Maintenance activities (repairing fencing, signage, etc.; trash removal)	Quarterly, beginning approximately Spring 2013
Adaptive Management Measures (Beginning in Spring 2013 and Extending in Perpetuity)	
Pest control	Annually, beginning approximately Winter 2013
Monitoring and removing trash	Quarterly, beginning approximately Spring 2013
Reporting	Annually, beginning approximately Winter 2013

NOTE: The timing of monitoring and management is subject to change dependent on the timing of development.

16.0 CONSERVATION AND TAKE ESTIMATES

This section quantifies and describes impacts to spineflower that are not avoided due to the development plans proposed for the project study area and documents the ways in which impacts have been avoided, minimized, and mitigated. As required by Fish and Game Code section 2081(b)(2), this section provides information that CDFG will consider when determining whether impacts of the authorized take are minimized and fully mitigated and, therefore, result in "no jeopardy" to the spineflower.

Since the spineflower was first discovered on the Newhall Land property in 2000, Newhall Land has conducted annual surveys to establish the distribution, areal extent, and numbers of spineflower. Based on the survey results, Newhall Land has revised the site development plans of the Specific Plan area and the Entrada planning area to avoid and minimize impacts to spineflower. As a result of the development redesign, direct impacts to spineflower have been reduced from almost 100% of the known populations outside the two existing conservation easements to approximately 31% of the 20.24 acres of known spineflower occurrences.

Avoidance of the spineflower and design of the preserves were based on a number of factors, including the distribution and abundance of the spineflower within the project study area, ecological indicators, and existing and proposed land uses. As described in *Section 7.0*, the preserves incorporate a cross-section of the ecological indicators associated with the overall spineflower occurrences, including vegetation, soils, geology, elevation, slope, and aspect. *Tables 7* through *13* in *Section 7.0* indicate that the various attributes of the six ecological indicators are represented in these preserves. In addition, the preserves contain areas of potentially suitable but unoccupied habitat that may accommodate fluctuations in the population numbers of the spineflower.

Four core occurrences (74% of 2002 through 2007 cumulative spineflower occurrence area within these areas) within the Specific Plan area would be preserved: San Martinez Grande Canyon, Potrero Canyon, Airport Mesa, and Grapevine Mesa. There are a number of occurrences that are not proposed for avoidance in this Plan because of their location and the difficulty associated with providing connectivity to those locations. These include occurrences adjacent to Airport Mesa, Grapevine Mesa, and Potrero Canyon.

At Entrada, approximately 49% of the 2002 through 2007 cumulative spineflower occurrence area would be conserved, although 25% of the cumulative spineflower area at Entrada occurs in or near an existing utility easement. Impacts were minimized by conserving the core area in the northeastern portion of the Entrada site.

At VCC, neither avoidance nor minimization is practicable in order to maintain the integrity of the approved development plan. The VCC project was approved for development in 1990, half of which has been built. Spineflower observed in the VCC planning area accounted for approximately 4% of all 2002 through 2007 cumulative spineflower occurrence area.

Table 21 depicts the proposed conservation and take of the 2002 through 2007 cumulative spineflower occurrence area in the project study area addressed in this Plan.

Table 21
Conservation and Take by Project Site Using Total Footprint

Project Site	SFVS Acres to be Conserved	SFVS Acres to be Taken	Total
Specific Plan area	12.86 (74%)	4.42[1] (26%)	17.28
VCC	0.00 (0%)	0.85(100%)	0.85
Entrada	1.03 (49%)	1.09 (51%)	2.10
Total	13.88 (69%)	6.36 (31%)	20.24

[1] A small portion (0.30 acre) of this area lies within what is designated as open space within the Grapevine Mesa and Potrero areas. While this area does not fall within the impact footprint, it will not be managed or monitored. For purposes of this analysis, this area is considered to be taken.

Spineflower occurrences located outside of these preserve areas would be subject to permanent impacts, and implementation of the Spineflower Conservation Plan would result in the take of approximately 6.36 acres (31%) of the 2002 through 2007 cumulative spineflower occurrence area. This direct impact would be fully mitigated, first by establishing a system of preserves to protect the core occurrences of spineflower in the project study area, and, second, by implementing management and monitoring within an adaptive management framework to maintain or enhance the protected spineflower occurrences within the five preserve areas. These activities, as described in *Sections 9.0*, *10.0*, and *11.0*, are essential to achieving a primary goal of this Plan, which is to ensure the long-term persistence of spineflower in the project study area.

Each preserve and buffer area would be placed into a permanent conservation easement to ensure long-term protection. The permanent conservation easements would contain appropriate restrictions to help ensure the property remains in a condition suitable for spineflower and its associated ecosystem components, in perpetuity. The CDFG would approve the conservation easement holder and the conservation easement language to ensure it is consistent with the CESA standards.

Long-term management and monitoring is also proposed as mitigation for direct impacts to spineflower. Management of the preserves would include restoration and enhancement of degraded and/or damaged spineflower habitats, as described in *Section 9.2.10* above; areas that have greater than 30% absolute cover by weeds (not including annual grasses) would be restored to have at least 70% absolute cover by native species. This will contribute to the achievement of Goal 2, to maintain and enhance the structure and native species composition of the native communities within the spineflower preserves, as described in *Section 3.0*. Additional management measures include restrictions to prevent unauthorized access to the preserves; limitations to activities within adjacent fuel modification zones; response strategies to wildfire events as presented in the Emergency Fire Response Plan; and regular and ongoing consultation to be maintained with the County and CDFG in connection with ongoing agricultural operations.

These management activities would serve to maintain or increase spineflower populations within the preserves, as described in Goal 1 of *Section 3.0*. As described in *Sections 11.0* through *11.7*, various forms of monitoring shall be conducted under the direction of the preserve manager or the NLMO, as approved by the CDFG. Newhall Land shall fund the spineflower preserve manager to perform environmental monitoring, oversee the proposed spineflower preserve areas, and ensure the monitoring and management activities outlined in the proposed Spineflower Conservation Plan and previously incorporated mitigation measures are carried out. The spineflower preserve manager, NLMO, and/or staff collecting data shall meet the qualifications described in *Section 9.0* and be familiar and experienced with the monitoring and data collection techniques outlined herein. The establishment of the system of spineflower preserves, along with the long-term monitoring and management measures mentioned above, would allow spineflower to persist on site in perpetuity, and would fully mitigate the take of 6.36 acres of the 2002 through 2007 cumulative spineflower occurrence area.

In addition to the direct take of 2002–2007 cumulative spineflower occupied area, secondary impacts to spineflower would occur due to implementation of the Spineflower Conservation Plan. Secondary impacts to the spineflower preserve areas and the spineflower occurrences within the preserves could occur as a result of construction activities and the subsequent development. Threats to spineflower include the introduction of non-native, invasive plant and animal species; vegetation clearing; trampling; changes in hydrology; the introduction of chemical pollutants; and increased fire frequency. These potential impacts would be fully mitigated, first by establishing a system of preserves to protect the core occurrences of spineflower in the project study area, and, second, by implementing management and monitoring within an adaptive management framework to maintain or enhance the protected spineflower occurrences within the five preserve areas. These activities, as described in *Sections 9.0, 10.0,* and *11.0*, are essential to achieving a primary goal of this Plan, which is to ensure the long-term persistence of spineflower in the project study area.

Each preserve and buffer area would be placed into a permanent conservation easement to ensure long-term protection. The permanent conservation easements would contain appropriate restrictions to help ensure the property remains in a condition suitable for spineflower and its associated ecosystem components, in perpetuity. The CDFG would approve the conservation easement holder and the conservation easement language to ensure it is consistent with the CESA standards.

Long-term management and monitoring is also proposed as mitigation for secondary impacts to spineflower. A spineflower preserve manager would perform environmental monitoring, oversee the proposed spineflower preserve areas, and ensure the monitoring and management activities outlined in the proposed Spineflower Conservation Plan and previously incorporated mitigation measures are carried out. Construction-related secondary impacts, such as vegetation clearing, trampling, and the introduction of chemical pollutants, would be addressed with the following management and monitoring measures: to reduce potential impacts due to unauthorized access, temporary fencing and signage would be required around the preserves prior to and during construction; various preserve and construction plan features including fencing requirements and installation practices, education sessions for construction workers, erosion control plans, dust control requirements, and an overall Project SWPPP are required to reduce potential impacts that may occur from the introduction of chemical pollutants, dust, and sedimentation; and weekly construction monitoring for all construction activities within 200 feet of preserve areas would be required.

Once construction is complete, secondary impacts from the resulting development could occur due to the introduction of non-native, invasive plant and animal species; trampling; increased fire frequency; the introduction of chemical pollutants; and changes in hydrology. Management and monitoring measures designed to address these potential secondary impacts include the following: management of the preserves to include the establishment of site-specific buffers aimed at neutralizing and controlling adverse edge effects from adjacent changes in land use, which would serve in reducing the impact of all of the above-mentioned threats; implementation of the Emergency Fire Response Plan to reduce impacts due to increased fire frequency; in order to minimize trampling, all portions of the preserves would be closed and permanent fencing and signage required along the subdivision tract bordering the preserves following the final stage of construction; plant palettes used on landscaped areas and fuel modification zones within 100 feet of the preserves, and all container plants to be installed within 200 feet of the preserves, would be reviewed by the preserve manager or qualified biologist for the presence of disease, weeds, and pests to minimize impacts due to the introduction of non-native, invasive plants; the invasion of Argentine ants would be minimized by maintaining an inhospitable habitat condition in the buffer between the development edge and the preserve and through quarterly monitoring along the urban–open space interface; and changes in hydrology would be addressed by minimizing changes in surface water flows to preserves, restricting the installation of storm drain outfalls from proposed development areas within preserve areas and requiring stormwater entering the preserves to pass through BMP measures outlined in the SWPPP.

These management and monitoring measures would serve to accomplish all three biological goals described in *Section 3.0*—maintain or increase spineflower populations within the preserves, maintain or enhance the structure and native species composition of the native communities within the spineflower preserves, and facilitate the natural ecological processes required to sustain the native populations and communities in the preserves—by minimizing and avoiding the potential secondary impacts that could occur due to construction activities and the subsequent development.

The establishment of the system of spineflower preserves, along with the long-term monitoring and management measures described above, would fully mitigate all direct and secondary impacts to the spineflower preserve areas and the spineflower within the preserves.

Permitting Process

Newhall Land has applied for a section 2081(b) Incidental Take Permit for spineflower within the project study area covered by this Plan. The CDFG and Corps are the lead agencies for the draft Newhall Ranch RMDP-SCP EIS/EIR for the Resource Management and Development Plan project component and associated section 404/Master section 1600 permits/agreements. The draft EIS/EIR will provide CEQA review for purposes of the section 2081 Permit for take of SFVS in the project study area. This Plan is intended to provide analysis of project and cumulative impacts to the spineflower, and it is anticipated that this Plan will be included as an appendix to the Draft EIS/EIR. In addition, this Plan will supplement Newhall Land's section 2081(b) Incidental Take Permit application for the spineflower as well as the Candidate Conservation Agreement between Newhall Land and the USFWS.

A Candidate Conservation Agreement for spineflower was submitted to the USFWS Ventura Field Office on February 2, 2005. This Plan will be attached to the Final Candidate Conservation Agreement as an appendix in order to demonstrate that threats to the spineflower will be reduced, such that spineflower need not be listed as endangered or threatened under FESA.

17.0 REFERENCES

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Appendix A

Proposed Habitat Characterization Study

PROPOSAL

CHARACTERIZE THE HABITAT OF THE SAN FERNANDO VALLEY SPINEFLOWER

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October 12, 2007

Background

As part of their development projects, Newhall Land is developing a Spineflower Conservation Plan (SCP), which will describe the preservation, adaptive management, and monitoring measures designed to fully mitigate the impacts of development on the San Fernando Valley spineflower (*Chorizanthe parryi* var. *fernandina*), a California Endangered Species. Scientists and planners who have been meeting to develop the SCP have determined that efforts to design and implement conservation measures for the San Fernando Valley spineflower (hereafter "spineflower") would benefit from an increased understanding of the abiotic and biotic characteristics of habitat occupied by the spineflower, and the factors that influence the plant's patchy occurrence, high variation in abundance, and highly variable size and thus reproduction.

This initial proposal provides an overview of a habitat characterization study designed to provide this information and then outlines the main study tasks. For each task, this proposal identifies project timelines, estimated costs, and any assumptions used to estimate the costs. A precise cost estimate will be developed based on the final study protocol to be developed in Task 1 (below). Details regarding how the habitat characterization will inform the SCP are provided in memos previously provided to the spineflower team (McGraw 2007a and McGraw 2007b).

Goals and Objectives

This project will conduct a habitat characterization for the San Fernando Valley spineflower. The goal of a habitat characterization for the spineflower would be to inform development and implementation of the SCP by increasing understanding of the factors that influence the distribution, abundance, and individual and population performance spineflower within the project area. This goal would be pursued through the following study objectives.

1. Determine the characteristics of spineflower habitat within the project area, by comparing quantitative data on the abiotic and biotic characteristics of areas with and without spineflower.
2. Identify microhabitat characteristics that influence the distribution, abundance, and performance of spineflowers, by comparing the abiotic and biotic characteristics of areas in which spineflowers are rooted to those without spineflower *within* occupied habitat.

Overview

The habitat characterization would use statistical analysis of systematically collected quantitative data depicting abiotic and biotic aspects of spineflower habitat and measures of spineflower abundance and performance to generate hypotheses for factors influencing spineflower distribution, abundance, and performance. Univariate statistical analyses would also be used to test existing hypotheses for the factors influencing spineflower occurrences which have been developed based on prior studies (e.g. spineflower preferentially occurs in areas of reduced thatch or lower grass cover). A suite of multivariate analytical techniques would be used to generate additional hypotheses, which can be tested through small-scale manipulative experiments and long term adaptive management of the spineflower preserves. Data for the study proposed here would be collected within a single year, though the plots would be permanently monumented and georeferenced, allowing extension of the study through time to increase understanding of the factors that influence the interannual variability in spineflower occurrences.

TASKS

The habitat characterization will be designed and implemented through seven main tasks.

1. **Develop the Habitat Characterization Study Protocol**

   Prior to initiation of the study, a detailed protocol will be developed based on careful consideration of known aspects of the spineflower's ecology and distribution and abundance within the study site, and the goals and objectives of the study as a tool to inform the SCP. The protocol will identify the specific questions the study will be designed to answer and the hypotheses that will be tested; the study region; the spatial scale(s) at which habitat will be evaluated; the aspects of habitat that will be examined; the types of statistical tools used to analyze the data; and how the data will be interpreted.

   The protocol will be provided for review to the spineflower team prior to finalization. For purposes of estimating the costs of the habitat characterization, this proposal assumes that habitat characterization will be similar to a similar successful characterization for an endangered terrestrial orchid (McGraw et al. 2006), as described below. The study protocol will serve as a basis for the methods section of the habitat characterization report.

2. **Conduct field sampling of spineflower habitat within the Newhall Land holdings**

   Field sampling will be used to quantify characteristics of spineflower habitat within the SCP planning area, which includes the Newhall Ranch Specific Plan Area, Valencia Commerce Center planning area, and Entrada planning area (Dudek Assoc. 2007). In each of the areas, habitat characteristics will be examined within (approx.) 100, 10m x 10m quadrats randomly located in areas with and without spineflower, as determined through prior distribution mapping (Dudek Assoc. 2007). Within the (approx.) 50, $100m^2$ quadrats with spineflower present, microhabitat characteristics will be measured within (approx). 5 replicate $1m^2$ circular quadrats located in areas within and without spineflower. Table 1 lists the anticipated data to be collected within plots of each size.

3. **Analyze soils collected within habitat characterization sites**

   Soils will be collected within the estimated 100 sample sites (i.e. $100m^2$ quadrats) and sent to a soil analysis laboratory to examine characteristics known or hypothesized to influence spineflower occurrences, including chemistry, texture, and moisture holding capacity. Table 2 lists the anticipated soils data that will be collected, and the methods used by the lab for soils analysis.

Table 1: Data to be collected within habitat characterization sites using plots of two sizes. Sites lacking spineflower will not have 1m² plots.

Type of Data	Data to be Collected: 100m² Quadrat	1m² Plot
Plant Community Composition	absolute cover of species by cover classes	absolute cover of species by cover classes
abiotic conditions	litter cover and depth; thatch cover and depth; tree canopy cover, slope, aspect, and soil characteristics (Table 2)	litter cover and depth; thatch cover and depth
spineflower abundance	absolute cover of species by cover classes	density
spineflower performance	mean plant size and/or involucre production	mean plant size and/or involucre production

4. Enter and analyze the habitat characteristic data

All data collected from field examination and derived from the soil analyses will be entered into spreadsheets from which they will be imported into various statistical and graphing programs. Univariate and multivariate statistical analyses will be used to examine characteristics of spineflower habitat and microhabitat, and to test specific hypotheses identified during development of the study protocol (Task 1). Data will be used to create a series of tables and figures (i.e. graphs) that can be used to illustrate the patterns observed.

5. Present preliminary study results to the spineflower team

Results of the data analyses will be presented via power point to the SCP planning team, in order to receive feedback prior to preparation of the report. This important step will provide biologists familiar with the species an opportunity to examine the data and identify any additional analyses or interpretations that should be considered in characterizing the habitat.

6. Prepare the draft spineflower habitat characterization report

A report will be prepared to document the spineflower habitat characterization. The report will identify study goals and objectives, including the questions addressed and specific hypotheses tested; describe the methods used to collect and analyze the data, so that readers will be able to evaluate the results; present all of the observations as well as statistical results, including the negative findings, using narratives, tables, and figures; interpret the results in light of the specific questions addressed; and discuss the implications of the results for the design and implementation of the SCP.

7. Create the final spineflower habitat characterization report

Based on comments received from the spineflower team, the draft report will be revised to create the final spineflower habitat characterization report.

Table 2: Soils characteristics and methods of analysis proposed for the spineflower habitat characterization.

Characteristic	Variable	Method
soil texture	proportion gravel (>2mm), sand, silt, and clay	Sieves to determine the gravel, sand fractions; settling column to determine silt, clay fractions
soil moisture	amount of water in soil sample	loss on drying
organic matter	proportion of soil comprised of organic matter	loss on ignition
pH	concentration of Hydronium ions	electrode on saturation paste
NO3-N	concentration of nitrate as nitrogen	KCl extract, detection by cadmium reduction
NH3-N	concentration of ammonia as nitrogen	KCl extract, detection by phenate method
P	concentration of available Phosphorus	Olsen Bicarbonate
exchangeable cations (Ca, Mg, Na, K)	concentration on exchange sites within the soil	Ammonium Acetate extraction, detection by ICP-AES[1]
Hydrogen	concentration of Hydrogen on soil exchange sites	Derived from regression equation based on original soil pH and the SMP buffer pH
cation exchange capacity	concentration of cations bound to the exchange sites in the soil	sum of exchangeable cations measured (Ca, Mg, Na, K, NH4, H)
electrical conductivity	Proportional to the total salts found in the solution	Saturation paste extract
soluble cations	Concentration of water soluble cations in the saturation paste extract	Saturation paste extract
SO4-S	concentration of sulfate	ion chromatography on saturation paste extract
Cl	concentration of chloride	ion chromatography on saturation paste extract
Sodium Adsorption Ratio	ratio of sodium to calcium and magnesium	Na/[(Ca+Mg)/2]½
Metals (Cu, Zn, Fe, Mn, and B)	concentration of available metals	DTPA[2] plus Sorbitol extraction, detection by ICP AES

[1] Inductively Coupled Plasma Atomic Emission Spectroscopy

[2] diethylenetriaminepentaacetic acid

PERSONNEL

The habitat characterization will be conducted by a team of plant ecologists and botanists with experience conducting quantitative assessments of plant populations and communities. The following briefly describes their qualifications and roles in the project. More detailed information including *curricula vitae* can be provided upon request.

Jodi McGraw, Ph.D., Lead Plant Ecologist and Project Manager

Jodi McGraw is a population and community ecologist with more than ten years experience designing and implementing research to inform the conservation of rare plants. Dr. McGraw has previously conducted a successful habitat characterization for an endangered orchid, and designed and implemented a research program examining the ecology of another endangered species of spineflower. As the Lead Plant Ecologist and Project Manager, Dr. McGraw will design the study protocol, collect field data, conduct the data analyses, and prepare the presentation and report, with the assistance of Drs. Buck and Willoughby, as described below.

Roy Buck, Ph.D., Lead Botanist

Roy Buck is a consulting botanist with over 25 years experience within the flora of the western United States. Dr. Buck has conducted plant surveys throughout California and assisted implementation of a characterization of a rare plant's habitat. As Lead Botanist on the project, Dr. Buck will assist with collection of the field data, including the floristic analysis of spineflower habitat.

John Willoughby, M.S., Quantitative Botanist

As the head botanist for the Bureau of Land Management in California, John Willoughby has 35 years of experience conducting research to inform rare plant conservation. Mr. Willoughby is recognized for his expertise in designing and implementing successful quantitative studies of rare plant populations. Mr. Willoughby will assist development of the habitat characterization protocol and aid analysis and interpretation of the data.

INFORMATION AND ASSISTANCE

The habitat characterization is designed to build on prior studies examining the spineflower within the Newhall planning area. Success of the study will be greatly facilitated by access to available information about the spineflower and the planning area, including:

- Geospatial data describing the spineflower distribution and abundance within the planning area
- Population sampling data for the spineflower within the planning area
- Additional geographic information system (GIS) data for the project area, including (but not limited to): project area boundaries (incl. proposed preserves), vegetation, soils, roads, existing facilities, elevation contours, high resolution aerial imagery, hillshade, and digital elevation models.
- Plant species lists developed for the planning area.

Our team would also appreciate logistical assistance and support from personnel familiar with the planning area and region, including an initial site reconnaissance tour to orient our team to the various regions that comprise the overall planning area prior to the field work.

DELIVERABLES

The following documents will be prepared during this project:

1. Draft Spineflower Habitat Characterization Study Protocol Spineflower (Task 1)
2. Spineflower Habitat Characterization Study Protocol Spineflower (Task 1)
3. Spineflower Habitat Characterization Presentation (Task 5)
4. Draft Spineflower Habitat Characterization Report (Task 6)
5. Spineflower Habitat Characterization Report (Task 7)

In addition, all raw data including both tabular and geospatial (i.e. geographic information system) data will be provided upon completion of the project.

TIMELINE

Table 3 provides an estimated timeline for completion of the project tasks described above. Shaded areas indicate the months in which the tasks will be performed. Numbers indicate the month in which deliverables will be provided.

Table 3: Anticipated timeline for completion of the seven main tasks to develop a habitat characterization for the San Fernando Valley spineflower between December 2007 and December 2008. Details provided in text.

Task		Month												
Number	**Description**	**Dec**	**Jan**	**Feb**	**Mar**	**April**	**May**	**June**	**July**	**Aug**	**Sept**	**Oct**	**Nov**	**Dec**
1	Prepare Study Protocol		1	2										
2	Conduct Field Sampling													
3	Conduct Soil Analysis													
4	Enter and Analyze Data													
5	Prepare Presentation									3				
6	Prepare Draft Report											4		
7	Create Final Report													5

COST ESTIMATE

Table 4 estimates the labor, travel, and other direct costs to implement the habitat characterization. The costs are based on aspects of the current anticipated study design described above, and the assumption that our team of two observers can locate, monument, and collect data within an average of 6.5 sites per day, therefore requiring three weeks of field work, following a single day reconnaissance to examine phenology (flowering status) and become more familiar with the sites before the onset of field work.

The estimated costs are primarily influenced by the level of the sampling effort, the amount and type of data to be collected within the sample sites, and the extensiveness of the data analyses and interpretations. These and other aspects of the study will be refined through preparation of the final study protocol, based upon which a more precise cost estimate could be prepared.

REFERENCES

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McGraw, J. M. 2007a. Habitat Characterization for the San Fernando Valley Spineflower. Memo provided to the Spineflower Team. August 5, 2007. 7 pages.

McGraw, J. M. 2007b. Habitat Characterization for the San Fernando Valley Spineflower: Assessment of Data Gaps That Could begin to be Filled. Memo provided to the Spineflower Team. September 13, 2007. 5 pages plus appendices.

For confidentiality reasons, the cost estimate information has been removed so that this document can be circulated as part of the public review process.

Appendix B

Sample Monthly Monitoring Report

APPENDIX B
Sample Monthly Monitoring Report

DUDEK **SITE OBSERVATION REPORT**

605 Third Street
Encinitas, California 92024
T 800.450.1818
F 760.632.0164

Project: ______ **Project No:** ______ **Job No:** ______

Owner: ______ **Monitoring Dates:** ______ **Times:** ______

District Representatives: ______

Day

M	T	W	T	F	S	S

Project Manager: ______

Weather

Sunny	Cloudy	Overcast	Rain

Biological Monitor: ______

Temp.

< 55	55-70	70-85	> 85

Field Notes/Activities/Observations:

Distribution:
1)
2)
3)

Signed: ______ **Date:** ______

1

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Appendix C

List of Invasive Ornamental Plants (Prohibited in Landscape Areas adjacent to Preserves)

APPENDIX C
List of Invasive Ornamental Plants
(Prohibited in Landscape Areas adjacent to Preserves)

Botanical Name	Common Name
Acacia latifolia	Sydney golden wattle
Achillea millefolium var. *millefolium*	common yarrow
Ailanthus altissima	tree of heaven
Aptenia cordifolia	red apple
Arctotheca calendula	cape weed
Arctotis spp. (all species and hybrids)	African daisy
Arundo (all species and hybrids)	giant reed or arundo grass
Atriplex semibaccata	Australian saltbush
Carex spp. (all species)	sedge
Carpobrotus chilensis	ice plant
Carpobrotus edulis	sea fig
Centranthus ruber	red valerian
Chrysanthemum coronarium	annual chrysanthemum
Cistus ladanifer (incl. hybrids/varieties)	gum rockrose
Cortaderia jubata [syn. *C. Atacamensis*]	jubata grass, pampas grass
Cortaderia dioica [syn. *C. sellowana*]	pampas grass
Cynodon dactylon	Bermuda grass
Cyperus spp. (all species)	nutsedge, umbrella plant
Cytisus spp. (all species)	broom
Dimorphotheca spp. (all species)	African daisy, Cape marigold
Drosanthemum floribundum	rosea ice plant
Drosanthemum hispidum	purple ice plant
Eichhornia crassipes	water hyacinth
Elaegnus angustifolia	Russian olive
Eucalyptus globulus	blue gum tree
Festuca rubra	creeping red fescue
Foeniculum vulgare	sweet fennel
Fraxinus uhdei (and cultivars)	evergreen ash, shamel ash
Gaura spp. (all species)	gaura
Genista spp. (all species)	broom
Hedera canariensis	Algerian ivy
Hedera helix	English ivy
Hypericum spp. (all species)	St. John's wort
Limonium perezii	sea lavender (Invades wetlands)
Linaria bipartita	toadflax
Lolium multiflorum	Italian ryegrass

Botanical Name	Common Name
Lollium perenne	perennial ryegrass
Lonicera japonica (including 'Halliana')	Japanese honeysuckle
Lupinus arboreus	yellow bush lupine
Lupinus texanus	Texas blue bonnets
Mesembryanthemum nodiflorum	little ice plant
Myoporum laetum	myoporum
Oenothera berlandieri	Mexican evening primrose
Olea europea	European olive tree
Opuntia ficus-indica	Indian fig
Pennisetum setaceum	fountain grass
Phoenix canariensis	Canary Island date palm
Phoenix dactylifera	date palm
Plumbago auriculata	cape plumbago
Polygonum spp. (all species)	knotweed
Populus nigra 'italica'	Lombardy poplar
Prosopis spp. (all species)	mesquite
Ricinus communis	castorbean
Robinia pseudoacacia	black locust
Rubus procerus	Himalayan blackberry
Sapium sebiferum	Chinese tallow tree
Saponaria officinalis	bouncing bet, soapwart
Schinus molle	Peruvian pepper tree, California pepper
Schinus terebinthifolius	Brazilian pepper tree
Spartium junceum	Spanish broom
Tamarix spp. (all species)	tamarisk, saltcedar
Trifolium tragiferum	strawberry clover
Tropaelolum majus	garden nasturtium
Ulex europaeus	prickly broom
Vinca major	periwinkle
Yucca gloriosa	Spanish dagger

Source: Hickman 1993.

Appendix D

Relationship of Argentine Ant to Conserved San Fernando Valley Spineflower Populations

DRAFT
Relationship of Argentine Ant to Conserved San Fernando Valley Spineflower Populations

SECTION 1 INTRODUCTION AND BACKGROUND

The purpose of this paper is to address the potential impact and management of the invasive, non-native Argentine ant (*Linepithema humile*) on the Newhall Ranch San Fernando Valley spineflower preserve areas and the ways in which these impacts can be avoided, minimized, and mitigated. A Spineflower Conservation Plan (SCP) (Dudek 2007) has been prepared that describes the conservation and management framework to permanently protect and manage a system of preserves designed to maximize the long-term persistence of the state-listed endangered San Fernando Valley spineflower (*Chorizanthe parryi* var. *fernandina*; spineflower) within the project study area described below. The SCP addresses issues that will be important for controlling the Argentine ant in the spineflower preserves such as buffer zones, edge conditions, project design features, and management of hydrology within preserve areas. In response to questions raised by the California Department of Fish and Game (CDFG), who will be issuing a California Endangered Species Act Section 2081(b) incidental take permit for the spineflower, this paper is intended to expand on the issues of controlling Argentine ants in the preserves that were not explicitly addressed in the SCP.

SECTION 2 ARGENTINE ANT BIOLOGY AND GENERAL CHARACTERISTICS

Argentine ants are native to subtropical and mild-temperature portions of Argentina (Holway et al. 2002a). They are small-bodied, about 0.0625 inch long, and are dark-brown to black in color. They are very social and in California they are thought to be "unicolonial," living in large "supercolonies" that function as one interdependent group and lacking distinct behavioral boundaries among separate nests (Holway et al. 2002a). These supercolonies may consist of hundreds to thousands of members. These ants have more than one queen per colony (i.e., are polygynous), typically with about eight queens for every 1,000 workers (Lanthrop and Valdellon 1999). New colonies form from old ones when a queen leaves with a band of workers to start a new colony in a process termed "budding." Holway et al. (2002a) note that invasive ants in general tend to be unicolonial and suggest that this pattern allows the colonies to become quite large and dominate invaded habitats.

Argentine ants are omnivores, meaning that they are dietary opportunists and generalists that eat both plant and animal matter, including seeds. This appears to be characteristic of invasive ant species in general (Holway et al. 2002a). Argentine ants, also known as "sugar ants," have a strong preference for sweet substances.

Argentine ants usually occupy the top 6 feet of soil. They prefer moist soil underneath buildings and sidewalks. As discussed in more detail below, Menke and Holway (2006) experimentally demonstrated with drip irrigation that, with elevated soil moisture and plant cover, Argentine ants both increase in abundance and invade native ant communities, and that the abundance of Argentine ants decreases with cessation of irrigation. Food sources and temperature dictate where they create their nests.

Argentine ants were originally introduced to North America via coffee and sugar shipments to New Orleans from South America around 1890. They have spread to several continents and smaller land bodies around the world, including sub-Saharan Africa, Atlantic Ocean islands, Asia, Australia, the Mediterranean, North America, and Pacific Ocean islands (Holway et al. 2002a). In North America, they have spread eastward from the Carolinas south to Florida and westward through Texas to California (Lanthrop and Valdellon 1999). They are thought to have first spread into Southern California near Ontario in San Bernardino County and then spread rapidly throughout citrus groves (Suarez et al. 1998). They are widespread in mild-temperature, Mediterranean ecosystems, but do not invade tropical and cold-temperature areas (Holway et al. 2002a), possibly because they have relatively narrow thermal tolerances. Holway et al. (2002b) exposed Argentine ants and six native ant species to high temperatures and found that Argentine ants have the lowest tolerance for high temperatures, with 100% of field-collected workers dying after 60 minutes of exposure to temperatures greater than or equal to 46°C (114.8°F). Similarly, Argentine ants were less tolerant of low soil moisture conditions in a laboratory setting. Generally, Argentine ants foraged more actively and had less mortality under warm and humid conditions than they did under hot and dry conditions (Holway et al. 2002b).

Dispersal by Argentine ants occurs by budding as opposed to winged dispersal of females. This budding limits the rate at which Argentine ants can disperse. Based on a compilation of several studies, Suarez et al. (2001) reported that Argentine ants in Northern California disperse at a rate of about 15–270 meters per year and suggest that budding depends on "human-mediated dispersal to colonize new and distant locations." Invasion of new areas thus occurs at the point of introduction or at points adjacent to source populations. For example, if the adjacent habitat has suitable habitat conditions (i.e., high moisture levels), infested landscape plants translocated to a new development could be a source of introduction that spreads to suitable habitat contiguous with the point of introduction. The likelihood that Argentine ants disperse also relates to nesting behavior, as colonies may relocate nests in response to changes in the physical environment or changes in food sources (Holway et al. 2002a). Argentine ants are also highly adaptive to dispersal in urban environments, able to disperse by "rafting" along water courses, including urban runoff (Holway et al. 2002a).

Recent studies have demonstrated that the invasive population of Argentine ants in California functions as a single large supercolony, based on population genetics and colony structure

(Tsutsui et al. 2003). Population samples in California compared to native populations in Argentina showed reduced genetic variability in the non-native California population compared to the native population, along with reduced intraspecific (within species) aggression among different colonies. This supercolony structure, and related lack of aggression between different nests, may have important ramifications for long-term management of this species because it is thought to be one of the factors that make the Argentine ant such a successful colonizer.

SECTION 3 IMPACTS ON NATIVE SPECIES AND HABITATS

Invasive ants, including Argentine ants, may significantly disrupt the natural ecosystems within their introduced range. Argentine ants may become abundant within their introduced range and may drive out or kill native ants of a newly invaded territory (Holway et al. 2002a; Suarez et al. 1998). This displacement of native ants is the most obvious and widely reported effect of non-native ants and may cause as high as 90% or more reduction of native ant abundance (Holway et al. 2002a). The displaced ants often are ecologically similar to the invasive ants (e.g., occupy similar ecological niches, use same food resources), but displaced ants may also be ecologically different (e.g., use different food sources), such as harvester ant species that are displaced by Argentine ants in California (Holway et al. 2002a). Cold- and heat-tolerant native ants may better coexist with Argentine ants in California because the Argentine ant cannot as effectively invade their habitats due to limited thermal tolerances and requirement of moist, mild conditions.

Argentine ants may impact native fauna may be mediated through killing or displacing prey of higher trophic species. In Southern California, for example, this impact has greatly reduced the numbers of the coast horned lizard (*Phrynosoma coronatum*), which predominantly feeds on native harvester ants (Suarez and Case 2002).

The mechanisms of displacement of native ants by non-native ants are not well understood, but appear to be some combined effect of what Holway et al. (2002a) call "interference" and "exploitative competition." Interference by invasive ants refers to worker-level behaviors, such as physical aggression and use of chemical defensive compounds, and colony-level behaviors, such as recruitment of nestmates, interspecific (between species) territoriality, and nest raiding (Holway et al. 2002a). The sheer size of the invading supercolonies relative to native ant populations is an important factor contributing to interference. Interference behavior of Argentine ants in particular includes chemical defensive compounds, physical aggression by workers, workers preying on the winged queens of native species, remaining at baits longer than native species, recruiting to baits in higher numbers than native species, recruiting to more baits than native species, discovering and recruiting to baits more quickly than native species, displacing native ants from baits, adjusting foraging behavior to local worker density, and remaining active both day and night and throughout the year (Holway et al. 2002a).

Exploitative competition, though indirect, can have severe impacts on native species. Supercolonies have superior work forces with more "scouts" looking for food and more "recruits" from the nest who help to exploit discovered food sources. This force of numbers allows Argentine ants to discover food and exploit food sources more quickly than native ants (Holway et al. 2002a). Holway et al. (2002a) suggest that exploitative competition may be relatively more important for colonizing new areas, such as "at the leading edge of an invasion front."

The impact of Argentine ants on native ants can have a cascading effect throughout the ecosystem. In addition to filling the ecological role of displaced native ants, Argentine ants can also directly impact other taxa (Holway et al. 2002a). The known ecological effects of Argentine ants in California on non-ant species through competition and predation identified by Holway et al. (2002a) include:

- Predation on invertebrates, including eggs, larvae, and certain adult forms
- Cause of California gnatcatcher nest failure
- Displacement of harvester ant prey of coast horned lizard
- Lower growth rate of coast horned lizard feeding on Argentine ants
- Lack of geographic overlap between Argentine ants and coast horned lizard (presumably due to impact on harvester ants)
- Negative relationship between Argentine ant density and gray shrew (*Notiosorex crawfordi*) captures
- Negative relationship, absence, or reduced abundance of Collembola (springtails), flies, spiders, beetles, longhorn beetle, yellowjackets (due to attacks on yellowjacket colonies by Argentine ants), mealybug, and walnut aphid.

Of particular interest in this analysis of the Argentine ant is its potential impact on the San Fernando Valley spineflower. Ant-plant "mutualisms" or relationships include tending, seed dispersal, and interactions with flowers (Holway et al. 2002a). If native ants that carry out these functions are replaced by non-native ants that may or may not fulfill any or all of these functions, the reproductive cycle of the plant may be disrupted

There is some evidence that native ants are pollinators of spineflower. Jones et al. (2004) conducted pollinator studies on spineflower populations on Newhall Ranch and Ahmanson Ranch. They found that one of the dominant floral visitors on Newhall Ranch was a little red ant (*Forelius Mccooki*) and the dominant floral visitors at the Ahmanson Ranch were two species of ants - the pyramid ant (*Dorymyrmex insanus*) and the southern fire ant (*Solenopsis xylonii*). About 76% of red ants collected from spineflower flowers on Newhall Ranch carried one or more spineflower pollen grains. Jones et al. also experimentally demonstrated that the pyramid ant is an effective pollinator or spineflower in a controlled laboratory setting. It appears that ants on Newhall and Ahmanson Ranch may be effective pollinators of spineflower, and, thus, any displacement of these native ant pollinators by Argentine ants could disrupt the reproductive cycle of the spineflower.

Argentine ants that are attracted to floral nectars also may be exploiting the nectar resource more effectively than native non-ant pollinators or directly displacing the native non-ant pollinators. Either way, the presence of Argentine ants may be detrimental to the plant. There is some evidence that Argentine ants are associated with declines in seed set, but the data are equivocal (Holway et al. 2002a).

Ants may be involved in seed dispersal from the parent plant. Some evidence indicates that a native harvester ant (*Messor andrei*) plays a role in dispersal of San Fernando Valley spineflower. LaPierre and Wright (2000) observed harvester ants carrying spineflower flower parts containing seeds to nest sites and spineflower parts were evident in harvester ant midden piles. Harvester ants are capable of foraging for seeds as far as 330 feet from the nest and thus seeds may be dropped along the way. Although there is no direct evidence that Argentine ants impact potential spineflower seed dispersal by *M. andrei*, their documented displacement of native harvester ants indicates a strong potential for disruption of seed dispersal to occur. Moreover, in South Africa, Argentine ants displace native ants that are seed dispersers, but they themselves are poor seed dispersers in that they fail to disperse or bury seeds. They consume the seed's elaisome (fleshy skin) and leave the seed above ground where it is susceptible to rodent predation and fire (Holway et al. 2002a).

Unchecked and under suitable conditions, Argentine ants may penetrate several hundred meters into native habitats in California. Suarez et al. (1998) investigated the penetration of Argentine ants into fragmented patches of coastal sage scrub in the San Diego region of Southern California. All of the sample locations were within about 10 to 11 miles of the coast and thus experience a fairly strong coastal influence throughout the year, including overcast conditions in the late spring and early summer months. Suarez et al. (1998) report that Argentine ants have penetrated several hundred meters into native habitats. For example, they state that, "at the

University of California's Elliot Reserve, Argentine ants have displaced native ants over 400 m into the reserve, and at Torrey Pines State Park Argentine ants have penetrated over 1 km into the park (J. King, *unpublished data*), both in areas with predominantly native vegetation" (Suarez et al. 1998, p. 2053). However, Suarez et al. also state that the amount of penetration is correlated with human-mediated disturbances such as the presence of exotic vegetation, changes in soil conditions, and increases in moisture. A complicating factor is that the amount of penetration is site-specific, likely resulting from some interaction among these factors. For example, a canyon receiving runoff from adjacent development (either through natural or artificial drainage), resulting in newly created high moisture conditions, may be vulnerable to invasion and create a point of penetration into surrounding habitat.

Suarez et al. (1998) also provide some systematic data for Argentine ant penetration along urban edges. All traps within 300 feet of urban edges in San Diego canyons showed high levels of Argentine ants, whereas traps greater than 300 feet from urban edges showed lower levels of Argentine ants.

Understanding the mechanisms that create suitable habitat conditions for Argentine ants is critical for controlling invasions. Menke and Holway (2006) conducted field experiments to examine the direct effect of increased moisture through drip irrigation and the associated indirect effect of increased plant cover in irrigated areas on the abundance of Argentine ants and their displacement of native ant species. Irrigated plots had soil moisture ranging from 50% to 80% saturation (depending on time since last watering) while the non-irrigated control transects had soil moistures of less than 5% saturation.[1] By artificially elevating moisture and manipulating plant cover (by suppressing plant cover in irrigated plots), they demonstrated that increased moisture resulted in a greater abundance of Argentine ants and increased their ability to invade native plant communities. Although increased moisture alone caused increases in Argentine ants, the associated increase in plants increased abundance of Argentine ants by 38% over plots where plant growth was suppressed, suggesting that fine-scale variation of the physical environment is an important factor in the susceptibility of an area to Argentine ant invasion. Menke and Holway (2006) suggested that the increased abundance on plots with plants may be related to presence of aphids. They concluded that the increased abundance in irrigated plots was probably due to the "combined result of colony reproduction by budding, nest relocation and enhanced colony productivity" (Menke and Holway 2006). Menke and Holway also concluded that the increased abundance, even when plant growth was suppressed, was directly due to increased moisture because there was no indication that ants were attracted to food resources on the irrigated plots.

[1] Soil measurements were obtained using an Aquaterr EC-200® soil probe, which estimates the percentage of saturation of the top 10 cm (3.9 in) of soil.

SECTION 4 PRESERVE DESIGN

Based on the foregoing review, and particularly on information regarding Argentine ant penetration into native habitats in fragmented canyon areas in Southern California, this section analyzes the risk of Argentine ant invasion of the Newhall Ranch San Fernando Valley spineflower preserve areas.

One factor affecting whether increased moisture could attract Argentine ants to the spineflower preserve is the aspect of the conserved spineflower populations. According to the SCP, in the 2003 and 2005 surveys, spineflower populations tended to be concentrated in the west, southwest, southeast, east, northwest, and flat aspects. The south, northeast, and north aspects consistently had the lowest percentages of spineflower populations (Dudek 2007). The spineflower preserves generally conserve those aspects that have the greatest natural concentrations of spineflower. These aspects are also those that would have the most xeric natural conditions resulting from greater solar and wind exposure and, thus, would be less likely to support moist conditions conducive to invasion by Argentine ants. In addition, the spineflower preserves are about 25 to 30 miles from the coast and experience hotter and drier summers than the coastal areas of San Diego (i.e., within 10 to 11 miles of the coast) where Suarez et al. (1998) observed ants in all sampled areas. It is possible that the spineflower preserves in the more inland area of Santa Clarita (where the Newhall Ranch spineflower preserve areas are located) would be less susceptible to Argentine ant invasion—all else being equal—than native habitats in coastal San Diego County, although this hypothesis would need to be tested.

The SCP analyzed the amount of buffer between the urban edge and spineflower populations within each of the preserve areas. The buffers between spineflower populations and urban development are required by the Newhall Ranch Specific Plan (NRSP) EIR to be at least 80 feet, and in most cases the buffer is much greater than 80 feet. In order to control Argentine ant invasions, this minimum 80-foot buffer will need to remain a "dry zone" where typical (i.e., non-rainy season) soil moistures are maintained below 10% saturation. Even though a few Argentine ants (scouts) may occur in this dry zone looking for suitable foraging and nesting resources, the chance of colonization will be greatly reduced if this zone can be maintained as a dry, xeric area.

These preserve buffer zones will be adjacent to fuel modification zones (FMZs) that will provide additional separation from the edge of urban development. Although FMZs are for public safety and the protection of property and not for management of the spineflower preserves, some general principles can help provide additional protection against Argentine ant invasions between the edge of urban development and spineflower populations. The foremost principle is to use native or non-invasive, non-native, drought-resistant plants to the extent possible in the

FMZ to minimize the amount of irrigation required to maintain the vegetation; irrigated zones should be eliminated to the extent possible, and particularly in the area adjoining the spineflower preserves. Soil disturbances in the FMZ should be avoided and minimized to reduce the chance of erosion, disturbance of cryptobiotic soils, and impacts to native species because Argentine ants also appear to be attracted to disturbed areas (Suarez et al. 1998).

The following section discusses project design features and mitigation and management measures for preserve areas that will further reduce the risk of Argentine ant invasions into the spineflower preserves.

SECTION 5 PROJECT DESIGN FEATURES AND MITIGATION AND MANAGEMENT MEASURES FOR PRESERVE AREAS

Controls on Argentine ants will likely require a combination of methods. The primary method is to maintain an inhospitable habitat condition between the development area and the spineflower preserve. This species is sensitive to moisture gradients and is more likely to invade mesic areas and avoid xeric areas. Menke and Holway (2006) noted that the abundance of Argentine ants changes dramatically across soil moisture gradients. They suggest that interception and diversion of urban runoff from naturally xeric areas could restrict invasions by Argentine ants and that "even small reductions in urban run-off may act to limit *L. humile* in areas that are otherwise too dry" (Menke and Holway 2006, p. 374). Thus a "dry zone" between urban and natural habitats where there is naturally little moisture may act a barrier for the ants and inhibit them from invading the natural areas.

Therefore, the focus of the Argentine-ant-control approach will be to implement measures that minimize the likelihood of Argentine ants establishing colonies at the interface between spineflower preserve and development areas and expanding into the preserve. Several project design features and mitigation and management measures described in the SCP will help prevent invasions of the Argentine ant into the spineflower preserves. Additional control measures beyond those specifically discussed in the SCP are discussed in this section.

Project Design Features

First, to minimize initial establishment of Argentine ants adjacent to preserves, container plants to be installed within 200 feet of the preserves shall be inspected for pests, including the Argentine ant, and any plants found to be infested shall be rejected. The CBI (2000) study suggests that this measure will be moderately effective for buffer widths of 80 to 100 feet and highly effective at buffers greater than 200 feet.

Second, project-specific design measures will be implemented in order to minimize changes in surface water flows to the spineflower preserve areas. These measures are intended to maintain the existing hydrology of the preserves and to prevent unnatural increases in moisture within the preserves. As described above, increased soil moisture is the primary cause of Argentine ant invasions into natural habitats. Roadways will be constructed with slopes that convey water flows within the roadway easements and away from spineflower preserve areas. French drains will be installed along the edge of any roadways and fill slopes that drain toward the preserve areas. The CBI (2000) study suggests that French drains should be highly effective for buffers as small as 15 feet in width. Underground utilities will not be located within or through the preserve areas. Drainage pipes installed within the preserve areas (but away from spineflower populations) to convey surface or subsurface water away from the populations will be aligned to avoid the preserve areas to the maximum extent practicable. Fencing or other structural barriers that will be installed to reduce intrusion of people or domestic animals into the preserve areas shall incorporate footing designs that minimize moisture collection.

Storm drain outfalls from proposed development areas will only be installed within preserve areas where necessary to retain hydrologic conditions within the preserves, to sustain existing riparian and wetland habitats, and/or to allow for the restoration of currently disturbed areas to native riparian/alluvial habitat. It is important that no new wetlands or riparian areas are inadvertently created in proximity to spineflower populations.

When located in a preserve area, storm drains must meet the following criteria:

1. Storm drains must not impact spineflower either directly or indirectly, based upon specific evaluations and a determination by CDFG.
2. Storm drains within preserve areas may only daylight at the bottom of slopes.
3. Under no circumstances shall storm drains daylight onto steeply sloped areas or other areas that would cause erosion.

Any surface water entering a preserve area from development areas during construction is required to pass through best management practice (BMP) measures, in accordance with the requirements of the County of Los Angeles (County) and the California Regional Water Quality Control Board (RWQCB), which will be described in the Stormwater Pollution Prevention Plan (SWPPP). Storm drain outlets must contain hydrologic controls (e.g., adequate energy dissipaters) to prevent downstream erosion and stream channel downcutting, in accordance with County and RWQCB requirements.

In addition, storm drain outlets must be designed based on pre- and post-construction hydrologic studies (in accordance with NRSP EIR Mitigation Measure 4.6-69 [County of Los Angeles 2003]). Storm drains and BMP measures shall be designed by a qualified licensed civil engineer, with design reviews by the consulting biologists, the County, and CDFG. Long-term maintenance of storm drain BMPs will be the responsibility of a County landscape maintenance district or other entity responsible for BMP maintenance.

General Monitoring and Management

Although the project design features described above will help control Argentine ant invasion into the spineflower preserves, there is still a potential for invasions to occur where typical soil moisture increases above about 10% saturation. Fortunately, invasions by Argentine ants, if they occur, are reversible under appropriate conditions. Menke and Holway (2006) demonstrated that Argentine ant abundance systematically declined in experimentally irrigated areas over a few months once the irrigation was terminated. If soil moisture can be restored to 10% saturation or less, Argentine ant abundances will decrease. If, for example, Argentine ants were found to have invaded an area of the preserve, remediation of the causal factor in increasing soil moisture will reduce the abundance of the ants in that area.

Qualitative and quantitative monitoring for Argentine ants should be performed quarterly and include an overall review of the spineflower populations and habitats within the preserve and preserve buffer. A conservation land management entity would continue Argentine ant monitoring and control in perpetuity. Based on the Suarez et al. (2001) study, which indicates that populations disperse at a rate of about 15 to 270 meters per year, quarterly monitoring for Argentine ants should be adequate to detect incipient invasions. The monitoring will note physiognomic changes and potential problems associated with Argentine ants such as evidence of increased moisture along the edges of and within preserve areas. Systematic sampling for Argentine ants should be conducted using pitfall traps established at various points along the urban–preserve interface (see *Appendix A* for a suggested field method).

The monitoring will inform management recommendations as necessary to maximize the likelihood that spineflower populations remain free of Argentine ant invasion and in a healthy state. Special attention should be placed on examining preserve edges, as these locations are where new ant invasions and other problems such as collecting moisture are often first detected. Quarterly assessments will also include a review of the preserve's physical features, including the condition of protective fencing, adjacent storm-drain outfalls, and BMPs to ensure they are functioning properly and not creating a suitable environment for Argentine ants.

Managing Infestations

Complete Argentine ant eradication in an urbanized environment is not feasible because the species is well-established in Southern California and is a very prolific colonizer. A more practical objective is to control their populations and prevent their spread into new areas. The most effective approach is to control soil moisture at potential invasion points—in this case, along the urban–preserve edge.

If ants appear, there are generally two distinct approaches to direct controls: (1) source or nest/mound treatment, and (2) broadcast applications.

Source or nest/mound treatment requires locating the colony's nest or mound and applying an insecticidal treatment in or around the nest. Delivery of the poison can be through a liquid drench treatment, dust or granule cover, or fumigation. Ants must come into contact with the insecticidal agent and killing the colony's queen is imperative to success. Nest/mound treatment can be effective, but it can also be costly because it is labor intensive.

Broadcast applications involve the distribution of insecticidal bait over large infested areas. Baits work because ants share food and nutrients among one another. If food contains a slow-acting toxicant that is not detected, it gets passed from ant to ant and eventually to the queen. Baits can also be applied in a source treatment at the nest/mound. Specific site conditions will dictate which treatment method will be appropriate to use. With any of these treatments, special consideration must be given to special-status wildlife and plants, non-target native ants, and/or other beneficial insects that may be affected by the treatments.

Through quarterly monitoring along the preserve edge, it should be possible to identify trouble spots fairly early before large colonies become established. If only a few ants (scouts) are trapped and soil moisture conditions in the area appear to be low enough to preclude colonization, a localized search within 300 to 500 feet of where the ants were observed may be adequate to identify and fix a source of increased moisture (e.g., a leaking pipe or uncaptured runoff) that could create a future problem. If the monitoring reveals a high abundance of ants in the area, suggesting the presence of a nearby nest, the direct controls discussed above may be warranted. Pesticide use shall be limited to within 200 feet of preserves and inside preserves.

SECTION 6 SUMMARY AND CONCLUSION

This paper reviews the biology of the invasive Argentine ant and the risk of the Newhall Ranch San Fernando Valley spineflower preserves to Argentine ant invasions. This species is well-established in Southern California and can be expected to invade areas adjacent to urban development that provide suitable habitat conditions, such as where soil moisture levels are allowed to remain relatively high (>10% soil saturation). The keys to controlling Argentine ants in the spineflower preserves include:

- Providing "dry zones" between urban development and spineflower populations where typical soil moistures are maintained at levels below about 10% soil saturation, which will deter the establishment of nesting colonies of ants
- Where feasible, and/or appropriate, dry areas such as parking lots and roadways shall be built next to preserve boundaries. These will be designed to slope away from the preserve to avoid runoff entering the preserve.
- Pedestrian pathways placed next to preserves shall consist of decomposed granite or other gravel to minimize the holding of moisture, thereby preventing establishment of suitable habitat for Argentine ant colonies.
- Ensuring that landscape container plants installed within 200 feet of spineflower preserves are ant-free prior to installation, to reduce the chance of colonies establishing in areas close to the preserves.
- Maintaining natural hydrological conditions in the spineflower preserves through the project design features for roadways, French drains, irrigation systems, underground utilities, drainage pipes and fencing, storm drains, and any other BMP measures that apply to surface water entering the preserve areas.
- Using drought-resistant plants in FMZs and minimizing irrigation to the extent feasible
- Upon initiating landscaping within a development area, initiating quarterly monitoring along the urban–preserve edge to detect incipient ant invasions and remedying any inadvertent sources of moisture that could create suitable ant habitat
- Managing infestations through direct controls such as source or nest/mound treatment and/or broadcast applications. Pesticide use shall be limited to within 200 feet of preserves and inside preserves.

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APPENDIX A

Field Method for Sampling for Argentine Ants

APPENDIX A
Field Method for Sampling for Argentine Ants

Pitfall trapping for Argentine ants is fairly straightforward but should be conducted by a biologist/entomologist who can identify the local invertebrate fauna to species level (to the extent possible) and at least to genus level. The following excerpt from Suarez et al. (1998) describes the basic field sampling methods:

> The pitfall traps consisted of 60 mm wide (internal diameter at the mouth), 250-mL (8-oz) glass jars. The jars were placed in a pattern resembling the five on a die with the corner jars being 20 m apart. The traps were filled halfway with a 50:50 water : Sierra brand antifreeze mix. Sierra brand antifreeze (Safe Brands, Omaha, Nebraska, USA) was used because it is non-toxic and works as an excellent preservative of insects. The jars were dug into the ground so the lip of the jar was flush with the surface. The jars were collected after 5 [days] and all ants counted and identified....Pitfall traps are an effective method for sampling ant communities (Anderson 1995, 1997) and provide an estimate of ant activity for each species by counting the number of workers falling into the jars for each [5-day] sample period.

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Appendix E

Spineflower Conservation Plan
Adaptive Management Program Module
June 2010

SPINEFLOWER CONSERVATION PLAN
Adaptive Management Program Module
June 2010

This adaptive management program (AMP) module was developed as a component of the Spineflower Conservation Plan (SCP) (Dudek 2007a). The AMP module includes portions that have been incorporated into Section 10.0 of the SCP, as well as detailed descriptions of seven threats evaluated as part of the adaptive management planning process. The AMP module is being prepared in isolation to facilitate the development and review process. This page outlines the basic structure of the module.

TABLE OF CONTENTS

INTRODUCTION

Development of the Adaptive Management Framework

Development of an adaptive management framework to support the conservation goal of this Plan began after preliminary attempts to develop management based upon performance standards and remedial-action triggers proved to be premature. The combination of natural variability inherent with spineflower populations and the lack of more complete information regarding the taxon's biology and ecology required the adoption of a more flexible, programmatic approach.

As described in Section 4.0 of the SCP, the spineflower is an annual, spring-blooming plant exhibiting dramatic fluctuations in aboveground populations apparently tied to annual climatic variability and other poorly understood stochastic (random) environmental variables. Population levels vary from very small numbers of plants in severe drought years to millions of plants when growing conditions are more favorable. From a management and monitoring perspective, therefore, the natural variability in the observed population levels can interfere with detecting the effects of non-natural factors. In particular, population declines due to anthropogenic factors can be difficult to differentiate from the natural variability of the system. Furthermore, annual plant seed banks are difficult to study because a potentially large and significant portion of the population resides below ground in a seed bank that is otherwise difficult to directly quantify. The need to balance this natural uncertainty with the demands for developing scientifically based and timely conservation and management methods calls for a flexible adaptive management approach.

The adaptive management framework proposed in the Plan thus is designed to balance natural sources of uncertainty with the demands and finite timescale associated with the conservation planning process. The adaptive management planning team was expanded in 2007 with the addition of outside scientific experts Jodi McGraw, PhD, and John Willoughby to the existing team of resource agency staff, land managers, landowners, and consultants representing CDFG, the Center for Natural Lands Management (CNLM), and Newhall Land. Since that time, development of the adaptive management framework has proceeded steadily, through iterations of strategy and design, using available information.

The Concept of Adaptive Management

McEachern et al. (2006) provide a description of the concept of adaptive management. Their description is provided in the context of multiple-species conservation planning, but it applies equally well to this situation, given the similar issues of uncertainty and incomplete information that are often inherent in the conservation planning process (McEachern et al. 2006, p. 18).

> [Adaptive management] is an iterative process of strategy, design, implementation, monitoring, evaluation and adjusting management to maximize conservation success. It evaluates decisions or actions through carefully designed monitoring and proposed subsequent modification to management, threat abatement and monitoring. The modifications are in turn tested with an appropriate, perhaps redesigned, monitoring protocol. At each turn of the cycle, active learning through monitoring and evaluation reduces management uncertainty. Adaptive management is logical, can deal with uncertainty and data gaps, and is similar to the scientific process of hypothesis testing.

Components of the Adaptive Management Framework

Using the McEachern et al. (2006) description as a foundation, the proposed adaptive management framework includes the following key elements:

- Biological goals and objectives
- Description of the programmatic approach
- Identification and evaluation of threats
- Reporting and plan adjustments
- Monitoring Protocols (Section 11.0 and Appendix F of the SCP)

These key elements form the basis of the proposed adaptive management program and thus provide the framework that will be augmented and modified as the adaptive management program progresses.

Programmatic Approach

The proposed adaptive management framework is being developed partly as a stressor-based plan that focuses on managing anthropogenic threats and partly as a series of study designs to inform and improve future management. Monitoring will be tied directly to management actions (i.e., "effectiveness" monitoring), such that management can be evaluated as having the desired effect of maintaining or enhancing spineflower populations. Management actions are categorized as near-, intermediate-, and long-term (i.e., 0 to 1 year, 1 to 5 years, and 5 to 20 years; time frames are set based on the timing of Annual Program Review) and are linked to (1) the characterization of threats as low, medium, or high priorities for management and (2) how studies can be linked to the potential for future positive enhancement activities. For example, near-term actions would address high-priority threats, such as existing and anticipated invasion by non-native species. Annual review, near-term adjustment, long-range planning and experimentation, and the development of annual work plans are incorporated as features of the adaptive management framework.

Adjustments to the annual work plans will rely on feedback from monitoring activities and on the newly available information (e.g., scientific research) to guide changes in management activities or overall strategy. Adjustments to management will also be made based upon the response of spineflower to experimentally designed small scale management trials. Decision-making responsibilities and ongoing development of the adaptive management process are the responsibility of an Adaptive Management Working Group comprising land managers, stakeholders, and scientific experts. The Adaptive Management Working Group is responsible for evaluating completed management actions and defining explicit objectives for future management actions.

A total of 10 threats and two studies were initially identified and evaluated during the development of the adaptive management program. Seven threats, including non-native plants, the loss of genetic diversity, fire suppression, trampling, fire exclusion, herbivory and seed predation, and the disruption of the natural soil-disturbance regime, are being carried forward as a focus of the adaptive management program, and detailed evaluations are provided below. Drought, nitrogen deposition, and Argentine ants were originally considered to be addressed through adaptive management, but were eliminated for different reasons: Drought and nitrogen were eliminated from the adaptive management program because direct management is not considered feasible and since their potential effects are manifested in changes (i.e., increased cover of non-native grasses, changes in vegetation communities) that are already being addressed by adaptive management. Because Argentine ants can be effectively managed within and adjacent to the preserves through general aspects of preserve design with a limited need for active management and human mediation, it is not necessary to address Argentine ants through adaptive management. Two experimental designs were evaluated and adopted as part of the adaptive management program. These designs involve a spineflower habitat characterization study (see Section 10.5.4 of the SCP) and a seed sowing and germination experiment based on seeds salvaged from development areas (see Section 10.5.3 of the SCP).

Biological Goals and Objectives

The following biological goals and objectives are the cornerstone of the adaptive management program for the spineflower within the preserves established as part of the Newhall Ranch Specific Plan (Specific Plan).

Three main goals for the preserves presented here describe the desired conditions of (1) the spineflower populations, (2) the communities in which the spineflower occurs, and (3) the ecosystem processes known or hypothesized to maintain the spineflower populations and associated communities. For each goal, a set of objectives provides the steps for attaining the goals, and a short explanation or rationale is provided for each objective.

Population

Goal 1: Maintain or increase San Fernando Valley Spineflower populations within the preserves.

Objective 1.1
Maintain or increase the distribution of the spineflower within each preserve. Persistence of an endangered plant is enhanced when it occupies a larger geographic area. The more extensive the distribution (i.e., areal extent), the lower the probability that localized events such as wildfire, pest outbreaks, or disease will remove the entire population. Therefore, it is anticipated that maintaining or increasing the distribution of spineflower within each preserve will reduce the probability that foreseen and unforeseen changes in habitat conditions will result in population declines that could threaten persistence throughout the preserve system.

Objective 1.2
Maintain or increase the abundance of the spineflower within each preserve. In general, more abundant populations (i.e., those comprising more individuals) will have a greater probability of persisting and maintaining genetic diversity necessary to adapt to a changing environment than smaller (less abundant) populations. Existing anthropogenic alterations to the habitat within the preserves, including the invasion and spread of exotic plants, may have reduced spineflower abundance. Management of preserves will be designed to remove unnatural barriers to spineflower populations and maintain conditions conducive to persistence of a viable seed bank, in order to increase abundance and enhance long term population persistence. It is important to note that this objective will be reached within the context of an ecological system so that maintaining or increasing spineflower abundance retains ecological functions as near to "natural" as possible rather than compromising other aspects of the ecosystem.

Objective 1.3
Reduce or prevent the increase of identified stressors or anthropogenic factors that negatively impact spineflower individual and population performance. Management of the preserves will be designed to address anthropogenic factors that are known or hypothesized to reduce spineflower individual and population performance, including exotic plants, Argentine ants (*Linepithema humile*), trampling or erosion due to trespass, and introduction of unseasonal run-off from off-site locations.

Objective 1.4
Increase understanding of the ecological factors influencing the distribution, abundance, and population persistence of the spineflower in order to inform management and monitoring within the preserves. Many gaps remain in the understanding of the ecology of the spineflower, making it difficult to devise management strategies to prevent its extirpation, and to design efficacious monitoring protocols. Studies, management, and monitoring will be designed and implemented to increase information about the spineflower needed to inform habitat management and increase the effectiveness of monitoring, thus facilitating Objectives 1.1 through 1.3.

Objective 1.5
Plan and conduct small scale experimental management trials to test the effects of proposed on-the-ground management treatments and evaluate effectiveness and spineflower's response. Tools and treatment methods needed to manage spineflower and its habitat, including measures to address excessive competition and implement weed control in occupied habitat, will be tested by implementing small scale experimental trials. The results will be monitored and evaluated, and those measures which produce a favorable spineflower response or otherwise do not result in adverse ecosystem effects, would then be implemented across larger areas over time.

Communities

Goal 2: Maintain or enhance the structure and native species composition of the native communities within the spineflower preserves.

Objective 2.1
Maintain a mosaic of naturally occurring native communities within the preserves. Under this objective, management would be implemented if a 25% change or greater is observed in the absolute cover of existing native plant communities within each preserve, as measured through a combination of remote sensing and aerial mapping at 10-year

intervals. Land slated to be included within the spineflower preserves currently supports a mosaic of native plant communities likely reflecting different abiotic conditions (e.g., soils, topography, and microclimate) and disturbance history (time since fire, cultivation, grazing regime, and other land uses). The proposed preserves also include considerable acreage of disturbed land and non-native annual grassland, which can be restored to native vegetation types and perhaps even suitable spineflower habitat. The existing native plant communities differ in native plant species composition, including the presence and relative abundance of spineflower. As a result of their different plant species composition and physiognomy (structure), these communities likely differ in the habitat conditions (e.g., food availability, abiotic conditions) and thus animal species composition. Through a variety of direct and indirect mechanisms, these plants and animals could be essential to the long-term persistence of the spineflower populations (e.g., by maintaining populations of pollinators and/or seed dispersers).

Anthropogenic contributions to global climate change are generally accepted by the scientific community, and these changes over time may influence the type and composition of native vegetation communities as well as other aspects of the natural environment in Southern California. Although it is an objective of this plan to prevent anthropogenic changes to the naturally occurring communities within the preserves, management of the preserves is not intended to reverse or slow changes that are the result from global climate change.

Objective 2.1(a)

Restore damaged habitats potentially capable of supporting spineflower, within the preserves. Specific areas shall be restored where they appear capable of being potentially occupied by spineflower. A spineflower Habitat Characterization Study will be conducted in the spring season no later than two years after issuance of the Incidental Take Permit. The results of the study will be used to inform the restoration of potentially suitable spineflower habitat, and maps will be produced showing the areas where such restoration will occur. Area-specific plans will be prepared for each location where restoration will occur and reviewed by the proposed adaptive management working group, and approved by CDFG.

Objective 2.1(b)

Revegetate areas within preserves that have been damaged and do not support native habitats but are unlikely to support spineflower in the future. Damaged habitats with deeper valley soils, for example, may not be suitable for spineflower, but may be capable of supporting other appropriate native habitats and pollinator habitat. These locations will also be identified and plans prepared, similar to Objective 2.1(a) to revegetate them and repair soil damage.

Objective 2.2

Maintain or increase the absolute cover of native plant species by 15% within each preserve every 10 years. Native plant species are important components of natural communities. Maintaining or increasing their relative abundance will facilitate the persistence of native plant populations and the maintenance of native plant communities to which native animals, fungi, and other organisms are adapted.

Because early successional stages characterized by sparse native plant cover provide the ideal habitat for some species, perhaps including the spineflower, increasing *total* native plant cover would be an inappropriate target. Instead, the objective will be to maintain and enhance the natural community structure and species composition, and to increase relative native plant cover—the proportion of the total plant cover that is composed of native plant species.

Objective 2.3

Maintain or increase the diversity of native plant species within each preserve by at least 15%, as measured within each preserve every 10 years. Maintaining the diversity of native plant species is also important for the persistence of native communities. A function of species richness and evenness, diversity is often created and maintained by natural ecological processes, including disturbances (e.g., fire) that enhance the diversity of habitat conditions for animals as well as other organisms. Species diversity will be examined at both at the landscape scale (i.e., total diversity), which is a function of community heterogeneity, and at the local or 'plot' scale (i.e., alpha diversity).

Though the abundance and diversity of other organisms including animals and fungi are also important, it can be difficult and costly to monitor all of the different groups of organisms. Native plant species can be used cautiously as indicators of native community structure for purposes of monitoring overall habitat conditions, unless research indicates this assumption is not met in this system.

Objective 2.4

Increase understanding of the ecology of the native communities needed to inform management of the preserves by undertaking the studies specified as part of the adaptive management program. Greater knowledge about the ecology of the natural communities within the preserves will facilitate management to attain the objectives designed to attain the population, community, and ecosystem goals. Information that could facilitate conservation and management includes: 1) ecological factors that influence the spatial variability in abiotic and biotic conditions within the communities, 2) species composition of various taxonomic groups (including mammals, birds, herpetofauna, insects, fungi, etc.), 3) components of the natural disturbance regimes, 4) ecological responses to disturbance, and 5) successional relationships among communities.

Ecosystem

Goal 3: Facilitate the natural ecological processes required to sustain the native populations and communities in the preserves.

Objective 3.1

Maintain or enhance opportunities for migration of plant and animal populations, including spineflower, between preserve areas. Following development, the preserves will contain remnant patches of native habitat. All else being equal, small areas are less likely to support persisting populations of endangered species than large areas. If extirpations occur, recolonization will be unlikely due to patch isolation. Genetic diversity is often lower in small, isolated habitat patches, due to genetic bottlenecks, inbreeding, and genetic drift.

Providing opportunities for plant and animal populations to migrate between protected areas can increase the probability of species persistence by increasing the size of populations, allowing recolonization following localized extinctions, and increasing genetic exchange among otherwise isolated populations.

Objective 3.2

Maintain the hydrologic conditions within the preserves. Direct and indirect impacts associated with adjacent development, particularly that which occurs upslope of the preserves, can alter hydrology and thus affect soil moisture and erosion processes. Increased moisture underneath and on the soil surface is predicted to facilitate the invasion and spread of Argentine ants—non-native arthropods that outcompete native ants that could be important spineflower pollinators and/or seed dispersers. Increases in soil moisture can also facilitate populations of native and non-native plants that can outcompete spineflowers, which are poor competitors. Preserves should be managed to prevent alterations to soil moisture by avoiding concentrated runoff, inhibiting drainage, and other factors that could increase soil moisture

References

Dudek. 2007a. *Spineflower Conservation Plan.* Draft. July 2007.

Dudek. 2007b. *Newhall Ranch Resource Management and Development Plan.* Draft. Prepared for the Newhall Land and Farming Company. February 2007.

McEachern, K., B. Pavlik, J. Rebman, and R. Sutter. 2006. San *Diego Multiple Species Conservation Program (MSCP) Rare Plant Monitoring Review and Revision.* Technical Report Draft Prepared for the City of San Diego. U.S. Geological Survey (USGS) Western Ecological Research Center.

THREATS

The threats discussed in this section are based on discussions with the scientific experts (McGraw and Willoughby), observations by biologists working in the field (Dudek and FL*x*), and input from CNLM, the land management entity that will be responsible for managing the proposed preserves. Threats are assigned low, medium, or high priority for management using several criteria: severity of impacts, probability of occurrence, certainty of consequences, and indirect and interactive effects.

Severity of Impacts

Each threat has either known or hypothesized impacts to spineflower. Impacts can be direct or indirect, and can affect spineflower at the population, community, or ecosystem level. This is a qualitative estimate of the magnitude of the impacts that could occur, regardless of whether the impacts are well-known and documented in the scientific literature, or whether they are only hypothesized to occur based on local observations or observations of similar situations elsewhere.

Probability of Occurrence

Probability of occurrence estimates the likelihood that the identified threat will occur or be present within or adjacent to the preserves. Non-native plants, for example, are currently present throughout the preserves, are already ubiquitous within developed areas of the Specific Plan adjacent to the preserves, and thus there is a 100% certainty that non-native plants occur within these areas and ought to be addressed by management.

Certainty of Consequences

Certainty of consequences addresses whether the impact of a potential threat to spineflower is adequately studied and documented in the literature and is virtually certain. Non-native annual grasses, for example, are known to have competitive effects detrimental to other native species, and the same is likely true for spineflower. In an experimental study of the Ben Lomond spineflower, low rainfall conditions were only found to have negative effects on demographic performance if non-native annual grasses were also present (McGraw 2004). Soil compaction and erosion (as indirect effects of trampling), on the other hand, could actually have both positive and negative effects on spineflower. Some level of soil compaction and erosion may increase the availability of suitable microhabitats by providing "safe sites" that are relatively free of potential competitors. Alternatively, soil compaction and erosion may invite colonization by invasive annual grasses and have an overall negative impact on spineflower.

Indirect and Interactive Effects

This section describes other ways in which an identified threat could have additional impacts to spineflower by influencing or combining with one or more other identified threats.

Each threat is explored further with a description of the relevant background information, known or hypothesized effects, the relationship between the threat and the biological goals and objectives, questions and topics for future research, the proposed management strategies and techniques, and proposed monitoring activities.

Individual threats are discussed in detail below. *Table 1*, Threats Characterization Summary, and *Figure 1*, Stressor Model, provide an overview of the threats characterization, proposed management actions, and a conceptual illustration of on the relationships between identified stressors and the basic life stages of the spineflower.

TABLE 1
Threats Characterization Summary

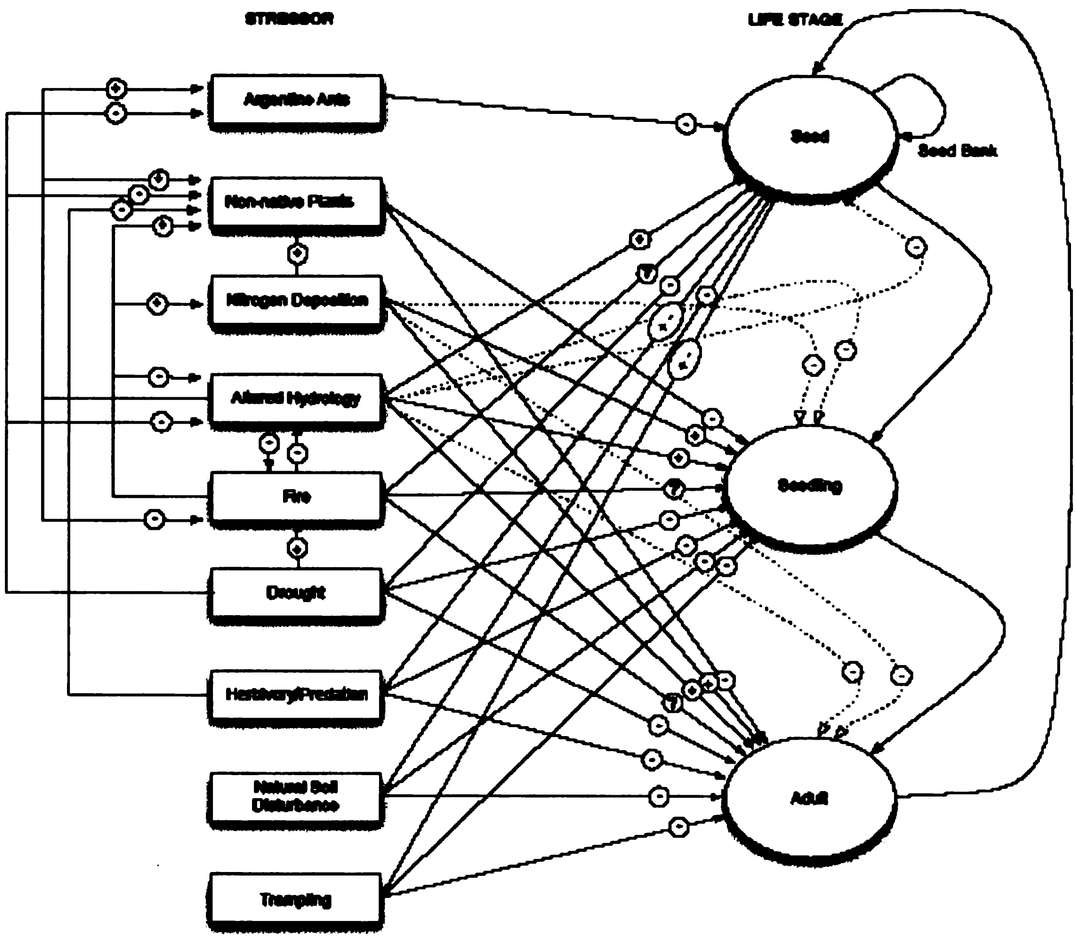
Threat	Information Known or Needed	Management and Monitoring
High Priority for Management		
Non-Native Plants	• Non-native plants are fairly ubiquitous within preserves. • Effect of non-native plants has not been well-studied for spineflower, but congeners are generally poor competitors and typically negatively impacted by non-native species. • Fire suppression, and cessation of cattle grazing can exacerbate the impacts of non-native plants. • Non-native plants reduce availability of belowground resources (water and soil nutrients), reduce light availability, and create thick litter on the soil surface that can inhibit seedling germination and establishment. • Non-native plants can indirectly affect spineflower by reducing populations of pollinators and/or seed dispersers, accelerating soil development and thus succession, and altering the natural fire regime. • Habitat characterization may identify correlation (positive or negative) between spineflower performance and non-native plants and experimental studies may examine the effects of various treatments intended to reduce the abundance and effects of non-native plants.	Management Strategies and Techniques 1. Develop preserve system non-native plants management plan to eradicate, control and prevent non-native plants. 2. Collect baseline data regarding non-native plant distribution and abundance. 3. Define management goals and objectives based on habitat characterization study and experimental studies examining available management techniques. Monitoring 1. Monitor effectiveness of non-native plant management techniques. 2. Monitor non-native plant distribution and abundance in concert with annual abundance sampling to determine effects of management on spineflower distribution and abundance. 3. Monitor distribution and abundance of non-native plants within the preserves.

[illegible]	Information Known or Needed	Management and Monitoring
Loss of Genetic Diversity	• Loss of genetic diversity is recognized as a significant threat to the conservation of endangered taxa. • Small population size and low genetic diversity can interact to increase risk of extinction. • Outcrossing, migration, and maintenance of seed banks are the primary mechanisms by which genetic diversity is maintained. • Primary causes of reduced genetic diversity include the loss of pollinators (i.e., ants, bees), increased rates of self-pollination, reduced or ineffective seed dispersal, and the reduction of seed bank, all of which could result from reduced connectivity between preserves. • Loss of genetic diversity can reduce demographic and population performance and the ability of a population to respond to changing environmental conditions. • A series of studies will investigate the genetic structure of spineflower occurrences, the presence of local adaptations within the occurrences, and whether a correlation exists between genetic diversity and potential pollinators.	**Management Strategies and Techniques** 1. Focus on maintaining and enhancing conditions for pollination, seed dispersal, and/or migration. 2. Possibly investigate the mechanisms of a loss of genetic diversity. 3. Artificial transplantation of seed between occurrences is not proposed at this time because current information is insufficient to understand the potential effects and associated risks. **Monitoring** 1. Monitor changes in the invertebrate and small mammal populations 2. Monitor for decreased fitness associated with loss of genetic variation. Annual spineflower abundance sampling will track changes in cover that will provide an indication of annual seed production.
	Medium Priority for Management	
Fire Suppression	• Fire suppression may include clearing, bulldozing and other activities conducted by fire agencies to control and suppress fires. • Areas of the preserves have burned on 7 separate occasions from 1858 to 2007 and fire suppression activities are expected to increase with development. • Fire suppression can directly impact spineflower and its habitat by damaging vegetation physically and chemically. • Indirect effects of fire suppression include increased erosion, the establishment of non-native plants, increased thatch and altered hydrology. • No experimental studies are recommended to manage fire suppression.	**Management Strategies and Techniques** 1. Fire response plan for first responders. 2. Establish contacts for communication and coordination with fire department and other appropriate agencies. 3. Periodic meetings to review fire response plan. 4. Incorporate fire response plans as an appendix to the SCP. 5. Repairing soil, seed bank and habitat values if preserve lands are affected by ground-disturbed suppression activities. **Monitoring** 1. Opportunistic ad hoc studies to examine effects of various management treatments under post-fire conditions.

Threat	Information Known or Needed	Management and Monitoring
Trampling	• Access to preserves will be controlled, but unauthorized access could lead to soil compaction or trampling. • Trampling could also occur inadvertently as a result of management activities such as weed removal and biological monitoring activities within the preserves. • Trampling of spineflower can increase mortality and reduce productivity, but can also indirectly impact spineflower through increased cover of non-native plants, erosion, soil compaction, and loss of soil organic horizon. • Spineflower impacts associated with soil and vegetation disturbances from trampling are addressed through studies specific to these factors; focused research on the impacts of trampling in itself are not recommended at this time.	Management Strategies and Techniques 1. Control access to preserves. 2. Install clearly marked, fenced boundaries. 3. Outreach and education. 4. Install signing as early as possible. 5. Include patrolling and enforcement of boundaries if necessary. 6. Planning management and monitoring activities within occupied areas to minimize adverse effects of trampling on aboveground plants. Monitoring 1. Quarterly monitoring to evaluate whether fencing and signage are successful in preventing unauthorized access which could lead to trampling impacts within the preserves.
	Low Priority for Management	
Fire Exclusion	• Fire exclusion involves fuel modification practices between developed areas and preserves. • Fire exclusion may increase shrub cover and decrease openings in scrub habitats transitioning habitat towards conditions thought to be unfavorable for spineflower, and can also increase the risk of high-intensity fires. • Fire exclusion can allow unnatural accumulation of litter on soil surface; increased plant cover and litter may be unfavorable for growth and establishment of spineflower. • It is unclear whether fire exclusion increases or decreases non-native cover.	Management Strategies and Techniques 1. Results of habitat characterization study to inform whether potential effects of fire exclusion will require management. 2. Available management actions include physical (mechanical or manual) control or removal of shrubs within preserves. Prescribed burns may be utilized if determined to be a viable and useful management tool. Monitoring 1. Increased shrub cover would be monitored as part of the overall monitoring of vegetation communities within the preserves.

Threat	Information Known or Needed	Management and Monitoring
Herbivory and Seed Predation	• Herbivory and seed predation have not been directly studied, but physical signs of herbivory have been observed anecdotally in the field in the study area. • Spineflower may be susceptible to herbivory by small mammals and invertebrates, which may negatively affect germination, plant growth, seed production, seed viability, and seed dispersal. • Reduced abundance of predators (coyotes, raptors) could increase herbivory by small mammals. • Invasion by Argentine ants could result in the displacement of existing invertebrate seed predators that are effective seed dispersers. • The habitat characterization study should determine extent of herbivory within preserves.	Management Strategies and Techniques 1. Maintain large core open-space areas and biological connectivity between preserves to maintain presence of top predators. 2. Control of small mammals through trapping and exclusionary fencing if herbivory or granivory shown to be deleterious. Monitoring 1. Periodically conduct raptor and scat and track surveys to estimate the abundance of top predator species 2. Effectiveness monitoring to evaluate the success of reducing the effects of herbivory and granivory.
Disruption of Natural Soil-Disturbance Regime	• Sources of soil disturbance include mammal diggings, trails, and erosion. • Soil disturbance can disrupt the creation and maintenance of safe sites for spineflower and create openings for the establishment of ruderal plants. • The habitat characterization study could determine what the sources of soil disturbance and whether aspects of spineflower performance are correlated with such disturbances (either natural or artificial).	Management Strategies and Techniques 1. Prevent anthropogenic disruptions of natural soil disturbance regime. 2. Collect more data regarding the effects of soil disturbance and determine whether the overall effect is positive or negative for spineflower. Monitoring 1. Status and trends of soil disturbances within occupied portions of the preserves will be tracked as part of annual spineflower abundance sampling.

FIGURE 1
Stressor Model



Non-Native Plants
Priority: High

Non-native plants were identified as a high priority for management within the preserves for the following reasons:

- Severity of Impacts: Non-native plants may have a very severe negative impact on spineflower population performance.
- Probability of Occurrence: Non-native plants are fairly ubiquitous within the preserves and invasions are likely to continue.
- Certainty of Consequences: Though not studied in this system, prior research has identified that other species in the *Chorizanthe* genus are poor competitors and that demographic rates (i.e., recruitment of new individuals and seed production) decline in the presence of non-native annual grasses and forbs.
- Indirect and Interactive Effects: Other anthropogenic impacts, including nitrogen deposition, fire suppression, and cessation of cattle grazing, can exacerbate the impacts of non-native plants, which can also alter the effects of disturbance on spineflower populations.

Background

A suite of non-native plants has become established within the California sagebrush scrub and California annual grassland communities in which spineflower occurs. Non-native annual grasses are widespread and patchily very abundant, including *Avena* spp., *Bromus diandrus*, *B. madritensis*, *Schismus barbatus,* and *Vulpia* myuros. Non-native forbs co-occurring with spineflower include *Brassica* spp., *Centaurea melitensis*, *Erodium* spp., and *Salsola tragus*. There is potential for a new invasion by yellow star thistle (*C. solsitialis*), which is expanding its range in the southern California area. Point-intercept transect sampling of spineflower polygons in the Entrada, Airport Mesa, Grapevine Mesa, Potrero Canyon and San Martinez Grande occurrences conducted in 2006 found that relative cover of non-native species in the sampled polygons ranged from 50% to 94% (Dudek and Associates 2006). In 2007, cover estimates based on quadrat sampling within sampled spineflower polygons found that relative cover of non-native species ranged from 28% to 100%, with relative cover of non-native grasses and forbs accounting ranging from 25% to 100%, and 0% to 33%, respectively (Dudek 2007).

Known or Hypothesized Effects and Their Mechanisms

Based on research examining the effects of non-native annual grasses and forbs on a species in the same genus as the San Fernando Valley spineflower, *Chorizanthe pungens* var. *hartwegiana*, non-native annual plants are hypothesized to compete with spineflower, reducing both individual and population performance (Kluse and Doak 1999; McGraw 2004). The impacts of non-native annuals occur through a variety of mechanisms, including:

- Reducing availability of soil resources (moisture, soil nutrients)
- Reducing light availability
- Creating thick litter on the soil surface that can inhibit seedling germination and establishment (McGraw 2004).

Invasive plant species alter the dynamics of the entire community. Hamilton (1997) presents evidence that southern California grasslands now dominated by non-native grasslands were likely to have once been occupied by desert scrub. Therefore, a distinct vegetation type developed due to disturbance (primarily grazing) rather than a simple conversion from native to non-native grassland as originally presumed (Hamilton 1997). Conversion to grassland, however, is not unidirectional, but rather depends on the level of disturbance experienced by the community. In general, areas that have been subjected to recent burning, grazing or other disturbance are typically dominated by grassland while areas without disturbance are likely to become dominated by shrubs (Frudenberger et al. 1987). Conversion from one vegetation type to another facilitates transformations throughout the ecosystem. Coastal sage scrub in particular appears to be susceptible to change, even over short time scales, because of its extensive coexistence with invasive annual grasses. By altering nutrient and moisture regimes, exotics inhibit the establishment, growth and survival of native shrubs, thereby fundamentally altering community structure and ecosystem functions (Minnich and Dezzani 1998).

Non-native annual plants could also indirectly negatively impact spineflower populations by:

- Reducing populations of pollinators and/or seed dispersers (i.e., by excluding native species and habitats that support natural native animals)
- Accelerating soil development and thus succession, which can increase the competitive environment, thus precluding use of habitat by
- Altering the natural fire regime (e.g., by increasing fire frequency, intensity, and/or severity by increasing the habitat's flammability) (D'Antonio and Vitousek 1992).

Relationship to Biological Goals and Objectives

Management to reduce or eliminate the potential direct and indirect effects described for non-native plants will help achieve the following specific biological objectives:

- Population: Objectives 1.1, 1.2, 1.3, and 1.5
- Community: Objectives 2.1, 2.2, 2.3, and 2.4.

Questions and Future Research

Prior observational studies have not examined patterns of spineflower distribution, abundance, or performance in relation to non-native plants, nor have experimental studies been conducted to examine the specific effects of non-native plants on the San Fernando Valley spineflower.

The following are specific questions that will be addressed through a habitat characterization study to be undertaken in the spring season no later than two years after issuance of the Incidental Take Permit if favorable rainfall conditions occur and through future experimental research that will be designed, in part, based on results of the habitat characterization study.

Habitat Characterization
Are the distribution, abundance, and/or performance of spineflower (positively or negatively) correlated with the occurrence of:

- One or more non-native plant species?
- Guilds (or functional groups) of non-native plant species (e.g., annual grasses, annual forbs)?
- Non-native plant species overall?

What are the distribution and abundance of non-native plant species within occupied spineflower habitat?

Are there any observable and consistent patterns in the occurrence of non-native plants and abiotic characteristics of the habitat (e.g., soil conditions) or disturbance (e.g., soil disturbances, time since fire) that might indicate the microhabitats in which non-native plants are most likely to occur in general and/or to compete with spineflower?

Experimental Studies
Experimental studies will be designed to examine the effects of various treatments intended to reduce the abundance and competitive effects of non-native plants. Experimental studies will

evaluate available non-native plant management techniques that are appropriate for use within portions of the preserves occupied by spineflower. Such experiments will involve establishing replicated plots in which various treatments are tested, including for example:

- Soil disturbance
- Weed whipping or mowing
- Raking (i.e., to remove accumulated thatch, if identified as a potential impediment)
- Small scale burning under controlled conditions
- Direct hand weeding
- Carefully timed selective herbicide application.

Management Strategies and Techniques

Management of the preserves has been designed to eradicate, control, and prevent non-native plants within the preserves. Specific management strategies will be developed within the context of a preserve-system non-native plant management plan which identifies the following:

1. Baseline data documenting the current distribution and abundance of each non-native species, gained from the habitat characterization study. Following completion of this study, mapping will be undertaken to capture spatial differences in weed abundance and distribution so that subsequent treatments can be customized.
2. Goals and objectives for non-native plant management within the preserve system and each preserve, derived from the habitat characterization study and any experimental studies
3. Strategies, targets, and techniques for non-native plant management within the preserve system and each preserve, derived from the habitat characterization study and any experimental studies
4. A coordinated program for non-native plant management within the preserves, including:
    a. A prioritized list of non-native plant control and eradication projects, developed through consideration of the distribution, abundance, impacts, and methods of control as well as the impacts of control methods on spineflower
    b. Timelines and budgets for project implementation
    c. A detailed program to prevent invasion by new non-native plants.

Depending on the outcome of the habitat characterization study and any experimental studies, various strategies will likely need to be developed for different guilds of non-native plants, including non-native grasses, early-season forbs, and late-season forbs, or for individual non-native plant species. Management techniques and metrics will also differ depending on the existing conditions of specific areas within the preserves. Management in areas dominated by non-native plant species will be intended to convert these areas back to native vegetation types, while in areas with existing native vegetation management will be intended to retain native character and reduce or prevent invasion by non-native plants. These should be based on available outside research examining effective control techniques (e.g., the use of Fusilade to control annual grasses; see Allen 2006) and will be tested and refined through on-site experimental trials designed to evaluate their effectiveness and effects on spineflower in this system. Those techniques that are proven to be successful would be implemented across a larger scale to achieve broader goals and objectives. Management strategies and techniques would be refined through the adaptive management processes, in which effectiveness of management is evaluated through monitoring and changes are made, as needed, to enhance achievement of the management objectives.

Monitoring

Monitoring linked to management within the preserves has been designed to attain four goals with regard to non-native plants:

1. Evaluate the effectiveness of management in attaining the goals and objectives established for non-native and native plant species within the preserves, including relative and absolute cover.
2. Examine the effects of non-native plant management techniques on spineflower populations, including abundance and distribution.
3. Assess the status and trends of non-native plant populations within the preserves.
4. Increase understanding of the factors influencing the distribution and abundance of non-native plants and their impacts on spineflower within the preserves.

These goals could be attained through three main types of monitoring.

Project Monitoring

The first two goals will be attained through project-level monitoring, in which non-native plant control projects are monitored to examine their effectiveness at attaining the goals and objectives of the control effort (e.g., reducing non-native annual grasses to <10% absolute cover) and to determine their effects on spineflower populations. Project monitoring can include conducting management as an explicit experiment, in which the factors mentioned in the goals above are compared between treatment areas and untreated areas (i.e., control areas).

Biological Effectiveness Monitoring
As part of monitoring protocols to track the distribution and abundance of spineflower through time, observations of non-native plant distribution and abundance will also be recorded, allowing managers to evaluate the status and trends of spineflower distribution and abundance as well as to increase understanding of how non-native plant populations interact with changes in the environmental conditions (e.g., disturbance, annual rainfall) to influence spineflower populations.

Non-Native Plant Monitoring
The status and trends of non-native plants within the preserves will also be monitored through a separate protocol focused on determining their occurrences preserve-wide, such as aerial extent mapping. This protocol would be used to supplement project and biological effectiveness monitoring studies and would provide additional information about the status and trends of non-native plants throughout the preserves and, perhaps, throughout the adjacent buffer areas and fuel modification zones from which non-native plants could invade.

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Loss of Genetic Diversity
Priority: High

The loss of genetic diversity was identified as a high priority for management for the following reasons:

- Severity of Impacts: The loss of genetic diversity is widely recognized as a significant threat to the conservation of endangered taxa, and the loss of genetic diversity thus is considered to be a significant risk to the long-term persistence of spineflower.
- Probability of Occurrence: Loss of genetic diversity can occur in a number of ways in response to both natural conditions and anthropogenic factors. The likelihood that spineflower occurrences conserved within the preserves will be subject to anthropogenic factors (loss of pollinators and seed dispersers, reduced connectivity between preserves) with the potential to reduce genetic diversity is moderate.
- Certainty of Consequences: The nature and magnitude of impacts due to reduced genetic diversity can vary, depending on the scale at which diversity is measured and the observed genetic structure, but the overall effect is presumed to be an increased risk of extinction over time.
- Indirect and Interactive Effects: The interaction of small population size and low genetic diversity can increase the risk of extinction.

Background

The genetic structure (intra- and interrelatedness) of spineflower occurrences in the Newhall Ranch RMDP study area has not been studied, so the potential for a loss of genetic diversity is currently unknown. Generally, outcrossing (via pollination) and migration (via seed dispersal between occurrences) are the primary mechanisms by which genetic diversity is maintained; for annual plants like spineflower, the seed bank is the repository for this reservoir of diverse alleles. Seed banks of annuals disproportionally represent genotypes that were successful in good years when large quantities of seeds were produced. In addition, a single year's seed production may not contain as much diversity as the entire seed bank, which represents that of several years of aboveground plants (Baker 1989). Genetic diversity within preserves would primarily be influenced by natural selection interacting with insect-mediated pollen exchange and movement of seeds over time. Genetic diversity between preserves primarily would be influenced by seed dispersal between preserves, and, to the extent that potential pollinators are capable of traveling between preserves, by pollination between preserves. Although other invertebrate taxa have been documented as floral visitors (Jones et al. 2002, 2004) and represent potential pollinators, native ants are hypothesized to be among the primary pollinators of spineflower (Jones 2007). Other pollinators include flies, beetles, and bees as well as other invertebrates. The relative abundance of these groups of pollinators differed between the different sites within Newhall Ranch (Grapevine Mesa, Mesa South, and Magic Mountain) and varied seasonally (Jones et al. 2004). European honeybees have been observed visiting spineflowers at the Laskey Mesa site (Jones et al. 2002) and may be able to transfer pollen between preserves. It is believed that European honey bees currently may be experiencing colony collapse syndrome, and pollination relying upon them therefore may be tenuous.

Known or Hypothesized Effects and Their Mechanisms

Loss of genetic diversity may threaten the ability of a species to persist in the face of abiotic and biotic environmental change by altering the ability of a population to cope with short-term challenges, such as pathogens and herbivores. Spineflower is susceptible to reduced genetic diversity through several general mechanisms discussed below whose effects tend to be exacerbated in populations of limited size. The presence of a seed bank, however, helps to retain genetic variation within a population by buffering against dramatic changes in genetic composition (Ellstrand and Elam 1993).

Genetic drift decreases variation within populations and increases differentiation among populations. Smaller populations are more susceptible to the loss and reorganization of variation by genetic drift than larger populations.

Inbreeding increases homozygosity within populations. Smaller populations tend to lose heterozygosity faster than larger populations. Increased homozygosity as a result of so-called inbreeding depression is associated with reduced demographic and population performance, specifically decreases in viability and fecundity (Ellstrand and Elam 1993).

- A plant species' mating system may influence its susceptibility to loss of genetic diversity. Honnay and Jacquemyn (2007) found that the genetic diversity of self-compatible species were less affected by decreasing population size than self-incompatible species.
- Spineflower appears capable of self-pollination, but studies have not been conducted to determine seed viability. In a laboratory experiment, Jones et al. (2004) found that spineflower excluded from all insect visitors experienced 29.2% seed set compared to spineflower excluded from all insects except for ants that experienced 64.6% seed set.
- Jennersten (1988) found that lower pollinator visitation rates were associated with lower seed sets in *Dianthus deltoids* in fragmented sites compared to intact sites.

- Horovitz and Harding (1972) found that self-pollination in an annual lupine, *Lupinus nanus*, varied across populations, and that self-pollination was negatively correlated with pollinator abundance.
- Self-incompatible plants in small populations can suffer from the inability to find a mate resulting in a lower seed set per individual and an increased variation in seed set among individuals (Byers and Meagher 1992).

Gene flow is the movement of genes among populations either through mating or migration of seeds (Ellstrand and Elam 1993). This generally contributes to more genetic variation making habitat fragmentation a primary conservation concern (Honnay and Jacquemyn 2007). Under certain circumstances in small populations, however, gene flow can reduce local variation, prevent local adaptive differentiation, and reduce fitness through outbreeding depression (Ellstrand and Elam 1993).

- Genetic erosion and a subsequent loss of fitness (e.g., demographic performance) caused by the loss of adaptive traits could occur if gene flow between previously connected occurrences is interrupted.
- Genetic contamination could occur by mixing previously isolated occurrences through human-mediated transplantation efforts and could lead to the unintended loss of local adaptations and an overall decline in fitness.
- Hybridization between sensitive rare species and more common species can put the rare species at risk of genetic assimilation or if the progeny is sterile or fitness is reduced, the plant may suffer from outbreeding depression (Ellstrand and Elam 1993). Turkish rugging (*Chorizanthe staticoides*), a common species from the same genus, co-occurs with spineflower but it is not known whether hybridization occurs or if it is possible.

The primary causes of reduced genetic diversity likely include the loss of pollinators, increased rates of self-pollination and reduced or ineffective seed dispersal, leading to loss of genetic diversity harbored in the seed bank and even reductions in the amount of viable seed produced. Increased isolation and loss of connectivity could lead to losses in unique alleles. Increased distance between preserved spineflower populations may result in reduced exchange of pollen or dispersal of seed to new areas.

Relationship to Biological Goals and Objectives

Management to reduce or eliminate the potential direct and indirect effects described for the loss of genetic diversity will help attain the following specific biological objectives:

- Population: Objectives 1.1, 1.2, 1.3, and 1.4
- Community: Objective 2.4
- Ecosystem: Objective 3.1.

Questions and Future Research

The first step in developing an appropriate strategy for maintaining genetic diversity is to complete a genetic study to investigate the genetic structure of the spineflower occurrences in the Newhall Ranch RMDP study area. This initial study of genetic diversity will utilize neutral genetic markers to compare differences in genetic diversity within and between spineflower occurrences, and if feasible, will sample the genetic diversity of the seed bank as well. Sampling seed banks in the field, however, can be very challenging and may not be feasible without an efficient way to collect and sort seed collected in the field. A second component to this study will investigate the viability of seed produced from self-fertilized individuals compared to seed produced from pollinated individuals. This genetic study is considered a high priority and will be conducted in the near-term within a 1-year time frame or in the first year where there are sufficient aboveground populations to undertake the study.

A second, more involved genetic study would investigate the presence of local adaptations within the spineflower occurrences. This study would take place in the medium-term 1- to 5-year time frame.

Another question to address would be: Is genetic diversity related to the abundance or assemblage of native ants and other invertebrate species?

Management Strategies and Techniques

Management strategies will focus on maintaining and enhancing conditions for pollination, seed dispersal, and/or migration.

In addition to maintaining habitat conditions to facilitate the natural movement of pollen and seed within and among preserves, depending on the outcome of the genetic studies, artificial human-mediated transfer of seed between adjacent occurrences could be used as a management technique for maintaining genetic diversity. Although according to Ellstrand and Elam (1993), the introduction of migrants may slow or halt loss of genetic variation caused by drift, the human-mediated transfer of individuals (i.e., seed) is not proposed at this time. Substantial information would be necessary to understand the potential effects of transplanting seed between populations and substantial risk is associated, for example, with the potential for the inadvertent loss of locally adapted alleles important for survival.

Monitoring

Monitoring of changes in the invertebrate and small mammal populations will be implemented to detect potential disruptions in gene flow within and among preserves.

Directly monitoring changes in genetic variation can be difficult. A more practical approach may be to monitor for decreased fitness associated with the loss of genetic variation, indicated, for example, by reduced seed set (Ellstrand and Elam 1993). As described in Appendix F of the SCP, spineflower abundance sampling will utilize cover as a measure of abundance which will also provide a measure of seed production, since the number of involucres is related to plant size (Dudek 2007).

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Fire Suppression
Priority: Medium

Fire suppression was identified as a medium priority for management within the preserves for the following reasons:

- Severity of Impacts: Fire suppression activities can involve clearing, bulldozing, and other activities that have direct impacts on habitat and species. Alteration of the natural fire frequency return interval reflecting conditions that local vegetation and species are adapted to, is also a concern. Long-term impacts within the preserves may occur, resulting from changes in vegetation communities (e.g., increased cover of non-native species, increased litter produced by expanding shrub cover).
- Probability of Occurrence: Based on historical records between 1858 and 2006, portions of the preserve areas were burned on 6 separate occasions as a result of 38 fires that occurred within 0.5 mile of the Newhall Ranch RMDP study area. Historical fire frequency appears to be correlated with current levels of shrub cover within preserves. For example, San Martinez Grande has had the highest fire frequency return interval (20 to 30 years) and supports very low shrub cover, whereas Grapevine Mesa has had low fire frequency and supports a more diversified complex of shrub, tree, and herb layers (County of Los Angeles Fire Department 2007). Increasing urbanization is expected to increase the frequency of wildfires in the area and, therefore, the need for fire suppression activities.
- Certainty of Consequences: Previous studies have documented the negative effects of fire suppression on other native plants. Clearing, bulldozing, and other activities within the preserves would directly impact spineflower and its habitat, particularly if conducted within occupied habitat areas.
- Indirect and Interactive Effects: Potential indirect effects could include erosion, soil compaction, the establishment of non-native plants, introduction of new weeds, and altered hydrology if sheet flow is redirected.

Background

In the greater Santa Clarita area, 39 fires have been documented within 0.5 mile of the Newhall Ranch RMDP study area based on Los Angeles County records between 1858 and 2007 (Recent fire records since 1950 jointly maintained by CAL FIRE, USDA Forest Service Region 5, BLM, NPS, Contract Counties and other agencies include fires 10 acres or greater in size. Fire records prior to this typically only recorded large fires, however, what was historically considered a large fire was not defined and may have varied over time. As a result, fire records prior to 1950 may understate the occurrence of fire). Seven fires have occurred within the proposed boundaries of the actual preserves during this period, including the Magic fire in October 2007 that burned portions of Entrada and Grapevine Mesa. *Table 2* summarizes these fire occurrences. *Figure 2* shows the cumulative boundary of all fire perimeters occurring within the greater Santa Clarita area between 1858 and 2007. In response to wildfires, fire agencies conduct clearing, bulldozing, and other activities to control and suppress fires. It should be noted that the causes of these fires are unknown, (although typically, the vast majority of wildfires in southern California are human caused) except for Verdale in 2003, which was caused by aircraft.

TABLE 2
Newhall Fire History 1858-2006: Incidents Occurring within at least 0.5 mile of Newhall RMDP Study Area

Year	Fire Name	Total Acres Burned	Preserve Area Burned (Acres)
1913		644	
1927	HARRISON RANCH NO. 5	34	
1929	BOWMAN RANCH NO. 88	251	
1930	TOWER NO. 88	132	
1940	TOWNLEY CYN-PICO CYN	598	
1943	NEWHALL FIRE NO. 197	1,889	San Martinez Grande (32)
1945	SHERIFF NO. 109	70	
1953	EDISON	771	
1954	PICO FIRE	327	
1962	GOLDEN FIRE	5,409	
1963	RAMONA	54	
1969	VALENCIA FIRE	438	
1969		568	
1970	MAYO FIRE	2,420	San Martinez Grande (32)
1970	CLAMPITT FIRE	10,565	Potrero (6)
1970		17	
1975		12	
1975		19	
1975		39	
1979	HASLEY FIRE	97	
1979	CHIQUITA FIRE	1,315	
1979	VALENCIA FIRE	463	
1979	WAYSIDE FIRE	266	
1982	HASLEY FIRE	93	
1986	HASLEY FIRE	14	
1986		8	
1986		42	
1988	PIRU FIRE	3,508	
1988	PIRU	2,639	San Martinez Grande (34)
1989		50	
1989		4	
1989		4	
1989		43	Airport Mesa (8)

TABLE 2 (Continued)

Year	Fire Name	Total Acres Burned	Preserve Area Burned (Acres)
1989		12	
1995	SAN MARTINEZ FIRE	3	
2000	WEST	121	
2003	VERDALE	2,102	San Martinez Grande (34)
2003	SIMI FIRE	10,201	
2007	MAGIC FIRE	1,219	Entrada (24), Grapevine Mesa (26)

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Newhall Ranch
-2007 Cumulative Area

FIGURE
2

Known or Hypothesized Effects and their Mechanisms

Fire suppression activities have been documented to negatively impact natural communities and constituent species. Damage caused by bulldozing and clearing have a direct impact on vegetation. Chemicals, such as fire retardants and suppressants, also directly impact soil and vegetation. Surfactant suppressant foams partially dissolve plant epicuticular wax, making the plants more susceptible to other threats. Fire retardants can decrease nitrogen mineralization; however, no other chemical or microbial changes in soil treated with fire retardants were detected in laboratory tests (Backer et al. 2004). In addition, gasoline or diesel contamination, which is a risk involved in fire suppression efforts, can induce negative plant responses, including acute toxicity, inhibited germination, and stunted and retarded growth (Backer et al. 2004).

Erosion is one of the indirect outcomes of fire suppression activities, such as the construction of fire lines and roads. Fire lines and the associated berms cause artificial channeling that accelerates erosion. The use of tractors, bulldozers, and wheeled skidders to construct fire lines also contributes to soil compaction (Backer et al. 2004). Both erosion and soil compaction alter the natural soil characteristics, which may negatively affect spineflower.

Fire suppression activities also can promote the introduction and spread of invasive species. Fire camps, fire lines, helibases, and incident command posts are likely sites for invasion by invasive plants because personnel, vehicles, and equipment can act as vectors for propagules (Backer et al. 2004; Keeley 2006). For example, higher densities of the non-native spotted knapweed (*Centaurea maculosa*) were found on bulldozer-constructed fire lines, and knapweed density decreased exponentially with distance from the fire line. Post-fire rehabilitation treatments, such as tilling and ripping the soil, post-fire logging, and the application of straw mulch contaminated with weeds, can also promote the spread of non-native plants (Backer et al. 2004). By increasing the risk of non-native plants, fire suppression activities can indirectly affect spineflower by exposing spineflower to competitive pressure by non-native plants. (See discussion on the threat of non-native plants for more information.)

Backfires and "burnout" areas may also indirectly affect vegetation. Backfires from containment lines may increase the extent and intensity of the fire. Burnout operations remove unburned "islands" of vegetation, producing a much more homogeneous burned area than would occur within typical fires. Refugia for plants and animals can even be removed by these burnout operations (Backer et al. 2004).

Relationship to Biological Goals and Objectives

Management to reduce or eliminate the potential direct and indirect effects described for fire suppression will help attain the following specific biological objectives:

- Population: Objective 1.3
- Community: Objectives 2.1, 2.2, and 2.3
- Ecosystem: Objectives 3.1 and 3.2.

Questions and Future Research

Prior observational studies have not examined patterns of spineflower distribution, abundance, or performance with respect to fire suppression, nor have experimental studies been conducted to directly examine the effects of fire suppression on the spineflower.

In the case of fire suppression, thoughtful planning is likely to be a more profitable approach than focusing efforts on research. However, in the event that fire suppression activities do take place within or adjacent to the preserves, opportunistic ad hoc monitoring studies could be implemented to examine the effects of various management treatments under post-fire conditions. In addition, a fire response plan will be in place to avoid and minimize the direct impacts of fire suppression activities. Many of the potential indirect impacts (i.e., non-native plants, erosion) are threats identified elsewhere and will be managed accordingly.

Management Strategies and Techniques

Specific management strategies for fire suppression in the preserves shall be designed to cover the following:

1. Developing a fire response plan for first responders
2. Establishing contacts for communication and coordination with the fire department and other appropriate agencies
3. Conducting periodic meetings with appropriate agencies to review the fire response plan. The preserve manager will contact the Los Angeles County Fire Department at least once every 5 years to review the plan and consult with them on implementation of the plan.
4. Incorporating the fire response plan as an appendix to the SCP (Dudek 2007a).

5. Repairing soil, seed bank and habitat values if preserve lands are affected by ground-disturbing suppression activities.

Monitoring

Opportunistic ad hoc studies to examine effects of fire suppression within or adjacent to preserves.

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Trampling

Priority: Medium

Trampling was identified as a medium priority for management within the preserves for the following reasons:

- Severity of Impacts: Trampling could have significant direct and indirect impacts to spineflower and habitat conditions within the preserves. Impacts could be severe but would likely be localized to the area directly disturbed by trampling.
- Probability of Occurrence: Access to preserve areas will be restricted via exclusionary fencing, signage and enforcement, so the incidence of trampling is expected to be low. However, trampling may also occur as a result of authorized or planned activities, including non-native plant control and spineflower monitoring.
- Certainty of Consequences: Direct trampling of spineflower occurrences would have a clear direct impact on spineflower performance through increased mortality and reduced flowering and seed production. Depending on the level of trampling, indirect effects could negatively impact spineflower due to potential increased cover of non-native plants, erosion, soil compaction, and loss of soil organic horizon[1].
- Indirect and Interactive Effects: Soil compaction and erosion (as indirect effects of trampling) could have both positive and negative effects on spineflower, but it is assumed that most impacts would be negative. Trampling could promote the invasion and spread of non-native plants, by both vectoring their seeds and by creating disturbance, which can promote their establishment.

Background

The primary cause of trampling within preserves is expected to be caused by human trespass. Preserves will be set aside as open space for conservation purposes only and will not be authorized for public uses, including both passive (e.g., hiking) and active recreation. Access to the preserves will be restricted using fencing and signage. However, trespassing into the preserves may occur and could include unauthorized foot traffic, though proposed fencing should be adequate to prevent entry by mountain bikes, horses and motorized off-highway motor vehicles (OHVs), such as motorcycles and quad runners. There is also the potential for trampling

[1] An organic layer of fresh and decaying plant residue at the surface of a mineral soil (NRCS 2007).

to occur inadvertently as a result of management activities such as weed removal and habitat monitoring within the preserves.

Known or Hypothesized Effects and their Mechanisms

Trampling has been documented to have both positive and negative ecological effects. On the positive side, it can slow the growth of competitive dominants and allow the persistence of less vigorous species by creating openings in vegetation, and higher rates of species richness have been attributed to trampling (Hobbs and Huenneke 1992). However, these openings can also facilitate the establishment of non-native plants (CBI 2000). Also on the negative side, Cole (1987) correlated trampling with a decrease in species richness and Hobbs and Huenneke (1992) demonstrated that most, though not all, species were negatively impacted by trampling. A study (Mashinski et al. 1996) comparing the endangered sentry milk-vetch (*Astragalus cremnophylax* var. *cremnophylax*), before and after it was protected from human trampling, showed that seedlings became reproductive more quickly, the total numbers of undamaged plants surpassed the numbers of damaged plants, and the population began to stabilize rather than decline after protection. In addition, the consequences of trampling are dependent upon the severity of the damage. For example, plants with light damage produced seven times more fruit than plants with severe damage (Maschinski et al. 1996). As an herbaceous plant, spineflower branches and stems can be easily crushed or broken and damage to this species is expected to be more severe than to more robust plants (CBI 2000).

Soil compaction and the loss of soil organic horizons are indirect effects of trespassing or trampling, apart from the direct loss of vegetation cover. Although in one study (Cole 1987) the loss of organic horizons sufficient to expose the underlying mineral soil only occurred at higher levels of trampling, the extent to which such soil disturbances caused by trampling affect spineflower demographic performance remains unknown and should thus be assumed to be negative.

Relationship to Biological Goals and Objectives

Management to reduce or eliminate the potential direct and indirect effects described for trampling will help attain the following specific biological objectives:

- Population: Objectives 1.2 and 1.3
- Community: Objectives 2.1 and 2.2

Questions and Future Research

The potential direct and indirect effects of trampling are expected to be minimized to an acceptable level by restricted access to the preserves through fencing, signage, and enforcement. Because the more obvious direct effects of trampling (e.g., OHVs) are almost certainly negative, focused research on their impacts is not recommended at this time. Apart from a focus on trampling impacts themselves, spineflower impacts related to soil and vegetation disturbances (i.e., non-native plants) are addressed through studies that are specific to these impacts.

Management Strategies and Techniques

Management of the preserves should be designed to control unauthorized access to the preserves. This includes:

1. Prohibiting public access to preserves
2. Installing clearly marked, fenced boundaries
3. Public outreach and education
4. Installing signage as early as possible
5. Increasing patrolling and enforcement of preserve boundaries if unauthorized access becomes evident.
6. Planning management and monitoring activities within occupied habitat to minimize adverse effects of trampling on aboveground plants.

The success of protection from human disturbance has been documented. In a study that controlled access to an area in the western Mojave Desert via fencing resulted in greater overall community biomass and diversity as well as other benefits (Brooks 1995).

Monitoring

Monitoring will be conducted periodically along the preserve boundaries to evaluate whether fencing, signage and current levels of enforcement (i.e., patrols) are successful in preventing unauthorized access. Monitors will search specifically for typical signs of unauthorized access including damaged fencing, vandalism, creation of foot trails, litter, etc. Monitoring the preserves for unauthorized access that could lead to trampling impacts will initially be conducted on a quarterly basis, but the frequency of monitoring may be increased depending on the proximity and type of adjacent land uses.

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Fire Exclusion
Priority: Low

Fire exclusion was identified as a management issue for the preserves but is considered a low priority for management, for the following reasons:

- Severity of Impacts: The exclusion of fire within the preserves could lead to a shift toward native shrub-dominated communities, reducing or eliminating the openings in which spineflower occurs. An increase in the extent of native shrub-dominated communities may reduce suitable openings for spineflower within the preserves, but it may also benefit spineflower by reducing competition from non-native plants and by maintaining favorable habitat conditions for pollinators. However, because openings within the preserves may also be attributable to environmental factors other than fire (White 1995), the negative effects of fire exclusion may be less severe than otherwise expected. This potential impact will need to be monitored over the long term to determine whether it is having a significant adverse effect on spineflower populations.
- Probability of Occurrence: Natural fire frequency (i.e., wildfires) in preserve areas will likely be reduced or eliminated by the exclusion of fires within and immediately surrounding developed areas, thus allowing for regeneration of native shrub communities in some areas. In addition, in concert with fire exclusion, management to control non-native grasses and forbs may encourage regeneration of native shrubs.
- Certainty of Consequences: Because fire exclusion can have both positive and negative effects on spineflower depending on various factors, the effect of fire exclusion on spineflower populations remains uncertain and difficult to predict.
- Indirect and Interactive Effects: Increased accumulation of thatch and expansion of native shrub cover due to fire exclusion may create conditions unsuitable for spineflower. Fire exclusion may increase or decrease non-native plant species populations, which compete with spineflower. Fire exclusion also increases the risk of higher-intensity fires, which may negatively affect spineflower populations. These potential impacts will need to be monitored over the long term to determine whether they are having a significant adverse effect on spineflower populations.

Background

Development will likely reduce or eliminate the opportunity for natural fires within preserve areas, by removing substantial areas of fuel and through fuel modification practices between developed areas and the preserves. Although the "natural" fire regime has undoubtedly been altered by landscape-level changes in vegetation and land use (e.g., agriculture) over the last 100 years, it is the recent historic fire regime (i.e., in the last 100 years) that has influenced the current distribution and abundance of spineflower. In the greater Santa Clarita area, 39 fires have been documented within 0.5 mile of the RMDP study area from records between 1858 and 2007, the first of which occurred in 1913. Seven fires have occurred within the preserves (Grapevine Mesa, Potrero Canyon, San Martinez Grande) themselves over this period (County of Los Angeles Fire Department 2007). *Table 2* summarizes the 39 fires that included the preserves or occurred within 0.5 mile of the Newhall Ranch RMDP study area and *Figure 2* shows the cumulative boundary of all fire perimeters occurring within the greater Santa Clarita area between 1858 and 2007 (see Fire Suppression).

Known or Hypothesized Effects and Their Mechanisms

In the absence of fire, shrub canopy cover could increase as a result of increased shrub survivorship and biomass, and herb-dominated communities could decrease. Fire exclusion may also facilitate establishment or spread of exotic plant species. Finally, fire exclusion can allow the unnatural accumulation of leaf litter on the soil surface (McGraw 2004). Increased plant cover and litter can create unfavorable conditions for the establishment and growth of spineflower.

Although the habitat and climate of the area in which San Fernando Valley spineflower is found differs from that of Ben Lomond spineflower (*Chorizanthe pungens* var. *hartwegiana*), the effects of fire exclusion on these two taxa may be similar. Through experimental research to inform conservation of the Ben Lomond spineflower, McGraw (2004) showed that fire exclusion increases the cover of shrubs and trees. This woody vegetation restricts the distribution of the endangered annual herb through the shade, which reduces growth and fecundity, as well as through the leaf litter that accumulates on the soil surface and reduces establishment, growth, and fecundity. In an experiment examining the effects of reintroducing fire or using fire surrogates to enhance habitat, fire increased spineflower demographic performance directly by removing accumulated leaf litter on the soil surface (McGraw 2004). However, the open structure of coastal sage scrub communities in the preserves could also be due to arid desert-transition physiography (White 1995), in which case a shift toward shrub-dominated communities and the potential impact to spineflower may be less severe than expected.

Fire exclusion can potentially benefit or harm spineflower by altering the relative abundance of non-native species. Fire can potentially promote the invasion and spread of non-native plants by reducing thatch and providing them with an opportunity to establish (Zedler and Scheid 1988).

However, McGraw (2004) found that fire actually indirectly facilitated spineflower by reducing the cover of non-native annual grasses and forbs, which negatively impact the spineflower through strong competition for soil resources. Raking to remove leaf litter had similar, beneficial effects on spineflower performance by removing leaf litter and reducing the abundance of non-native annuals (McGraw 2004).

Relationship to Biological Goals and Objectives

Management to reduce or eliminate the potential direct and indirect effects described for fire exclusion will help attain the following specific biological objectives:

- Population: Objective 1.1, 1.2 and 1.5
- Community: Objective 2.1, 2.2 and 2.3

Questions and Future Research

Research should examine whether prescribed burns can be used as a management tool to maintain or increase spineflower populations. ,Due to political, public safety and air quality issues, research would need to be conducted at a small spatial scale, through the aid of burn boxes (*sensu* McGraw 2004). Due to concerns over the long term viability of using prescribed fire as a management tool in the spineflower preserves, it will be important to also investigate fire surrogates—alternatives that mimic the beneficial effects of fire spineflower habitat conditions.

Management Strategies and Techniques

Results of the habitat characterization study to be conducted in the spring season no later than two years after issuance of the Incidental Take Permit should inform whether potential effects of fire exclusion (i.e., increased abundance of native shrubs, non-native species, and thatch) will require management. Management strategies for non-native species are discussed above. Management techniques and strategies for native shrubs include physical (mechanical or manual) control or removal within preserves. If determined to be a viable and useful management tool, prescribed burns may be utilized to maintain or increase spineflower populations.

Monitoring

Landscape-level changes in vegetation communities within the preserves will be monitored using remote sensing and aerial interpretation at 10-year intervals. In order to detect changes in relative shrub cover, landscape-level monitoring of vegetation communities may need to be supplemented with on-the-ground vegetation monitoring techniques, including the use of permanent photo-documentation stations. As a potential effect of fire excluding fire within the preserves, increases in shrub cover would be measured as part of the overall monitoring of vegetation communities within the preserves.

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Herbivory and Seed Predation
Priority: Low

Herbivory and seed predation are identified as management issues for the preserves but are considered low management priorities, for the following reasons:

- Severity of Impacts: Impacts due to herbivory and/or seed predation of spineflower are uncertain, but are unlikely to be severe. A number of factors can influence the occurrence and effects of herbivory and seed predation, including seasonal abundance of herbivores and granivores (seed predators), timing of plant production, vegetation type, and food availability (Hamback et al. 2004). Changes in seed predation and herbivory levels may affect spineflower competitors, which could indirectly affect spineflower in positive or negative ways. For example, if native harvester ants decline, there is potential for reductions in sparsely vegetated openings that may be favorable safe sites for spineflower to occupy. Red harvester ants tend to occupy such openings and maintain more open conditions by thinning annual grass vegetation and removing seed from the soil surface.
- Probability of Occurrence: Loss of top predator habitat where connectivity to preserved habitats is impaired, and proximity to development are likely to decrease predator (coyote, bobcat, raptor) abundance from pre-development levels. This could increase existing rates of herbivory and seed predation within the preserves due to a release effect on herbivores and granivores.
- Certainty of Consequences: Herbivory would most likely depress spineflower performance. However, the effects of granivores are less certain and may depend upon which species are removing seed and whether or not they are providing effective dispersal of spineflower seed in the process. Currently, it is not known whether or not loss of spineflower seed to seed predators is a significant concern.
- The potential impact to spineflower is tied to the effects of reduced predator abundance cascading down trophic levels, which can be complex and difficult to study due to multiple levels of interactions. Reduced top predator abundance could lead to a release in prey species and a resultant increase in herbivory and granivory. Alternatively, reduced top predator abundance and the proximity to development may cause mesopredator release (Crooks and Soulé 1999), in which case the abundance of prey species may decrease and reduce the potential for herbivory and granivory. In addition, even if prey abundance increases, the extent to which increased herbivory and granivory will affect spineflower as a potential food source remains unknown. In the absence of additional information, the potential effects of herbivory and granivory are very uncertain.

- Indirect and Interactive Effects: In addition to the complex predator–prey relationships discussed above, invasion by Argentine ants could cause the displacement of existing invertebrate seed predators that are effective seed dispersers. The interactive effects of granivory and invasion by Argentine ants, therefore, could have significant negative impacts to spineflower performance.

Background

Herbivory and granivory of spineflower has not been directly studied, but physical signs of herbivory, for example, have been observed anecdotally in the field in the Newhall Ranch RMDP study area (FL*x* 2007). With regard to granivory, spineflower seeds are retained within the spine-tipped involucres even after the plant disarticulates in the late summer, and release of seed from involucres may not occur for several more months (Sapphos 2001). The delayed release of seeds from spiny involucres and the timing of disarticulation may inhibit seed predation, although the presence of spiny involucres likely inhibits seed predation by small mammals more so than invertebrates. In mammal trapping studies conducted at Ahmanson Ranch in September 1999, no seeds or seed heads were found in the cheek pouches of kangaroo rats or pocket mice among four species trapped within spineflower habitat (Sapphos 2001). Also at Ahmanson Ranch, LaPierre and Wright (2000) noted harvester ants carrying flower parts containing seeds to nest sites.

Known or Hypothesized Effects and Their Mechanisms

Increased herbivory and granivory are hypothesized to depress demographic performance of spineflower within the preserves. Germination, plant growth, seed production, seed viability, and seed dispersal could be affected. The effects of increased herbivory and granivory may also vary by species.

Increases or qualitative changes in herbivory and granivory may occur as an indirect result of changes in predator and prey (i.e., herbivores such as small mammals) abundance. Changes in the level of granivory and herbivory are anticipated if small mammal prey species (e.g., rabbits, gophers, pocket mice) increase in abundance due to decreased predation associated with development. However, as noted above, this effect may be negated by an increase in mesopredators, resulting in a reduction of the granivores and herbivores.

Hamback et al. (2004) examined the effects of predator exclusion on herbivory and found that outcomes were dependent upon seasonal changes in prey abundance and food availability, vegetation type (i.e., herb or shrub), and the timing of plant emergence and growth. Annual herbs (grasses and forbs) as opposed to perennial shrubs were able to avoid the effects of increased herbivory under predator exclusion as herbivores had low densities in the spring and were unable to track the increase in plant productivity.

Potential interactive effects of granivory and invasion by Argentine ants, which may displace native invertebrate granivores, could be significant. In coastal San Diego county, Argentine ants were ineffective in safely dispersing seeds of the myrmecochorous tree poppy (*Dendromecon rigida*) relative to displaced native harvester ant (*Pogonomyrmex subnitidus*) as seeds left by Argentine ants were not sufficiently buried to avoid subsequent predation at the soil surface.

Herbivory could promote spineflower populations indirectly by reducing competition from non-native annual grasses and forbs. For example, harvester ants collect and consume a lot of seed, including spineflower seed. If Argentine ants effectively exclude harvester ants from preserves then any effect their granivory may now have on controlling or limiting competing plant species would be lost.

Relationship to Biological Goals and Objectives

Management to reduce or eliminate the potential direct and indirect effects described for herbivory and granivory will help attain the following specific biological objectives:

- Population: Objectives 1.1, 1.2, 1.3, and 1.4
- Community: Objective 2.4
- Ecosystem: Objective 3.1

Questions and Future Research

The Habitat Characterization Study to be conducted in the spring season no later than two years after issuance of the Incidental Take Permit will document the extent of herbivory as indicated by evidence of browsing on spineflower plants. If warranted by the extent of herbivory, future research projects should determine the extent to which herbivores and granivores within the preserves utilize spineflower plants and seed as a food source. If herbivory and granivory of spineflower are found to occur, additional studies might include exclosure experiments to determine the effects of herbivory and granivory on spineflower demographic performance on a small scale so that appropriate management measures could be identified. Further studies could be conducted to investigate whether the effects of granivory within the preserves are dependent upon species, in which case management efforts could be refined and made more effective by targeting a particular species. With the uncertainty regarding potential effects, herbivory and granivory are considered a low priority for management at this time.

The following are specific questions that will be addressed through the habitat characterization study to be conducted in the spring season no later than two years after issuance of the Incidental Take Permit and through additional, experimental research that will be designed, in part, based on results of the habitat characterization study.

- Is spineflower subject to browsing? If so, what are the predators of spineflower and what is the incidence of herbivory?
- What are the effects of browsing on spineflower demographic performance? Should management interference occur?

Management Strategies and Techniques

Maintenance of large core open-space areas (i.e., High Country Special Management Area (SMA), Salt Creek area, and River Corridor SMA) and biological connectivity between preserves is intended to maintain the presence of top predators, such as raptors, coyotes, and bobcats and would prevent the occurrence of predator release within the preserves.

If necessary to control increased herbivory or granivory, small-mammal trapping and exclusionary fencing could be used as management techniques. In addition, raptor perches could be installed to discourage small mammals from predating spineflower if they are determined to negatively affect spineflower.

Monitoring

Monitoring the effectiveness of the core open-space areas and wildlife corridors between preserves could be achieved by periodically conducting raptor and scat and track surveys (for large mammals) to estimate the abundance of top prey species for comparison against pre-development levels.

The incidence of herbivory will initially be determined as part of the Habitat Characterization Study in the spring season no later than two years after issuance of the Incidental Take Permit. Additional monitoring of herbivory or seed predation is not proposed at this time, but could be implemented in the future if warranted.

Effectiveness monitoring would be implemented to evaluate the success of reducing the effects of herbivory and granivory.

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Disruption of Natural Soil-Disturbance Regime
Priority: Low

Disruption of the natural soil-disturbance regime was identified as a management issue for the preserves but with a low priority, for the following reasons:

- Severity of Impacts: The disruption of the natural soil disturbance could have an overall negative effect on spineflower distribution and abundance. However, management of non-native plants, which mediate the impacts, may limit the severity of the impacts.
- Probability of Occurrence: Natural soil disturbances could decline due to reductions in populations of burrowing mammals due to predation by domestic cats or general decline in suitability and connectivity of habitat within the preserves as a result of adjacent development. Fire exclusion could reduce erosion due to gravity, wind, or water, by increasing plant cover that stabilizes the soil.
- Certainty of Consequences: The impacts of alterations to the natural disturbance regime depend on the role of soil disturbances in influencing the distribution, abundance, and demographic performance of spineflowers within the preserves, and the aspect of the disturbance regime that is altered (i.e., type of disturbance, frequency, severity, etc.) A range of consequences are possible.
- Indirect and Interactive Effects: Because soil disturbances affect spineflower both directly and indirectly, via effects on non-native plants, alterations to the natural disturbance regime will similarly have both direct and indirect consequences for spineflower populations, as described below.

Background

San Fernando Valley spineflower preferentially occurs in open habitat away from shrub and tree canopy, and where the cover of non-native annual herbs is sparse (Lukos 2000). While recurring fire likely plays a role in limiting woody plant encroachment, small-scale soil disturbances may help create and maintain areas of reduced non-native annual grass and forb cover (Lukos 2000). Natural and anthropogenic soil disturbances within the spineflower preserves include trails, erosion, and diggings created by burrowing small mammals, including California ground squirrels (*Spermophilus beecheyi*), pocket gophers (*Thomomys bottae*) murid rodents (*Peromyscus* spp., *Reithrodontomys megalotis*), pocket mice (*Perognathus* spp. and *Chaetodipus* spp.), and kangaroo rats (*Dipodomys* spp.). Cattle are likely responsible, to some degree, for existing levels of soil disturbance.

Known or Hypothesized Effects and Their Mechanisms

Based on experimental research examining the effects of erosion, trails, and gopher mounds on the Ben Lomond spineflower (*Chorizanthe pungens* var. *hartwegiana*; McGraw 2004), soil disturbances may directly facilitate spineflower populations by removing established plant cover, thatch, and leaf litter, which inhibit germination and seedling survival. Soil disturbances can also promote spineflower populations indirectly, by reducing competition from other species, thus increasing plant growth and fecundity. Soil disturbances might also directly facilitate spineflower performance by increasing soil nutrients (J. McGraw, unpublished data).

Through many of the same mechanisms, soil disturbances can enhance establishment of disturbance-adapted non-native plants, which in turn can compete with native plants, causing soil disturbance to have indirect negative effects (Hobbs and Huenneke 2002). Soil disturbances can also directly negatively impact spineflowers by killing seed or plants.

However, in already invaded communities, such as the California annual grassland and degraded California Sagebrush scrub that occur within the spineflower preserves, the net effects of soil disturbances are likely to be positive, in that they create safe sites for spineflower germination, survivorship, and growth, amidst otherwise dense cover of non-native annual grasses and forbs. This net beneficial effect was observed in experiments for the Ben Lomond spineflower, which like the San Fernando Valley Spineflower, occurs in open vegetation that is largely dominated by non-native annual grasses and forbs (McGraw 2004).

Because the San Fernando Valley spineflower may require recurring soil disturbance to create and maintain open microsites required for germination, survivorship, and growth, alterations to the natural disturbance regime have the potential to reduce its distribution and abundance (McGraw 2004). Declines in small mammal populations due to predation by domestic cats or other declines in the suitability and connectivity of habitat due to the adjacent development could reduce the occurrence of diggings. Erosion due to gravity, wind, or water, might also decline in the absence of recurring fires which historically remove plant cover and destabilize the soil.

Relationship to Biological Goals and Objectives

Management to address disruptions of the natural soil-disturbance regime will help attain the following specific biological objectives:

- Population: Objectives 1.1, 1.2, 1.3 and 1.4
- Community: Objectives 2.2 and 2.4
- Ecosystem: Objectives 3.1

Questions and Future Research

Research is needed to further understand the role of soil disturbances in influencing the distribution, abundance, and demographic performance of spineflowers within the preserves. The net effects of soil disturbances on spineflower populations will be determined by complex interactions between aspects of the soil disturbance, including the type, seasonality, frequency, and severity, and the conditions of the habitat it which it occurs, including soil conditions, spineflower distribution and abundance, and the occurrence of nonnative competitors, among other factors.

The following are specific questions that could be addressed through the Habitat Characterization study to be conducted in the spring season no later than two years after issuance of the Incidental Take Permit.

- Are the distribution, abundance, and/or performance of spineflower (positively or negatively) correlated with incidences of natural and/or artificial soil disturbance?
- Is spineflower distribution or abundance affected by the type of soil disturbance (i.e., natural or artificial)?

Management Strategies and Techniques

The preserves will be managed to prevent anthropogenic disruptions to the natural soil-disturbance regime. More information regarding the net effects of soil disturbance will be needed to determine whether the overall effect is positive or negative for spineflower.

Monitoring

As described in Appendix F of the SCP, annual spineflower abundance sampling will include recording the percent cover of soil disturbances observed. In this way, some measure of the status and trends of soil disturbances in occupied areas of the preserves will be gained on an annual basis.

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MANAGEMENT FRAMEWORK

This section describes the basic organizational structure of the management framework proposed in the AMP and is based on the model provided by McEachern et al. (2006). The basic organizational elements include an Adaptive Management Working Group and a Technical Advisory Subgroup, an Annual Program Review, and a Spineflower Information Center that provides centralized storage and facilitates a structured flow of information related to all aspects of the AMP.

Adaptive Management Working Group and Technical Advisory Subgroup

The Adaptive Management Working Group will consist of land managers, resource agency staff, and scientific experts. The Adaptive Management Working Group is the ultimate decision-making entity that will guide the management, monitoring, and planning activities of the AMP. Management actions will be implemented using annual work plans developed by the Adaptive Management Working Group. Annual work plans will be developed based on the priority level assigned to individual threats and will incorporate the corresponding recommended management actions that are to be implemented in the upcoming year based on the results of monitoring. Funding for management activities and research studies currently proposed and approximate schedules are listed in Sections 12.0 and 15.0 of the SCP. Recommended management activities for which work plans have yet to be developed but are anticipated in the 1 to 2 years following issuance of take authorization are also identified. Work plans will be developed by the Adaptive Management Working Group at the appropriate time.

The Technical Advisory Subgroup will consist of a subset of the Adaptive Management Working Group, specifically responsible for addressing technical scientific issues associated with management, monitoring designs, and data analysis.

Annual Program Review

A fundamental element of the AMP is a repeating process of periodic review, short-term adjustment, and long-range planning. The goal of Annual Program Review is to evaluate the success of completed management actions to date, to develop new management actions and objectives as necessary, and to prepare annual work plans for the implementation of management actions in the upcoming year. Annual Program Review will be conducted by the Adaptive Management Working Group in September or October of each year, once spineflower is dehiscent, but before the onset of germination associated with seasonal fall and winter rains, which typically begin in October. The timing of Annual Program Review also must provide sufficient time to compile and analyze the monitoring data from the current year's activities, to incorporate that data into decision making, and to prepare the annual work plan for the upcoming year. As proposed by McEachern et al. (2006), Annual Program Review may include peer presentations and external review but will ultimately evaluate monitoring data to determine the success of management actions that have been implemented.

Annual Program Review will allow short-term adjustments to be made to the AMP based on the results of implemented management actions. Short-term adjustments may result in changes to ongoing or planned management actions. Consideration of long-range planning will be done annually but will likely involve an overall evaluation of management activities over several years (e.g., over a 5-year horizon). Long-range planning pertains more broadly to the ongoing refinement of AMP objectives.

Spineflower Enhancement Program

A spineflower enhancement program will be implemented at the direction of CDFG. The program will involve experimentation utilizing salvaged seed sown into new non-preserve areas. Results of those experiments will inform managers of the potential for future use of banked seeds to expand preserve populations.

Salvaged Seed Experimental Program

Salvaged material (e.g., soils, seeds) taken from development areas will be used experimentally to attempt to establish new spineflower occurrences in open space areas, in the Salt Creek corridor and in an area north of the proposed San Martinez Grande Preserve. Sowing and monitoring these salvaged seeds should improve the overall understanding of SFVS' ecology and life history. This increased understanding may inform future SFVS management decisions within the Newhall Ranch preserve areas. The results of these experiments and their potential contribution to future conservation management are not known at this time. However, the experimental activities will improve understanding of SFVS and may provide valuable information that could be used to inform adaptive management decisions on whether banked preserve seeds could be utilized to expand preserve populations.

The direct seeding plan, which will include proposed monitoring and maintenance schedules and activities, shall be submitted to CDFG for input and approval prior to implementation.

In general, direct seeding will include identifying locations within the receiver areas with appropriate soils, geology, aspect, slope, and vegetation conditions. Once the appropriate area(s) is identified and approved by CDFG, the site shall be adequately prepared by staking the boundaries, removing weeds and debris, and applying seeds. Seeding shall be performed at the onset of the rainy season (October through early December).

Seeding will be applied using two methods. The first method will use a calibrated hand or "belly" spreader and mix the seed with clean masonry sand or inert bran fiber for better distribution. Immediately following application, the seed shall be lightly raked into the soil to a depth of 5 millimeters (maximum) using a steel rake. This method will be used for approximately 60% of the spineflower creation areas. The second method will use a seed imprinting device that has ripping teeth in front of the imprint wheel and a calibrated seed bin. This method shall be used for approximately 40% of the direct seeded area. This method mimics a natural disturbance situation and has proven to be highly effective for seeding native plants in non-irrigated situations. Imprints shall be parallel with the contours, "v" in shape, and between 3 and 4 inches deep. Imprinting teeth shall be offset to prevent channeling of water. Imprinting shall not occur on slopes steeper than 3:1. Imprinted areas shall be covered with blown straw certified as weed-free at the rate of 2,000 pounds per acre.

The rate of seeding will be dependent on the seed purity, percent germination, individual site conditions, and the quantity of seed available. Therefore, the seeding rate (to be expressed in pounds per acre) will be calculated by the project biologist and submitted to CDFG for review. Fifty percent of the seed shall be pretreated by clipping the seed coats, as previous studies (Sapphos 2001) have determined that germination rates were dramatically increased by clipping seed coats.

In areas where herbivores, including birds, are known or expected to be problematic, the seeded areas should include temporary exclusion fencing and/or bird deterrents, such as silver tape attached to posts, artificial owls, or other pre-approved devices. All spineflower direct seeding work shall be monitored and reported to CDFG.

Seed Banking from Preserves

Spineflower seed shall be collected from spineflower preserves. Seed collection shall follow the approved seed collection protocol described in the October 8, 2003, CDFG letter to Newhall Land authorizing collection of spineflower seed (CDFG 2003). Two-thirds of the collected seed will be sent to RSABG for storage (one-third for short-term and one-third for long-term storage), and one-third will be sent to the USDA National Seed Storage Lab in Fort Collins, Colorado, for long-term storage. Approximately 5% of seed will be collected in each preserve area each year, only in years of within 20% of normal rainfall, or greater than normal, for 10 years, beginning in the year the preserves are established. Collected seed maintained at RSABG may potentially be used for seeding, as discussed in *Section 10.5.3.3*, below.

Potential Expansion of Preserve Populations through Seeding

Pending the outcome of the Salvage Seed Experimental Program, seeding of spineflower in the preserves may be performed to create additional spineflower occurrences. Direct seeding in a preserve area would only utilize seeds from that preserve area; it would not involve seeds collected from development areas or other preserves. Prior to utilizing banked seeds from any preserve, a direct seeding plan shall be developed for spineflower mitigation/creation areas that includes the following data:

1. Scaled topographic maps showing the accurate locations and acreages of the proposed seeding areas
2. A detailed description of proposed (site-specific) methodology
3. Name of biologist that prepared the plan
4. Map and description of the habitat(s) adjacent to the seeding area
5. List of plant species and densities present within the seeding area
6. The project schedule
7. Plans and specifications for site preparation, seed application, and maintenance methods developed from the salvaged seed experimental program.

Spineflower Habitat Characterization Study

The following are specific questions that will be addressed through a habitat characterization study to be undertaken in the spring season no later than two years after issuance of a 2081(b) Incidental Take Permit, and prior to proposed development, at such time as favorable rainfall conditions occur.

- Are the distribution, abundance, and/or performance of spineflower (positively or negatively) correlated with the occurrence of:
    - One or more non-native plant species?

- Guilds (or functional groups) of non-native plant species (e.g., annual grasses, annual forbs)?
- Non-native plant species overall?

- What are the distribution and abundance of non-native plant species within occupied spineflower habitat?
- Are there any observable and consistent patterns in the occurrence of non-native plants and abiotic characteristics of the habitat (e.g., soil conditions) or disturbance (e.g., soil disturbances, time since fire) that might indicate the microhabitats in which non-native plants are most likely to occur in general and/or to compete with spineflower?

Centralized Information

Information sharing is a critical component of the AMP. A Spineflower Information Center web site or FTP server will be established to serve as a repository for annual work plans, monitoring data, and findings of Annual Program Reviews. Regional weather data, local weather information, and raw monitoring data will also be stored and accessible through the Spineflower Information Center. In addition, the Spineflower Information Center may also be configured to provide an internet-based forum to facilitate discussion among Adaptive Management Working Group members outside of scheduled Annual Program Review meetings.

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Appendix F

Draft Monitoring Protocols

MONITORING PROGRAM FOR THE
SPINEFLOWER CONSERVATION PLAN PRESERVES
JODI M. MCGRAW
DECEMBER 19, 2007

1. Introduction

An integral part of the overall adaptive management program of the Spineflower Conservation Plan, monitoring will be used to evaluate the Plan's success toward its biological goals and objectives, and indicate where and when modifications to management are needed in order to enhance success of the conservation strategy (Figure 1; Elzinga et al. 2001). This appendix describes the elements of the monitoring program that will evaluate the biological effectiveness of the Spineflower Conservation Plan at attaining the objectives of its first goal:

Goal 1: Maintain or increase San Fernando Valley Spineflower populations within the preserves.

Objective 1.1: Maintain or increase the distribution of the spineflower within each preserve.

Objective 1.2: Maintain or increase the abundance of the spineflower within each preserve.

Objective 1.3: Reduce or prevent the increase of anthropogenic factors that negatively impact spineflower individual and population performance.

Objective 1.4: Increase understanding of the ecological factors influencing the distribution, abundance, and population persistence of the spineflower in order to inform management and monitoring within the preserves.

The program describes the monitoring protocols that will be used to measure success of management toward attaining these biological goals and objectives and outlines how monitoring results will be evaluated to inform changes in management. Background information about the elements of the monitoring protocols, including the monitoring objectives, field methods, and statistical analyses that are described here can be found in Elzinga et al. 2001 and Hayak and Buzas 1997, among other texts addressing monitoring design and implementation.

<u>Goal</u>

The goal of the monitoring program will be to provide objective, repeatable methods for collecting, analyzing, and interpreting ecologically meaningful information about San Fernando Valley spineflower that can be used to evaluate the status of the populations, the effectiveness of the conservation strategy, and the design of future management and monitoring, using the most cost-effective methods possible.

2. Monitoring Protocols

The monitoring program for San Fernando Valley spineflower incorporates two monitoring protocols:

1. Areal mapping to determine and monitor spineflower distribution (Objective 1.1).
2. Abundance sampling to estimate and monitor spineflower cover (Objective 1.2).

These complementary protocols will track success toward the first three biological objectives for the spineflower populations, as well as increase understanding of the rare plant's ecology needed to inform management (Objective 1.4). Additional monitoring protocols could be developed to evaluate success toward the other goals and objectives of the Spineflower Conservation Plan (Dudek and Assoc. 2007a).

2.1 Areal Extent Mapping

Background

In areal extent mapping, the perimeter spineflower plant patches within the preserves is delimited and mapped, allowing monitoring of the distribution of the population through time. When incorporated into a GIS, patch polygons can also be used to evaluate changes in the area occupied. In addition, analyses can be conducted to evaluate the association of the plant patches with abiotic and biotic characteristics of the environment (soils, vegetation types, topography) to evaluate the habitat characteristics, and in response to different management treatments and regimes.

Monitoring Objectives

The objectives of areal mapping are:

1. To identify and track the location and areal coverage of spineflower patches within the preserves.
2. To allow spatially explicit examination of the spineflower distribution that will facilitate the design of management and other monitoring studies (incl. abundance sampling), and provide insight into the factors affecting the population distribution and persistence.

Monitoring Design

Field Survey

Location: Areal mapping will occur throughout each of the preserves established as part of the Spineflower Conservation Plan (SCP).

Patch Delimitation: The perimeter of each spineflower patch will be delimited using pin flags by identifying the outermost plants, with plants more than 4 m apart included in separate patches. Isolated patches (i.e., one or more plants) that occupy 1 m^2 or less will be mapped as points and the area estimated to the nearest 0.25 m^2.

Following patch delimitation on the ground, mapping will be conducted using a GPS equipped with ArcPad software and recent, high resolution aerial imagery. Following field assessment, the polygons can be downloaded directly into GIS software which can be used to 'connect the dots' represented by the outermost plants to create the minimum convex polygon for each patch.

<u>Anthropogenic Factors</u>: Within each delimited polygon, the occurrence of anthropogenic factors known or hypothesized to degrade spineflower habitat will be examined. These factors and the methods to assess them will be identified based on the spineflower habitat characterization, including: 1) invasive exotic plants, 2) non-native annual plants (grasses and forbs), and 3) soil disturbance (such as that caused by recreation). Occurrence of factors will include presence/absence and where possible, a visual estimate of the area impacted using cover classes: <1, 1-5, 6-25, 26-50, 51-75, 76-95, and 96-100%.

It is important to note that separate monitoring will likely be needed to examine the status and trends of factors that degrade spineflower habitat throughout the preserves as well as perhaps adjacent to the preserves, not just within occupied habitat. The purpose of this data is to aid interpretation of any detected changes in spineflower distribution.

Implementation

<u>Seasonality</u>: Field surveys will occur when the spineflower is in fruit in approximately late June and mid-July. During this period, the reddened leaves and inflorescence stalks can be more readily detected (compared to the small, white flowers), and the plants are less susceptible to trampling. Beginning in June, weekly reconnaissance surveys will be used to track spineflower phenology and determine the onset of areal mapping, which will occur during the period of maximum flower production.

<u>Frequency</u>: Areal mapping will occur approximately every 10 years. To reduce the potential for inter-annual variability in density to influence areal extent, areal mapping will be conducted only during years with weather conditions appropriate for establishment and survival (i.e., years of good aboveground expression). Areal extent mapping will only be conducted in years with the above average annual rainfall (mean rainfall plus one standard deviation of the mean based on historic data for the region).

<u>Personnel:</u> Areal extent mapping will be completed by individuals trained to identify the rare plant and distinguish it from co-occurring congeners. Individuals will also be trained to delineate patch perimeters following the mapping rules described above and to record the spatial location of the patches using the GPS.

Analyses

<u>Descriptive</u>: Through GIS, the patch (polygons) layer will be used to calculate total patch area, the number of patches, and mean patch size. These statistics will be computed by preserve and for the preserve system overall. Maps illustrating spineflower occurrences with respect to other habitat characteristics and prior management activities will be used to interpret observed changes.

Single Interval Comparisons: Change in spineflower areal coverage between two sample periods (i.e., a single interval) can be calculated as:

$$\Delta = \frac{\text{Area}(t) - \text{Area}(b)}{\text{Area}(b)}$$

where t is the current time period, and b is the baseline.

The changes will be calculated for each preserve and for the preserve system overall.

Extra-curricular: In support of Objective 4, the spatial and tabular data could be used in additional analyses designed to increase knowledge of spineflower ecology. For example, overlay analyses can be used to evaluate the occurrence of patches within different vegetation types, conditions (e.g. historically disturbed vs. intact), or in response to management (e.g. exotic plant control). If changes, particularly declines, are detected, additional analysis can be used to detect patterns relating change in occupied habitat to changes in the occurrence of anthropogenic factors that degrade habitat.

Pilot Study

Exploratory studies will be used to evaluate the effectiveness of the mapping rules in delineating patch polygons. Specifically, the nearest neighbor rule for patch inclusion (4 m) will be evaluated. Previous monitoring has used this nearest neighbor rule value (Dudek Assoc. 2007). Additional exploratory studies will be used in several sites exhibiting a range of spineflower densities, distributions, and other conditions such as vegetation structure and species composition that could influence the accuracy and repeatability of the protocol.

Establishing the Baseline

The baseline for spineflower distribution will be established through implementation of areal mapping during the spring of a growing season with above average rainfall (mean + 1 S.D.) soon after establishment of each preserve. Provided that the sampling protocol meets the monitoring objectives, the total patch area identified during the initial mapping will be used as the baseline for spineflower distribution.

Thresholds and Evaluation

Due to the low frequency at which areal mapping will be conducted, thresholds used to trigger remedial efforts for spineflower are based on single intervals (i.e. 2020 compared to 2010). The following thresholds will be used to trigger remedial action:

- A 10% decline in total areal extent of spineflower compared to the baseline for each preserve or for the preserve system overall.
- A 10% increase in the frequency of occurrence and/or percent cover of anthropogenic factors that negatively impact spineflower distribution, including invasive exotic plants, non-native annual plants, and unnatural disturbances.

Remedial Action

If monitoring reveals that spineflower distribution has declined below the established threshold and thus biological objective 1.1 is not being met, then remedial action will be initiated to enhance success. Remedial measures will be developed through consideration of all available information about the preserves, including the status and trends of spineflower abundance developed through quantitative abundance sampling (Section 3).

2.2 Abundance Sampling

Background

Spineflower abundance will tracked by repeatedly sampling spineflower absolute percent cover within patches of occupied habitat identified in the areal extent mapping within each preserve (Section 2.1). The efficacy of abundance sampling for tracking annual plants and species that exhibit dormancy, such as those with seed banks, has been questioned (Elzinga et. al. 2001). This is because large interannual variability in abundance due to plant responses to a host of factors can make it difficult to discern overall trends. San Fernando Valley spineflower has been observed to exhibit such high variability (Dudek Assoc. 2007).

Though the problem presented by high variability in abundance is acute for monitoring programs occurring over short time scales, this concern is less of an issue for monitoring programs that extend over long time periods. Long term monitoring programs provide the opportunity to quantify the interannual variability in abundance. With each sample point, there is greater ability to distinguish prolonged population declines perhaps due to declining habitat conditions or other intrinsic factors from short term drops due to natural factors (e.g. drought). Statistical analyses employing General Linear Models will help partition the variability in spineflower abundance that is related largely to extrinsic factors such as interannual variability in weather, from actual trends occurring due to changes in the suitability of habitat conditions or other factors causing population declines (i.e., intrinsic factors), such as reduced pollinator availability. When coupled with distribution monitoring, as in this program, abundance sampling can be an effective means of detecting long term declines in abundance, including those resulting from degradation of habitat, which can threaten population persistence.

As in all sampling, numerous characteristics of the monitoring design can influence the precision of the abundance estimate, including the size and shape of the sample unit, the method of allocating samples (randomly, stratified randomly, etc.), whether the samples are temporary (re-allocated each interval) or permanent (resampled each interval), and most importantly, the number of samples taken (Hayek and Buzas 1997, Krebs 1999, Southwood and Henderson 2000, Elzinga et al. 2001).

A recent development in long term ecological monitoring is the use of panel designs, which increase the area monitored and avoid artifacts (inadvertent impacts) associated with repeatedly monitoring the same samples through time (e.g. soil compaction). In panel designs, sample plots (sites) are grouped within panels, within which all sites are sampled at the same interval. The sites within a panel can be permanent (sampled throughout the life of the monitoring study), temporary (sampled only once), or sampled for a limited duration, such as 10 years. In split panel monitoring designs, the revisit schedule, or frequency of resampling, is different for one or more of the panels. One split panel design balances the objective of trend detection with that of accurate status estimation. In this design, one panel is comprised of permanent plots that are always revisited. The other panel (or series temporary panels) is comprised of sites that are randomly located each sample period (McDonald 2003).

Panel designs offer many advantages to long term monitoring, however one disadvantage is that slightly more complicated statistical approaches are required for data analysis. Mixed linear models (statistical analyses) are needed to partition the variance associated with the different factors and thus discern changes and trends in population parameters.

For spineflowers, abundance can be measured as density, the number of individuals per given area, or absolute cover, the proportion of a given area occupied or covered by the plant. Cover is recommended as a measure of spineflower abundance for the following reasons:

1. Cover reflects both density and plant size: Spineflowers very likely experience reduced growth due to intraspecific competition, in that individual plants in higher density patches are smaller and produce fewer seeds than individuals in lower density patches, such that overall the production of seed in a given year is more a function of plant cover than plant density.
2. Density requires counts which are very time consuming, particularly if sampled in an area large enough to evaluate simultaneously the occurrence of anthropogenic factors that degrade habitat.

Current information about the distribution and abundance of spineflower within Newhall Ranch was used to inform the abundance sampling protocols. However, it will be essential to evaluate the effectiveness of the sampling design using a 'pilot study' (McGraw 2004).

Monitoring Objectives

The objectives of abundance sampling are to accurately track spineflower cover within the preserves in order to:

1. Detect biologically meaningful declines in cover amidst the background fluctuations in abundance, and
2. Link any observed declines in abundance to changes in habitat conditions in order to inform remedial management (Section 3).

Sampling Objectives

The objectives of the monitoring protocol are to have 90% power to detect 20% declines in spineflower cover over at least 5 sampling intervals, with a 10% chance of indicating a statistically significant change has occurred when one has not.

Monitoring Design

Field Methods

Sampling Design: The absolute percent cover of spineflower will be visually estimated in 1m x 5m quadrats randomly located within the areal extent mapping polygons that are large enough to fit the quadrat.

The samples will be allocated using a stratified, random design, in which an equal number of quadrats are located within each of the spineflower preserves, which are the strata, and the quadrats within each preserve are located randomly within the areal extent mapping polygons that are at least 1 m x 5 m.

Monitoring will be conducted using a split panel design designed to balance the power to detect trends derived from permanent plots, with the power to estimate the status of the populations that comes from randomly locating plots (Table 1). The first panel (set of plots) will consists of 20 plots per preserve (strata) randomly located within the areal extent mapping polygons that were used to establish the baseline for the plant's distribution (Section 2.1). This panel will be sampled annually beginning after the areal extent mapping is completed and continuing in perpetuity.

In addition, rotating panels consisting of 10 plots (1 m x 5 m quadrats) per preserve will be randomly located within spineflower patch polygons each time the areal extent mapping is conducted. The plots within each panel will be sampled until the areal extent mapping is conducted again (i.e., approximately 10 years), after which time a new panel of 10 plots will be established within each preserve, and the prior panel will be retired (Table 1).

In each 1 m x 5 m sample plot, measurements will be taken within 5, contiguous, 1 m^2 quadrats located along the length of the plot (Figure 2).

Measurements: A 30m transect tape will be pulled taut around the outside of the corner stakes to delimit the perimeter of the quadrat, with the tape oriented perpendicular to the soil surface to create a boundary of minimal width. To create the 1 m^2 areas to be sampled, meter sticks will be temporarily located perpendicularly to the tape at the 1, 2, 3, and 4 m intervals. Within the 1 m^2 plot created by the tape and meter sticks, absolute percent cover of spineflower will be estimated using 5% increments from 10% to 90%, and 1%, 3%, 5%, 8% as values below 10%, and 91%, 93%, 95%, and 98% as values above 90%. Accurate estimation will be facilitated through the use of square cardboard cutouts that represent 1%, 2%, 5%, and 10% of the 1 m^2 quadrat, which observers will use to calibrate their visual estimation.

In addition to the cover of spineflower, the occurrences of factors known or hypothesized to negatively impact spineflower performance will be recorded. The variables to be measured will be identified based on results of the habitat characterization. At present, potential variables to be visually estimated using separate cover classes include:

- the percent cover of non-native plants by species
- the percent cover of woody plants (subshrubs, shrubs, and trees) by species
- the percent cover of anthropogenic soil disturbance and/or erosion
- depth of litter (including thatch)
- cover of litter (including thatch)

Cover classes, in percentages, will be the same as that listed for spineflower cover above.

Implementation

To provide accurate information about spineflower abundance that can be compared through time, sampling will be implemented following these considerations.

Seasonality: To facilitate comparable cover estimates, fiel0d surveys will occur during the peak portion of the flowering period, which differs each year but is typically between mid-April and early May. Beginning in April, bi-weekly reconnaissance surveys will be used to track the spineflower phenology and determine the onset of abundance sampling.

Personnel: Spineflower cover sampling will be completed by a team of individuals trained to identify the rare plant and distinguish it from morphologically similar species. Field staff will be able to provide repeatable visual estimates of spineflower cover and habitat factors using the designated cover classes. They must also be able to identify all co-occurring plant species.

Plot Monumenting: To increase the repeatability of measurements between sampling intervals, the four corners of the quadrat will be permanently monumented using 20 cm long pieces of aluminum conduit (approx. ½" diameter). The markers will be placed 25 cm into the ground. In areas where vandalism is not a concern, the tops of the markers can be painted to facilitate detection. The coordinates of the north corner stake will be recorded using a survey grade GPS, which will facilitate relocation of the plot should the corner stakes be removed.

Analyses

Mean spineflower cover and the mean cover and frequency of anthropogenic factors will be calculated for each plot based on the values obtained from the five, 1 m^2 subplots (i.e., the 1 m x 5 m plot is the statistical sampling unit). Changes in these statistics, relative to the baseline, will be examined within each preserve and for the preserve system as a whole, as described below.

Single interval declines in spineflower cover and/or increases in the cover or frequency (expressed as a percent of the subplots) of anthropogenic factors can be evaluated using paired t-tests—statistical tests used to evaluate whether statistically significant changes have occurred between permanent plots. Though this might be a reliable indicator of changes in the disturbance and/or the cover of woody species, changes in spineflower abundance and the cover of non-native annual plants detected over single sampling intervals should be cautiously interpreted, due to natural variability in abundance due to climate and sampling error.

After data are available from five iterations of sampling, and for every year thereafter, the mean trend in spineflower abundance and the cover and frequency (as a percent) of anthropogenic factors across all permanent plots within each preserve and preserve system-wide will be examined using route regression—a statistical test designed to detect and measure significant trends observed within a set of permanent plots (Elzinga et al. 2001).

Pilot Study to Evaluate Monitoring

To refine the abundance monitoring protocol and evaluate its ability to attain the monitoring objectives, a pilot study will be conducted. The monitoring protocol must be implemented for two years in order to evaluate the variation in the difference between plots between years (i.e. the standard deviation of the mean difference in cover), which will be crucial in determining the sample size necessary to attain the power to detect significant changes. Data from the pilot study will be used to determine whether permanent plots provide a more effective tool for tracking changes in abundance, or whether temporary plots would provide greater power and/or reduced costs (Elzinga et al. 2001, McGraw 2004).

Establishment of the Baseline

The baseline for spineflower cover will be established through implementation of the abundance sampling protocol during three years after areal extent mapping. The baseline will be calculated for each preserve and for the entire preserve system as the average of the three year mean cover for each plot, provided that at least two years have precipitation at or above the mean for the region. After 10 years of abundance monitoring, ANOVA will be used to evaluate whether the three year average was abnormally high or low as a result of climate or other stochastic factors during the first three years of abundance sampling. If so, the baseline will be corrected.

Evaluating Thresholds Based on Long Term Monitoring

The following thresholds are proposed to trigger remedial efforts based on the results of the spineflower cover sampling:

- 20% decline in cover relative to the baseline over a five year period
- 20% increase in the percent cover or frequency of anthropogenic factors that negatively impact spineflower over a five year period.

Trends toward persistent declines in spineflower, or increases in anthropogenic factors affecting spineflower that do not exceed the threshold will trigger evaluation of remedial action, including additional analyses (Section 3).

Additional Analyses

Data generated by this monitoring protocol can be used to enhance understanding of the ecology of the system and species through the additional analyses, which might include:

- examine potential relationships between the cover of spineflower and the occurrence (extent) of the measured anthropogenic factors
- evaluate spineflower cover in different habitat conditions (e.g., vegetation types)
- examine patterns of spineflower cover with respect to climate (abundance and distribution of precipitation) and management (exotic plant control projects).

3. Remedial Actions

If monitoring studies reveal that spineflower population parameters have declined below the established thresholds and thus one or more of the biological objectives are not being met, then remedial action will be initiated to enhance success. Because the factors affecting spineflower distribution and abundance remain poorly understood, and because it is difficult to anticipate potential future changes to the populations and communities, remedial measures will be developed based on an assessment of available information, and will likely include a suite of management techniques designed to address anthropogenic stressors to the spineflower populations, as described in the Spineflower Conservation Plan (Dudek and Assoc. 2007).

In general, a series of steps will be taken to identify appropriate remedial actions, beginning with efforts to assess the cause(s) of the observed decline (Figure 3). Known or hypothesized causes for decline in spineflower distribution or abundance will be classified as either natural or anthropogenic, considering the full range of proximate and ultimate, direct and indirect impacts of human activities on the system. If the cause is known and is deemed anthropogenic in origin, for example in the case of the invasion or spread of one or more non-native plants, then management will be implemented to address the cause, within an adaptive management framework. Studies and experimental management to develop effective remedial actions to known anthropogenic stressors must be implemented before declines are detected.

If the cause of the decline is unknown, additional analyses of existing information and/or new studies will be used to determine potential causes. If the putative causes for decline are anthropogenic, steps will be taken to remove the stressor from the system or alleviate its impacts using experimental management—management conducted at small spatial scales using elements of experimental design in order to evaluate effectiveness. If the decline is not anthropogenic in nature, the determination will be made as to whether it is important to intervene within the system to protect remaining populations.

The following are examples of remedial efforts that could be initiated if monitoring reveals declines in spineflower distribution (areal extent) and/or abundance (cover).

Declines in Distribution

Distribution monitoring is designed to detect declines in the spineflower areal extent that could result from landscape-level reductions in the availability of suitable habitat. Such declines might occur as a result of succession, which reduces gaps in the shrub canopies in California sagebrush scrub, the invasion and spread of aggressive exotic plants, which compete with spineflower, and degradation of habitat due to trespassing within spineflower preserves, among other factors. However, declines in aboveground expression of spineflower (i.e. abundance) due to interannual variability in climate could result in reduced patch area as measured during areal extent monitoring of distribution.

The following series of additional analyses and associated remedial actions are recommended in the event that total spineflower patch area declines beyond the 10% threshold. They are designed to first assess the potential that declines are due to natural fluctuations. If there is no evidence for this, the subsequent steps are designed to assess potential anthropogenic causes and prescribe remedial management actions.

1. **Determine the proportion of preserves in which a decline in areal extent (distribution) was observed.**

   Climate-induced variation in spineflower performance is more likely to cause declines in distribution throughout the preserves and preserve system, than in a subset of a preserve or the preserves within the system. In contrast, degradation of habitat due to anthropogenic stressors is anticipated to cause patchy declines in distribution within or among preserves. Therefore, if declines in spineflower distribution are observed only in a subset of the previously occupied areas (preserves or portions of preserves), efforts will be initiated to identify potential causes of contracted distribution those areas. This would include examination of the anthropogenic factor occurrence data collected within each polygon (Section 2.1), as well as evaluation of additional information available for the area where declines were observed. Because the spineflower preserves will be established following permitting, but development will be staggered through time, changes in spineflower distribution can be compared among preserves adjacent to existing development and those adjacent to intact habitat, to help interpret observed declines in distribution.

2. **Evaluate whether declines were also observed in spineflower abundance and, if so, in what proportion of the monitored patches and preserves.**

   Widespread declines in spineflower abundance are more likely to result from short term reductions in spineflower performance due to climate than they are to loss or degradation of habitat due to anthropogenic factors such as exotic plants and/or trespassing, which are unlikely to simultaneously impact many areas.

3. **If declines in abundance were not observed, and declines in distribution were only observed in some of the preserves (or portions thereof), the available data on anthropogenic factors will be examined to determine whether new or persistent**

threats might be causing declines in distribution in the preserves where they occurred.

Data will be examined to determine whether the declines in distribution are spatially correlated with new or persisting anthropogenic stressors. If so, management will be conducted to remove the stressors and restore the habitat, as needed.

Declines in Abundance

Abundance sampling is designed to detect reductions in the suitability of habitat for spineflower, such as might occur due to the invasion and spread of exotic plants, increases in shrub or tree cover, and degradation of habitat due to trespassing, among other factors. However, spineflower abundance is greatly influenced by annual climate, the variability of which could cause temporary reductions in abundance from which populations are expected to rebound over time.

The following are a series of additional analyses and associated remedial actions that could be followed in the event that trend analysis reveals significant declines in spineflower abundance of 20% (the threshold), or persistent trends toward such a decline. They are designed to first determine the likelihood that the decline is the result of one or more anthropogenic factors and, if so, determine appropriate remedial management actions.

1. **Determine whether declines in abundance might be due to prolonged drought.**

   Spineflower cover could be reduced in low rainfall years, and a series of drought years as periodically occur within the region could cause a prolonged decline in aboveground abundance by reducing spineflower establishment, survivorship, growth, and/or fecundity. If declines in abundance are observed throughout the preserve system, rainfall and temperature data will be examined to evaluate the extent to which declines are correlated with climate. Ideally, climate data would be collected within the preserves, or the Newhall Ranch region.

2. **Evaluate whether habitat degradation might have caused abundance declines.**

   Multiple regression can be used to test the hypotheses that increases in exotic plants, soil disturbances, woody plant encroachment, or other factors quantified within the abundance sampling plots have contributed to observed declines in spineflower cover, by regressing the percent change in abundance of spineflower on the percent change in the cover of each of the threats. Management will be initiated to reduce and repair the effects of any detected anthropogenic stressors affecting spineflower abundance.

3. **If population declines are not linked to climate or increases in currently known anthropogenic threats, research will be completed to identify other causes.**

   Even though the declines in abundance may not be attributable to anthropogenic factors, they might still influence persistence and thus merit remedial management action. Additional monitoring and/or research will be initiated to examine potential causes for the declines. This may be facilitated by partnering with universities and other local researchers.

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Table 1: Split panel design for sampling the spineflower abundance within each preserve. The symbol (•) indicates that the plots within the panel will be sampled in the year indicated. Additional details are provided in the sampling protocol text.

	Sample	Year																																								
Panel	Size	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	…
1	20	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•
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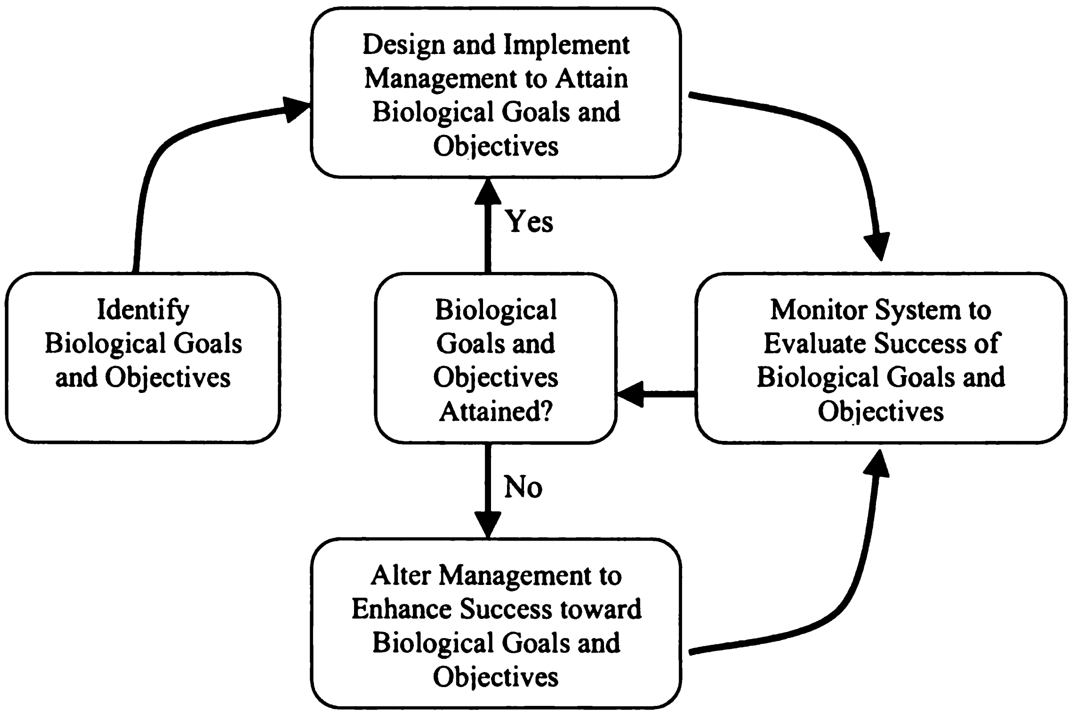

Figure 1: Components and processes of an adaptive management program (adapted from (Elzinga et al. 2001).

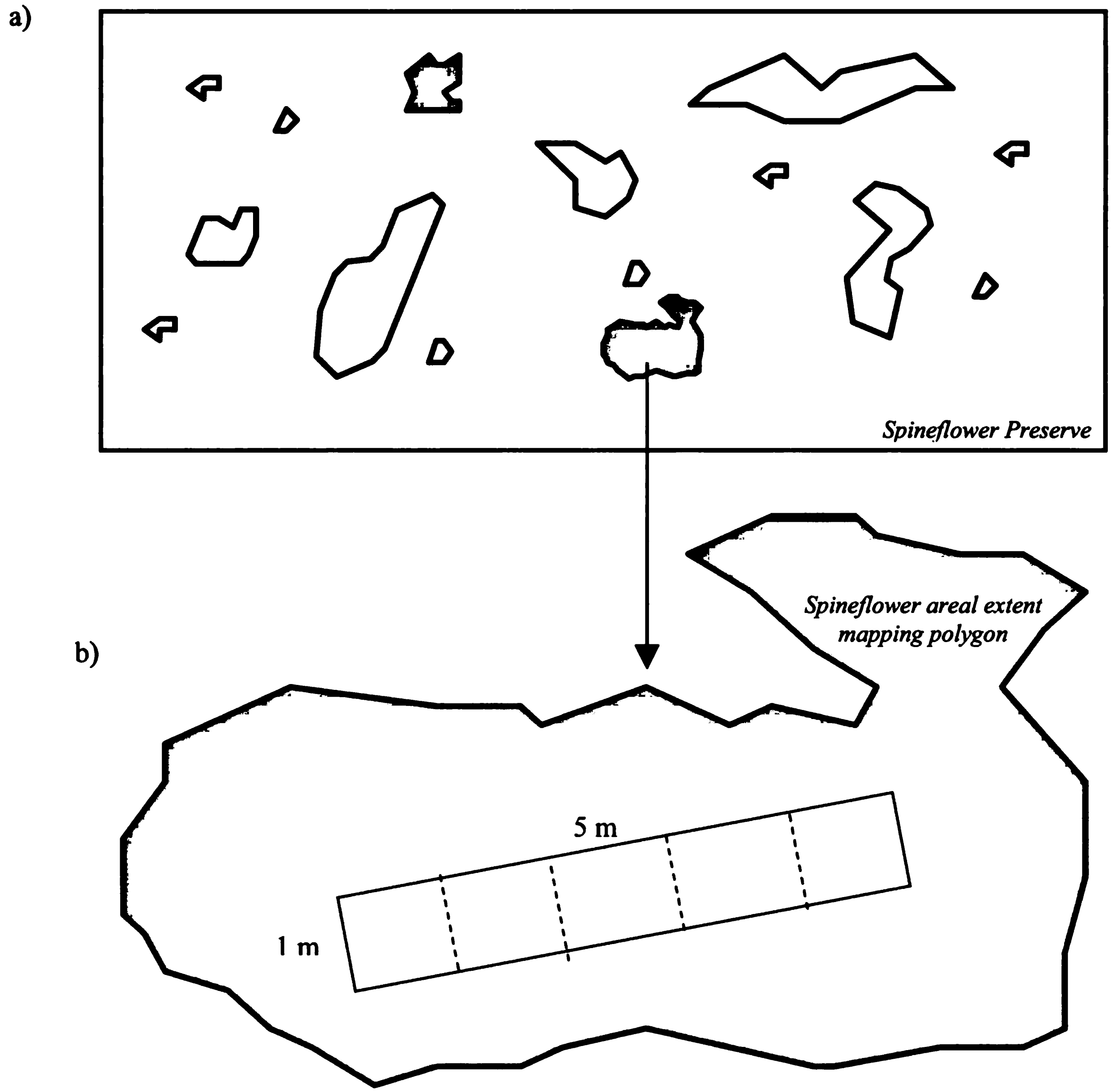

Figure 2: Schematic illustrations of aspects of the abundance sampling monitoring protocol design: a) spineflower areal extent polygons mapped within a spineflower preserve, showing those that are too small for inclusion in abundance sampling (red outline), those that were eligible for inclusion in abundance sampling (green outline), and the randomly selected polygons to be sampled (green fill); and b) a randomly selected spineflower areal extent mapping polygon with an abundance sampling plot (1 m x 5 m), showing the five, nested 1 m^2 quadrats.

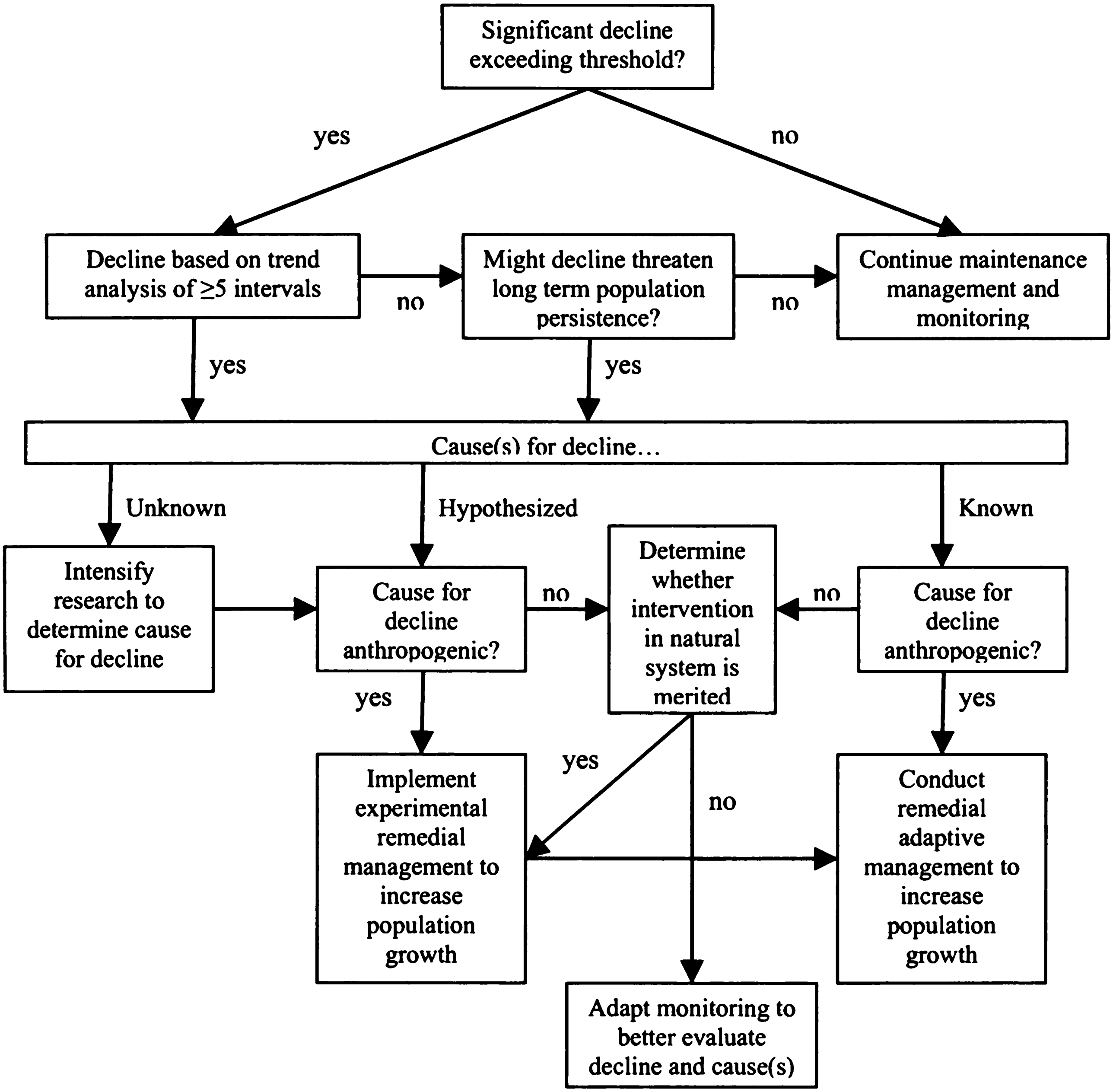

Figure 3: Decision tree to trigger remedial management based on monitoring results.

U.S. Army Corps of Engineers, June 2010, Section 404(b)(1) Alternatives Analysis for the Newhall Ranch Resource Management and Development Plan and attachments

DRAFT CLEAN WATER ACT SECTION 404(b)(1) EVALUATION

APPLICANT:
NEWHALL LAND AND FARMING COMPANY
NEWHALL RANCH RESOURCE MANAGEMENT AND DEVELOPMENT PLAN

I. Introduction

The following evaluation is prepared in accordance with Section 404(b)(1) of the Federal Water Pollution Control Act Amendments of 1972 (Public Law 92-500) as amended by the Clean Water Act of 1977 (Public Law 95-217). The intent of this document is to state and evaluate information regarding the effects of the discharge of dredged or fill material into waters of the United States. As a result, this analysis is not meant to stand-alone and relies heavily upon information provided in the Draft and Final Environmental Impact Statement/Environmental Impact Report for the Newhall Ranch Resource Management and Development Plan (RMDP) and Spineflower Conservation Plan (SCP) as well as the attached Draft Section 404(b)(1) Alternatives Analysis that was prepared by the applicant. The proposed project is to permanently discharge fill material into approximately 93.3 acres and temporarily impact 33.3 acres of waters of the United States for the construction and maintenance of flood control facilities, roads, utilities, infrastructure and other components associated with the proposed Newhall Ranch Resource Management and Development Plan near the city of Santa Clarita, Los Angeles County, California.

II. Project Description

A. Location

The 12,000-acre site encompasses approximately 5.5 linear miles of the Santa Clara River and several side drainages near Santa Clarita, northwestern Los Angeles County, California (at: lat:34-24-5.0040 lon:118-37-46.9920).

B. General Description

The proposed RMDP component of the Newhall Ranch Specific Plan would facilitate a broad range of residential, mixed-use, commercial and industrial land uses, various public facilities, and public services and utilities, together with preservation of large tracts of open space. At build-out, the proposed project would result in approximately 2,550 acres of residential uses (9,081 single-family homes on 1,559 acres, and 11,804 multi-family homes on 991 acres), 5.5 million square feet of commercial uses on 258 acres; and the development of approximately 643 acres devoted to public facilities such as community parks, neighborhood parks, golf course, community lake, new elementary, junior high and high schools, library, electrical substation, fire stations, and a 6.8 million gallon per day water reclamation plant (WRP). Open space would be provided on approximately 8,683 acres on the project site, and an additional 1,517 acres of open space in the Salt Creek area adjacent to the project area (for a total of about 10,200 acres of open space within the project site including the Salt Creek preservation area). The open space would also include land dedicated to the preservation of the San Fernando Valley spineflower (spineflower).

The proposed project and alternatives would include discharges of fill material to construct infrastructure and other components in the Santa Clara River and its tributary drainages. The proposed infrastructure and other elements would include debris and detention basins, water quality control facilities, bank stabilization, bridges, culverted road crossings, grade control structures, temporary haul routes, utilities, storm drains, habitat enhancement and geotechnical survey activities. In addition, the existing channels for some drainages would be realigned, recontoured, or converted to buried storm drain systems to accommodate the proposed development. Of the 660.1 acres of waters of the Unites States within the project area, the proposed project would permanently impact 93.3 acres, or approximately 14.1 percent of waters of the United States on site. Of the 660.1 acres of waters of the United States, approximately 276.9 acres are jurisdictional wetlands, with the proposed project permanently filling approximately 20.5 acres of wetlands (avoidance of permanent impacts to approximately 92% of the total wetland area). Temporary impacts would occur in jurisdictional areas where necessary to allow construction and maintenance of proposed project facilities. To minimize impacts to waters of the United States, the temporary impacts would occur outside the actual footprint of the facility once constructed, thereby allowing rehabilitation of channel substrate and riparian vegetation. For example, construction of bridges across the Santa Clara River would require disturbance of lands on either side of the proposed bridge location during construction, but these areas would not be occupied by the bridge once completed. Temporary impact zones would be restored to appropriate grade and revegetated, following completion of construction activities in the area. Although proposed maintenance areas would remain waters of the United States, these areas would exhibit a permanent reduction in functions and services, which would require compensatory mitigation. In total, the proposed project would result in temporary discharges of fill material in approximately 33.3 acres of waters of the United States in the Santa Clara River and its tributaries. With the proposed project, approximately 533.5 acres of waters of the United States would be completely avoided (approximately 80% of the jurisdictional areas) and approximately 566.8 acres of waters of the United States would not be affected by permanent discharges of fill material (approximately 86% of the jurisdictional areas). Aquatic resource areas that exhibit relatively high physical and biological functions that would be avoided by the proposed project design include the Middle Canyon Spring, the majority of the wetlands adjacent to the Santa Clara River and the entire Salt Creek subwatershed.

C. Overall and Basic Project Purpose

The "overall project purpose" is the development of a master planned community with interrelated villages in the vicinity of the Santa Clarita Valley in northwestern Los Angeles County that achieves the basic objectives of the Specific Plan by providing a broad range of land uses of approximately the same size and proportions as approved in the Specific Plan, including residential, mixed-use, commercial and industrial uses, public services (schools, parks, *etc.*), and a water reclamation plant. The "basic project purpose" is to provide housing and commercial/industrial/mixed-use development. The basic project purpose is not water dependent and therefore, the rebuttable presumption in the 404(b)(1) Guidelines does apply to the proposed project. For detailed information concerning the development of the overall and basic project purpose, please reference the attached Draft Section 404(b)(1) Alternatives Analysis that was prepared by the applicant.

D. General Description of Dredged or Fill Material

The proposed infrastructure and other components include of debris and detention basins, bank stabilization, water quality control facilities, bridges, culverted road crossings, grade control structures, utilities, habitat enhancement, temporary haul routes, storm drains and geotechnical survey activities. In addition, the existing channels of some drainages would be realigned, recontoured, or converted to buried storm drain systems to accommodate the proposed development. The proposed project and alternatives would include placement of upland substrate from the project area in waters of the United States as well as standard construction materials for roads and flood control facilities such as compacted substrate, sheet pile, soil cement, rip rap and concrete.

E. Description of Proposed Discharge of Fill Location

The Santa Clara River is the largest watercourse within the project site, and all other drainages within the site are tributary drainages to this river. There are 21 jurisdictional drainages within the project site (including a five-mile reach of the Santa Clara River). The smallest, ephemeral drainages on site have been combined into a single group, and have jurisdictional area totaling 34.4 acres (approximately 5.2 percent of the total Corps jurisdiction on the project site). The proposed project is to permanently discharge fill material into approximately 93.3 acres and temporarily impact 33.3 acres of waters of the United States for the construction and maintenance of flood control facilities, roads, infrastructure and other components associated with the RMDP. For detailed information concerning the proposed locations for the discharge of fill material, please reference the attached Draft Section 404(b)(1) Alternatives Analysis that was prepared by the applicant.

F. Description of Fill Methods

The proposed project and alternatives propose to construct up to three bridges across the Santa Clara River mainstem to accommodate future traffic associated with development of the proposed project (Alternative 2) and the region. These include two proposed bridges, at Potrero Canyon Road and Long Canyon Road, and one previously permitted bridge at Commerce Center Drive. The bridges would consist of concrete roadway decks atop concrete, pier walls, columns and/or piers spaced approximately 100 feet apart. Each bridge would require an abutment on either bank of the river, and the bridge piers would be either poured in place or constructed by pile-driving, depending on circumstances. Where pile-driving technology is used, the piers would be constructed without the need to place fill material into waters of the United States. Instead, the piles would be driven sequentially, and equipment would be supported by one pile while driving the next. Where poured-in-place technology is employed, construction equipment would need to enter the riverbed, excavate to suitable depth, and construct forms for the piers, which would then be filled with concrete. This construction method could potentially require dewatering activities in the river channel, if the proposed pier location is within the active channel or if subsurface flows are encountered during construction. The proposed project does not propose any bridges across tributary drainages; but many of the other alternatives evaluated in the Final EIS/EIR include them as a means for avoiding and minimizing impacts to waters of the United States that would be associated with the proposed culvert drainage crossings.

The design of proposed bridges crossing tributary drainages would be substantially similar to that proposed for bridges across the river mainstem, except that, in many cases, the tributary drainage channels are narrow enough that piers would not be required. In these cases, fill of waters of the United States would be limited to impacts along the banks caused by the bridge abutments. Where interior supports are needed, the same technologies proposed for the Santa Clara River bridges would be implemented (pile-driving, concrete poured in place). Because the proposed bridges crossing tributary channels would be smaller than those proposed across the river mainstem, the temporary construction zone would not be as large, and would only extend approximately 60 feet upstream and downstream of the bridge.

The proposed project and alternatives would utilize culvert road crossings to facilitate vehicle traffic over tributary drainages. These crossings would accomplish the same basic function as bridges across tributary drainages, discussed above, but would result in greater fill of waters of the United States. Under the proposed project, 15 new road crossing culverts would cross six of the larger on-site tributaries of the Santa Clara River (Chiquito, San Martinez Grande, Lion, Long, Potrero, and Ayers Canyons). Extension of Magic Mountain Parkway to the west, as envisioned with the proposed project, likewise would require culvert road crossings on an additional two unnamed drainages. Each road crossing would be constructed of earthen fill and pre-fabricated arched culverts, and would temporarily disturb a 60-foot wide (approximate) corridor on each side of the crossing, in addition to a permanent impact within the actual footprint of the crossing. Following construction, the temporary impact zone would be restored to pre-project contours and revegetated with native riparian and upland species as appropriate, minimizing impacts to waters of the United States.

The proposed bank protection would include buried soil cement, grouted and ungrouted rock riprap, turf reinforcement mats, and limited gunite slope lining around bridge abutments. These types of bank protection can be divided into two different categories, flexible and rigid revetments. Ungrouted rock riprap and turf reinforcement mats are flexible revetment systems that would be used as exposed bank protection in areas without earthen cover where stream velocities are low enough that the stabilization can resist erosive hydraulic forces in a Los Angeles County capital storm. Generally, this would be a maximum stream velocity of 12-14 feet per second (fps). Rigid revetments can resist much higher velocities (20+ fps) and erosive forces; however, they do not adjust or move like flexible systems. The bank stabilization would be installed over an approximate 20-year period to coincide with development of individual tracts within the project area, and in accordance with the development phasing program. All the proposed development areas would be raised above the FEMA flood hazard elevation to protect land uses from potential flooding.

Along the river mainstem, the majority of the proposed bank stabilization would be constructed of buried soil cement, with the use of gunite and rip-rap being limited to areas in the immediate vicinity of bridges and storm drain outlets. Installation of buried soil cement would involve placement of fill material in the footprint of the stabilization itself, as well as temporary impacts in the construction zone on the riverward side of the structure. Bank stabilization along the river would be installed under all of the alternatives considered, but the location and extent of the stabilization would vary. To minimize impacts, the bank stabilization would be constructed outside the lateral limits of waters of the United States under all alternatives, and fill of waters would be limited to temporary impacts during construction. By locating bank stabilization outside the active channel, hydrologic impacts of bank stabilization would be reduced under most alternatives. Along tributary drainages, buried bank stabilization would be installed in post-development channels to limit lateral channel migration and protect adjacent land uses. The construction methods would be identical to those employed along the river mainstem, but in many cases the stabilization would be constructed within waters of the United States. The alternatives considered in this analysis would generally reduce impacts from bank stabilization by featuring wider channels, with bank stabilization set back laterally from the active channel.

Under each of the alternatives, the five modified drainages described above (Chiquito, Lion, Long, Potrero, and San Martinez Grande) would contain bank and channel-bed protection designed to mimic natural features and use a combination of structural and vegetative methods to provide drainages that are stable, visually aesthetic, and support native vegetation following implementation of the proposed project. The grade stabilization structures are designed to contain the hydraulic "jump" that occurs when there is a substantial drop in streambed elevation, so that higher velocities are dissipated within the area; the proposed structures would help control erosion and changes to the configuration of the streambed channel. Such structures would be constructed of soil cement, sheet piles, or reinforced concrete.

The proposed project incorporated various treatments of tributary drainages to accommodate approved land uses within the project area. In order to optimize the location of development within portions of the project area, mass grading would occur in portions of the northern and southern tributary watersheds. Generally, there would be some higher areas that would be graded or "cut" and lower valley areas that would be elevated with fill material, balancing the distribution of cut and fill soil material throughout the project area. In many cases, the excavation of native material and placement of compacted fill material is necessary to achieve geotechnically-stable development pads. The wet-weather flows in these drainages meet the Los Angeles County flood criteria (less than 2,000 cfs) to be conveyed by storm drain. The proposed project does not propose to create new drainage channels to replace these impacted drainages. Rather, the wet-weather flows that currently occupy the drainages would be routed into the development's storm drain system, and would be discharged to the Santa Clara River via the proposed storm drain outlets.

The proposed project includes installation of 25 storm drain outlets along the Santa Clara River. **Figure 2.0-36** in the Final EIS/EIR depicts the approximate locations of the storm drain outlets. A typical storm drain outlet and associated schematic are shown on **Figure 2.0-37** in the Final EIS/EIR. Installation of storm drain outlets would generally requires a 20-foot wide excavation/construction zone. All of the storm drain outlets would drain to jurisdictional areas of the Corps and CDFG, although most are constructed outside of jurisdictional areas. In total, approximately 0.2 acres of jurisdictional area would be permanently impacted by construction of the storm drain outlets in the approximately 25 locations. Associated maintenance access ramps would impact up to an additional 0.2 acres at these locations. Maintenance of storm drain outlets would include clearing vegetation and removal of accumulated sediment. In situations where drain outlets are not draining sufficiently, pilot channels up to 75 feet long by 10 feet wide may be created to facilitate the conveyance of storm flows. See Appendix A of the RMDP for additional details on the proposed maintenance.

Pursuant to NPDES requirements, Best Management Practices (BMPs) would be implemented at the project site under all alternatives to avoid and minimize impacts to water quality. These BMPs include the following water quality control facilities: (1) water quality basins; (2) debris basins, located just upstream of the interface between developed and undeveloped areas, primarily to trap debris coming from the upper watersheds; (3) detention basins, which are typically sized to capture the predicted runoff volume and retain the water volume for a period of time (usually 24 to 48 hours); (4) catch basin inserts or screens/filters installed in existing or new storm drains to capture pollutants in the stormwater runoff; (5) bioretention, such as vegetated grassy swales, that provide water quality benefits and convey storm water runoff; and (6) solids separator units or in-line structures that reduce or manipulate runoff velocities such that particulate matter falls out of suspension and settles in a collection chamber. Many of these proposed facilities would be constructed outside waters of the United States or as components of storm drain systems or newly created channels. However, some of the proposed water quality facilities would require work in jurisdictional areas.

Due to the existing degraded conditions within portions of some drainages in the project site (Potrero Canyon, Long Canyon, and portions of Chiquito, San Martinez Grande, and Lion Canyons), stabilization of the existing drainages is not feasible as part of the proposed project. In order to meet Los Angeles County flood protection objectives, these drainages would be graded, and a new drainage would be constructed in the same or similar location. The new drainages would be designed to incorporate buried bank stabilization and grade stabilization, and would have sufficient hydrologic capacity to pass the Los Angeles County Capital Flood without the need for clearing vegetation from the channels. The new channel banks would be planted with riparian vegetation following construction. Some of the drainages within the project site, including many of the smaller, ephemeral drainages, would be graded and replaced with underground storm drains as part of the construction operations required to facilitate build-out of the proposed project. The wet-weather flows in these drainages meet the Los Angeles County flood criteria (less than 2,000 cfs) to be conveyed by storm drain. Where large-scale removal of drainages are not required to meet flood protection objectives, the alternatives would integrate the flood control and grade stabilizing measures described above, to maintain sediment equilibrium to avoid and minimize impacts to the channel bed and banks from hydromodification while providing adequate flood protection to adjacent developed lands. In some instances, existing conditions within on-site drainages are such that if no modifications were implemented, excessive vertical scour or lateral channel migration would occur. In these locations, grade control measures are proposed regardless of any need to provide flood protection, as complete avoidance of such drainages would allow existing channel degradation to continue unabated. The proposed grade control measures would include installation of grade control structures, described above, and could also require recontouring of existing banks to restore stable channel morphology and minimize channel incision. These proposed channel stabilization activities would result in permanent and temporary fill of waters of the United States.

Primary electrical, sewer, water, gas, and communications lines would be installed south of SR-126 and across the Santa Clara River (two locations), Castaic Creek, Chiquito Canyon, and San Martinez Canyon to serve the proposed project. Other locally-serving utilities would be installed across other tributaries and drainages. On the river, utility lines would be installed in rights-of-way adjacent to bridges where access for installation and repair could be readily accommodated. Directional drilling techniques would be used to avoid the environmental impacts associated with trenching across the Santa Clara River. In the Chiquito Canyon and San Martinez Grande Canyon tributaries, where trenching would be used, installation of buried lines would require a 30- to 50-foot-wide construction zone. In other tributaries and drainages, trenching is likely to be used with similar construction zones. Buried lines across watercourses would be buried below scour depth and weighted or cemented in place, where appropriate, or co-located with bed stabilization features that provide scour protection. Following completion of construction activities, the temporary impact zone would be restored to channel grade and revegetated with native riparian and upland species as appropriate. Permanent access for maintenance of utilities would be located outside the jurisdictional limits of the streambed and associated habitats. Maintenance of the proposed utility crossings is discussed in Appendix A of the RMDP.

During construction, the proposed temporary haul routes would cross the Santa Clara River and be used to move excavated soil and provide general construction access to locations within the project area where fill material is required. The approximate locations of the proposed temporary haul routes are depicted on **Figure 2.0-33** in the Final EIS/EIR. The proposed crossings would be two-way with 60 feet of travel surface width. In locations where the riverbank is steep and ramping is required, fill would be placed in the river channel to facilitate a safe slope ratio for passage of heavy equipment. Extra width for the side slopes of such crossings would be also required. Passage of river flows would be maintained for all periods that the temporary haul routes are in use, and may include culverts or a simple span bridge crossing. Crossings may be removed as necessary to allow larger winter flows to pass. Upon on-site determination that the routes are no longer required to serve as temporary haul routes, the routes would either: (a) revert back to agricultural routes to continue to serve the needs of agricultural activities; (b) in the event that the routes are to be preserved for future haul route activities, the crossings would be gated during times of non-activity to prevent unauthorized access; or (c) if no longer needed for agricultural activities, the river crossings would be removed and restored to appropriate native habitats.

III. Physical/chemical characteristics and anticipated changes

(X) **substrate:** With the proposed project (Alternative 2), of the 660.1 acres of waters of the Unites States within the project area, the proposed project would permanently impact 93.3 acres of channel substrate (approximately 14.1 percent of the waters of the United States in the project area). Temporary impacts to channel substrate would occur in approximately 33.3 acres of jurisdictional areas, to facilitate construction and maintenance of the proposed project facilities. To avoid and minimize impacts to channel substrate, the proposed temporary impacts would occur outside the actual footprint of the facility once constructed, thereby allowing rehabilitation of channel morphology and vegetation. For example, construction of bridges across the Santa Clara River would require disturbance of channel substrate upstream and downstream of the proposed bridge location during construction, but these areas would not be occupied by the bridge once completed. To avoid and minimize impacts, all temporary impact areas would be restored to pre-project contours and revegetated, following completion of construction activities in waters of the United States. Of the approximately 660.1 acres of waters of the United States within the project site, approximately 533.5 acres (approximately 80 percent of total acreage) would be completely avoided under the proposed project. Sensitive resource areas avoided under the proposed project would include the majority of the Santa Clara River mainstem, the Middle Canyon spring complex (a high-quality wetland), and the entire Salt Creek sub-watershed.

The proposed project (Alternative 2) and the various alternatives could disrupt the sediment equilibrium in the Santa Clara River mainstem or tributaries, thereby causing adverse geomorphic impacts on waters of the United States. In addition, the conversion of existing undeveloped lands to a non-erodible urban condition would slightly reduce the available sand supply reaching beaches in Ventura County. These indirect effects to channel substrate generally would be minor. In the mainstem of the Santa Clara River, the proposed project could increase sediment flows downstream during storm events, resulting in substantial erosion and deposition impacts downstream. Under the proposed project, the total floodplain area subject to potentially erosive velocities (four fps or greater) would decrease for all modeled storms with the exception of the 5-year return period, under which the area susceptible to erosion increases by 0.6 acre. However, this minor increase during the 5-year return interval is not considered significant relative to the substantial decrease in area subject to erosive velocities during 2-, 10-, 20-, 50-, 100-year, and capital flood events. In some areas, velocities greater than four fps would correspond with outlet structures, access ramps, or bridge abutments, which could result in localized erosion impacts. Where necessary to minimize erosion and structural damage, materials such as grouted riprap or reinforced concrete would be used according to the standards, criteria, and specifications developed by Los Angeles County. No changes in flow velocity would occur upstream or downstream of the proposed project area. For detailed information regarding the hydrologic impacts and associated direct and indirect impacts to channel substrate, please reference revised Section 4.2 of the Final EIS/EIR.

The proposed project and alternatives would result in localized variations in scour and sedimentation due to the changes in flow velocity described above. The precise location and extent of material removal and deposition would shift with the installation of the various project components, similar to natural changes in channel morphology that occur with large storm events. Modeling results indicate that there would be no significant changes in local patterns of sediment deposition and erosion. In some areas, velocities greater than four fps would correspond with outlet structures, access ramps, or bridge abutments, which could result in a significant localized erosion impacts and minor changes in channel substrate. To minimize erosion and structural damage to such structures, erosion resistant materials such as concrete, soil cement or secured rip-rap would be used according to the standards, criteria, and specifications developed by the County to ensure long-term stability. For detailed information concerning changes to the sediment budget and associated direct and indirect impacts to channel substrate, please reference revised **Section 4.2** of the Final EIS/EIR for the proposed project.

Within the tributary drainages in the project area, certain drainages would not be graded and would remain undisturbed, while other drainage areas would be graded, reconstructed to a soft-bottom drainage channel with buried bank stabilization along each side of the drainage, or converted to buried storm drains. In channels where reconstructed drainages are proposed, the channel designs would integrate flood control and grade stabilizing measures (*i.e.*, a combination of drop structures/grade stabilizers and bank protection) to maintain sediment equilibrium and protect the channel substrate, bed and banks from hydromodification impacts. The proposed design methodology is intended to create stable drainage channels that would support the in-channel riparian vegetation following project implementation. For detailed information concerning the proposed channel structures and associated direct and indirect impacts to channel substrate, please reference revised **Section 4.2** of the Final EIS/EIR for the proposed project.

The proposed design focuses on developing channel width, depth, slope, and other parameters based on the predicted flow and sediment regime for each drainage. The intent is to develop and establish stable channel characteristics through an integrated analysis, and then use structures and other measures only in those drainage locations where erosional forces are shown to exceed the natural stability of the drainage channel. All such structures (*i.e.*, bank and channel bed protection) would be designed to mimic natural features and use a combination of structural and vegetative methods to provide drainage channels that are stable, aesthetic, and maintain native habitat (*e.g.*, riparian, wetland, and upland habitat) after implementing the proposed construction activities in waters of the United States. The proposed road crossing culverts and bridges would traverse various drainages to accommodate the proposed project circulation system. The exact channel configuration within each drainage would be determined at the final design stage of project implementation, but would be submitted to the Corps for final verification and approval prior to construction activities in waters of the United States. Under the proposed project, the site's five largest tributary drainages (Chiquito, San Martinez Grande, Potrero, Long, and Lion Canyons) would be modified or reconstructed, but would not be entirely replaced by storm drain systems. The modified channels would be designed for geomorphic equilibrium in terms of channel stability, sediment transport, and flow conveyance under future conditions. The channels and floodplains would be designed to account for geomorphic stability, flood conveyance, ecological functions, hydromodification, and low maintenance. Although the final design details for the proposed modified and reconstructed drainages have not been determined, the criteria listed above would ensure that the channels would be free from geomorphic instabilities in the post-project condition. For detailed information concerning the proposed post-project hydrologic condition and associated direct and indirect impacts to channel substrate, please reference revised **Section 4.2** of the Final EIS/EIR for the proposed project.

The indirect effects of the proposed project components on beach replenishment are a function of the sediment load delivered through the project reach. The Santa Clara River watershed contributes approximately 60 percent of beach sand within Ventura County, with other streams and sand from upcoast providing the remaining 40 percent. In total, the Santa Clara River watershed yields approximately 4.08 million tons of sediment per year (1,170 tons per square mile) from its mouth into the Santa Barbara Channel. By reducing the erodible area within the project site, the proposed project could cause a reduction in suspended sediment and bedload during storm events, which could negatively affect beaches, as incrementally less sediment would be available for their replenishment. The proposed project would convert approximately 5,307 acres of currently undeveloped lands to a non-erodible, urban condition. This conversion would translate to an average loss of approximately 9,700 tons of sediment per year, or 0.24 percent of the river's total annual yield. Because this reduction is very slight, the proposed project would not substantially affect recruitment of sand onto Ventura County beaches. For detailed information concerning potential indirect impacts to beaches, please reference revised **Section 4.2** of the Final EIS/EIR for the proposed project.

Alternatives 3 through 7 would have similar direct and indirect impacts to channel substrate, but would be reduced when compared to the proposed project. With the project alternatives permanent impacts to waters of the United States would vary from approximately 73 acres to 13 acres, with similar temporary impacts to channel substrate for the construction and maintenance of bridges, bank stabilization and debris and detention basins (temporary impacts associated with the various alternatives would vary from 41.6 acres to 20.3 acres). The project alternatives would include similar avoidance and minimization measures to reduce impacts to channel substrate, including returning temporary impact areas to pre-project contours with revegetation as well as project design features to eliminate or reduce indirect impacts to channel substrate. For detailed information concerning the direct and indirect impacts to channel substrate that would be associated with the various project alternatives, please refer to revised **Section 4.1** and revised **Section 4.2** of the Final EIS/EIR for the proposed project.

(X) **currents, circulation or drainage patterns**: The proposed project (Alternative 2) and alternatives could directly and indirectly impact currents, circulation and/or drainage patterns, reducing the hydrologic function of waters of the United States in the project area. In general, hydrologic function is affected by the source of water, the duration and magnitude of flows (hydroperiod), whether flows reach the floodplain, the presence of flow restrictions, the duration of ponding on the floodplain, and the width of the floodplain. An increase in water depth in the Santa Clara River could result in significant impacts to currents and drainage patterns if the additional water depth causes greater "shear forces" (*i.e.*, friction caused by the weight of water) on the channel bottom, and thereby increasing scouring of the channel bed and removal of riparian vegetation. This effect could reduce the extent of aquatic, wetland, and riparian habitats in waters of the United States. **Table 4.2-12** in the Draft EIS/EIR provides the general hydrologic characteristics of the Santa Clara River channel for the two-, five-, 10-, 20-, 50-, and 100-year events, both with and without the proposed project. The results of the hydraulic analysis indicate that water depths and, correspondingly, total shear in the Santa Clara River would not increase significantly due to the proposed project. Based on PACE HEC-RAS and HEC-RMS modeling of the 100-year storm event, project-related infrastructure would result in 52 locations of increased water surface elevation exceeding one foot, and no decreased water surface elevation locations in the Santa Clara River. No impacts to water surface elevation would be realized upstream or downstream of the project site (PACE, 2007). The additional riparian vegetation area subject to inundation would not be changed during the two-year flood event, but would be reduced by approximately 0.3, 2.6, 80.2. 131.5, 137.1, and 225.1 acres as a result of the proposed project during the five-, 10-, 20-, 50-, 100-year, and capital flood (discharge resulting from a hypothetical four-day storm with a 50-year return period falling on a saturated watershed with debris from a wildfire) events, respectively (PACE, 2008A). **Figures 4.2-9** and **4.2-10** in the Draft EIS/EIR show the area of inundation and velocity distribution for the 10- and 100-year flow events for both existing conditions and the proposed project. As shown in these figures, the decrease in inundated area (by percentage and acreage) would primarily affect areas of currently disturbed, agricultural land. Accordingly, impacts to currents and drainage patterns would be limited such that water flow depths, velocities, and total shear for all return events would not be significantly different in the river channel between existing and proposed conditions in the project area. Since there would not be a significant change in flow depths or total shear in existing channel, the impacts to the amount and pattern of aquatic, wetland, and riparian habitats in the Santa Clara River would be less than significant.

The Hybrid Assessment of Riparian Condition (HARC) analysis indicates that, overall, the proposed project would result in substantial changes to the hydrologic function, including currents and drainage patterns, of the tributaries with net losses observed for the source water and hydroperiod and net gains observed for the floodplain connection, surface water persistence, and flood prone area metrics. In total, the proposed project would result in a net loss of 19.98 hydrology AW-score units but a net gain of 35.68 total HARC AW-score units within the tributaries. Absent mitigation, the decrease in HARC AW-score units within the tributaries may be the result of an increase in the frequency and magnitude of scouring of riparian vegetation which, absent mitigation, would be a significant impact. Accordingly, the impacts of the proposed project to the currents, drainage patterns and riparian habitat in the tributaries are considered significant prior to mitigation, but less than significant under Significance Criterion 4 through implementation of Mitigation Measures SW-2, SW-3, SW-5, BIO-1, BIO-6, and BIO-7.

The HARC hydrology score indicates the relative extent to which the assessment reaches on site perform the above functions. Lost hydrologic function due to the proposed discharges of fill material in waters of the United States was calculated by applying the HARC hydrology score as a weighting factor to the acreages filled. Fill from the proposed project would cause the permanent loss of 66.1 HARC hydrology-weighted acres, and the temporary loss of 27.7 HARC hydrology-weighted acres of waters of the United States. Losses of hydrologic function could include changes to the fluctuations in water level that occur within the on-site drainages during storm events. The storm hydrograph is dictated by a number of factors, including rainfall intensity, slope and permeability of the watershed, channel slope and width, and the presence of any manmade features that would detain or attenuate flows. Adverse changes to some of these parameters (*e.g.*, increased impervious surfaces in the project area, narrowed stream channels) could result in more severe fluctuations in water depth, while changes to others (*e.g.*, installation of detention basins) would make the fluctuations less severe. Because all of the waters within the project area are riverine, rather than impoundments or tidal waters, on-site surface flows are unidirectional. Therefore, the hydrologic functioning of these waters does not include large-scale water circulation. For detailed information concerning direct and indirect impacts to currents, circulation and drainage patterns, please reference revised **Section 4.1** and revised **Section 4.2** of the Final EIS/EIR for the proposed project.

Alternatives 3 through 7 would have similar direct and indirect impacts to currents, circulation and drainage patterns, but would be reduced when compared to the proposed project. With the project alternatives permanent impacts to waters of the United States would vary from approximately 73 acres to 13 acres, with similar temporary impacts for the construction and maintenance of bridges, bank stabilization and debris and detention basins (temporary impacts associated with the various alternatives would vary from 41.6 acres to 20.3 acres). The project alternatives would include similar avoidance and minimization measures to reduce impacts to currents and drainage patterns, including returning temporary impact areas to pre-project contours with revegetation as well as project design features to eliminate or reduce indirect impacts to currents and drainage patterns. For detailed information concerning the direct and indirect impacts to currents, circulation and drainage patterns that would be associated with the various project alternatives, please reference revised **Section 4.1** and revised **Section 4.2** of the Final EIS/EIR for the proposed project.

(X) **suspended particulates; turbidity:** The proposed project (Alternative 2) and alternatives would involve large-scale construction operations and would result in permanent changes to the channels and watersheds of most tributary drainages within the project site. During construction, concentrations of sediment (Total Suspended Solids (TSS) and turbidity), nutrients, heavy metals, and pesticides in tributary drainages could potentially be altered when vegetation removal, grading, and trenching activities expose soils to wind and water erosion. On a long-term basis, many of the on-site watersheds would be largely comprised of impervious surfaces following build out of the proposed development and natural drainage patterns would be replaced with engineered paths reaching the tributaries via storm drains and detention basins.

The potential water quality impacts from proposed construction activities, construction materials, and non-stormwater runoff during the construction phase relate primarily to sediment (TSS and turbidity) and non-sediment related pollutants, such as nutrients, heavy metals, and certain pesticides, including legacy pesticides. Construction-related sediment releases are most often caused by exposing soils to rain/runoff and wind. A number of pollutants not related to sediment also pose water quality problems during the construction phase. These include construction materials (*e.g.*, paint), chemicals, liquid products, and petroleum products used in facility construction or the maintenance of heavy equipment; and concrete-related pollutants.

Construction impacts would be minimized through compliance with the NPDES permit for stormwater discharges from construction sites ([NPDES No. CAR000002] Water Quality Order 2009-0009-DWQ, State Water Resources Control Board [SWRCB] NPDES General Permit for Stormwater Discharges Associated with Construction Activity [Construction General Permit]). This permit imposes specific, tiered requirements depending on which of three risk levels are assigned to the project's discharges, by watershed, based on prescribed formulas. These formulas determine sediment and receiving water risk during periods of soil exposure, using calculation tools provided in Appendix 1 of the permit. Receiving water risk is categorized as either "high" or 'low," and sediment risk is categorized as "low," "medium" or "high." Under the Construction General Permit, Risk Level 1 applies if both sediment risk and receiving water risk are deemed to be "low;" such sites have minimum BMP requirements but require no effluent monitoring (except for non-visible pollutants, if identified as potentially present). Risk Level 2 applies at all other sites unless both sediment risk and receiving water risk are determined to be "high." Risk Level 2 sites are subject to numeric action levels for turbidity and pH, and effluent monitoring requirements. If both receiving water and sediment risk are calculated to be "high," then the project is assigned Risk Level 3, and the site is subject to turbidity and pH numeric effluent limits and more rigorous monitoring requirements.

All projects are required to prepare and implement a Storm Water Pollution Prevention Plan (SWPPP). The SWPPP itself must include erosion and sediment control BMPs to reduce or eliminate the discharge of sediment and other potential construction-related pollutants. The SWPPP must also contain a Construction Site Monitoring Program that identifies monitoring and sampling requirements during construction. Preliminary analysis indicates that the proposed project would most likely be categorized as a Risk Level 2. BMPs and monitoring required by the Construction General Permit will be incorporated into the proposed project to comply with the Risk Level 2 requirements, as described in Attachment D of the Construction General Permit. If final design analysis indicates that the proposed project will fall under Risk Level 3, the additional Level 3 permit requirements will be implemented as necessary.

Construction of the in-stream elements within the proposed project area would require dewatering discharges as well as discharges not related to stormwater. For example, excavation depths needed for bank protection would be below the river bottom and, as a result, would frequently encounter groundwater that would have to be removed during the construction period. The dewatering activity would place shallow wells close to the excavation, drawing down the groundwater in the construction zone. Typically, soil composition within the dry streambed would allow the discharged dewatering flows to percolate quickly back into the ground. However, in some instances, the amount of discharged water may create sufficient flow during dewatering operations to form a continuous wetted channel from the work site to the Santa Clara River or a tributary.

In general, the Construction General Permit authorizes construction dewatering activities and other non-stormwater discharges related to construction not subject to a separate general permit adopted by a Regional Board, as long as: (1) they do not cause or contribute to violation of any water quality standards; (2) they do not violate any other provisions of the permit; (3) they are not prohibited by a Basin Plan provision; (4) the discharger has included and implemented specific BMPs required by the permit to prevent or reduce the contact of the non-stormwater discharge with construction materials or equipment; (5) the discharge does not contain toxic constituents in toxic amounts or (other) significant quantities of pollutants; (6) the discharge is monitored and meets the applicable numeric action levels (NALs) and numeric effluent limitations (NELs); and (7) the discharger reports the sampling information in the Annual Report.

BMPs would also be implemented to protect receiving waters from dewatering and construction related non-stormwater discharges. In the case of dewatering discharges, such BMPs would include source control and treatment control

BMPs in compliance with either: (a) the Los Angeles RWQCB's general waste discharge requirements (WDRs) (under Order No. R4-2003-0111; NPDES No. CAG994004) governing construction-related dewatering discharges within the project area; or (b) an individual WDR/NPDES permit specific to the proposed project dewatering activities. Typical BMPs for in-stream construction dewatering include infiltration of clean groundwater or on-site treatment using an engineered system, such as a weir tank, which is designed to remove suspended particulates from the water before it is discharged. To avoid significant impacts to receiving waters from dewatering activities, discharged water would be allowed to "sheet-flow" from energy dissipaters so that it soaks into the dry soils, or it would be routed through a sprinkler field and sprayed over a large upland area adjacent to the river/streambed with the intent to percolate the entire discharge.

Implementation of erosion and sedimentation source control BMPs during the construction of the proposed RMDP infrastructure and other components would prevent significant erosion and sediment transport from the project site during the construction phases for the proposed project. These same BMPS would also avoid and minimize direct and indirect impacts associated with the transport of other pollutants potentially entrained in the sediment. The BMPs would meet best available technology (BAT)/best conventional pollutant control technology (BCT) standards to ensure that discharges during construction would not cause or contribute to any exceedance of water quality standards in the receiving waters. During construction of the proposed project, the BMPs would be implemented in compliance with the Construction General Permit and the general waste discharge requirements in the Dewatering General WDRs, or in compliance with an individual WDR/NPDES permit specific to the project dewatering activities. All discharges from qualifying storm events would be sampled for turbidity and pH, and the results would be compared to NALs to ensure that BMPs are functioning as intended. If discharge sample results fall outside of these action levels, the existing site BMPs and potential causative agents would be reviewed. In addition, the existing BMPs would be maintained and/or repaired and/or additional BMPs would be provided to ensure that future discharges meet these criteria. For detailed information concerning the direct and indirect impacts to turbidity as well as the associated mitigation measures, please reference revised **Section 4.4** of the Final EIS/EIR for the proposed project.

Alternatives 3 through 7 would have similar direct and indirect impacts to turbidity levels, but would be reduced when compared to the proposed project. With the project alternatives permanent impacts to waters of the United States would vary from approximately 73 acres to 13 acres, with similar temporary impacts for the construction and maintenance of bridges, bank stabilization and debris and detention basins (temporary impacts associated with the various alternatives would vary from 41.6 acres to 20.3 acres). The project alternatives would include similar avoidance and minimization measures to reduce impacts to turbidity including all the above BMPs as well as project design features to eliminate or reduce direct and indirect impacts to turbidity levels. For detailed information concerning the direct and indirect impacts to turbidity that would be associated with the various project alternatives, please refer to revised **Section 4.4** of the Final EIS/EIR for the proposed project.

(X) **water quality (temperature, salinity patterns and other parameters):** The proposed project (Alternative 2) and alternatives would facilitate the development of up to 20,885 residential dwelling units and a maximum of approximately 5.5 msf of nonresidential uses on the project site. Runoff volume and all pollutant loads, with the exception of TSS and nitrate + nitrite-N, are predicted to increase with the proposed project when compared to existing conditions. Concentrations of all pollutants, with the exception of dissolved copper, are predicted to decrease under the proposed project when compared to existing conditions; dissolved copper concentrations are predicted to increase. All concentrations are predicted to be below benchmark criteria and within the range of observed concentrations in Santa Clara River Reach 5.

For the qualitatively assessed pollutants of concern, concentrations of hydrocarbons and MBAS are expected to increase once the proposed project is implemented. Concentrations of pathogens, pesticides, trash and debris, and cyanide also may increase under the proposed project when compared to existing conditions, resulting in a potentially significant impact to water quality. However, none of the pollutants of concern are expected to significantly impact receiving waters, as these pollutants would be effectively reduced by implementation of the comprehensive site design/low impact development, source control, and treatment control BMPs specified in the Newhall Ranch Specific Plan Sub-Regional Stormwater Mitigation Plan. The proposed plan, developed by the applicant consistent with local stormwater regulatory requirements, sets forth the urban runoff management program that would be implemented for the build-out of the proposed project.

Wastewater generated by the build-out of the proposed project would be treated in the proposed Newhall Ranch Water Reclamation Plant (WRP). Treatment at the WRP would consist of screening, activated sludge secondary treatment with membrane bioreactors, nitrification/denitrification, ultraviolet disinfection, and partial reverse osmosis. Treated effluent from the Newhall Ranch WRP would be used to supply distribution of recycled water throughout the proposed development area in the form of irrigation of landscaping and other approved uses. As required by the CWA, NPDES Permit and WDRs for the Newhall Ranch WRP (Order No. R4-2007-0046, effective October 27, 2007 (Los Angeles RWQCB, 2007)) include effluent limitations that are protective of surface receiving water quality and designated beneficial uses. For detailed information concerning the water quality impacts and associated mitigation measures, please reference revised **Section 4.4** of the Final EIS/EIR for the proposed project.

The proposed project and alternatives could result in a loss of biogeochemical function of waters of the United States on the project site. Biogeochemical function measures the ability of wetland and riparian areas to perform specific processes such as maintenance of water quality, cycling of nutrients, retention of particulates, and export of organic carbon. The HARC biogeochemical score indicates the relative extent to which the assessment reaches on site perform this function. Lost biogeochemical function due to the proposed fill was calculated by applying the HARC biogeochemical score as a weighting factor to the acreages filled. The fill from implementation of the proposed RMDP would result in the permanent loss of 60.3 HARC biogeochemical-weighted acres and a temporary loss of 25.7 HARC biogeochemical-weighted acres of waters of the United States. For detailed information concerning the direct and indirect impacts to water quality, please reference revised **Section 4.4** of the Final EIS/EIR for the proposed project.

Alternatives 3 through 7 would have similar direct and indirect impacts to water quality, but would be reduced when compared to the proposed project. With the project alternatives permanent impacts to waters of the United States would vary from approximately 73 acres to 13 acres, with similar temporary impacts for the construction and maintenance of bridges, bank stabilization and debris and detention basins (temporary impacts associated with the various alternatives would vary from 41.6 acres to 20.3 acres). The project alternatives would include similar avoidance and minimization measures to reduce impacts to water quality including all the above BMPs as well as project design features to eliminate or reduce indirect impacts to water quality. For more information concerning the direct and indirect impacts to water quality that would be associated with the various project alternatives, please refer to revised **Section 4.4** of the Final EIS/EIR for the proposed project.

(X) **flood control functions**: The proposed project and alternatives would authorize the construction and maintenance of flood control features, such as bank stabilization, grade control structures, storm drains, and debris and detention basins, throughout the project site to protect proposed development areas from flooding. All facilities would be constructed to Los Angeles County standards, which require that they be sized to convey flows from the Capital Flood, a worst-case situation combining a modeled 50-year storm with a bulking factor simulating a burned watershed. Because the Capital Flood substantially exceeds the 100-year flood in magnitude in all modeled watersheds within the project site, the proposed facilities would be adequate to protect the proposed development areas from 100-year storm events. The proposed project and all alternatives would provide for adequate flood conveyance. For detailed information concerning the direct and indirect impacts to flood control functions associated with the proposed project, please reference revised **Section 4.1** of the Final EIS/EIR for the proposed project.

Alternatives 3 through 7 would have similar direct and indirect impacts to flood control functions, but would be reduced when compared to the proposed project. With the project alternatives permanent impacts to waters of the United States would vary from approximately 73 acres to 13 acres, with similar temporary impacts for the construction and maintenance of bridges, bank stabilization and debris and detention basins (temporary impacts associated with the various alternatives would vary from 41.6 acres to 20.3 acres). The project alternatives would include similar avoidance and minimization measures to reduce impacts to flood control functions, including project design features to eliminate or reduce direct and indirect impacts to flood control functions. For more information concerning the direct and indirect impacts to flood control functions that would be associated with the various project alternatives, please refer to revised **Section 4.1** of the Final EIS/EIR for the proposed project.

( ) **storm, wave and erosion buffers:** Not applicable.

(X) **erosion and accretion patterns**: The proposed project (Alternative 2) and alternatives could increase downstream sediment flows during storm events, resulting in substantial downstream erosion and deposition impacts. Under the proposed project, the total floodplain area subject to potentially erosive velocities (four fps or greater) would decrease for all modeled storms with the exception of the 5-year return period, under which the area susceptible to erosion increases by 0.6 acre. However, this minor increase during the 5-year return interval is not considered significant relative to the substantial decrease in area subject to erosive velocities during 2-, 10-, 20-, 50-, 100-year, and capital flood events. In some areas, velocities greater than four fps would correspond with outlet structures, access ramps, or bridge abutments, which could result in localized erosion impacts. Where necessary to minimize erosion and structural damage, materials such as grouted riprap or reinforced concrete would be used according to the standards, criteria, and specifications developed by Los Angeles County. No changes in flow velocity would be realized upstream or downstream of the proposed project area.

The proposed project and alternatives would result in localized variations in scour and sedimentation due to the changes in flow velocity described above. The precise location and extent of material removal and deposition would shift with the installation of the various project components, much as it does with natural storm events. Modeling results indicate that there would be no significant changes in local patterns of sediment deposition and erosion. In some areas, velocities greater than four fps would correspond with outlet structures, access ramps, or bridge abutments, which could result in a significant localized erosion impact. To minimize erosion and structural damage to such structures, erosion resistant materials such as concrete, soil cement or secured rip-rap would be used according to the standards, criteria, and specifications developed by Los Angeles County to ensure long-term stability. For detailed information concerning potential changes to erosion and accretion patterns, please reference revised **Section 4.2** of the Final EIS/EIR for the proposed project.

The indirect effects of the proposed project components on beach replenishment are a function of the sediment load delivered through the project area. The Santa Clara River watershed contributes approximately 60 percent of beach sand within Ventura County, with other streams and sand from upcoast providing the remaining 40 percent. In total, the Santa Clara River watershed yields approximately 4.08 million tons of sediment per year (1,170 tons per square mile) from its mouth into the Santa Barbara Channel. By reducing the erodible area within the project site, the proposed project could cause a reduction in this floodwater sediment, which could negatively affect beaches, as incrementally less sediment would be available for their replenishment. For detailed information concerning the indirect impacts to erosion and accretion patterns in coastal areas, please reference revised **Section 4.2** of the Final EIS/EIR for the proposed project.

Alternatives 3 through 7 would have similar direct and indirect impacts to erosion and accretion patterns, but would be reduced when compared to the proposed project. With the project alternatives permanent impacts to waters of the United States would vary from approximately 73 acres to 13 acres, with similar temporary impacts for the construction and maintenance of bridges, bank stabilization and debris and detention basins (temporary impacts associated with the various alternatives would vary from 41.6 acres to 20.3 acres). The project alternatives would include similar avoidance and minimization measures to reduce impacts to erosion and accretion patterns including project design features to eliminate or reduce direct and indirect impacts. For more information concerning the direct and indirect impacts to erosion and accretion patterns that would be associated with the various project alternatives, please refer to revised **Section 4.2** of the Final EIS/EIR for the proposed project.

(X) **aquifer recharge:** The proposed project (Alternative 2) and alternatives are not expected to result in any direct or indirect impact on groundwater supplies. The applicant has utilized a low of 5,971 acre-feet to a high of 14,303 acre-feet of groundwater from the Alluvial aquifer and the Saugus Formation from 1980 through 2008. This groundwater was used primarily for the applicant's agriculture, farming, and grazing operations. In contrast, the proposed project would require only approximately 3.3 to 8.1 afy of water to install the infrastructure (*e.g.*, bridges, road-crossing culverts, bank stabilization). Construction water would either be trucked to the project area, or come from existing on-site wells, located within the project study area. This water demand is expected to be required during the approximately 20-year construction period for the required infrastructure to support the proposed project, and this demand would be met by the applicant's existing groundwater supply.

Supplying water to the proposed project or any of the alternatives would not substantially deplete groundwater supplies or interfere substantially with groundwater recharge volume or levels. There are sufficient local groundwater supplies to support construction of the proposed project infrastructure, in addition to existing and future development in the Santa Clarita Valley. An evaluation of groundwater supplies in the 2005 UWMP, the 2005 Basin Yield Report, and the 2009 Basin Yield Update resulted in the following findings: (a) both the Alluvial aquifer and the Saugus Formation are reasonable and sustainable sources of local water supplies at the yields stated in the 2005 UWMP; (b) the yields are not overstated and will not deplete or "dry-up" the groundwater basin; and (c) there is no need to reduce the yields for purposes of planning, as shown in the 2005 UWMP, the 2005 Basin Yield Report, and the 2009

Basin Yield Update. In addition, these reports determined that neither the Alluvial aquifer nor the Saugus Formation is in an overdraft condition, or projected to become overdrafted. For detailed information concerning potential direct and indirect impacts to aquifer recharge, please reference revised **Section 4.3** of the Final EIS/EIR for the proposed project.

Alternatives 3 through 7 would have similar direct and indirect impacts to aquifer recharge, but would be reduced when compared to the proposed project. With the project alternatives permanent impacts to waters of the United States would vary from approximately 73 acres to 13 acres, with similar temporary impacts for the construction and maintenance of bridges, bank stabilization and debris and detention basins (temporary impacts associated with the various alternatives would vary from 41.6 acres to 20.3 acres). The project alternatives would include similar avoidance and minimization measures to reduce impacts to aquifer recharge including project design features to increase infiltration and recharge in the project area. For more information concerning the direct and indirect impacts to aquifer recharge that would be associated with the various project alternatives, please refer to revised **Section 4.3** of the Final EIS/EIR for the proposed project.

(X) **baseflow**: The proposed project (Alternative 2) and alternatives are not expected to have significant direct or indirect impacts to baseflow. The Santa Clara River is perennial from the existing Valencia Water Reclamation Plant (WRP) to approximately 3.5 miles downstream of the Los Angeles County/Ventura County line near Rancho Camulos. Further downstream, the Santa Clara River flows through the Piru groundwater basin where surface water flow in the river is lost to groundwater. GSI Water Solutions, Inc. (2008) evaluated a series of historic air photos from 1927 to present, and assessed observed conditions in conjunction with known vegetation and geological information. GSI noted a fault control on the upstream end of the Piru basin, leading to a thick accumulation of alluvial sediments and a deep groundwater table. Taken together, these factors led to an ephemeral Santa Clara River in this zone during each year evaluated. Specifically, surface water flow in the Santa Clara River disappears completely and infiltrates into the Piru groundwater basin, forming an ephemeral "Dry Gap" reach for most of the year.

Two existing WRPs are located upstream of the proposed Newhall Ranch WRP. These two WRPs are the Valencia WRP and the Saugus WRP, which are operated by the County Sanitation Districts of Los Angeles County (CSD), the agency that would operate the Newhall Ranch WRP. Both upstream WRPs discharge water to the Santa Clara River. Discharges from the Saugus WRP began in 1966, and discharges from the Valencia WRP began in 1967. The Saugus WRP, located near the Bouquet Canyon Road bridge, has a permitted dry weather average design capacity of 6.5 mgd, and the Valencia WRP has a permitted dry weather average design capacity of 21.6 mgd. The combined average discharge of treated water from the Saugus and Valencia WRPs was approximately 20 mgd during the period January 2004 through June 2007. In 2006, the combined annual discharge volume from these two WRPs was 22,913 AF.

The timing and magnitude of future discharges from the Newhall Ranch WRP were originally identified from water demand projections for the proposed Newhall Ranch community. These projections were developed and presented in documents supporting the Newhall Ranch Specific Plan (FORMA, 2003) which was approved by Los Angeles County on May 27, 2003. As discussed in the Draft Additional Analysis for the Specific Plan (Impact Sciences, 2001), the Newhall Ranch WRP will be a near-zero discharge facility. Most of the treated water generated by the Newhall WRP would be recycled to meet non-potable (outdoor irrigation) demands of the proposed project. Based on a detailed water demand analysis presented, the inflows to the Newhall Ranch WRP would average 5,630 acre-feet per year (AF/yr), of which 5,344 AF/yr would be recycled. The remaining 286 AF would be discharged to the Santa Clara River during the wettest (winter) months, at a rate of between 0.6 and 2.0 mgd, which is equivalent to rates of 0.9 to 3.1 cubic feet per second (cfs). This discharge would occur primarily during December and January. Additionally, during wet years (when rainfall is significantly above average because of heavy winter storms), non-potable demands may be lower than average during the winter and early spring months, resulting in Newhall Ranch WRP discharge volumes greater than 286 AF. This discharge volume could amount to as much as 1,025 AF, based on a 5- to 6-month discharge period (beginning as early as October or November and potentially extending through March) and the discharge limit of 2 mgd that is specified in the permit for the Newhall Ranch WRP (Los Angeles RWQCB, 2007).

Compared with the 2006 annual discharge of 22,913 AF from the Valencia WRP and the Saugus WRP, the future Newhall Ranch WRP discharge of 286 AF is low (about 1.25%). Additionally, future discharges from the Saugus and Valencia WRPs would increase over time. Specifically, the annual discharges to the Santa Clara River from the Saugus and Valencia WRPs could increase to about 24,300 AF in the future, an increase of 1,400 AF/yr compared with annual discharge for 2006 (GSI Water Solutions, Inc., 2008). Accordingly, in the future, the volume of discharge from the Newhall Ranch WRP would likely represent a smaller fraction of the total discharges from WRPs to the Santa Clara River.

The proposed Newhall Ranch WRP discharge is also negligible compared with the total river flow volume, which consists of WRP discharges, groundwater discharges to the river, and storm flows. During a recent 5-year period of low rainfall (calendar years 1999 through 2003), total annual flow in the Santa Clara River, as measured at the Los Angeles County/Ventura County line, ranged from about 25,000 to 44,000 AF/yr, and the non-storm flow (groundwater discharge and WRP flows) ranged from about 23,000 to 30,000 AF/yr (GSI Water Solutions, Inc., 2008). For this period of dry conditions, the proposed Newhall Ranch WRP average discharge of 286 AF/yr would have represented between 0.6 and 1.1 percent of the total annual flow volume in the river. The Newhall Ranch WRP discharge would represent a much smaller percentage of the total annual flow volume in the River during wet years when the annual volume of river flow at the county line can exceed 100,000 AF/yr (and even 200,000 AF/yr because of high rainfall runoff from the watershed). For example, historical streamflow measurements at the Los Angeles County/Ventura County line during the period 1977 through 2006 indicate that the 90th and 95th percentile values of November-March streamflow, which are indicative of significant rainfall years, are 385 and 692 cfs, respectively (GSI Water Solutions, Inc., 2008). These flows are substantially greater than the future discharges from the Newhall Ranch WRP. Specifically, the future average discharge from the Newhall Ranch WRP (0.6 mgd [0.9 cfs]) is 0.13 percent to 0.23 percent of these streamflows, while the future potential maximum discharge from the Newhall Ranch WRP (2.0 mgd [3.1 cfs]) is 0.45 percent to 0.81 percent of these streamflows. Additionally, the total non-storm flow during wet years can exceed 50,000 AF/yr, with the year-to-year variability reflecting the influence of groundwater discharges to the river (which vary according to rainfall-induced fluctuations in the water table elevation). In summary, the proposed Newhall Ranch WRP discharges would be very small compared with future river flows, comprising 1 percent or less of river flow during average and dry years, and only 0.1 percent to 0.8 percent of river flows during wet years, which would not substantially lengthen the duration of seasonal flows in the Dry Gap.

The potential indirect impacts of the proposed Newhall Ranch WRP to the Dry Gap are considered less than significant since they would not substantially lengthen the duration of seasonal flow in the Dry Gap. This significance finding is based on the fact that discharge from the Newhall Ranch WRP would occur in the winter and would be small relative to the overall flow in the Santa Clara River, and the existing data shows that increases in base flow due to discharges from the Valencia WRP and the Saugus WRP since the 1960s have not led to a substantial change in the duration of seasonal flow in the Dry Gap.

Alternatives 3 through 7 would have similar direct and indirect impacts to baseflow, but would be reduced when compared to the proposed project. With the project alternatives permanent impacts to waters of the United States would vary from approximately 73 acres to 13 acres, with similar temporary impacts for the construction and maintenance of bridges, bank stabilization and debris and detention basins (temporary impacts associated with the various alternatives would vary from 41.6 acres to 20.3 acres). The project alternatives would include similar avoidance and minimization measures to reduce impacts to baseflow including project design features to increase infiltration and recharge. For more information concerning the direct and indirect impacts to baseflow that would be associated with the various project alternatives, please reference to revised **Sections 4.1, 4.2,** and **4.4** of the Final EIS/EIR for the proposed project.

For projects involving the discharge of dredged material;

(X) mixing zone, in light of the depth of water at the disposal site; current velocity, direction and variability at the disposal site; degree of turbulence; water column stratification; discharge vessel speed and direction; rate of discharge; dredged material characteristics; number of discharges per unit of time; and

any other relevant factors affecting rates and patterns of mixing: Not applicable – the proposed project would not include discharges of dredged material.

IV. Biological Characteristics

(X) **special aquatic sites (wetlands, mudflats, coral reefs, pool and riffle areas, vegetated shallows, sanctuaries and refuges, as defined in 40 CFR 230.40-45):** For detailed information concerning direct and indirect impacts to waters of the United States, including wetlands, please reference revised Section 4.6 of the Final EIS/EIR for the proposed project. Of the various types of special aquatic sites, only wetlands occur in the project area.

Wetlands. The project site contains a total of approximately 276.9 acres of federal jurisdictional wetlands.[1] Because the site does not contain any other type of special aquatic site, the proposed project impact on wetlands would constitute the whole of the impact on special aquatic sites. Most of the site's wetlands are located adjacent to the active channel of the Santa Clara River, which exhibits perennial flows and supports extensive riparian vegetation in the project area. However, two of the site's larger tributary drainages, Salt Creek and Potrero Canyon, also support wetlands along perennial reaches. In addition, the project site also contains a spring complex, located near Middle Canyon, the entirety of which is also a wetland. The proposed project (Alternative 2) would permanently disturb 20.5 acres of wetlands, and would temporarily disturb an additional 11.2 acres. These impacts would occur primarily due to bridge construction along the Santa Clara River mainstem, but the proposed project would also affect two cismontane alkali marsh wetlands in lower and middle Potrero Canyon. The entire Salt Creek watershed and the Middle Canyon spring complex would be preserved under the proposed project, and no impacts to wetlands in those areas would occur. In total, the proposed project would avoid permanent impacts to approximately 92 percent of all wetlands on site. To minimize temporary impacts to 11.2 acres, the proposed project would restore all construction areas in wetlands to pre-project contours with revegetation with native wetland species. All restored wetland areas would be monitored for at least five years as described in the attached Draft Mitigation Plan. To compensate for permanent impacts to 20.5 acres of wetlands, the proposed project would include extensive compensatory mitigation measures both in the Santa Clara River and Salt Creek, similar to those described in the attached Draft Mitigation Plan.

Alternatives 3 through 7 would have similar impacts to wetlands, but would be reduced when compared to the proposed project. With the project alternatives permanent impacts to wetlands would vary from approximately 14.6 acres to 3.2

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1 Wetland acres are a subset of waters of the United States within the Santa Clara River mainstem and the tributary drainages.

acres, with similar temporary impacts for the construction and maintenance of bridges, bank stabilization and debris and detention basins (temporary impacts to wetlands would vary from 13.5 acres to 9.0 acres). The project alternatives would include similar avoidance and minimization measures to reduce impacts to wetlands including restoring temporary impact areas to pre-project contours and revegetating the areas with native wetland species. All restored wetland areas would be monitored for at least five years as described in the attached Draft Mitigation Plan. To compensate for permanent impacts to wetlands, the project alternatives would include extensive compensatory mitigation measures both in the Santa Clara River, Potrero Canyon and Salt Creek, similar to those described in the attached Draft Mitigation Plan. For detailed information concerning the direct and indirect impacts to wetlands that would be associated with the various project alternatives, please reference revised **Section 4.6** of the Final EIS/EIR for the proposed project.

(X) **habitat for fish and other aquatic organisms:** With the proposed project (Alternative 2), of the 660.1 acres of waters of the Unites States within the project area, the proposed project would permanently impact 93.3 acres of aquatic and riparian habitat, or approximately 14.1 percent of waters of the United States on site. Temporary impacts to channel substrate would occur in approximately 33.3 acres of jurisdictional areas, where necessary to allow construction and maintenance of the proposed project facilities. To avoid and minimize impacts to aquatic habitat, the proposed temporary impacts would occur outside the actual footprint of the facility once constructed, thereby allowing rehabilitation. For example, construction of bridges across the Santa Clara River would require disturbance of channel substrate upstream and downstream of the proposed bridge location during construction, but these areas would not be occupied by the bridge once completed. To avoid and minimize impacts, all temporary impact areas would be restored to pre-project contours and revegetated, following completion of construction activities in waters of the United States. There a total of approximately 660.1 acres of waters of the United States within the project site. Of these, approximately 533.5 acres (approximately 80 percent of total acreage), would be completely avoided under the proposed project. Sensitive aquatic resource areas avoided under the proposed project would include the majority of the Santa Clara River mainstem, the Middle Canyon spring complex (a high-quality wetland), and the entire Salt Creek sub-watershed.

The proposed project (Alternative 2) and alternatives could reduce habitat function of waters of the United States on the project site. Habitat function takes into account such factors as plant species diversity, percentage of native plant species, biological structure, and evidence of vegetation recruitment (*i.e.*, the presence of seedlings and/or saplings), and the width of the floodplain. The HARC habitat score indicates the relative extent to which the assessment reaches on site perform this function. Lost habitat function due to the proposed fill in waters of the United States was calculated by applying the HARC habitat score as a weighting factor to the acreages filled. The fill from implementation of the proposed project would result in the permanent loss of 67.7 HARC habitat-weighted acres and the temporary loss of 25.9 HARC habitat-weighted acres of waters of the United States.

Each of the alternatives, including Alternative 2, could result in permanent physical changes to the Santa Clara River corridor and surrounding watershed, including changes to hydrology and fluvial processes, which could affect suitable fish habitat, as discussed in the stickleback analysis section (**Section 4.5.5.3** of the Draft EIS/EIR). ENTRIX (2009) analyzed project-related hydrologic changes in the Santa Clara River and tributaries. While the placement of the proposed bridge footings would result in the loss of river channel, the large width and hydrology of the river would maintain the formation of natural channels to support fish species. Most of the tributaries do not support perennial flows; and none of the tributaries has surface water connectivity with the Santa Clara River, except for Middle and Potrero Canyons, which, although they contain perennial flow, have substantial blockages (bedrock headcuts or cascades) that are impassable to fish (ENTRIX 2009).

Direct and indirect impacts to crustaceans, mollusks, and other aquatic organisms in the food web would be minor as the diversity of invertebrates is generally low due to the substrate being dominated by sand and gravel. Impacts to these organisms would be caused by the changes in water quality, substrate and sediment dynamics, and hydrologic function as discussed in **Section 4.5** of the Draft EIS/EIR. No significant water quality-related effects are anticipated as the proposed project would comply with all applicable water quality regulations. Hydrologically, the proposed project would reconfigure some in-channel habitat through alterations of the velocity distribution regime. The two most important effects of construction within the river channel are alteration of natural stream hydrology and loss of available fish habitat. The ENTRIX report indicates that the alteration of the stream hydrology would not result in significant impacts related to fish access to floodplain refugia during flood events, since the general morphology of the Santa Clara River, adjacent rearing habitat, and high-flow floodplain refugia would not be substantially altered. Therefore, there would not be large-scale changes in the distribution or abundance of aquatic organisms as a result of construction of the proposed project.

An increase in water depth in the Santa Clara River could result in significant direct and indirect impacts to riparian habitat if the additional water depth causes greater "shear forces" (*i.e.*, friction caused by the weight of water) on the channel bottom, and thereby increasing scouring of the channel bed and removal of riparian vegetation. This effect could reduce the extent of aquatic, wetland, and riparian habitats in waters of the United States. **Table 4.2-12** in the Draft EIS/EIR provides the general hydrologic characteristics of the Santa Clara River channel for the two-, five-, 10-, 20-, 50-, and 100-year events, both with and without the proposed project. The results of the hydraulic analysis indicate that water depths and, correspondingly, total shear in the Santa Clara River would not increase significantly due to the proposed project. Based on PACE HEC-RAS and HEC-RMS modeling of the 100-year storm event, project-related infrastructure would result in 52 locations of increased water surface elevation exceeding one foot, and no decreased water surface elevation locations in the Santa Clara River. No impacts to water surface elevation would be realized upstream or downstream of the project site (PACE, 2007). The additional riparian vegetation area subject to inundation would not be changed during the two-year flood event, but would be reduced by approximately 0.3, 2.6, 80.2. 131.5, 137.1, and 225.1 acres as a result of the proposed project during the five-, 10-, 20-, 50-, 100-year, and capital flood (discharge resulting from a hypothetical four-day storm with a 50-year return period falling on a saturated watershed with debris from a wildfire) events, respectively (PACE, 2008A). **Figures 4.2-9** and **4.2-10** in the Draft EIS/EIR show the area of inundation and velocity distribution for the 10- and 100-year flow events for both existing conditions and the proposed project. As shown in these figures, the decrease in inundated area (by percentage and acreage) would primarily affect areas of currently disturbed, agricultural land. Accordingly, impacts to riparian habitat would be limited such that water flow depths, velocities, and total shear for all return events would not be significantly different in riparian habitat between existing and proposed conditions in the project area. Since there will not be a significant change in flow depths or total shear in existing riparian habitat, the impacts to the amount and pattern of aquatic, wetland, and riparian habitats in the Santa Clara River would be less than significant. The HARC analysis indicates that, overall, the proposed project would result in substantial changes to the hydrologic function of the tributaries with net losses observed for the source water and hydroperiod and net gains observed for the floodplain connection, surface water persistence, and flood prone area metrics. In total, the proposed project would result in a net loss of 19.98 hydrology AW-score units but a net gain of 35.68 total HARC AW-score units within the tributaries. Absent mitigation, the decrease in HARC AW-score units may be the result of an increase in the frequency and magnitude of scouring of riparian vegetation which, absent mitigation, would be a significant impact. Accordingly, the impacts of the proposed project to the riparian habitat of the tributaries are considered significant prior to mitigation, but less than significant under Significance Criterion 4 through implementation of Mitigation Measures SW-2, SW-3, SW-5, BIO-1, BIO-2, BIO-6, and BIO-7.

Alternatives 3 through 7 would have similar direct and indirect impacts to aquatic habitat, but would be reduced when compared to the proposed project. With the project alternatives permanent impacts to waters of the United States would vary from approximately 73 acres to 13 acres, with similar temporary impacts for the construction and maintenance of bridges, bank stabilization and debris and detention basins (temporary impacts associated with the various alternatives would vary from 41.6 acres to 20.3 acres). The project alternatives would include similar avoidance and minimization measures to reduce impacts to aquatic habitat including project design features to reduce direct and indirect impacts. The proposed minimization measures would also include restoring temporary impact areas to pre-project contours and revegetating the areas with native species. All restored waters of the United States would be monitored for at least five years as described in the attached Draft Mitigation Plan. To compensate for permanent impacts to waters of the United States, the proposed project would include extensive compensatory mitigation measures both in the Santa Clara River, Salt Creek and other tributaries, as described in the attached Draft Mitigation Plan. For detailed information concerning the direct and indirect impacts to waters of the United States that would be associated with the various project alternatives, please reference to revised **Section 4.6** of the Final EIS/EIR for the proposed project.

(X) **wildlife habitat (breeding, cover, food, travel, general):** Because non-aquatic species typically do not occur within waters of the United States, impacts on such species would generally be limited to indirect effects associated with the construction of the proposed project. The proposed project (Alternative 2) and all alternatives would result in direct and indirect impacts to non-aquatic biological resources, including sensitive terrestrial plants and wildlife, sensitive upland vegetation communities, and wildlife movement corridors. The proposed project would also have impacts on habitat for sensitive non-aquatic plants and wildlife. For two species, the San Fernando Valley spineflower and San Emigdio blue butterfly, the Draft EIS/EIR determined that impacts under Alternative 2 would be significant and unavoidable. With respect to the spineflower, this determination was made because the proposed project under Alternative 2 would permanently affect a relatively large proportion of occupied habitat on the site (31.4 percent) for this highly endemic species. Impacts on San Emigdio blue butterfly were deemed significant and unavoidable because, under Alternative 2, the proposed infrastructure and flood control facilities in lower Potrero Canyon would fragment the butterfly population west of the Potrero Reserve Area, whereas the other project alternatives would avoid fragmenting this population.

Protocol surveys have not documented the coastal California gnatcatcher in the proposed project area, but the species has been observed twice in the project vicinity during the course of biological monitoring for other projects. Specifically, gnatcatchers were observed in October 2007 in the Valencia Commerce Center (VCC) planning area and in August 2008 at the Del Valle Training Center Road located south of the town of Val Verde. Due to the timing (late summer/fall) and limited number of sightings, the birds observed in both instances are believed to have been dispersing or transient individuals, perhaps from isolated populations of California gnatcatchers that have been periodically observed to the east of the project site.

The proposed project would permanently disturb 1,351 acres of suitable habitat for the coastal California gnatcatcher. There are 13.2 acres of suitable habitat identified within Corps' jurisdiction on the project site. Temporary impacts under Alternative 2 would be limited to two acres. Regarding impacts to individuals, California gnatcatcher is a relatively mobile species that is expected to occasionally occur on site during dispersal, so it is unlikely that project-related construction activities would result in the loss of individual adults. However, if the California gnatcatcher were to nest in the project area in the future, and if construction/grading activities took place during the nesting season, implementation of the proposed development under any of the alternatives could adversely impact nests and/or young gnatcatchers. Potential indirect/secondary impacts to California gnatcatcher include short-term construction-related effects and long-term development-related effects. These potential impacts on dispersing or transient individuals would be relatively minor, but could be more substantial if the species were to establish territories and breed on site in the future. These potential indirect/secondary impacts are briefly identified here and are analyzed in detail in **Subsection 4.5.5.3** of the Draft EIS/EIR. Short-term impacts could include exposure to construction-related dust, noise, ground vibration, and nighttime lighting. Potential long-term development-related secondary impacts include habitat fragmentation; habitat degradation from frequent wildfires; increased disturbance from human activity; nighttime lighting; harassment by humans and pet cats and dogs; harassment from stray and feral cats and dogs and other mesopredators; loss of food sources and secondary poisoning from pesticides; and predation of nestlings by Argentine ants along the open space-development interface.

Annual plant surveys conducted from 2002 through 2007 indicate that the number of individual San Fernando Valley spineflower plants in the project site (*i.e.*, Airport Mesa, Grapevine Mesa, Potrero, and San Martinez Grande) varies considerably from year to year (see Draft EIS/EIR, **Table 4.5-57**). Potential impacts to this species are, therefore, evaluated in terms of loss of cumulative area occupied by spineflower mapped between 2002 and 2007 rather than number of individuals. The cumulative spineflower occurrence data show 17.6 acres occupied by spineflower within the project area (*i.e.*, the maximum occupied polygon boundaries; see Draft EIS/EIR, **Table 4.5-58**). Under Alternative 2, implementation of the proposed project would result in the permanent loss of 6.4 acres (31.4 percent) of spineflower cumulative occurrence area. The Draft EIS/EIR determined that this impact was significant and unavoidable, as it could not feasibly be mitigated to a less-than-significant level. Indirect/secondary short-term construction-related impacts and long-term development-related impacts to spineflower could occur, and would be similar, under any of the alternatives, including Alternative 2. These include hydrologic alterations and water quality impacts; accidental clearing, trampling, and grading; runoff, sedimentation, erosion and chemical and toxic compound pollution; exposure to fugitive dust; the introduction of non-native, invasive plant and animal species; increased human activity and trampling and soil compaction; and increased risk of fire.

Surveys for San Emigdio blue butterfly were conducted in the project area in 2004 and 2005. In 2004 the butterfly was documented within the project area at the west-central edge of Potrero Canyon. During the 2005 survey, five adult San Emigdio blue butterflies were again observed at this location and one individual was also observed in the High Country SMA at the northwestern edge of Salt Creek. This butterfly usually is associated with its primary host plant, the four-wing saltbush (*Atriplex canescens*), but has also been observed in association with quail brush (*A. lentiformis*) in the project area. Vegetation clearing under the proposed project would remove quail brush plants associated with the San Emigdio blue butterfly colony that occurs west of and outside the Potrero Preserve Area. In addition, this colony would be permanently bisected by the proposed facilities in lower Potrero Canyon. The proposed vegetation clearing and construction activities would result in the loss of San Emigdio blue butterfly adults, eggs, and/or larvae occurring on quail brush plants. Quail brush plants would also be removed from other portions of the project area, but these areas were not found to support the San Emigdio blue butterfly during the 2004 and 2005 surveys. Short-term construction-related and long-term development-related indirect/secondary impacts to the San Emigdio blue butterfly colony could result from implementation of the proposed project under any of the alternatives. Short-term construction-related indirect/secondary impacts include vegetation clearing, trampling, exposure to fugitive dust, contact with polluted runoff, and changes in hydrology. Long-term indirect/secondary impacts include intrusion by non-native species, human disturbance, increased fire frequency, isolation of the San Emigdio blue butterfly colony, and use of the proposed road in Potrero Canyon.

The Draft EIS/EIR for the project evaluated the direct and indirect effects of the proposed project and alternatives on wildlife movement at three different spatial scales: (1) wildlife landscape habitat linkages; (2) local wildlife corridors; and (3) location-specific wildlife crossings. As part of the analysis, wildlife species were assigned to different guilds based on their similar abilities to move across the landscape, with the assumption that different guilds would interact differently with the habitat linkages, corridors, and crossings. At the largest spatial scale, the Draft EIS/EIR concluded that impacts to wildlife landscape habitat linkages would be adverse but not significant under any of the alternatives. This conclusion is based on the fact that the three main wildlife landscape habitat linkages on site (the High Country SMA, River Corridor SMA, and Salt Creek area) would remain intact and functional following implementation of the proposed project. On an intermediate scale, the Draft EIS/EIR evaluated impacts on 17 local wildlife corridors within the project site, each of which is associated with one or more tributary drainage connecting the Santa Clara River to the adjacent uplands on site. The analysis concluded that under Alternative 2, four of the wildlife corridors in the project area would be completely eliminated, three would become dead-ends for wildlife, and six would be constrained by surrounding development, but would provide at least limited wildlife movement function. The remaining four corridors would remain fully functional after implementation of the proposed project.

At the smallest spatial scale, the Draft EIS/EIR evaluated whether the various proposed infrastructure components, such as specific bridges and culverts, might serve as wildlife crossings. Allowing north-south movement of wildlife across SR-126 was an objective, as this roadway represents the most substantial existing obstacle to wildlife movement on site. The Draft EIS/EIR concluded that the proposed bridges would not preclude use of the Santa Clara River corridor as a wildlife undercrossing, and that the proposed culverts beneath SR-126 would be sufficiently open to allow wildlife use. For more information regarding the direct and indirect effects of Alternative 2 and all alternatives on wildlife movement, please refer to revised **Section 4.5** of the Final EIS/EIR for the proposed project.

Alternatives 3 through 7 would have similar direct and indirect impacts to wildlife habitat, but would be reduced when compared to the proposed project. With the project alternatives permanent impacts to waters of the United States would vary from approximately 73 acres to 13 acres, with similar temporary impacts for the construction and maintenance of bridges, bank stabilization and debris and detention basins (temporary impacts associated with the various alternatives would vary from 41.6 acres to 20.3 acres). The project alternatives would include similar avoidance and minimization measures to reduce impacts to wildlife habitat including project design features to reduce direct and indirect impacts. Extensive mitigation measures to avoid and minimize impacts to wildlife habitat are included in Section 4.5 of the Draft EIS/EIR for the proposed project. For detailed information concerning the direct and indirect impacts to wildlife habitat that would be associated with the various project alternatives, please reference revised **Section 4.5** of the Final EIS/EIR for the proposed project.

(X) **endangered or threatened species:** The proposed project (Alternative 2) and alternatives could have potentially direct and indirect significant impacts to endangered or threatened species and their designated critical habitat. Several federally listed threatened or endangered species are known to be present in the project area. The unarmored threespine stickleback (*Gasterosteus aculeatus* ssp. *williamsoni*) occurs in portions of the Santa Clara River mainstem where suitable backwater refuge habitat (*i.e.*, zero to two fps flow) is available. Based on the lack of suitable habitat and existing blockages, the unarmored threespine stickleback does not occur in tributaries to the Santa Clara River in the project area. The proposed project could result in permanent physical changes to the Santa Clara River corridor and surrounding watershed, including changes in hydrology and fluvial process. Such impacts could affect habitat suitable for unarmored threespine stickleback. Impacts to individuals and indirect impacts could also occur absent mitigation. These potential impacts are described in detail in **Subsection 4.5.5.3** of the Draft EIS/EIR. The ENTRIX report further indicates that the alteration of the stream hydrology would not result in significant impacts related to stickleback access to floodplain refugia during flood events, since the general morphology of the Santa Clara River, adjacent rearing habitat, and high-flow floodplain refugia would not be substantially altered. This is illustrated on the Draft EIS/EIR **Figures 4.5-61a** and **4.5-61b**, which indicate stream flow areas with less than two fps during the 20- and 100-year flood events, respectively (see entire set of graphics in ENTRIX 2009 report, **Appendix 4.5** to the Draft EIS/EIR). Most of the tributaries to the Santa Clara River do not support perennial flows, and none has surface water connectivity with the river, except for Middle and Potrero Canyons, which have substantial blockages (bedrock headcuts or cascades) that are impassable to fish (ENTRIX 2009). For these reasons, stickleback are absent from the tributaries to the Santa Clara River, and would not be affected by the proposed modifications of those tributaries.

Within the Santa Clara River drainage, southern steelhead historically inhabited Piru Creek, Sespe Creek, Santa Paula Creek, Hopper Creek, and possibly Pole Creek (Titus *et al.* n.d.). Presently, southern steelhead (*Oncorhynchus mykiss*) occurs in the Santa Clara River watershed in Piru Creek between the confluence with the Santa Clara River and Santa Felicia Dam, in Sespe Creek, in Santa Paula Creek, and possibly Hopper and Pole Creeks (Stoeker and Kelly 2005). There is no historic record of steelhead use of the Santa Clara River or tributaries upstream of Piru Creek and the Dry Gap approximately five miles downstream of the project area. Based on information in revised **Section 4.5** of the Final EIS/EIR, steelhead and designated critical habitat for this species is not present in the project area. Following build-out of the proposed project potential physical changes to the Santa Clara River include long-term hydrologic, geomorphic, or water quality alterations of the river. The Flood Hydraulics Impacts Assessment (PACE 2009) found that there would be minor changes to water flows, velocities, depth, sedimentation, or floodplain and channel conditions downstream of the project area over the long term as a result of the proposed project improvements. For example, under Alternative 2 build-out will not appreciably alter the existing sediment transport regime (less than a 0.25 percent decrease in average annual sediment supply/delivery to the Santa Clara River). Therefore channel morphology and substrate composition conditions downstream that support steelhead migration in Ventura County will not be affected. These hydraulic effects were also found to be insufficient to alter the amount, location, and nature of aquatic and riparian habitats within the project area and downstream into Ventura County. The PACE study determined that the Santa Clara River would still retain sufficient width to allow natural fluvial processes to continue. As a result, the mosaic of habitats in downstream portions of the river that support various special status fish species would be maintained. Because steelhead has not been recorded in the project area and the above hydrogeomorphic analysis shows that downstream designated critical habitat would exhibit minimal changes, the Corps determined that the proposed project would not affect the southern steelhead or downstream designated critical habitat for this species.

The least Bell's vireo (*Vireo bellii pusillus*), in the form of breeding pairs, territorial males, and/or nests, has been observed almost every year along the Santa Clara River within the project area and adjacent to riparian scrub habitat at Castaic Junction, but with yearly fluctuations in level of occupancy and breeding activity. Each of the alternatives, including Alternative 2, would have permanent and temporary impacts on suitable least Bell's vireo riparian nesting/foraging habitat, and on "foraging only" habitat adjacent to nesting habitat. Specifically, Alternative 2 would permanently disturb 28.1 acres of suitable habitat for least Bell's vireo within the Corps' jurisdiction. Of these, 25.6 acres would be nesting/foraging habitat and 2.6 acres would be adjacent foraging only habitat. Alternative 2 would also temporarily disturb 8.1 acres of vireo nesting/foraging habitat and 0.1 acre of foraging only habitat within Corps jurisdiction. Potential indirect effects to least Bell's vireo include short-term construction-related impact and long-term post-development impacts. These potential indirect/secondary effects are briefly identified here and analyzed in detail in **Subsection 4.5.5.3**, of the Draft EIS/EIR for the project. All of the impacts indicated above occur within designated least Bell's vireo critical habitat containing primary constituent elements (PCEs). Therefore, 25.5 acres of nesting/foraging habitat would be permanently lost with the construction of the proposed project. To compensate for permanent loss of nesting/foraging habitat multiple mitigation measures would be implemented as documented in revised **Section 4.5** of the Final EIS/EIR.

Willow flycatchers have been observed in the project area during migration. The southwestern willow flycatcher subspecies (*Empidonax traillii extimus*) has not been known to nest in the project area. However, recent nesting in the Santa Clara River has been documented near Fillmore, downstream of the project site. Two breeding pairs were observed in 2006 by J. Gallo, with one nest producing two successful fledglings and the other failing (Root 2008). Therefore, impacts to potential southwestern willow flycatcher riparian nesting/ foraging habitat were analyzed. Suitable habitat for the southwestern willow flycatcher would be permanently impacted and temporarily impacted under all of the alternatives, including Alternative 2. Under Alternative 2, 28.1 acres of suitable habitat for southwestern willow flycatcher within Corps jurisdiction would be permanently impacted due to implementation of the proposed project, and an additional 8.1 acres would be temporarily impacted. The proposed project is not likely to cause the loss of individual adult Southwestern willow flycatchers, as the species is relatively mobile. However, if the southwestern willow flycatcher were to nest within the project site in the future, and if construction/grading activities were to take place during the nesting season, the proposed project could adversely impact nests and young birds. Potential indirect/secondary impacts to southwestern willow flycatcher include short-term construction-related effects and long-term effects. The nature of these impacts would be similar to those affecting the least Bell's vireo, described above.

Arroyo toad (*Bufo californicus*) adults and subadults have not been detected within the project site during protocol surveys. However, during surveys conducted in 2000, Aquatic Consulting Services found arroyo toad tadpoles in the Santa Clara River upstream and downstream of the proposed Commerce Center Drive Bridge site and near the Valencia Water Treatment Plant. This analysis assumes that arroyo toads could occur in suitable habitat within the Santa Clara River floodplain and adjacent upland areas. Suitable arroyo toad habitat was assigned to three categories. "Category 1" habitats are defined as habitats that are capable of supporting all life history phases. In the project area, Category 1 habitat falls primarily within the 100-year floodplain of the Santa Clara River. "Category 2" habitats may support some phases of the arroyo toad's life history, such as foraging and aestivation/hibernation, but do not generally support adequate hydrology for breeding. "Category 3" habitats are missing two or more elements, especially where the hydrologic regime is absent, and thus would be limited to supporting aestivation/hibernation, dispersal, and foraging, but less frequently than Category 2 habitats. Category 3 habitat primarily includes upland areas, including agriculture, outside the Santa Clara River floodplain. For a more detailed discussion of these habitat suitability categories, please refer to **Subsection 4.5.5.3** of the Draft EIS/EIR for the proposed project. Each of the alternatives, including Alternative 2, would have permanent and temporary impacts on all three categories of arroyo toad habitat. Within Corps jurisdiction, Alternative 2 would permanently affect 14.3 acres of Category 1 habitat, 0.9 acres of Category 2 habitat, and 9.0 acres of Category 3 habitat, for a total of 24.2 acres. Alternative 2 would also result in temporary impacts to 17 acres of Category 1 habitat, 0.3 acres of Category 2 habitat, and 1.2 acres of Category 3 habitat, for a total of 18.4 acres. With respect to impacts on arroyo toad individuals, these effects are not expected to be significant under Alternative 2 or any other alternative, as the species is generally not present at the project site. Although the project area supports suitable habitat for the arroyo toad, only a few tadpoles and no adult or subadult arroyo toads have been observed during multiple surveys conducted over the last fifteen years. Potential indirect/secondary impacts to arroyo toad include short-term construction-related effects and long-term development-related effects. These potential indirect/secondary impacts are briefly identified here and are analyzed in detail in **Subsection 4.5.5.3** of the Draft EIS/EIR for the Project. Potential short-term construction-related impacts include ground vibration; dispersion of sediments and pollutants; chemical pollution; increased turbidity; excessive sedimentation; flow interruptions; changes in water temperature; fugitive dust; and trash. Long term effects could include invasion of the on-site habitat by exotic plants (*e.g.*, giant reed, tamarisk, and pampas grass) and wildlife species (*e.g.*, Argentine ants, bullfrogs, African clawed frogs, exotic fish, and crayfish). To compensate for direct and indirect impacts to arroyo toad multiple mitigation measures would be implemented as documented in revised **Section 4.5** of the Final EIS/EIR.

The California red-legged frog (*Rana aurora draytonii*) has not been observed in the project site, and conditions generally do not support suitable breeding habitat. While there are no records of California red-legged frog from the site in the numerous wildlife surveys conducted since 1992, the species is known in the area surrounding the project site from verified records upstream and downstream of the project area. The project site is within the potential distribution of the California red-legged frog along the Santa Clara River. Therefore, potential impacts on this species are evaluated in this alternatives analysis. Alternative 2 would permanently disturb 24.2 acres, and temporarily disturb 18.4 acres, of the 329.98 acres of suitable habitat for red-legged frog within Corps jurisdiction on the project site. The potential for impacts to individual red-legged frogs is considered very low, due to the lack of evidence that the species is present on site. But should California red-legged frog adults, subadults, tadpoles, or egg masses be present within the disturbance footprint, these activities could result in injury or mortality of California red-legged frog individuals due to direct contact with construction equipment, entombment in burrows, and disturbances to aquatic breeding sites that could disturb egg masses and tadpoles. Potential indirect/secondary impacts to California red-legged frog, were it to occur in the project area, include short-term construction-related effects and long-term development-related effects. These potential indirect/secondary impacts would be similar to those affecting the arroyo toad, discussed above.

Protocol surveys have not documented the coastal California gnatcatcher (*Polioptila californica californica)* in the project area, but the species has been observed twice in the project vicinity during the course of biological monitoring for other projects. Specifically, gnatcatchers were observed in October 2007 in the Valencia Commerce Center (VCC) planning area and in August 2008 at the Del Valle Training Center Road located south of the town of Val Verde. Due to the timing (late summer/fall) and limited number of sightings, the birds observed in both instances are believed to have been dispersing or transient individuals, perhaps from isolated populations of California gnatcatchers that have been periodically observed to the east of the Project site.

The proposed project would permanently disturb 1,351 acres of suitable habitat for the California gnatcatcher. There are 13.2 acres of suitable habitat identified within Corps jurisdiction on the Project site. Temporary impacts under Alternative 2 would be limited to two acres. Regarding impacts to individuals, coastal California gnatcatcher is a relatively mobile species that is expected to occasionally occur on site during dispersal, so it is unlikely that project-related construction activities would result in the loss of individual adults. However, if the coastal California gnatcatcher were to nest in the project area in the future, and if construction/grading activities took place during the nesting season, implementation of the proposed project and any of the alternatives could adversely impact nests and/or young gnatcatchers. Potential indirect/secondary impacts to California gnatcatcher include short-term construction-related effects and long-term development-related effects. These potential impacts on dispersing or transient individuals would be relatively minor, but could be more substantial if the species were to establish territories and breed on site in the future. These potential indirect/secondary impacts are briefly identified here and are analyzed in detail in **Subsection 4.5.5.3** of the Draft EIS/EIR. Short-term impacts could include exposure to construction-related dust, noise, ground vibration, and nighttime lighting. Potential long-term development-related secondary impacts include habitat fragmentation; habitat degradation from frequent wildfires; increased disturbance from human activity; nighttime lighting; harassment by humans and pet cats and dogs; harassment from stray and feral cats and dogs and other mesopredators; loss of food sources and secondary poisoning from pesticides; and predation of nestlings by Argentine ants along the open space-development interface.

The proposed project could impact the California condor (*Gymnogyps californianus*) because two occupied critical habitat areas (Tejon Ranch and the Sespe-Piru Condor areas) are within several miles of the project site. As a result, it is likely that the Condors may use the airspace above the project site for movement. In addition, this species is highly mobile and has been documented to use the project area for foraging, but not for nesting (based on information in the Final EIS the project area is not suitable for condor nesting due to the lack of necessary topographic elements). Because of the mobility of the species, it is very unlikely that any California condors would be killed or injured by equipment during the proposed construction activities. However, long-term indirect/secondary impacts associated with the proposed development would include presence of phone towers, power lines and utility poles, which could increase the potential for collisions and increased microtrash within residential and commercial areas, potentially causing sickness or mortality.

Alternatives 3 through 7 would have similar direct and indirect impacts to endangered and threatened species, but would be reduced when compared to the proposed project. With the project alternatives permanent impacts to waters of the United States would vary from approximately 73 acres to 13 acres, with similar temporary impacts for the construction and maintenance of bridges, bank stabilization and debris and detention basins (temporary impacts associated with the various alternatives would vary from 41.6 acres to 20.3 acres). The project alternatives would include similar avoidance and minimization measures to reduce impacts to aquatic habitat including restoring temporary impact areas to pre-project contours and revegetating the areas with native species. All restored waters of the United States would be monitored for at least five years as described in the attached Draft Mitigation Plan. To compensate for permanent impacts to waters of the United States, the proposed project would include extensive compensatory mitigation measures both in the Santa Clara River, Salt Creek and other tributaries, as described in the attached Draft Mitigation Plan. For detailed information concerning the direct and indirect impacts to endangered and threatened species, as well as the proposed mitigation measures, that would be associated with the various project alternatives, please reference revised **Section 4.5** of the Final EIS/EIR for the proposed project.

The Corps has determined the project may affect several federally listed endangered species, including least Bell's vireo (*Vireo bellii pusillus*), unarmored threespine stickleback (*Gasterosteus aculeatus* ssp. *williamsoni*), arroyo toad (*Bufo californicus*), southwestern willow flycatcher (*Empidonax traillii extimus*), California red-legged frog (*Rana aurora draytonii*), California condor (*Gymnogyps californianus*), and coastal California gnatcatcher (*Polioptila californica californica*), known to utilize habitat in the vicinity of the proposed project. The Corps has also determined the proposed project may affect designated critical habitat for the above species. In addition, the Corps has determined the proposed project may affect vernal pool fairy shrimp (*Branchinecta lynchi*) and Riverside fairy shrimp (*Streptocephalus wootoni*), but is not likely to adversely affect these two species. To comply with the requirements of the Endangered Species Act, the Corps determined that formal consultation with the U.S. Fish and Wildlife Service was required for the proposed federal action. Based on the above determinations, on February 26, 2008 the Corps initiated formal consultation under Section 7 of the Endangered Species Act with the U.S. Fish and Wildlife Service (USFWS). As part of the formal consultation package, the Corps provided the required biological assessment to describe impacts to the above endangered and threatened species as well as their designated critical habitat. In their letter dated November 12, 2008, the USFWS requested additional information for some of the above species and concurred with the Corps determination that the proposed project is not likely to adversely affect vernal pool fairy shrimp (*Branchinecta lynchi*) and Riverside fairy shrimp (*Streptocephalus wootoni*). In a letter dated July 24, 2009, the USFWS indicated that they had received sufficient information to prepare a biological opinion (Log Number 8-8-09-F-44).

(X) biological availability of possible contaminants in dredged or fill material, considering hydrography in relation to known or anticipated sources of contaminants; results of previous testing of material from the vicinity of the project; known significant sources of persistent pesticides from land runoff or percolation; spill records for petroleum products or designated (Section 311 of the CWA) hazardous substances; other public records of significant introduction of contaminants from industries, municipalities or other sources: The proposed project impacts related to hazards and hazardous materials were evaluated in revised **Section 4.17** of the Final EIS/EIR based on existing and proposed land uses within the project area and the potential to expose sensitive receptors, including residents and construction workers, as well as the surrounding environment, to hazards or hazardous materials during construction activities and after development/redevelopment in this area. There are three oil and natural gas fields in the project area: the Newhall-Potrero Oil Field discovered in 1937, the Del Valle Oil Field discovered in 1979, and the Castaic Junction Oil Field discovered in 1950. The Newhall-Potrero Oil Field is currently operated by Vintage Production California LLC, a subsidiary of Occidental Petroleum Corp.; the Castaic Junction Oil Field, which already has been abandoned and remediated, was previously operated by Exxon Company, USA. The Del Valle Oil Field is also within the project site, and portions of this field are operated by LBTH and Vintage Production California LLC. In addition, pesticides were historically used and stored on the project site are listed in **Table 4.17-3** of the Final EIS/EIR and some agricultural uses are likely to continue on the site as development takes place. As described in **Subsection 4.17.4.2** of the Final EIS/EIR, multiple site assessment investigations have been conducted on the project site. Based on the results of those investigations, approximately 135 acres of development would occur under Alternative 2 within areas affected by past oil production activities. With the extensive testing and required remediation, the potential for the placement of contaminated material in waters of the United States would be very low. For all the alternatives, the direct and indirect impacts would be similar to Alternative 2, but slightly reduced. For detailed information concerning the direct and indirect impacts of the proposed project and all alternatives to hazards and hazardous materials, please reference revised **Section 4.17** of the Final EIS/EIR for the proposed project.

(X) **Municipal And Private Water Supplies:** The proposed project and alternatives would not involve any activities that would render municipal or public water supplies unfit for consumption. The WRP associated with the proposed project would be designed to comply with applicable NPDES requirements, ensuring that downstream water quality would not be impaired. The quantity of water passing through the project site within the Santa Clara River and tributaries would not be affected by the proposed project. For detailed information concerning the direct and indirect impacts of the proposed project and all alternatives to water supplies, please reference revised **Section 4.3** of the Final EIS/EIR for the proposed project.

(X) **Recreational and Commercial Fisheries:** The proposed project and alternatives would not have any direct or indirect impacts upon recreational or commercial fisheries on the site as it is private land, where such use of the site is not authorized. Potential direct and indirect effects upon hydrologic function and water quality would be mitigated to comply with applicable standards such that build-out of the proposed project would not affect recreational or commercial fishing downstream of the project area.

(X) **Water-Related Recreation:** As stated in the previous section, the site is on private land, where recreational use of the site is not authorized. Further, the proposed project and alternatives would not cause off-site impacts to water quality or hydrologic function that would adversely affect water-related recreation upstream and downstream of the project area.

(X) **Aesthetics:** With the proposed project (Alternative 2), of the 660.1 acres of waters of the Unites States within the project area, the proposed project would permanently impact 93.3 acres of aquatic and riparian habitat, or approximately 14.1 percent of waters of the United States on site. Temporary impacts to channel substrate would occur in approximately 33.3 acres of jurisdictional areas, where necessary to allow construction and maintenance of the proposed project facilities. Build-out of the proposed project (Alternative 2) and all alternatives would permanently alter the visual character of the project area as a whole, primarily due to the construction of major development that would be visible to viewers traveling along I-5 and SR-126 (see **Section 4.15** of the Draft EIS/EIR). However, visual impacts of the activities proposed within Corps jurisdiction would largely be confined to bridges, grade control structures, storm drain outlets, and similar facilities. These proposed facilities would contrast with existing natural stream banks, but are not expected to result in significant adverse impacts to the aesthetic values of the jurisdictional areas overall. Proposed bank stabilization activities would cause a substantial change in the appearance of jurisdictional areas during construction, but because the stabilization would be buried and revegetated, these impacts would be temporary. In addition, the proposed project would include substantial on-site establishment and restoration of aquatic and riparian habitat, which will largely replace lost functions and services; and the activities would take place in the context of a master-planned community, which would be designed to integrate the resources with the community. Therefore, the proposed project would not cause significant adverse impacts to aesthetic values of waters of the United States. For detailed information concerning the direct and indirect impacts of the proposed project and all alternatives to aesthetics, please reference revised **Section 4.15** of the Final EIS/EIR for the proposed project.

Alternatives 3 through 7 would have similar direct and indirect impacts to aesthetics, but would be reduced when compared to the proposed project. With the project alternatives permanent impacts to waters of the United States would vary from approximately 73 acres to 13 acres, with similar temporary impacts for the construction and maintenance of bridges, bank stabilization and debris and detention basins (temporary impacts associated with the various alternatives would vary from 41.6 acres to 20.3 acres). The project alternatives would include similar avoidance and minimization measures to reduce impacts to aesthetics including project design features that would reduce direct and indirect impacts. Extensive mitigation measures to avoid and minimize impacts to aesthetics are included in **Section 4.15** of the Draft EIS/EIR for the proposed project. For detailed information concerning the direct and indirect impacts to aesthetics that would be associated with the various project alternatives, please reference **Section 4.15** of the Draft EIS/EIR for the proposed project.

(X) Parks, National And Historical Monuments, National Seashores, Wilderness Areas, Research Sites, And Similar Preserves: The proposed project (Alternative 2) and alternatives would not impact parks, national and historical monuments, national seashores, wilderness areas, research sites, or similar preserves, as the project site is privately owned and does not contain any such designated features.

V. Summary of indirect and cumulative effects

Indirect/secondary impacts have been analyzed in the above sections. The following section is based on the detailed cumulative impact analysis presented in revised **Section 6.0** of the Final EIS/EIR for the proposed project and alternatives.

In the upper Santa Clara River watershed, the first Spanish ranches were established in the 1830's and included both sheep and cattle. Small farms and orchards began developing as early as the 1860's and included the production of wheat, corn, barley, oranges, apples, pears, walnuts and olives. Gold was discovered in Placerita Canyon in the late 1840's and oil was discovered in both Pico Canyon and Placerita Canyon in 1865. In 1876, the Southern Pacific Railroad (Lang Station) was completed, facilitating increased access to the upper Santa Clara River watershed. Population growth in the Santa Clarita area exhibits substantial increases, especially over the last fifty years. In 1940, the population in Santa Clarita was approximately 4,000 people, increasing to 6,950 in 1950, 12,350 in 1960, 46,800 in 1970, 66,700 in 1980, 110,600 in 1990 and approximately 153,000 in 2000. The estimated current population for the entire Santa Clarita area, including unincorporated county areas, is approximately 200,000. Much of the early residential development involved the conversion of existing agricultural areas to housing. In 1960, urban areas in Santa Clarita occupied 1,890 acres with 7,410 acres in agricultural production. By 1970, urban areas had increased to 3,830 acres while agricultural land declined to approximately 5,610 acres. Based on the above information, scattered areas in the upper Santa Clara River watershed have been disturbed for over 100 years by ongoing oil production, mining, ranching and agricultural production, with urban development over the last fifty years being focused in the Santa Clarita area.

Between 1988 and 2006, the Corps issued an average of approximately 12.6 CWA section 404 permits per year within the Santa Clara River watershed. (See revised **Figure 6.0-2** and Figure **6.0-3** and **Appendix 6.0** of the Draft EIS/EIR.) In general, the acreages of waters of the United States affected by activities authorized under CWA section 404 permits in a given year were related to the number of permits authorized that year. The data for 1998 and 2005 (years in which major El Niño events occurred), showed peaks in the number of authorizations granted, and a corresponding trend with respect to acreages of jurisdictional areas impacted. This is likely due to the fact that substantial flood events necessitate the need for repairs and maintenance of existing facilities, and may also underscore the general need to construct additional flood and erosion facilities for protection against future disasters.

Of the 228 permits issued by the Corps under CWA section 404 in the Santa Clara River watershed between 1988 and 2006, more were associated with emergency repairs and maintenance than any other type of activity. Combined, the permits issued for emergency repairs and maintenance of existing facilities accounted for a combined 25 percent of the total permits issued (16 percent were emergency repairs, nine percent maintenance). Flood protection activities, including bank protection, riprap, rock groin, and culver/levee improvements, accounted for 25 percent of the total permits issued. Another 17 percent of the permits issued were associated with residential development. Unknown activities (largely from older permits with minimal available data) comprised 15 percent of the permits. The remaining 18 percent include bridges, channel alterations, sediment removal, storm drains, and other projects. (See **Figure 6.0-4 in the Draft EIS/EIR**). **Table 6.0-7** in the Draft EIS/EIR summarizes federal biological opinions issued in the Santa Clara River watershed between 1993 and 2006 as they relate to the species that are the most likely to be reviewed by the USFWS as part of the species-related determinations and/or authorizations that are being sought as part of the proposed project approval process. A total of 25 USFWS biological opinions were reviewed. One of those opinions is not incorporated below because it did not affect any species of primary concern. Three opinions have been combined into one entry because they concern the same request.

In total, the Corps authorized approximately 149 acres of permanent impacts and 480 acres of temporary impacts to waters of the United States between 1988 and 2006.[2] This included 15 acres of permanent impacts to wetlands. The amount of permanent fill (including fill of wetlands and non-wetland waters of the United States) authorized per year (combining all permits) averaged 6.4 acres per year between 1988 and 1997, and 9.5

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2 Note that temporary impacts, due to their nature, do not result in a cumulative change in the acreage of waters, but this information is provided for context.

acres per year between 1998 and 2006. A graph showing acres of impact authorized per year, as well as mitigation acreage, is presented in **Figure 6.0-12** of the Draft EIS/EIR.[3] A line expressing the cumulative "running total" effect on waters of the U.S. (defined as the acreage of waters created through mitigation minus the acreage of waters permanently impacted) for the period between 1988 and 2006 is also shown, and illustrates that the acreage of compensatory mitigation required of 404 permit applicants exceeded the acreage of waters impacted during that period. The distribution of permanent impacts authorized by the Corps over time can best be described as a punctuated equilibrium. During most years the permanent impact acreage was fairly low, although certain years (1998 and 2005, in particular) showed higher impact acreages authorized. This increase in impact acreages is likely due to the increase in activities following large storm events, which occurred in both 1998 and 2005.

Past and present land-use changes that have potentially impacted the fluvial geomorphology of the lower Santa Clara River include the introduction of ranching (and exotic grass species) and the growth in watershed population that has occurred since the 1940s. Much of the associated urban growth, which is estimated to cover over 59,000 acres, has occurred along the mainstem River Corridor. (See **Table 6.0-6** in the Draft EIS/EIR.) Based on current public lands ownership and currently zoned open space, approximately 733,526 acres (71 percent) of the Santa Clara River watershed is open space. (Dudek, 2008: Table 1 and Figure 3.) As shown in **Table 6.0-17** in the Draft EIS/EIR, seven of the cumulative projects or groups of projects would have significant or potentially significant impacts prior to mitigation, and all other impacts would be less than significant or the significance criteria were not analyzed in the corresponding environmental documents. Increase in the urban extent is frequently associated with a suite of changes to watershed hydrology and geomorphology, focused particularly in the increased frequency of moderate flood events. However, these impacts should be taken in context when considered within the lower Santa Clara River. First, geomorphic activity is concentrated into very large magnitude flood events (*i.e.*, "re-set" events). Specifically, due to the "flashy", flood event-dominated nature of the Santa Clara River watershed, geomorphologic response to human influences may not be progressive, but is more likely to be episodic, with channel morphology responding primarily to larger flood events. Further, detecting the relative effects of human impacts on natural flood events and morphological response may be difficult, since relatively infrequent large flood events appear to exert the greatest influence on morphological change in the Santa Clara River. For example, in humid watersheds, urbanization can affect channel morphology by increasing the occurrence of moderate flood events. This increase is due to the prevalence of impermeable ground surfaces in urban areas, which produce more runoff in a shorter amount of time in comparison to native land cover. In larger (*i.e.*, less frequent), flood events when natural ground surfaces are typically saturated and thus runoff rates would be very similar to impervious surfaces, the effect of the urban surfaces is substantially diminished. However, because the Santa Clara River watershed is large, and has a flood frequency dominated by large flood events, the effect of

3 Note: Permits issued are ascribed to the year of application.

moderate magnitude events on channel morphology is likely to be less significant (Stillwater Sciences, 2005). Therefore, it is unclear whether increasing the frequency of intermediate floods from the upper watershed will have a substantial influence on the downstream channel morphology. Second, past, present and reasonably foreseeable urban expansion is currently focused in the Santa Clarita region of the upper watershed and may have less impact in the lower watershed due to the influence of incoming creeks (*e.g.*, Piru Creek, Santa Paula Creek and Sespe Creek) on the morphology and riparian vegetation of the lower river channel (Stillwater Sciences, 2005).

Historic changes in the geomorphology of the Santa Clara River have been driven by large flood events, and the proposed project, in conjunction with past, present, and reasonably foreseeable future projects, do not substantially alter the magnitude of such large flood events. There are no significant cumulative erosion, downstream deposition, and geomorphic function impacts in the Santa Clara River mainstem, and therefore, the proposed project will not result in a cumulatively considerable contribution to significant cumulative impacts under Criteria 1-3 in the Draft EIS/EIR. Because most of the tributary drainages and associated watersheds within the project area are included within the site, off-site projects would not combine with the proposed project's geomorphic impacts within these tributaries; and, therefore, no cumulative effects would occur (Criteria 1-6 in the Draft EIS/EIR).

Although generally the environmental documents for the identified cumulative development projects have not analyzed geomorphic effects on the same scale as the analysis for the proposed project (see **Table 6.0-17** in the Draft EIS/EIR), based on a review of available information regarding these projects, the incremental effects of the proposed project on the geomorphology of the Santa Clara River (Criteria 1-3, 5-6 in the Draft EIS/EIR) and Newhall area tributaries (Criteria 1-6 in the Draft EIS/EIR) are not significant when viewed in connection with the effects of other past, present, and foreseeable future projects. The proposed project's contributions to impacts under Criteria 4 and 7 are reduced to less than cumulatively considerable with the proposed mitigation measures in revised **Sections 4.2, 4.5 and 4.6** of the Final EIS/EIR for the proposed project.

Development on the proposed project, Entrada, and VCC project sites would comply with applicable regulatory requirements for both construction and post-development surface runoff water quality, which ensures that project-related development would not result in significant water quality impacts. These regulatory requirements include PDFs; MS4 Permit and SUSMP requirements; Construction General Permit requirements; General Dewatering Permit requirements; and benchmark Basin Plan water quality objectives, CTR criteria, and TMDLs issued by the Los Angeles RWQCB and Los Angeles County. Any future urban development occurring in the Santa Clara River watershed must also comply with these requirements. Therefore, cumulative impacts on surface water quality of receiving waters from the proposed project and future urban development in the Santa Clara watershed would be addressed through compliance with the applicable regulatory requirements that are intended to be protective of beneficial uses of the receiving waters. In addition, WQ-1 sets a minimum BMP approach required for the SUSMP and WQ-2 sets a minimum required approach for a Landscape and Integrated Pest Management Plan. Based on compliance with these regulatory mitigation requirements, cumulative water quality impacts related to stormwater and nonstormwater runoff would be less than significant, and the proposed project's contribution would be less than cumulatively considerable. Other cumulative projects will be required to comply with federal, state, and local water quality regulations, including implementation of BMPs and PDFs to minimize and mitigate each project's potential water quality impacts. In addition, the Newhall Ranch WRP, like the existing Saugus and Valencia WRPs, is required to comply with the terms of its NPDES permit and WDRs, which would ensure that the Newhall Ranch WRP's contribution to cumulative impacts is rendered less than cumulatively considerable. Because each cumulative project will be subject to this rigorous regulatory regime, cumulative water quality impacts are considered to be less than significant, following mitigation.

Impacts would be cumulatively considerable, absent mitigation, for a majority of other biological resources, including: vegetation communities other than coastal scrub; common wildlife as a whole; most of the federally- and state-listed threatened and endangered and all California Fully Protected species; wildlife habitat linkages, corridors, and crossings; most California Species of Special Concern; many California Special Animals, Watch List species, Specially Protected Mammals, and CDFG Trust Resources; and three special-status plants. The mitigation measures required by the Newhall Ranch Specific Plan Program EIR and mitigation measures recommended by the Draft EIS/EIR (revised **Subsection 4.5.6,** Mitigation Measures) would reduce the cumulative impacts of the proposed project to these resources to a level less than significant. To offset loss vegetation communities and habitat for species, these mitigation measures generally include the dedication and maintenance of existing natural lands in the Open Area, River Corridor SMA, High Country SMA, and Salt Creek area, totaling approximately 9,753 acres. For riparian resources, these measures include replacing the functions and services of riparian communities that may be lost through construction. For both wildlife and plant species, mitigation includes measures to control for long-term indirect/secondary effects, including controls on public access to dedicated open space areas; controls on pet, stray, and feral cats and dogs; termination of grazing activities (except for the purpose of resource management); controls on invasive plant and animal species (including Argentine ants, brown-headed cowbirds, bullfrogs, African clawed frogs, and crayfish); controls on pesticides (including rodenticides); controls on hydrological alterations and water quality; and controls on nighttime lighting; fencing and signage; homeowner education about sensitive resources; and design of aboveground utilities (phone and cell towers, power lines, and utility poles) in the High Country SMA and Salt Creek area to reduce collisions and electrocutions of raptors.

It was determined that the proposed project's contribution, in combination with past, present and reasonably foreseeable projects, to potential significant cumulative impacts at the watershed level would not be cumulatively considerable for most special-status biological resources, including southern steelhead and several special-status plants. In addition, it was determined that significant cumulative impacts to a majority of wildlife and plant species at the watershed level would not occur. Although the proposed project's contribution would not be cumulatively considerable in these cases, the mitigation measures described above would reduce on site impacts to these resources.

In summary, although the proposed project would include significant impacts to some biological resources absent mitigation, the mitigation measures required by the Newhall Ranch Specific Plan Program EIR and the recommended project specific mitigation measures proposed in revised **Section 4.5**, Biological Resources (see **Subsection 4.5.6**, Mitigation Measures), of the Final EIS/EIR would avoid, substantially lessen, or mitigate these impacts to below a level of significance. However, the proposed project, in combination with other past, present and reasonably foreseeable projects within the SCRW, would result in significant cumulative impacts to three biological resources. Despite project-specific mitigation, the proposed project would result in a cumulatively considerable contribution to significant impacts on the coastal scrub community, the San Emigdio butterfly, and the San Fernando spineflower that cannot be avoided, substantially lessen, or mitigated to below a level of significance under Alternative 2. Under all other alternatives, the significant cumulative impacts to the San Emigdio butterfly and the San Fernando spineflower would be less than significant, with mitigation.

Although the proposed project would include cumulative impacts to waters of the United States absent mitigation, the project-specific mitigation measures proposed in revised **Section 4.6**, Jurisdictional Waters and Streams, of the Final EIS/EIR would mitigate these impacts to a less-than-significant level. After incorporation of the project-specific mitigation measures identified in the Final EIS/EIR, the proposed project, in consideration of past, present and reasonably foreseeable actions, would not result in a cumulatively considerable contribution to any impact on jurisdictional waters, and cumulative impacts would be less than significant with the inclusion of the proposed mitigation measures.

VI. Findings

A. Evaluation of Compliance with 404(b)(1) guidelines (restrictions on discharge, 40 CFR 230.10). (A check in a block denoted by an asterisk indicates that the project does not comply with the guidelines.)

1) Alternatives Test

☐ Yes ☒ No

a) Based on the Discussion IIB, above, are there available, practicable alternatives having less adverse impact on the aquatic ecosystem and without other significant adverse environmental consequences that do not involve discharges into "waters of the United States" or at other locations within these waters?

Discussion: Initially a wide range of on-site and off-site alternatives was examined. However, based on comments received during the scoping process, from resource agencies at various meetings during the planning process, and in response to the Draft EIS/EIR, the Corps and CDFG developed the various project alternatives to avoid and minimize impacts to aquatic resources. Alternatives previously considered for analysis in the Draft EIS/EIR included the No Action alternative, Alternatives 3 through 7. The No Federal Action Alternative has also been included in the analysis as well as specific measures to avoid and minimize impacts to special aquatic sites in the project area, all of which are described below as well as in the attached applicant prepared Draft Section 404(b)(1) Alternatives Analysis.

Alternative 1: The No Action alternative would not include any new actions in the project area and, as a result, the existing agriculture and oil production would continue. The No Action Alterative would not meet any of the basic objectives of the Specific Plan and therefore, would not meet the overall project purpose. Therefore, the No Action alternative would not represent the least environmentally damaging practicable alternative (LEDPA).

Alternative 2: Alternative 2 is the proposed project and is described in detail in the above sections. Of the 660.1 acres of waters of the Unites States within the project area, the proposed project would permanently fill 93.3 acres, or approximately 14.1 percent of waters of the United States on site. Of the 660.1 acres of waters of the United States, approximately 276.9 acres are jurisdictional wetlands with the proposed project permanently filling approximately 20.5 acres of wetlands (the proposed project would avoid all impacts to approximately 88.6% of the total wetland area). In total, the proposed project would result in temporary discharges of fill material in approximately 33.3 acres of waters of the United States, including 11.2 acres of wetlands, in the Santa Clara River and its tributaries. With the proposed project, approximately 533.5 acres of waters of the United States would be completely avoided (approximately 80% of the jurisdictional areas).

In order to help determine what magnitude of costs would be reasonable for a project of this type, the applicant commissioned a comparison of similar development projects from Developers Research, an economic consultant (see the attached applicant prepared Draft Section 404(b)(1) Alternatives Analysis). The project type is a master-planned community. These communities are found throughout California and other parts of the country. As shown in the Comparison of Master Planned Communities (Developers Research 2010) ("Comparison Report"), the location, size and costs of these master planned communities varies substantially. Among eight comparable projects located in the southern California region (master-planned communities), the cost per net developable acre ranges from a low of $493,889 to a high of $928,504. The median cost per net developable acre is $707,784 (unweighted). Weighted to reflect the relative size of the various projects (*i.e.*, larger projects are given more weight than smaller projects in determining the average), the average cost per acre is $673,114. Compared to the cost of comparable projects, the cost of the proposed project is $1,038,000 per net developable acre.

This data reflects the fact that the proposed project is somewhat unique in that the size and complexity of the Specific Plan is at the upper end of the size and complexity mix of master-planned communities. As such there is no "standard" cost that can be identified as typical. Instead, costs for master-planned communities vary based on a wide range of factors. These include the size of the project, regulatory standards of the local land use authority (fees, building standards, and other requirements) the physical setting (the terrain affects grading and infrastructure costs), the availability of infrastructure (existing sewer, water, and roads), the kind of community being built (urban, suburban, or rural) and environmental considerations (presence of sensitive environmental features). What these California projects do have in common is a reliance on the land use and environmental standards that establish the basic elements of the given master-planned community. These, in turn, establish what costs the proposed community must bear to meet applicable state and local requirements, including satisfying needs for roads, parks and schools, water, sewer, and other utilities and design, and infrastructure requirements. As such, there are common cost elements to develop the various master-planned communities.

Given these factors and the intensive land use review that led to the Specific Plan, the attached Draft Section 404(b)(1) Alternatives Analysis prepared by the applicant uses the Specific Plan as the base case for evaluating costs. To put the application of increased cost per net developable acre into perspective for the Specific Plan, a twenty percent increase in cost per net developable acre over Alternative 2 is approximately $207,000 per acre, a ten percent increase in cost per net developable acre over Alternative 2 is approximately $103,500 per acre and a five percent increase in the cost per net developable acre over Alternative 2 is approximately $51,750 If these increased costs are applied to the 2,957 acres of proposed development in Alternative 2, the cost increases would be $612,000,000, $306,000,000, and $153,000,000, respectively. The substantial cost increases associated with some alternatives also must be viewed in light of the amount of additional avoidance of waters of the United States that they provide. A substantial cost increase may be reasonable if impacts also are reduced substantially, while a large increase in cost associated with a minimal reduction in impacts may not be reasonable. Because the Specific Plan costs are already at the high end of the cost spectrum, a relatively small increase of five to ten percent in the cost per net developable acre over Alternative 2 could represent a substantial increase in cost and would not be practicable (a 5% increase would represent approximately the same cost as the highest-cost project in the above Comparison Report provided by the applicant). Based on the above information, the proposed project would clearly meet the overall project purpose and Alternative 2 would also be practicable in light of cost, logistics and technology.

Alternative 3: Under Alternative 3, the proposed project design would be modified in key respects. Like Alternative 2, this alternative calls for the construction of two bridges across the Santa Clara River with associated bank stabilization: (1) the Commerce Center Driver Bridge (already approved by the Corps and CDFG in 1999), and (2) the Long Canyon Road Bridge. The two alternatives differ, however, in that Alternative 3 eliminates the proposed bridge at Potrero Canyon Road. Under Alternative 3, major tributary drainages would be regraded and realigned; but the channels would be wider than those proposed under Alternative 2. Under Alternative 3, the cismontane alkali marsh in lower Potrero Canyon would be avoided and preserved. This alternative would facilitate similar urban development within the Specific Plan site, including 20,433 residential units and 5.48 msf of commercial/ industrial/business park floor area. The proposed configuration of infrastructure facilities and land uses that would occur under Alternative 3 is presented graphically on **Figure 8-2** of the attached Draft Section 404(b)(1) Alternatives Analysis prepared by the applicant. For a complete description of Alternative 3, including infrastructure proposed and urban development facilitated, please refer to revised **Section 3.0** of the Final EIS/EIR for the proposed project.

Of the 660.1 acres of waters of the United States on the project site, implementation of Alternative 3 would result in the permanent fill of 70 acres of waters of the United States (approximately 11% of the total site jurisdiction and 25 percent less acreage than Alternative 2), and would temporarily disturb an additional 37.6 acres (12.9 percent more acreage than the proposed project design). These temporary impacts would be associated with construction zones adjacent to proposed project facilities, which would be restored and revegetated following completion of construction. In some instances temporary impacts would also result from restoration activities, *i.e.*, when such activities require earthwork to be conducted in jurisdictional areas (correction of existing incised channel banks, for example). The increase in temporary impacts to waters under this alternative is due to the implementation of modified channels (temporary impacts) in areas where the proposed project would feature storm drains (permanent impacts). Alternative 3 would avoid 552.4 acres of waters of the United States within the project site. Of the total 660.1 acres of waters of the United States that occur on the site, Alternative 3 would avoid all impacts to approximately 83 percent, compared to 80 percent avoidance for the proposed project. Implementation of Alternative 3 would permanently disturb 9.2 acres of wetlands (55 percent reduction in impact acreage compared to the proposed project), and would temporarily disturb 11.2 acres of wetlands (a similar impact compared to the proposed project). The cismontane alkali marsh wetland in lower Potrero Canyon, which would be disturbed under the proposed project, would be avoided and preserved under this alternative. In total, Alternative 3 would avoid approximately 93 percent of all wetlands on site, a 4 percent increase in wetland avoidance compared to the proposed project. Based on a detailed review of Alternative 3 and the attached applicant prepared Draft Section 404(b)(1) Alternatives Analysis, it would meet the overall project purpose and would be practicable in light of costs, logistics and technology. Because Alternative 3 would substantially reduce impacts to waters of the United States when compared to Alternative 2, this alternative could potentially represent the least environmentally damaging practicable alternative.

Alternative 4: Under this alternative, the proposed project design would be modified in key respects. Two bridges across the Santa Clara River and the associated bank stabilization would be constructed, including the Commerce Center Driver Bridge (already approved by the Corps and CDFG in 1999) and the Long Canyon Road Bridge. The proposed Potrero Canyon Road Bridge, however, would not be constructed under this alternative. Major tributary drainages would be regraded and realigned under this alternative. Under Alternative 4, the cismontane alkali marsh in lower Potrero Canyon would be avoided and preserved. This alternative would facilitate urban development within the project site, including 20,721 residential units and 5.48 msf of commercial/industrial/business park floor area. The proposed configuration of infrastructure facilities and land uses that would occur under Alternative 4 is presented graphically on **Figure 8-3** in the attached Draft Section 404(b)(1) Alternatives Analysis prepared by the applicant. For a complete description of Alternative 4, including infrastructure proposed and urban development facilitated, please refer to revised **Section 3.0** of the Final EIS/EIR for the proposed project.

Implementation of Alternative 4 would facilitate urban development in the project site, and would result in the placement of fill within waters of the United States. In total, this alternative would permanently fill 73.3 acres of waters of the United States (21.4 percent reduction compared to the proposed project), and would temporarily disturb an additional 33.8 acres (approximate 1.5 percent increase compared to Alternative 2). Temporary impacts would be associated with construction zones adjacent to proposed project facilities. Waters temporarily affected by the proposed project would be restored and revegetated after completion of construction in the area. In some instances temporary impacts would also result from restoration activities, *i.e.*, when such activities require earthwork to be conducted in jurisdictional areas (correction of existing incised channel banks, for example). Alternative 4 would avoid 552.9 acres of waters of the United States within the project site. Of the total 660.1 acres of waters of the United States that occur on the site, Alternative 4 would avoid approximately 83 percent, compared to only 80 percent avoidance for the proposed project. Implementation of Alternative 4 would permanently disturb 9.4 acres of wetlands (55 percent reduction in acreage compared to the proposed project) and would temporarily disturb 11.7 acres of wetlands (similar impact to the proposed project). The cismontane alkali marsh wetland in lower Potrero Canyon, which would be disturbed under the proposed project, would be avoided and preserved under this alternative. In total, Alternative 4 would avoid approximately 93 percent of all wetlands on site, a 4 percent increase in avoidance compared to the proposed project. Based on a detailed review of Alternative 4 and the attached applicant prepared Draft Section 404(b)(1) Alternatives Analysis, this alternative would meet the overall project purpose and would be practicable in light of costs, logistics and technology. Because Alternative 4 would substantially reduce impacts to waters of the United States when compared to Alternative 2, it could potentially represent the least environmentally damaging practicable alternative.

Alternative 5: Under this alternative, the proposed project design would be modified in key respects. Three bridges across the Santa Clara River and the associated bank stabilization would be constructed, including the Commerce Center Driver Bridge (already approved by the Corps and CDFG in 1999) the Potrero Canyon Bridge, and the Long Canyon Road Bridge. Major tributary drainages would be regraded and realigned under this alternative, but would result in impact reductions in the Chiquito Canyon, San Martinez Grande Canyon, and Potrero Canyon drainages compared to the proposed project (Alternative 2). This alternative would facilitate urban development within the project site, including 20,196 residential units and 5.42 msf of commercial/ industrial/business park floor area. The proposed configuration of infrastructure facilities and land uses that would occur under Alternative 5 is presented graphically on **Figure 8-4** in the attached Draft Section 404(b)(1) Alternatives Analysis prepared by the applicant. For a complete description of Alternative 5, including infrastructure proposed and urban development facilitated, please refer to revised **Section 3.0** of the Final EIS/EIR for the proposed project.

Alternative 5 would result in the placement of fill within waters of the United States. In total, this alternative would permanently fill 72.4 acres of waters of the United States (22.5 percent reduction in acreage compared to the proposed project), and would temporarily disturb an additional 41.6 acres (24.9 percent increase compared to the proposed project). Temporary impacts would be associated with construction zones adjacent to proposed project facilities. Waters temporarily affected by the proposed project would be restored and revegetated after completion of construction in the area. In some instances temporary impacts would also result from restoration activities, *i.e.*, when such activities require earthwork to be conducted in jurisdictional areas (correction of existing incised channel banks, for example). The increase in temporarily impacts to waters is due the implementation of modified channels (temporary impacts) in areas where the proposed project would feature storm drains (permanent impacts). Alternative 5 would avoid all impacts to 546 acres of waters of the United States within the project site (3 percent more acreage than the proposed project). Of the total 660.1 acres of waters of the United States that occur on the site, Alternative 5 would avoid approximately 83 percent, compared to only 80 percent avoidance for the proposed project. Implementation of Alternative 5 would permanently disturb 14.6 acres of wetlands (28.8 percent reduction in impact acreage compared to the proposed project), and would temporarily disturb 13.5 acres of wetlands (20.5 percent increase in impact acreage compared to the proposed project). The cismontane alkali marsh wetland in lower Potrero Canyon, which would be disturbed under the proposed project, would be avoided and preserved under this alternative. Alternative 5 would avoid approximately 90 percent of all wetlands on site, a one percent increase compared to the proposed project. Based on a detailed review of Alternative 5 and the attached applicant prepared

Draft Section 404(b)(1) Alternatives Analysis, it would meet the overall project purpose and would be practicable in light of costs, logistics and technology. Because Alternative 5 would substantially reduce impacts to waters of the United States when compared to Alternative 2, it could potentially represent the least environmentally damaging practicable alternative.

Alternative 6: Under this alternative, the proposed project design would be modified in key respects. Two bridges across the Santa Clara River and associated bank stabilization would be constructed. The proposed Potrero Canyon Road Bridge (extended span similar to Alternative 5) and the Long Canyon Road Bridge. The previously-approved Commerce Center Drive bridge would not be constructed under this alternative. Major tributary drainages would be regraded and realigned under this alternative, but the channels would be wider than under the proposed project (Alternative 2), and the majority of proposed road crossings along the channels would be bridges as opposed to culverts. This alternative would facilitate urban development within the project site, including 19,787 residential units and 5.33 msf of commercial and industrial/business park floor area. The proposed configuration of infrastructure facilities and land uses that would occur under Alternative 6 is presented graphically on **Figure 8-5** in the attached Draft Section 404(b)(1) Alternatives Analysis prepared by the applicant. For a complete description of Alternative 6, please refer to revised **Section 3.0** of the Final EIS/EIR for the proposed project.

Implementation of Alternative 6 would facilitate urban development in the project site, and would result in the placement of fill material within waters of the United States. In total, this alternative would permanently fill 60.7 acres of waters of the United States (35 percent reduction in acreage compared to the proposed project), and would temporarily disturb an additional 33.9 acres (similar impact acreage when compared to the proposed project). Temporary impacts would be associated with construction zones adjacent to proposed project facilities. Waters of the United States temporarily affected by the proposed project would be restored and revegetated after completion of construction in the area. In some instances temporary impacts would also result from restoration activities, *i.e.*, when such activities require earthwork to be conducted in jurisdictional areas (correction of existing incised channel banks, for example). Alternative 6 would avoid 565.4 acres of waters of the United States within the project site. Of the total 660.1 acres of waters of the United States that occur on the site, Alternative 6 would avoid all impacts to approximately 85 percent of the waters of the United Stets in the project site (a 5 percent increase in avoidance acreage compared to the proposed project). Implementation of Alternative 6 would permanently disturb 9.5 acres of wetlands (53.5 percent reduction in impact acreage compared to the proposed project), and would temporarily disturb 12.0 acres of wetlands (7 percent increase in impact acreage when compared to the proposed project). These impacts would result primarily from bridge construction along the Santa Clara River mainstem, but this alternative would also affect the cismontane alkali marsh wetland in middle Potrero Canyon. Elimination of the planned bridge across the river at Commerce Center Drive would reduce impacts to adjacent wetlands along the Santa Clara River under this alternative. The cismontane alkali marsh wetland in lower Potrero Canyon, which would be disturbed under the proposed project, would be avoided and preserved under this alternative. In total, Alternative 6 would avoid approximately 92 percent of all wetlands on the site, a 4 percent increase in avoidance area compared to the proposed project. Alternative 6 would result in a substantial reduction in impacts to waters of the United States, but additional analysis is required to determine if it would meet the overall project purpose and would be practicable in light of cost logistics and technology (see additional analysis below).

Alternative 7: Under this alternative, the proposed project design would be modified in key respects. Only one bridge would be constructed across the Santa Clara River, including associated bank stabilization, which would be constructed for the proposed Long Canyon Road. With Alternative 7, the proposed Potrero Canyon Road Bridge and the previously approved Commerce Center Drive Bridge would not be constructed. Under this alternative, major tributary drainages would not be regraded or realigned. In addition, the Middle Canyon and Magic Mountain Canyon drainages, which are proposed for conversion to buried storm drains under the proposed project (Alternative 2), would be avoided and preserved. This alternative would facilitate urban development within the project site, including 16,471 residential units and 3.76 msf of commercial/industrial/business park floor area. The proposed configuration of infrastructure facilities and land uses that would occur under Alternative 7 is presented graphically on **Figure 8-6** in the attached Draft Section 404(b)(1) Alternatives Analysis prepared by the applicant. For a complete description of Alternative 7, including infrastructure proposed and urban development facilitated, please refer to revised **Section 3.0** of the Final EIS/EIR for the proposed project.

Implementation of Alternative 7 would facilitate urban development in the project site, and would result in the placement of fill material within waters of the United States. In total, this alternative would permanently fill 13.1 acres of waters of the United States (86 percent reduction in acreage compared to the proposed project), and would temporarily disturb 20.3 acres of waters of the United States (39 percent reduction in acreage compared to the proposed project). Temporary impacts would be associated with construction zones adjacent to proposed project facilities. Fill under this alternative would be greatly reduced compared to the proposed project, because Alternative 7 would avoid all mapped 100-year floodplains (Santa Clara River and several major tributaries) within the project site. Waters temporarily disturbed would be restored and revegetated after completion of construction in the area. In some instances temporary impacts would also result from restoration activities, *i.e.*, when such activities require earthwork to be conducted in jurisdictional areas (correction of existing incised channel banks, for example). Alternative 7 would avoid all impacts to 626.7 acres of waters of the United States within the project site. Of the total 660.1 acres of waters of the United States that occur on the site, Alternative 7 would avoid approximately 95 percent (15 percent increase in acreage avoided when compared to the proposed project). Under Alternative 7, the Potrero Canyon and Long Canyon tributaries, which would be filled and reconstructed under the proposed project, would be avoided except for bridge impacts. Further, the Middle Canyon and Magic Mountain Canyon tributaries, which would sustain substantial impacts under all other alternatives, would be avoided under Alternative 7. This alternative would also reduce impacts to the Santa Clara River mainstem by eliminating the planned bridges at Potrero Canyon Road and Commerce Center Drive. Implementation of Alternative 7 would avoid all mapped 100-year floodplains within the project site, except where proposed facilities would intercept floodplains to meet design requirements (bridges and grade control structures). This alternative would permanently disturb 3.2 acres of wetlands (84.4 percent reduction in acreage compared to the proposed project), and would temporarily disturb 9.0 acres of wetlands (20 percent reduction in acreage compared to the proposed project). These impacts would occur primarily due to construction of one bridge across the Santa Clara River mainstem, at Long Canyon Road. Impacts to wetlands under this alternative would be reduced through the elimination of the two planned bridges across the Santa Clara River at Commerce Center Drive and Potrero Canyon Road, and through avoidance of nearly all wetlands in Potrero Canyon. In total, Alternative 7 would avoid approximately 96 percent of all wetlands on site, a seven percent increase in avoidance when compared to the proposed project. Alternative 7 would result in a substantial reduction in impacts to waters of the United States, but additional analysis is required to determine if it would meet the overall project purpose and would be practicable in light of cost logistics and technology (see additional analysis below).

Alternative 8 (Total Avoidance Alternative): Under Alternative 8, urban development within the project site would be substantially reduced compared to the Alternative 2. In addition, two of the proposed villages would be disproportionately impacted. As a result, Alternative 8 would not meet aspects of the overall project purpose, including several basic objectives of the Specific Plan, related to development potential and village viability. Implementation of Alternative 8 would facilitate a master-planned urban development within the project site, comprising 2,144.9 net developable acres of residential, commercial, and industrial uses and public facilities. Compared to the proposed project, the development facilitated under this alternative would be reduced by 28.5 percent. Due to this substantial reduction in net developable acres and associated development, Alternative 8 would not meet the overall project purpose with regard to net developable acreage. Implementation of Alternative 8 would facilitate urban development in the project site, but would do so in a manner that would avoid the need to place permanent or temporary fill within waters of the United States. Fill of waters would, therefore, be reduced by 100 percent compared to the proposed Project. All 660.1 acres of waters of the United States within the project site, including all 276.9 acres of jurisdictional wetlands, would be avoided and preserved under this alternative. Alternative 8 would result in a substantial reduction in impacts to waters of the United States, but additional analysis is required to determine if it would meet the overall project purpose and would be practicable in light of cost logistics and technology (see additional analysis below).

Modified Alternative 3: Based on their review of the various alternatives to determine compliance with state regulations, the California Department of Fish and Game (CDFG) suggested that the Corps consider three modifications to Alternative 3, to ensure compliance with section 1600 of the Fish and Game Code and the California Endangered Species Act (CESA), which would avoid other potential significant adverse effects under the 404(b)(1) Guidelines: (1) expanding the proposed spineflower preserves; (2) further avoiding and minimizing impacts to riparian resources along the Santa Clara River; and (3) modifying tributary designs to incorporate additional riparian mitigation areas. CDFG also recommended changes to the Commerce Center Bridge design and road alignment that would reduce indirect/secondary impacts to the Middle Canyon Spring complex. In addition, CDFG confirmed that eliminating the Potrero Canyon Road bridge over the Santa Clara River under Alternative 3 is consistent with reducing riparian habitat and wildlife impacts in the vicinity of lower Potrero Canyon and the Santa Clara River. Furthermore the practicability of additional avoidance of aquatic resources in the project area that exhibit relatively high physical and biological functions was also evaluated. With the modified version of Alternative 3, the proposed 20,885 residential units would be reduced by 1,073 units to 19,812 units, and the approved 5.55 msf of commercial uses would be reduced by 140,000 square feet. In general, the design for the modified version of Alternative 3 is very similar to the Alternative 3 described in the Draft EIS/EIR, however, there would be increased avoidance along the Santa Clara River, reduced impacts to the Middle Canyon Spring complex, augmented spineflower preserve acreage and larger riparian corridors within the five major tributaries under the modified version of Alternative 3.

Under the Modified Alternative 3, two of the three bridges crossing the Santa Clara River and the associated bank stabilization would be constructed (Commerce Center Drive Bridge and the Long Canyon Road Bridge). However, the Potrero Canyon Road Bridge would not be constructed, further reducing impacts to jurisdictional waters and wetlands in the Santa Clara River and lower Potrero Canyon. Two major tributary drainages (Long and Potrero canyons) would be regraded and realigned under this alternative; however, the channels would be wider than those of the proposed project. In the three other major tributary drainages (Lion, San Martinez Grande, and Chiquito canyons), the modified version of Alternative 3 incorporates additional areas of preserved jurisdiction with limited channel grading to expand the drainage and adjacent riparian areas and realign their banks to accommodate adjoining infrastructure and development area. The Modified Alternative 3 includes additional spineflower preserve acreage in the Potrero, San Martinez Grande, Grapevine Mesa, and Airport Mesa preserves, however, the Spineflower Conservation Plan (SCP) and the related CESA incidental take permit decision is primarily within the jurisdiction of CDFG. The Modified Alternative 3 would increase the acreage within the preserves from 167 acres to 247 acres. In addition, the acreage of occupied spineflower habitat protected would increase from 13.88 acres under the proposed project to 13.97 acres, while the area of impacted occupied habitat would be decreased from 6.36 acres to 5.87 acres. Therefore, the modified version of Alternative 3 incorporates a spineflower preserve design (based on previous input received from CDFG), but no final permitting decision has been made regarding spineflower, because the SCP is not under the direct jurisdiction of the Corps'. In addition, the modified version of Alternative 3 does not involve areas outside of the project site, which is exclusive to the SCP and CDFG's spineflower permitting actions, specifically in Entrada and the Valencia Commerce Center.

The Draft EIS/EIR evaluated a range of alternatives to the proposed project, including Alternative 3 (Elimination of Planned Potrero Bridge and Additional Spineflower Preserves), which considered the development of 20,433 dwelling units and 5.48 msf of commercial square feet on the project site. With these development characteristics, Alternative 3 is similar to the overall development characteristics of the Modified Alternative 3. The modified version of Alternative 3 would provide 621 fewer residential units than Alternative 3 and result in a 0.07 msf reduction in commercial square footage. Under the modified version of Alternative 3 the floodplain area for the 100-year return event would be increased by 12.8 acres, resulting in a 100-year floodplain area of 1,296.7 acres within the project area. This increase would constitute a one percent reduction in impact compared to the proposed project. Even with this reduction, impacts under the Modified Alternative 3 on surface water hydrology and flood control would be substantially similar to those of the proposed project (Alternative 2). The Modified Alternative 3 would preserve 131,769 lf of on-site drainages, which is 54 percent of the total 242,049 lf of jurisdictional drainages on the project site. In total, the modified version of Alternative 3 would modify 54,001 feet of on-site tributaries; convert 56,291 lf of tributary channel to buried storm drain; install 69,913 lf of bank stabilization; and provide three bridges and 13 culvert tributary road crossings and would result in substantially similar impacts to Alternative 3. Impacts to water quality resulting from development with implementation of the Modified Alternative 3 would be generally similar to the impacts identified for the proposed project and Alternative 3, and would be reduced to a less-than-significant level with implementation of identified project design features, regulatory requirements, and mitigation measures. In general, the direct and indirect impacts associated with the modified version of Alternative 3 would be substantially similar to Alternative 3, but slightly resources along the Santa Clara River; and (3) modifying tributary designs to incorporate additional riparian mitigation areas. CDFG also recommended changes to the Commerce Center Bridge design and road alignment that would reduce indirect/secondary impacts to the Middle Canyon Spring complex. In addition, CDFG confirmed that eliminating the Potrero Canyon Road bridge over the Santa Clara River under Alternative 3 is consistent with reducing riparian habitat and wildlife impacts in the vicinity of lower Potrero Canyon and the Santa Clara River. Furthermore the practicability of additional avoidance of aquatic resources in the project area that exhibit relatively high physical and biological functions was also evaluated. With the modified version of Alternative 3, the proposed 20,885 residential units would be reduced by 1,073 units to 19,812 units, and the approved 5.55 msf of commercial uses would be reduced by 140,000 square feet. In general, the design for the modified version of Alternative 3 is very similar to the Alternative 3 described in the Draft EIS/EIR, however, there would be increased avoidance along the Santa Clara River, reduced impacts to the Middle Canyon Spring complex, augmented spineflower preserve acreage and larger riparian corridors within the five major tributaries under the modified version of Alternative 3.

Under the Modified Alternative 3, two of the three bridges crossing the Santa Clara River and the associated bank stabilization would be constructed (Commerce Center Drive Bridge and the Long Canyon Road Bridge). However, the Potrero Canyon Road Bridge would not be constructed, further reducing impacts to jurisdictional waters and wetlands in the Santa Clara River and lower Potrero Canyon. Two major tributary drainages (Long and Potrero canyons) would be regraded and realigned under this alternative; however, the channels would be wider than those of the proposed project. In the three other major tributary drainages (Lion, San Martinez Grande, and Chiquito canyons), the modified version of Alternative 3 incorporates additional areas of preserved jurisdiction with limited channel grading to expand the drainage and adjacent riparian areas and realign their banks to accommodate adjoining infrastructure and development area. The Modified Alternative 3 includes additional spineflower preserve acreage in the Potrero, San Martinez Grande, Grapevine Mesa, and Airport Mesa preserves, however, the Spineflower Conservation Plan (SCP) and the related CESA incidental take permit decision is primarily within the jurisdiction of CDFG. The Modified Alternative 3 would increase the acreage within the preserves from 167 acres to 247 acres. In addition, the acreage of occupied spineflower habitat protected would increase from 13.88 acres under the proposed project to 13.97 acres, while the area of impacted occupied habitat would be decreased from 6.36 acres to 5.87 acres. Therefore, the modified version of Alternative 3 incorporates a spineflower preserve design (based on previous input received from CDFG), but no final permitting decision has been made regarding spineflower, because the SCP is not under the direct jurisdiction of the Corps'. In addition, the modified version of Alternative 3 does not involve areas outside of the project site, which is exclusive to the SCP and CDFG's spineflower permitting actions, specifically in Entrada and the Valencia Commerce Center.

The Draft EIS/EIR evaluated a range of alternatives to the proposed project, including Alternative 3 (Elimination of Planned Potrero Bridge and Additional Spineflower Preserves), which considered the development of 20,433 dwelling units and 5.48 msf of commercial square feet on the project site. With these development characteristics, Alternative 3 is similar to the overall development characteristics of the Modified Alternative 3. The modified version of Alternative 3 would provide 621 fewer residential units than Alternative 3 and result in a 0.07 msf reduction in commercial square footage. Under the modified version of Alternative 3 the floodplain area for the 100-year return event would be increased by 12.8 acres, resulting in a 100-year floodplain area of 1,296.7 acres within the project area. This increase would constitute a one percent reduction in impact compared to the proposed project. Even with this reduction, impacts under the Modified Alternative 3 on surface water hydrology and flood control would be substantially similar to those of the proposed project (Alternative 2). The Modified Alternative 3 would preserve 131,769 lf of on-site drainages, which is 54 percent of the total 242,049 lf of jurisdictional drainages on the project site. In total, the modified version of Alternative 3 would modify 54,001 feet of on-site tributaries; convert 56,291 lf of tributary channel to buried storm drain; install 69,913 lf of bank stabilization; and provide three bridges and 13 culvert tributary road crossings and would result in substantially similar impacts to Alternative 3. Impacts to water quality resulting from development with implementation of the Modified Alternative 3 would be generally similar to the impacts identified for the proposed project and Alternative 3, and would be reduced to a less-than-significant level with implementation of identified project design features, regulatory requirements, and mitigation measures. In general, the direct and indirect impacts associated with the modified version of Alternative 3 would be substantially similar to Alternative 3, but slightly reduced. For detailed information concerning the direct and indirect impacts of the modified version of Alternative 3, please reference revised **Section 5.0** of the Final EIS/EIR and the attached Draft Section 404(b)(1) Alternatives Analysis prepared by the applicant.

Implementation of the Modified Alternative 3 would result in the placement of fill material within waters of the United States. In total, this alternative would permanently fill approximately 66.3 acres of waters of the United States (29 percent reduction in acreage compared to the proposed project), and would temporarily disturb 32.2 acres (3 percent decrease in acreage compared to the proposed project). The modified version of Alternative 3 would avoid 561.5 acres of waters of the United States within the project site. Of the total 660.1 acres of waters of the United States that occur on the site, the modified version of Alternative 3 would avoid approximately 85 percent, compared to 80 percent avoidance for the proposed project. Implementation of the Modified Alternative 3 would permanently disturb 7.7 acres of wetlands (62 percent reduction in impact acreage compared to the proposed project), and would temporarily disturb 11.4 acres of wetlands (2 percent decrease in impact acreage compared to the proposed project). Under the modified version of Alternative 3, there would be 4.5 acres of permanent impact and 14.6 acres of temporary impact to waters of the United States in the main stem of the Santa Clara River. In all the tributaries in the project area, the modified version of Alternative 3 would result in 61.8 acres of permanent impact and 17.6 acres of temporary impact in waters of the United States. In addition, a 19-acre wetland mitigation area could be implemented in lower Potrero Canyon, contiguous with the lower mesic meadow (cismontane alkali marsh) wetland preservation area. In total, the Modified Alternative 3 would avoid approximately 93 percent of all wetlands on site, a 4 percent increase in wetland avoidance compared to the proposed project. Based on a detailed review of the Modified Alternative 3 and the attached applicant prepared Draft Section 404(b)(1) Alternatives Analysis, it would meet the overall project purpose and would be practicable in light of costs, logistics and technology. Because the Modified Alternative 3 would substantially reduce impacts to waters of the United States when compared to Alternative 2, this alternative could potentially represent the least environmentally damaging practicable alternative.

Conclusion: Evaluation of the proposed project and alternatives in light of practicability and the overall project purpose (development of a master planned community with interrelated villages in the vicinity of the Santa Clarita Valley in northwestern Los Angeles County that achieves the basic objectives of the Specific Plan by providing a broad range of land uses of approximately the same size and proportions as approved in the Specific Plan, including residential, mixed-use, commercial and industrial uses, public services (schools, parks, *etc.*), and a water reclamation plant) has resulted in a preliminary conclusion that the Modified Alternative 3, meets the overall project purpose, would be practicable in light of cost, logistics and technology and would not result in other significant adverse effects.

The No Action alternative would not include any new actions in the project area and, as a result, the existing agriculture and oil production would continue. The No Action Alterative would not meet any of the basic objectives of the Specific Plan and therefore, would not meet the overall project purpose. Therefore, the No Federal Action alternative would not represent the least environmentally damaging practicable alternative (LEDPA).

Under Alternative 2, of the 660.1 acres of waters of the United States within the project area, the proposed project would permanently fill 93.3 acres, or approximately 14.1 percent of waters of the United States on site. Of the 660.1 acres of waters of the United States, approximately 276.9 acres are jurisdictional wetlands, with the proposed project permanently filling approximately 20.5 acres of wetlands (avoidance of impacts to approximately 89% of the total wetland area). In total, the proposed project would result in temporary discharges of fill material in approximately 33.3 acres of waters of the United States in the Santa Clara River and its tributaries. With the proposed project, approximately 533.5 acres of waters of the United States would be completely avoided (approximately 80% of the jurisdictional areas) and approximately 566.8 acres of waters of the United States would not be affected by permanent discharges of fill material (approximately 86% of the jurisdictional areas). Including residential, commercial and industrial development, Alternative 2 would result in approximately 2,957.7 acres of total development area (of the 2,957.7 acres approximately 2,550 acres would be residential development area). The proposed project would clearly meet the overall project purpose and Alternative 2 would also be practicable in light of cost, logistics and technology (total development cost of $3,069,918,000, which yields an average cost of $1,037,940 per net developable acre). Based on a detailed analysis of the project alternatives, the Corps has identified other practicable alternatives that would result in reduced impacts to waters of the United States and, as a result, Alternative 2 would not represent the least environmentally damaging practicable alternative.

Of the 660.1 acres of waters of the United States on the project site, implementation of Alternative 3 would result in the permanent fill of 70 acres of waters of the United States (approximately 11% of the total site jurisdiction and 25 percent less acreage than Alternative 2), and would temporarily disturb an additional 37.6 acres (12.9 percent more acreage than the proposed project design). Including residential, commercial and industrial development, Alternative 3 would result in approximately 2,702.5 acres of total development area (of the 2,702.5 acres approximately 2,325.7 acres would be residential development area). Alternative 3 would increase the cost of the proposed project by approximately 3.0% and would be practicable in light of cost logistics and technology (total development cost of $2,884,032,000, which yields an average development cost of $1,067,172 per net developable acre). In addition, Alternative 3 would meet the basic objectives of the Specific Plan and, therefore, would also meet the overall project purpose. Alternative 3 has reduced permanent impacts to waters of the United States when compared to Alternatives 4 and 5 and, as a result is the least damaging practicable alternative in terms of waters of the United States, including wetlands. However, Alternative 3 would result in other significant adverse impacts to spineflower individuals and habitat and, therefore, would not represent the least environmentally damaging practicable alternative.

Implementation of Alternative 4 would facilitate urban development in the project site, and would result in the placement of fill within waters of the United States. In total, this alternative would permanently fill 73.3 acres of waters of the United States (21.4 percent reduction compared to the proposed project), and would temporarily disturb an additional 33.8 acres (approximate 1.5 percent increase compared to Alternative 2). Including residential, commercial and industrial development, Alternative 4 would result in approximately 2,712.1 acres of total development area (of the 2,712.1 acres approximately 2,329.6 acres would be residential development area). Alternative 4 would increase the cost of the proposed project by approximately 2.5% and would be practicable in light of cost logistics and technology (total development cost of $2,878,781,000, which yields an average development cost of $1,061,458 per net developable acre). In addition, Alternative 4 would meet the basic objectives of the Specific Plan and, therefore, would also meet the overall project purpose. However, Alternative 4 has increased permanent impacts to waters of the United States when compared to Alternative 3 and, as a result this alternative would not represent the least environmentally damaging practicable alternative.

Alternative 5 would result in the placement of fill within waters of the United States. In total, this alternative would permanently fill 72.4 acres of waters of the United States (22.5 percent reduction in acreage compared to the proposed project), and would temporarily disturb an additional 41.6 acres (24.9 percent increase compared to the proposed project). Including residential, commercial and industrial development, Alternative 5 would result in approximately 2,621.9 acres of total development area (of the 2,621.9 acres approximately 2,232 acres would be residential development area). With a total of 2,621.9 net developable acres, Alternative 5 would result in a total development cost of $2,894,539,000. This yields an average development cost of $1,103,985 per net developable acre. Alternative 5 would increase the cost per net developable acre by approximately 6.0% and would be marginally practicable in light of cost logistics and technology. In addition, Alternative 5 would meet the basic objectives of the Specific Plan and, therefore, would also meet the overall project purpose. However, Alternative 5 would increase cost and permanent impacts to waters of the United States when compared to Alternative 3 and, as a result this alternative would not represent the least environmentally damaging practicable alternative.

Implementation of Alternative 6 would facilitate urban development in the project site, and would result in the placement of fill within waters of the United States. In total, this alternative would permanently fill 60.7 acres of waters of the United States (35 percent reduction in acreage compared to the proposed project), and would temporarily disturb an additional 33.9 acres (similar to impact acreage when compared to the proposed project). Alternative 6 would facilitate urban development within the project site, but less than the proposed project. However, because this alternative would not include the bridge across the Santa Clara River at Commerce Center Drive, a substantial portion of the development reduction would occur in the easternmost portion of the project site. The configuration of developable space under Alternative 6 would result in a substantial reduction in development in one section of the project area and, as a result, preclude the construction of a coherent village in the eastern section of the project area. Therefore, Alternative 6 would impede construction of a development composed of interrelated villages and, for this reason Alternative

6 would fail to meet the Specific Plan basic objective with regard to villages. As a result, the Corps has made a preliminary decision that Alternative 6 would not meet the overall project purpose. Including residential, commercial and industrial development, Alternative 6 would result in approximately 2,310.7 acres of total development area (of the 2,310.7 acres approximately 1,976.4 acres would be residential development area). Alternative 6 would yield a total of 2,310.7 net developable acres at a total development cost of $2,757,365,000, which yields a substantial increase in the average development cost of $1,193,303 per net developable acre (approximately a 15.0 percent increase compared to the proposed project). When compared to the modified version of Alternative 3, Alternative 6 would provide approximately 6 acres of additional avoidance of waters of the United States (66.3 acres compared to 60.7 acres). Based on the above comparison, avoidance of approximately 6 additional acres of waters of the United States under Alternative 6 would require a substantial increase in cost per net developable acre when compared to the modified version of Alternative 3. In consideration of the relatively high cost for the proposed project, a 15% increase in cost per net developable acre would not be practicable and, therefore, Alternative 6 would not represent the least environmentally damaging practicable alternative.

Implementation of Alternative 7 would facilitate urban development in the project site, and would result in the placement of fill within waters of the United States. In total, this alternative would permanently fill 13.1 acres of waters of the United States (86 percent reduction in acreage compared to the proposed project), and would temporarily disturb an additional 20.3 acres (39 percent reduction in acreage compared to the proposed project). Implementation of Alternative 7 would facilitate a master-planned urban development within the project site, comprising 1,596 net developable acres of residential, commercial, and industrial uses and public facilities. Compared to the proposed project, the development facilitated under this alternative would be reduced by 46 percent. In addition, Alternative 7 would facilitate the development of 1,352.4 acres of residential uses, a reduction of 47.0 percent when compared to the proposed project. Even after incorporating feasible increases in density, Alternative 7 would allow the construction of 16,471 dwelling units, a reduction of 21 percent compared to the proposed project. Because the number of dwelling units available under Alternative 7 would be reduced substantially (more than 20 percent compared to the number approved in the Specific Plan), Alternative 7 would fail to achieve the Specific Plan basic objectives for residential uses. Alternative 7 would facilitate the development of 125.4 acres of commercial uses, a reduction of 51 percent compared to the proposed project. With feasible increases in density, such as vertical construction, this acreage would support only 3.76 msf of commercial floor space, a substantial reduction of 32 percent when compared to the proposed project. Because the commercial floor space available under Alternative 7 would substantially reduce (more than thirty percent) the floor space that would result from build out of the Specific Plan, Alternative 7 would fail to achieve the Specific Plan basic objectives for commercial uses. Alternative 7 would yield 1,596 net developable acres at a development cost of $2,538,137,000, which yields a substantial increase in the average development cost of $1,590,311 per net developable acre (53 percent increase compared to the proposed project). Based on the above information, Alternative 7 would not meet the overall project purpose and would not be practicable in light of the substantial increase in cost per net developable acre. As a result, Alternative 7 would not represent the least environmentally damaging practicable alternative.

Implementation of Alternative 8 (Avoidance of waters of the United States) would facilitate urban development in the project site, but would do so in a manner that would avoid permanent or temporary fill within waters of the United States. Fill of waters would, therefore, be reduced by 100 percent compared to the proposed project. All 660.1 acres of waters of the United States within the project site, including all 276.9 acres of jurisdictional wetlands, would be avoided under this alternative. Implementation of Alternative 8 would facilitate a master-planned urban development within the project site, comprising 2,144.9 net developable acres of residential, commercial, and industrial uses and public facilities. Compared to the proposed project, the development facilitated under this alternative would be reduced by 28.5 percent. Due to this substantial reduction, Alternative 8 would not meet the basic objective with regard to net developable acreage. Of the 2,144.9 acres of total development area, approximately 1,831.7 acres would be residential development area. Alternative 8 would facilitate urban development within the project site, but less than the proposed project (12 percent reduction in dwelling units as compared to the proposed project). This alternative would include one bridge across the Santa Clara River, but would not include bridges at Commerce Center Drive and Potrero Canyon Road. As a result, a substantial portion of the development reduction would occur in the easternmost portion of the project site. The configuration of developable space under Alternative 8 would preclude the construction of a coherent village in this location. For this reason, Alternative 8 would fail to achieve the Specific Plan basic objectives for villages. Alternative 8 would yield a total of 2,144.9 net developable acres at a total development cost of $2,890,933,000, which yields a substantial increase in the average development cost of $1,347,817 per net developable acre (29.9 percent increase compared to the proposed project). These costs would be substantially greater than the proposed project and, as a result, would not be practicable for a project of this type. Based on the above information, Alternative 8 would not meet the overall project purpose and would not be practicable in light of the substantial increase in cost per net developable acre. As a result, Alternative 8 would not represent the least environmentally damaging practicable alternative.

Implementation of the Modified Alternative 3 would result in the placement of fill within waters of the United States. In total, this alternative would permanently fill approximately 66.3 acres of waters of the United States (29 percent reduction in acreage compared to the proposed project), and would temporarily disturb 32.2 acres (3 percent decrease in acreage compared to the proposed project). Implementation of the Modified Alternative 3 would permanently disturb 7.7 acres of wetlands (62 percent reduction in impact acreage compared to the proposed project), and would temporarily disturb 11.4 acres of wetlands (2 percent decrease in impact acreage compared to the proposed project). The Modified Alternative 3 would reduce total developable acreage by 13 percent compared to the proposed project. Specifically, the residential development acreage is reduced by 11 percent, and its corresponding unit count is reduced by 5 percent (1,073 units). Commercial acreage is reduced by 14 percent (35.6 acres), but commercial square footage is reduced by only 3 percent (140,000 square feet). Acreage for public facilities acreage is reduced by 4 percent (6 acres), while open space acreage increases by 372.2 acres compared to the proposed project. There are no disproportionate impacts that threaten the viability of any of the proposed villages. Therefore, the modified Alternative 3 would allow for development of the site consistent with the basic objectives of the Specific Plan. Including residential, commercial and industrial development, the modified version of Alternative 3 would result in approximately 2,587.0 acres of total development area (of the 2,587.0 acres approximately 2,221.2 acres would be residential development area). Total development costs for the Modified Alternative 3 would be $2,813,955,840, compared to $3,069,918,000 for the proposed project, resulting in a cost per net developable acre increase of 4.9 percent ($1,091,402) when compared to the proposed project. Based on the above information, the modified version of Alternative 3 would meet the overall project purpose and would be practicable in light of cost, logistics and technology. In addition, modified Alternative 3 would include additional spineflower preserve area when compared to Alternative 3. As a result, the modified version of Alternative 3 would not result in other significant adverse impacts to spineflower individuals or habitat and, therefore the Corps has made a preliminary determination that this alternative would represent the least environmentally damaging practicable alternative (Draft LEDPA).

b) Based on II B, if the project is in a special aquatic site and is not water-dependent, has the applicant clearly demonstrated that there are no practicable alternative sites available?

☒ Yes ☐ No

Discussion: The Draft EIS/EIR for the proposed project initially identified 23 alternative sites within the region that were considered potentially available. These sites were evaluated using initial screening criteria to determine whether they might have the potential to accommodate the proposed project. Twenty of the sites were eliminated from further analysis at this stage, for one or more of the following reasons directly related to the overall project purpose and the basic objectives of the Specific Plan. The site was too small to accommodate the development proposed; site is not in the vicinity of Santa Clarita; and the site is in an isolated location that cannot be connected efficiently with existing infrastructure; Site is entitled for development and is actively being planned for development by the current owner or is already under construction. Based on the initial screening, the Draft EIS/EIR identified three off-site alternative sites that have the potential to meet most or all of the basic objectives for the Specific Plan, and carried them forward for further analysis: Temescal Ranch (Alternative Site A), the Newhall-Ventura Property (Alternative Site B), and Hathaway Ranch (Alternative Site C).

The Temescal Ranch site is approximately 7,580 acres in size and is located approximately two miles northwest of the project site in unincorporated Ventura County, northeast of the community of Piru. Lake Piru, formed within the Piru Creek watershed by the San Felicia Dam at the southern end of the Lake, extends through the northern third of the Temescal Ranch site. Lake Piru serves Ventura County and provides water conservation, flood control, seawater intrusion abatement, groundwater recharge, irrigation, and municipal and industrial water supplies. The Piru recreational area, which provides lake access, is located on the western side of the lake, while the Santa Felicia Dam extends across the southern edge of the lake. Compared to the proposed project site, the Temescal Ranch site is more distant from existing job centers and transit corridors. In addition, Temescal Ranch is not served directly by SR-126 or any other major state highway, and is much farther away from I-5, one of the state's major north-south freeway corridors (**Figure 7-1**). Consequently, the amount of transportation infrastructure needed to reach Temescal Ranch would be substantially greater than that needed for the proposed project site. Travel distances between Temescal Ranch and the surrounding employment centers found in the Santa Clarita Valley would also be greater than at the proposed project site. Temescal Ranch is also further from existing sewer, water, and other existing utilities than the proposed project site, and would require that such utilities be extended substantially to serve development in accordance with the overall project purpose.

Costs associated with developing the Temescal Ranch site were not evaluated in detail. On-site development costs associated with the Temescal Ranch site are assumed to be comparable to those for the proposed project area, although fixed costs may be spread across a somewhat smaller development area under this alternative as compared to the proposed project. Off-site costs for the extension of infrastructure would be greater than for the project area because the Temescal Ranch site is located further from existing development and infrastructure. Due to the increased off-site costs, development of the site is considered to be substantially higher when compare to the proposed project. Development of Temescal Ranch would have the potential to reduce impacts to the aquatic ecosystem when compared to the development at the proposed project site, assuming that key aquatic resources such as Lake Piru and Piru Creek were largely avoided. Lake Piru encompasses the majority of the jurisdictional area within Temescal Ranch, approximately 995 acres. The largest stream within Temescal Ranch is Piru Creek, which is fed perennially by releases from Santa Felicia Dam at the downstream end of Lake Piru. The on-site jurisdictional area of Piru Creek is approximately 250 acres. In addition to Piru Creek and Lake Piru, Temescal Ranch contains approximately 11.7 miles of intermittent and ephemeral tributary drainages to these waters, constituting an additional 47 acres of jurisdiction. However, avoidance of both Piru Creek and Lake would limit the ability of the site to provide sufficient development area to fulfill the overall project purpose. Additional development could occur if a portion of Lake Piru were filled, but this is not considered a practicable alternative given the existing aquatic resources as well as the importance of this facility for water supply, flood control, recreation and other purposes.

Development of the Temescal Ranch site consistent with the overall project purpose has the potential to reduce impacts to the aquatic ecosystem compared to the proposed project, assuming that Lake Piru and Piru Creek were largely avoided. Under this assumption, however, the site would not allow enough development to achieve the overall project purpose. In addition, large-scale development of the site would not be logistically feasible because it would be inconsistent with applicable Ventura County policies and ordinances regarding conversion of land from agricultural and open space uses, and because the site has no readily available source of potable water. Even if these obstacles could be overcome, the site would have substantially higher costs when compared to the proposed project, result in greater environmental impacts to non-aquatic resources such as traffic and air quality due to its more remote location, the need to extend infrastructure to the site, and the site's proximity to the Sespe Wilderness and Sespe Condor Sanctuary.

Based on a review of the Temescal Ranch alternative, the following basic objectives of the Specific Plan would not be achieved if the proposed project were to be developed on the Temescal Ranch site: Avoid leapfrog development and accommodate projected regional growth in a location that is adjacent to existing and planned infrastructure, urban services, transportation corridors, and major employment centers; and arrange land uses to reduce vehicle miles traveled and energy consumption. Based on the above information, the Temescal Ranch site would not meet the overall project purpose, would result in other significant adverse impacts and would substantially increase the costs associated with the proposed project. As a result, the Temescal Ranch site does not have the potential to be the least environmentally damaging practicable alternative (LEDPA).

The Newhall-Ventura property is an approximately 15,000-acre site located in unincorporated Ventura County adjacent to the western boundary of the proposed project site. The property is generally bounded by SR-126 on the north, the

Santa Susana Mountains on the south, Los Angeles County on the east, and extends approximately two miles west of the community of Piru. The northwest portion of the Newhall-Ventura property encompasses a portion of the Santa Clara River floodplain and extends north of SR-126. Like the proposed project site, the topography of the Newhall-Ventura property is highly variable, with elevations ranging from approximately 630 feet AMSL in the Santa Clara River valley to approximately 3,000 AMSL in the Santa Susana Mountains. Historic uses of the site include cattle grazing, agriculture and oil production. The site is heavily developed with agricultural uses (row crops, citrus, *etc.*) and also maintains a number of rural-type residences and structures. Vehicular access is available to this site from SR-126. The site is within both the UWCD and Castaic Lake Water Agency (CLWA) service areas; however, no wastewater lines serve the site.

Costs associated with developing the Newhall-Ventura property were not evaluated in detail. On-site costs associated with developing the Newhall-Ventura alternative site are assumed to be comparable to costs for the proposed project. Off-site costs for extension of infrastructure would be greater than for the proposed project area because the Newhall Ventura site is located further from existing development and infrastructure. Due to the increased off-site costs, the cost of developing the site is considered to be substantially higher than for the proposed project area.

The Santa Clara River runs through the Newhall-Ventura property, just as it does through the project site. In addition, several intermittent drainages drain to the Santa Clara River throughout the site. Because the Newhall-Ventura property and the proposed project site contain similar reaches of the Santa Clara River and tributary drainages, both sites, if developed to meet the overall project purpose, would yield comparable impacts to geomorphic and hydrologic functions in the Santa Clara River. The Newhall-Ventura property is located immediately adjacent to the west of the proposed project site and has similar aquatic features, habitat and topography. The Newhall-Ventura property contains approximately 946 acres of the Santa Clara River and 53.8 miles of intermittent and ephemeral drainages that ultimately convey flows to the Santa Clara River, for a total of approximately 990 acres of jurisdictional waters. It is assumed, based on its proximity to the project location, that the Newhall-Ventura property contains palustrine fringe wetlands along the edges of the Santa Clara River. Depressional wetlands also may occur on site, but are likely limited in extent due to relatively steep topography and arid climate conditions.

At approximately 15,000 acres, the Newhall-Ventura site is larger than the proposed project site. Therefore, even though the quantity and quality of jurisdictional streams and wetlands on these two sites are similar, development on the Newhall-Ventura property could be designed to affect a smaller percentage of jurisdictional streams and wetlands. As a result, the Newhall-Ventura property site could potentially be developed with fewer direct impacts to jurisdictional streams and wetlands as compared to the proposed project site. The Newhall-Ventura site has the potential to reduce impacts to the aquatic ecosystem compared to the proposed project. However, development of the site would conflict with the overall project purpose elements of avoiding leapfrog development and reducing vehicle miles traveled (two basic objectives of the Specific Plan). In addition, development of the site consistent with the overall project purpose is not logistically feasible because it would be inconsistent with applicable Ventura County policies and ordinances and, therefore, is extremely unlikely to be approved and, even if these obstacles could be overcome, the site would have significantly higher cost due to off-site infrastructure costs. Finally, development of the site could have greater adverse effects than the proposed project in the form of traffic, air quality, and noise impacts due to its greater distance from existing urban centers. Based on the above information, the Newhall-Ventura site would not meet the overall project purpose, would result in a substantial increase in cost when compared to the proposed project and would result in other significant adverse effects. As a result, the Newhall-Ventura site does not have the potential to be the LEDPA.

The Hathaway Ranch site is approximately 6,195 acres in size, and is located approximately five miles north of the project site in unincorporated Los Angeles County, generally between the Ventura County line to the west, I-5 to the east, Hasley Canyon to the south, and the Angeles National Forest to the north. Topography on the Hathaway Ranch site is highly variable, with elevations ranging from approximately 1,100 feet AMSL to more than 2,500 AMSL; very little flat land exists on this site. According to a slope analysis performed by Hunsaker and Associates (Hunsaker Technical

Memorandum), both the project site and Hathaway Ranch have hilly terrain, the chief difference between them is that Hathaway Ranch has a higher percentage of land within the 25-50 percent slope range, while the proposed project site has a higher percentage of land in the 0-25 percent slope range and the >50 percent slope range.[4] Historic uses of the Hathaway site include cattle grazing, oil and natural gas operations, and mineral resource mining. As Hathaway Ranch is undeveloped, no vehicular access is available via improved roadways, and no water or wastewater lines serve the site.

The *on-site* infrastructure necessary to serve the Hathaway Ranch site, including highways, drainage, sewer, water, and utility distribution systems, would be generally similar to that required to serve the project site, as both properties would support developments of similar size. The chief difference between the two properties relates to *off-site* infrastructure. Due to its remote location, Hathaway Ranch would require a significant amount of new off-site infrastructure improvements, the cost of which, in terms of additional environmental impact and additional financial burden, could be prohibitive. Costs described in this analysis cover off-site improvements only, and are in addition to the on-site development costs (which are assumed to be similar to the project site development costs). As such, the off-site costs represent costs unique to development of the Hathaway Ranch site (*i.e.*, costs that would not be incurred if the proposed project were developed on the project site). Unit prices for the cost items are based upon the proposed project cost estimates to maintain consistency. Costs for major improvements such as the freeway interchanges are also based upon Newhall Ranch Specific Plan improvements and are approximations only. The per-unit cost to acquire rights-of way is assumed to be similar for both sites, and does not account for any improvements on the properties to be acquired. Additional fees required for litigation and/or condemnation proceedings have not been included in this estimate. Acquisition of property outside of the road right-of-way (for slopes and grading) can be reduced by constructing retaining walls.

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4 Hunsaker Technical Memorandum, dated February 9, 2010, at p.1. A copy of the Hunsaker Technical Memorandum, including exhibits, is attached as **Appendix 7.0** to this report.

Finally, as mentioned above, development of Hathaway Ranch, if consistent with the overall project purpose, would require off-site mitigation for habitat loss and open space, which is an additional cost of development. To determine this cost, this analysis assumes that the Applicant would have to acquire approximately 2,000 acres of open space for mitigation purposes. Based on this assumption, the cost of acquiring off-site mitigation land was estimated to be $99,180,000. (Hunsaker Technical Memorandum, at p. 8.) When the additional development costs of the Hathaway Ranch site are totaled, they come to $591,269,184 (plus an additional $99,180,000 for off-site mitigation land).[5] Again, these are costs over and above those the applicant would expect to incur if it developed the project on the proposed site.[6]

The Hathaway Ranch site is located in the mountains on the north side of the Santa Clara River Valley and does not contain any major rivers or impoundments. The site contains a total of approximately 25.5 linear miles of intermittent and ephemeral drainages on site, encompassing a total jurisdictional area of approximately 101 acres. Although available information was not sufficient to allow the mapping of wetlands on Hathaway Ranch, it is unlikely that palustrine wetlands exist on the site due to the lack of perennial water sources. Although depressional wetlands may occur on site, these are likely limited in extent due to the relatively steep topography and lack of perennial and intermittent streams. The Hathaway Ranch alternative site has the potential to substantially reduce impacts to the aquatic ecosystem. However, the site is not currently zoned for urban development, and amending the General Plan to allow high density development of the site would not be consistent with local and regional planning efforts and is not considered feasible. The site also would not meet several Specific Plan basic objectives, including avoiding leapfrog development, locating housing proximate to transit corridors and employment centers, and reducing vehicle miles traveled. In addition, because the site is located farther from existing utility and transportation infrastructure, it would require extension of infrastructure that would substantially increase the project cost. Moreover, the improvements to infrastructure would increase adverse environmental impacts to upland resources. Finally, it may not be practicable to obtain sufficient water supply to serve the proposed project if constructed on the Hathaway Ranch site. Based on the above information, the Hathaway Ranch site would not meet the overall project purpose, would result in a substantial increase in cost when compared to the proposed project and would result in other significant adverse effects. Therefore, the site is not a practicable alternative and does not have the potential to be the LEDPA. Based on the above analysis of on-site and off-site alternatives, the Corps has made a preliminary determination that the presumption that there is a less damaging alternative that would not discharge fill in a special aquatic site has been rebutted. The Draft LEDPA would substantially reduce permanent impacts to special aquatic sites (approximately a 62% reduction when compared to Alternative 2), but would not eliminate all impacts to jurisdictional wetlands.

<u>2) Special restrictions. Will the project:</u>

Yes	No	
☐	☒	a) violate state water quality standards?
☐	☒	b) violate toxic effluent standards (under Section 307 of the Act)
☐	☒	c) jeopardize endangered or threatened species or their critical habitat?
☐	☒	d) violate standards set by the Department of Commerce to protect marine sanctuaries?
☒	☐	e) evaluation of the information in II C and D above indicates that the proposed discharge material meets testing exclusions criteria for the following reason(s)

(X) based on the above information, the material is not a carrier of contaminants

( ) the levels of contamination are substantially similar at the extraction and disposal sites and the discharge is not likely to result in degradation of the disposal site and pollutants will not be transported to less contaminated areas

( ) acceptable constraints are available and will be implemented to reduce contamination to acceptable levels within the disposal site and prevent contaminants from being transported beyond the boundaries of the disposal site.

3) **Other restrictions.** Will the discharge contribute to significant degradation of "waters of the U.S." through adverse impacts to:

☐ Yes ☒ No a) human health or welfare, through pollution of municipal water supplies, fish, shellfish, wildlife and special aquatic sites?

☐ Yes ☒ No b) life states of aquatic life and other wildlife?

☐ Yes ☒ No c) diversity, productivity and stability of the aquatic ecosystem, such as the loss of fish or wildlife habitat, or loss of the capacity of wetland to assimilate nutrients, purify water or reduce wave energy

☐ Yes ☒ No d) recreational, aesthetic and economic values?

☒ Yes ☐ No 4) **Actions to minimize potential adverse impacts (mitigation).** Will all appropriate and practicable steps (40 CFR 23.70-77) be taken to minimize the potential adverse impacts of the discharge on the aquatic ecosystem?

Discussion: In order to avoid and minimize the potential adverse impacts of the discharge on the aquatic ecosystem during the proposed construction activities in waters of the United States, several measures have been incorporated into the modified version of Alternative 3 (Draft LEDPA), including: substantial avoidance and minimization of impacts to waters of the United States (approximately 90% waters of the United States in the project area would not be affected by permanent impacts), substantial biological mitigation measures, implementation of construction and water quality BMPs, and development of a comprehensive SWPPP.

The Draft LEDPA would permanently impact 66.3 acres, including 7.7 acres of wetlands, and temporarily impact 32.2 acres of waters of the United States, including 11.4 acres of jurisdictional wetlands. With the implementation of the Draft LEDPA, of the 660.1 acres of waters of the United States in the project area, 85 percent of waters of the United States would be completely avoided and approximately 90% of the waters of the United States would not be permanently affected by discharges of fill material. To avoid and minimize indirect/secondary impacts, approximately 8,500 acres of uplands would be preserved in the project area, reducing direct and indirect impacts to drainage patterns, erosion/accretion, water quality, special aquatic sites, aquatic habitat, wildlife habitat, endangered species and aesthetics. Sensitive resource areas that would be avoided with the Draft LEDPA include the Middle Canyon spring, the entire Salt Creek watershed, the cismontane alkali marsh wetland in lower Potrero Canyon and the majority of the jurisdictional wetlands in the Santa Clara River.

To minimize impacts, the proposed bank stabilization would be constructed outside the lateral limits of waters of the United States under the Draft LEDPA, and fill of waters would be limited to temporary impacts during construction activities. By locating bank stabilization outside the active channel, hydrologic impacts of bank stabilization would be reduced under the Draft LEDPA. Along the tributary drainages, the proposed buried bank stabilization would be installed in post-development channels to limit lateral channel migration and protect adjacent land uses. The construction methods would be identical to those employed along the river mainstem, but in many cases the stabilization would be constructed within waters of the United States. The Draft LEDPA would preserve 131,769 lf of on-site drainages, which is 54 percent of the total 242,049 lf of jurisdictional drainages on the project site, reducing impacts when compared to Alternative 2. In total, the Draft LEDPA would alter 54,001 feet of on-site tributaries, convert 56,291 lf of tributary channel to buried storm drain and install 69,913 lf of bank stabilization. The Draft LEDPA would avoid and minimize impacts to aquatic resources from bank stabilization by featuring wider channels, with bank stabilization set back laterally from the active channel, allowing relatively natural channel morphology to develop in the drainages. The new drainages included in the Draft LEDPA would be designed to incorporate buried bank protection and grade stabilization, and would have sufficient hydrologic capacity to pass the Los Angeles County Capital Flood without the need for clearing native vegetation from the channels, allowing moderate to high physical and biological functions to persist in the project area.

To avoid and minimize water quality impacts during the proposed construction activities, the Draft LEDPA would include preparation and implementation of a Storm Water Pollution Prevention Plan (SWPPP). The SWPPP itself would include erosion and sediment control BMPs to reduce or eliminate the discharge of sediment and other potential construction-related pollutants. The SWPPP must also contain a Construction Site Monitoring Program that identifies monitoring and sampling requirements during construction. Preliminary analysis indicates that the Draft LEDPA would most likely be categorized as a Risk Level 2. BMPs and monitoring required by the Construction General Permit would be incorporated into the project design to comply with the Risk Level 2 requirements, as described in Attachment D of the Construction General Permit. If final design analysis indicates that the Draft LEDPA would fall under Risk Level 3, the additional Level 3 permit requirements would be implemented as necessary.

Pursuant to NPDES requirements, Best Management Practices (BMPs) would be implemented at the project site under the Draft LEDPA to avoid and minimize impacts to water quality. These BMPs include the following water quality control facilities: (1) water quality basins; (2) debris basins, located just upstream of the interface between developed and undeveloped areas, primarily to trap debris coming from the upper watersheds; (3) detention basins, which are typically sized to capture the predicted runoff volume and retain the water volume for a period of time (usually 24 to 48 hours); (4) catch basin inserts or screens/filters installed in existing or new storm drains to capture pollutants in the stormwater runoff; (5) bioretention, such as vegetated grassy swales, that provide water quality benefits and convey storm water runoff; and (6) solids separator units or in-line structures that reduce or manipulate runoff velocities such that particulate matter falls out of suspension and settles in a collection chamber. With the implementation of the above measures, impacts to water quality would be substantially reduced, avoiding and minimizing direct and indirect impacts to water quality in the project area.

To compensate for unavoidable permanent impacts to 66.3 acres and temporary impacts to 32.2 acres of waters of the United States, the Draft LEDPA would implement a variety of on-site compensatory mitigation measures. As a standard measure to minimize impacts to waters of the United States, the 32.2 acres of temporary impact areas would be restored to pre-project contours and revegetated as stipulated in Corps and CDFG approved mitigation and monitoring plans. As part of the required monitoring for the restored temporary impact areas, the applicant would be required to utilize the Hybrid Assessment of Riparian Condition (HARC) methodology to document adequate restoration of the physical and biological functions in the temporary impact areas. To compensate for permanent impacts to waters of the Unite States, large areas in the Santa Clara River floodplain that are currently agricultural areas would restored to active floodplain, resulting in both an increase in the acreage of waters of the United States as well as augmented physical and biological functions. Establishment and restoration activities in the main-stem of Salt Creek watershed would also result in a net increase in the acreage of waters of the United States as well as augmented physical and biological functions. Lastly, major tributaries that would be filled as part of the Draft LEDPA would be replaced by created channels that would be designed to be wide enough to accommodate riparian vegetation and would require minimal maintenance activities, providing additional compensation for permanent impacts to waters of the United States.

Because the Draft LEDPA would involve various phases over a 20 year period, the compensatory mitigation would also be implemented in phases. To avoid and minimize temporal losses, prior to any permanent impacts in waters of the United States, the applicant would initiate establishment and restoration activities in Salt Creek and Santa Clara River (Mayo Crossing area). In this initial phase, approximately 20.4 acres of compensatory mitigation would be implemented in Salt Creek and 15.9 acres in the Santa Clara River, for a total of 36.4 acres of available mitigation area. Concurrent with construction activities in waters of the United States associated with the various phases of the proposed development, additional compensatory mitigation capacity would be available including approximately 1.3 acres in Lion Canyon, 11.1 acres in Chiquito Canyon, 6.0 acres in San Martinez Grande, 22.5 acres in Long Canyon and 70.0 acres in Potrero Canyon, and 17.0 acre river bed expansion area along margins of the Santa Clara River (conversion of agricultural fields) could be suitable for Corps mitigation establishment, ensuring no net loss of physical and biological functions in the project area. In addition, a 19-acre wetland mitigation area could also be implemented in lower Potrero Canyon, contiguous with the lower mesic meadow (cismontane alkali marsh) wetland preservation area. Total available compensatory mitigation in the project acre would be 183.3 acres. For more information regarding the proposed compensatory mitigation program, please reference the Draft Mitigation Plan in **Appendix F1.0** in the Final EIS/EIR.

Overall, the Draft LEDPA would include substantial avoidance and minimization of impacts to waters of the United States, including wetlands, with approximately 85 percent of the jurisdictional areas being completely avoided and avoiding permanent impacts in approximately 90 percent of the waters of the United States in the project area. Implementation of the Draft LEDPA would permanently disturb 7.7 acres of wetlands (62 percent reduction in impact acreage compared to the proposed project), and would temporarily disturb an additional 11.4 acres (4 percent decrease in impact acreage compared to the proposed project). The Draft LEDPA would avoid permanent impacts to approximately 97 percent of the jurisdictional wetlands in the project area. To avoid and minimize construction impacts to water quality, the Draft LEDPA would include numerous best management practices as well as substantial project design features to facilitate on-site treatment of runoff to avoid and minimize downstream water quality impacts associated with the proposed residential development. As a standard measure to minimize impacts to waters of the United States, the 32.2 acres of temporary impact areas would be restored to pre-project contours and revegetated as stipulated in Corps and CDFG approved mitigation and monitoring plans. As part of the required monitoring for the restored temporary impact areas, the applicant would be required to utilize the Hybrid Assessment of Riparian Condition (HARC) methodology to document adequate restoration of the physical and biological functions in the temporary impact areas. Based on the above information, the Corps has made a preliminary determination that the Draft LEDPA would avoid and minimize impacts to aquatic resources to the maximum extent practicable and would represent the least environmentally damaging practicable alternative.

VII. References

See reference sections in the Final EIS/EIR and the attached applicant prepared Draft 404(b)(1) Alternatives Analysis.

NEWHALL LAND

June 1, 2010

Dr. Aaron O. Allen, North Coast Branch Chief
U.S. Army Corps of Engineers
2151 Alessandro Drive, Suite 110
Ventura, California 93001

Re: Newhall Ranch Resource Management and Development Plan Section 404 Permit Application (File No. 2003-01264-AOA) and Draft 404(b)(1) Alternatives Analysis Submittal

Dear Dr. Allen:

The Newhall Land and Farming Company ("Newhall Land") submitted an application on December 15, 2003 for an individual Clean Water Act section 404 permit for the proposed Newhall Ranch Resource Management and Development Plan ("RMDP") (File No. 2003-01264-AOA). The Section 404(b)(1) Guidelines ("Guidelines") require the applicant for a section 404 permit to demonstrate that the proposed project is the least environmentally damaging practicable alternative ("LEDPA")—i.e., that there is no practicable alternative that would have less adverse impact on the aquatic ecosystem without having other significant adverse environmental consequences. In accordance with the Guidelines, Newhall Land has prepared the attached Draft Section 404(b)(1) Alternatives Analysis for the RMDP. The analysis evaluates a range of alternatives, including the RMDP as originally proposed by Newhall Land, a "No Fill" alternative, and a variety of alternatives featuring modified configurations of the proposed RMDP infrastructure and facilities.

The Draft Section 404(b)(1) Alternatives Analysis identifies a practicable alternative that would have less adverse impact on the aquatic ecosystem than the RMDP, without causing other significant adverse environmental consequences. This alternative is termed the Draft LEDPA. Under the Draft LEDPA, the proposed bridge across the Santa Clara River at Potrero Canyon Road would not be constructed, the cismontane alkali marsh wetland in lower Potrero Canyon would be avoided, and proposed buried bank stabilization along the Santa Clara River and tributaries would be set back in many locations to lessen impacts to waters of the United States. Overall, of the 660.1 acres of waters of the United States within the RMDP site, implementation of the Draft LEDPA would result in the permanent fill of 66.3 acres of waters of the United States (which amounts to 10 percent of the total site jurisdiction and represents a 29 percent reduction compared to the proposed RMDP). The Draft LEDPA would temporarily disturb an additional 32.2 acres (three percent less than the proposed Project).

The Draft LEDPA is a hybrid alternative, which is similar to Draft EIS/EIR Alternative 3 but it incorporates various elements from the seven alternatives evaluated in the Draft EIS/EIR for the RMDP, which was circulated for public review and comment in April 2009. These elements include infrastructure configurations and drainage treatments for specific locations within the RMDP site. The Draft LEDPA also would incorporate revisions to the RMDP to ensure consistency with applicable federal and state statutes, including the Endangered Species Act, National Historic Preservation Act, California Endangered Species Act, and Section 1600 *et seq.* of the California Fish and Game Code. These modifications are described in detail in Section 9.0 of the attached Draft Section 404(b)(1)

Alternatives Analysis. Overall, impacts of the Draft LEDPA would be less than those of the proposed RMDP but greater than the impacts of some alternatives considered in the Draft EIS/EIR, such as Alternative 1 (the No Action/No Project alternative) and Alternative 7 (avoidance of all mapped 100-year floodplains). Thus the Draft LEDPA falls within the range of alternatives evaluated in the Draft EIS/EIR, in terms of both project configuration and environmental impacts.

The mitigation associated with the Draft LEDPA, described in draft Mitigation and Monitoring Plan in Appendix 11.0 of the Draft 404b1 Alternatives Analysis. Implementation of the plan would ensure no net loss of acreage or functions and values of waters of the United States. Taking the proposed mitigation into account, the proposed discharge would not result in significant degradation of waters of the United States; cause or contribute to violations of any applicable State water quality standard; violate any applicable toxic effluent standard or prohibition under Clean Water Act section 307; jeopardize the continued existence of any species listed under the ESA or result in destruction or adverse modification of critical habitat; or violate requirements imposed to protect any marine sanctuary. The Draft LEDPA also would not cause or contribute to significant degradation of the waters of the United States, and would not result in significant adverse effects on life stages of aquatic life and other wildlife dependent on aquatic ecosystems, aquatic ecosystem diversity, productivity, and stability, or recreational, aesthetic, and economic values of waters of the United States. Therefore, the Draft LEDPA would comply with the restrictions on discharge found in the Guidelines.

If the Corps finds that the Draft LEDPA complies with the Guidelines, Newhall Land respectfully requests that the Corps issue a Section 404 Permit authorizing the discharge of fill material into waters of the United States for the Draft LEDPA, rather than for the RMDP as originally proposed.

Should you have any questions regarding this submittal, please contact me at (661) 255-4259.

Sincerely,
THE NEWHALL LAND AND FARMING COMPANY

Matt Carpenter
Director, Environmental Resources

Attachment

Attachment A Draft Section 404(b)(1) Alternatives Analysis (Newhall Land, June 2010)

cc: M. Subbotin
S. Rojas

SECTION 404(b)(1) ALTERNATIVES ANALYSIS

NEWHALL RANCH RESOURCE MANAGEMENT AND DEVELOPMENT PLAN

CORPS PERMIT APPLICATION NO. 2003-01264-AOA

Prepared for:

U.S. Army Corps of Engineers
Los Angeles District

Prepared by:

The Newhall Land and Farming Company
Valencia, California

With Assistance from:

Hunsaker & Associates
NEWHALL LAND
Dudek

June 2010

SECTION 404(b)(1) ALTERNATIVES ANALYSIS

NEWHALL RANCH RESOURCE MANAGEMENT AND DEVELOPMENT PLAN

CORPS PERMIT APPLICATION NO. 2003-01264-AOA

Prepared for:
U.S. Army Corps of Engineers
Ventura Field Office

Prepared by:
The Newhall Land and Farming Company
Valencia, California

With Assistance from:
Hunsaker & Associates
URS Corporation
DUDEK

June 2010

TABLE OF CONTENTS

APPENDICES

Appendix 7.0

Hunsaker Technical Memorandum, dated February 9, 2010

Appendix 8.0

Newhall Ranch 404B1 Cost Analysis Procedure, June 2010, prepared by Hunsaker & Associates

Newhall Ranch -- Database Study of Lot Improvement Costs For Representative Master Planned Communities, May 6, 2010, prepared by Developers Research

Comparison of Onsite Alternatives: Project Purpose Detail

Comparison of Onsite Alternatives: Logistics Detail

Comparison of Onsite Alternatives: Cost Detail

Comparison of On-Site Alternatives - Impacts to the Aquatic Ecosystem

Comparison of On-Site Alternatives: Detail of Impacts from Alternatives on Waters of the United States

Comparison of On-Site Alternatives: Other Adverse Environmental Consequences

Appendix 9.0

Evaluation of Revised Initial LEDPA - Project Purpose Detail

Evaluation of Revised Initial LEDPA - Logistics

Evaluation of Revised Initial LEDPA - Cost

Evaluation of Revised Initial LEDPA - Practicability

Evaluation of Revised Initial LEDPA - Impacts to the Aquatic Ecosystem

Evaluation of Revised Initial LEDPA - Detail of Impacts from Alternatives on Waters of the United States

Appendix 10.0

Additional Study: Utility Corridor

Additional Study: Potrero

Additional Study: Long Canyon

Additional Study: Chiquito Canyon

Additional Study: San Martinez Grande Canyon

Additional Study: Middle Canyon

Lion Canyon Geomorphic Description by Reach with Design Recommendations

Appendix 11.0

LIST OF TABLES

LIST OF FIGURES

LIST OF FIGURES

(CONTINUED)

1.0 INTRODUCTION

This Section 404(b)(1) Alternatives Analysis is for the Newhall Ranch Resource Management and Development Plan ("RMDP" or "Project"), and is submitted pursuant to section 404(b)(1) of the federal Water Pollution Control Act of 1972 ("Clean Water Act" or "CWA"). The applicant for the CWA section 404 permit (Corps Permit Application No. 2003-01264-AOA) is The Newhall Land and Farming Company ("Newhall" or "Applicant"). The U.S. Army Corps of Engineers, Los Angeles District ("Corps"), is the agency responsible for issuance of the requested section 404 permit. This permit is a prerequisite to implementation of Newhall's proposed RMDP -- a comprehensive permitting, conservation, and mitigation plan for providing the flood control facilities and other infrastructure needed to facilitate build-out of the Newhall Ranch Specific Plan ("Specific Plan"). The Specific Plan, which was adopted by the County of Los Angeles on May 27, 2003, allows for a master-planned community with interrelated villages and a broad range of residential, mixed-used, commercial and industrial uses, public services (schools, parks, recreation facilities, *etc.*), and a water reclamation plant, together with the preservation and management of large tracts of open space. The Specific Plan site is located on approximately 12,000 acres of land owned by Newhall in the northwest portion of the Santa Clarita Valley in unincorporated Los Angeles County, California.

The Specific Plan site is largely undeveloped, and traversed by the Santa Clara River and various tributary drainages which, during storm events, are prone to flood. Therefore, the RMDP proposes to construct bridges and road crossing culverts, install flood and erosion control and bank stabilization, modify and/or stabilize existing tributary drainages, convert minor tributary drainages to buried storm drains, allow for the maintenance of such facilities, and permit habitat restoration, enhancement, and other associated activities. Without these facilities, implementation of the approved Specific Plan would be impracticable. Construction of these facilities, however, would discharge dredge or fill material in waters of the United States, including wetlands. Thus, implementation of the RMDP requires a section 404 permit.

Before the Corps may issue the requested section 404 permit, it must find that the proposed discharge complies with federal regulations established by the U.S. Environmental Protection Agency ("USEPA") under section 404(b)(1) of the Clean Water Act ("section 404(b)(1) Guidelines;" 40 C.F.R. Part 230). The section 404(b)(1) Guidelines include several restrictions on discharges. One of these restrictions prohibits any discharge if practicable alternatives exist that would have less adverse impact on the aquatic environment, while avoiding other significant adverse environmental consequences. In other words, the project resulting in the discharge must be the "least environmentally damaging practicable alternative" ("LEDPA"). This Section 404(b)(1) Alternatives Analysis is intended to assist the Corps in evaluating the alternatives to the proposed Project and in assessing the potential impacts of the Project in accordance with the section 404(b)(1) Guidelines.

1.1 PROCESS EMPLOYED TO IDENTIFY DRAFT LEDPA

The purpose of this analysis is two-fold: (1) to identify the LEDPA; and (2) to demonstrate that the LEDPA complies with the other discharge restrictions of the section 404(b)(1) Guidelines., The analysis relies in part on the joint Draft Environmental Impact Statement/Environmental

Impact Report ("EIS/EIR") prepared for the Project by the Corps and the California Department of Fish and Game ("CDFG"). This analysis includes additional discussions that address the specific requirements of the section 404(b)(1) Guidelines.

As explained in the body of this analysis, the proposed RMDP -- known as Alternative 2 in the Draft EIS/EIR -- was determined *not* to be the LEDPA, as it would create some impacts to waters of the United States, including wetlands, that could be practicably avoided or minimized by implementing one of the other alternatives considered. After the initial environmental screening of the alternatives analyzed in the Draft EIS/EIR, Alternative 3 was determined to be the Initial LEDPA. Alternative 3 would reduce the most significant water and wetland impacts of Alternative 2 while still meeting the Applicant's overall project purpose.

The Initial LEDPA was next evaluated to determine whether it would comply with the federal and state Endangered Species Acts and requirements of the California streambed alteration program. It was determined that the Initial LEDPA could be adjusted to accommodate: (1) expanded preserves for the state-listed San Fernando Valley spineflower; (2) additional avoidance of riparian resources along the Santa Clara River; and (3) modifications of tributary drainage designs to avoid additional waters of the United States while also allowing for wider stabilized channels and increased area available for riparian and wetlands mitigation. The Applicant-proposed modifications avoid fill and/or other impacts at Chiquito Canyon, San Martinez Grande Canyon, Long Canyon, and Potrero Canyon. The Applicant also agreed to alter the design of the Commerce Center Bridge and realign it to reduce secondary impacts on the Middle Canyon Spring complex (a special aquatic site), resulting in the identification of the "Revised Initial LEDPA." Ultimately, the modifications set forth in the Revised Initial LEDPA reduced permanent discharge of fill material into waters of the United States by 1.0 acres, and reduced temporary discharge of fill material into waters of the United States by 4.7 acres. In total, the Revised Initial LEDPA would permanently impact 69.0 acres of jurisdictional waters and temporarily impact 32.9 acres.

This determination, however, did not end the LEDPA inquiry. Because the analysis leading to the Revised Initial LEDPA was conducted on a site-wide scale, it did not examine the practicability of reducing impacts through small-scale changes and fine-tuning. To address this possibility, the analysis identified six key geographic areas within the RMDP site where additional avoidance/minimization might be achieved and then evaluated "sub-alternatives" for each area to determine whether additional avoidance/ minimization was practicable. The areas are: (1) Santa Clara River at the Utility Corridor Location; (2) Potrero Canyon; (3) Chiquito Canyon; (4) Long Canyon; (5) San Martinez Grande Canyon; and (6) Middle Canyon. This smaller-scale analysis indicated that Project-related impacts at most of the geographic areas studied could not practicably be reduced beyond the levels achieved in the Revised Initial LEDPA. However, the analysis determined that practicable modifications could be made to the Revised Initial LEDPA in Long Canyon. Those modifications were incorporated into the Revised Initial LEDPA, resulting in the Draft LEDPA presented herein.

1.2 DRAFT LEDPA

The Draft LEDPA, shown in Figure 10-24, is a modified version of Draft EIS/EIR Alternative 3 that includes additional avoidance of waters of the United States, increased spineflower preserve acreage in the Potrero, San Martinez Grande, Grapevine Mesa, and Airport Mesa areas, and larger riparian corridors within five major tributaries. As in Alternative 3, there will only be two bridges crossing the Santa Clara River (Commerce Center Drive Bridge and the Long Canyon Road Bridge). The Potrero Canyon Road Bridge would not be constructed, reducing impacts to jurisdictional waters and wetlands in the Santa Clara River and lower Potrero Canyon. In addition, a 19-acre wetland preservation area would be established in lower Potrero Canyon, contiguous with the existing lower mesic meadow (cismontane alkali marsh). In two major tributary drainages, Long and Potrero canyons, most of the existing drainages would be filled and reconstructed to reestablish areas of Corps jurisdiction. In the three other major tributary drainages -- Lion, San Martinez Grande, and Chiquito canyons -- the Draft LEDPA would incorporate limited channel grading to expand the drainages and adjacent riparian areas and realign their banks. The remainder of the jurisdictional areas in Lion, San Martinez Grande, and Chiquito Canyon would be avoided. Overall, of the 660.1 acres of waters of the United States on the RMDP site, implementation of the Draft LEDPA would result in the permanent fill of 66.3 acres of waters of the United States (which amounts to 10 percent of the total site jurisdiction and is a 29 percent reduction versus the proposed Project). The Draft LEDPA would temporarily disturb an additional 32.2 acres (three percent less than the proposed Project). The mitigation associated with the Draft LEDPA would ensure no net loss of acreage or functions and values of waters of the United States. In addition, the Draft LEDPA would reduce permanent impacts to CDFG streambed jurisdiction by 34.4 acres.

1.3 STRUCTURE OF THE SECTION 404(b)(1) ANALYSIS

This analysis is organized into twelve sections, each one critical to the ultimate identification of the Draft LEDPA. A short description of each is provided below.

Section 1: Introduction. This section describes the proposed RMDP and the role it plays in providing infrastructure support for the approved Specific Plan. This section also describes the components of the Specific Plan itself, including its design concept (interconnected villages), its residential and commercial uses, its public facilities, and its conservation and open space elements.

Section 2: Regulatory Framework of the Section 404(b)(1) Alternatives Analysis. This section explains the section 404(b)(1) Guidelines that govern the analysis of potential alternatives to the proposed RMDP. Under the section 404(b)(1) Guidelines, the Applicant must first determine whether the Project is water-dependent. If it is not, as is the case with the proposed RMDP, then the Guidelines include a rebuttable presumption that: (1) practicable alternatives to the project exist that do not involve discharges of fill into special aquatic sites; and (2) such alternatives, when compared to the Project, have fewer and/or less severe impacts on the aquatic ecosystem.

Section 3: Project Purpose. In this section, the analysis defines the "basic project purpose" and the "overall project purpose." This is a critical step in the process of identifying the LEDPA. The basic project purpose determines whether a project is water-dependent, and thus whether the presumptions against discharge to special aquatic sites apply. The overall project purpose helps to determine which alternatives are practicable. This section also describes the legal rules that guide development of the overall project purpose. These rules are designed to ensure that the overall project purpose is specific enough to allow a meaningful analysis of each alternative's practicability, but not so narrow as to exclude alternatives unnecessarily.

The Applicant's basic project purpose is to provide housing and commercial/mixed-use/industrial development. The Applicant's overall project purpose is the development of a master-planned community with interrelated villages in the vicinity of the Santa Clarita Valley in northwestern Los Angeles County that achieves the basic objectives of the Specific Plan by providing a broad range of land uses of approximately the same size and proportions as approved in the Specific Plan, including residential, mixed-use, commercial and industrial uses, public services (schools, parks, *etc.*), a water reclamation plant, and large tracts of open space.

Section 4: Jurisdictional Waters of the United States. This section identifies the waters of the United States, including wetlands, located within the RMDP site. There are 21 aquatic resource areas within the Corps' jurisdiction (including a five-mile reach of the Santa Clara River). Refined mapping indicates that the RMDP site contains 660.1 acres of waters of the United States, including 276.9 acres of wetlands. Of the total jurisdictional waters on site, 471.2 acres (71 percent) are located in the Santa Clara River corridor. The remaining portion is located in various tributary drainages to the Santa Clara River. Section 4 also provides a Hybrid Assessment of Riparian Condition ("HARC") for each of the jurisdictional waters that might be affected by the Project. The HARC evaluates the relative *functional* qualities of the jurisdictional areas within the RMDP site so that direct and indirect impacts of the Project can be compared with those of the alternatives.

Section 5: Fill of Waters of the United States. A project may adversely affect Corps jurisdictional areas in various ways. However, the discharge of dredged and fill material into waters of the United States (considered the most serious impact to areas within the Corps' regulatory control) is the activity the Corps regulates. Section 5 describes the activities proposed under the RMDP and onsite alternatives that would result in the discharge of fill within waters of the United States. The RMDP components that likely will require discharge of fill in waters of the United States include: (1) bridges across the Santa Clara mainstem; (2) bridges across tributary drainages; (3) culvert road crossings of tributary drainages; (4) widened bridges and culvert extensions; (5) bank stabilization; (6) grade stabilization and bank protection; (7) water quality treatment/detention basins; and (8) debris basins.

Section 6: Overview of Alternatives Analysis Methodology. This section explains how the off-site and on-site alternatives were selected and then screened for both impact avoidance/ minimization and practicability. The methodology employed in the alternatives analysis is graphically depicted in a flow-chart.

Section 7: Analysis of Alternative Project Locations. The section 404(b)(1) Guidelines require the Applicant to consider alternative site locations, provided they are available and suitable for the proposed Project. Section 7 provides a detailed analysis of three off-site alternatives:

Temescal Ranch (Alternative Site A), the Newhall-Ventura Property (Alternative Site B), and Hathaway Ranch (Alternative Site C). To determine whether these alternative locations might practicably achieve the overall project purpose while causing less impact to waters of the United States, the Applicant developed evaluative criteria covering seven key issues: location, size, form, logistics, cost, impacts to the aquatic ecosystem, and other environmental impacts.

Ultimately, the analysis concluded that Temescal Ranch and the Newhall-Ventura Property, both of which are located in Ventura County, were not logistically practicable because the Applicant could not reasonably expect to obtain the necessary land use entitlements for developing the properties consistent with the overall project purpose. The two sites would require general plan amendments and zone changes that the County of Ventura could not adopt without voter approval. In light of the highly restrictive growth ordinances that apply to rural lands in Ventura County, the analysis concluded that the electorate was unlikely to approve the plan and zone changes necessary to implement a project similar to that described in the Specific Plan.

The Hathaway Ranch site, although located in Los Angeles County, was rejected on grounds that it is more remote than the RMDP site and would require substantially more road and utility infrastructure, adding significantly to the cost and secondary impacts of the Project. In addition, Hathaway Ranch, unlike the RMDP site, has no access to potable water, making it impracticable from a development standpoint.

Section 8: Analysis of On-Site Project Alternatives and Determination of Initial LEDPA. Section 8 is the heart of the 404(b)(1) analysis. It compares seven on-site alternatives, testing each against screening criteria for practicability, impacts to the aquatic ecosystem, and other significant environmental consequences.

> The **practicability** criteria address such issues as project purpose, cost, technology, and logistics.
>
> The **aquatic impacts** criteria address effects on the *chemical* characteristics of the aquatic environment; effects on the *physical* characteristics of the aquatic environment; effects on *biological* functions of the aquatic environment; *cumulative* effects on the aquatic environment; and impacts on human use characteristics.
>
> The **other significant environmental consequences** criteria address impacts on non-aquatic biological resources, hazards and hazardous waste, and public safety.

Each of these criteria was applied to the six on-site "build" alternatives considered in the Draft EIS/EIR and to a "no fill" alternative. The Draft EIS/EIR discussed the No Fill Alternative, **Subsection 3.3.3**, however, it was considered infeasible.

> *Alternative 2 -- The Proposed RMDP.* This alternative, often referred to as the "proposed Project," would facilitate development of the Specific Plan. It contemplates the construction of 20,885 residential units, 5.55 million square feet

(msf) of commercial space, various public amenities, roads, and utilities. In addition, this alternative would dedicate 10,181.5 acres of undeveloped land as permanent open space. It includes spineflower preserves totaling 140.5 acres, as well as three large, interconnected habitat conservation areas. Key infrastructure components include bridges at Potrero Canyon Road, Commerce Center Drive, and the Long Canyon Bridge; bank stabilization and channel modifications; and conversion of smaller tributary drainages to buried storm drain systems. This alternative would permanently or temporarily disturb 126.6 of the 660.1 acres of jurisdictional waters on site, including 31.7 of the 276.9 acres of on-site wetlands. Approximately 93.3 acres of the impacts to jurisdictional waters would consist of permanent (i.e., discharge/fill) impacts, including 20.5 acres of permanent impacts to wetlands. The cost of this alternative is $1,037,906 per net developable acre.

Alternative 3 -- Elimination of the Planned Potrero Bridge. This alternative is similar to Alternative 2, except that it deletes the bridge at Potrero Canyon Road, thereby eliminating the aquatic habitat impacts associated with that infrastructure. This improves conditions significantly for a number of special-status species, including the unarmored three-spine stickleback, the southwestern pond turtle, and the San Emigdio blue butterfly. Alternative 3 would accommodate 20,433 residential units, 5.48 msf of commercial space, and provide public amenities similar to those of Alternative 2. In addition, this alternative would dedicate 10,437.8 acres of undeveloped land as permanent open space, including 219.9 acres of spineflower preserve. Like Alternative 2, it contemplates the construction of various flood control structures and the modification of some drainages. Ultimately, this alternative would permanently or temporarily disturb 107.6 of the 660.1 acres of jurisdictional waters on site, including 20.3 of the 276.9 acres of on-site wetlands. Of all impacts to jurisdictional waters, 70.0 acres would consist of discharge/fill impacts, including 9.2 acres of permanent discharge/fill impacts to wetlands. The cost of this alternative is $1,067,172 per developable acre (2.8 percent greater than the cost of Alternative 2).

Alternative 4 -- Elimination of Planned Potrero Bridge and Addition of VCC Spineflower Preserve. Like Alternative 3, this alternative would eliminate the planned bridge at Potrero Canyon Road. However, it differs from Alternative 3 (and Alternative 2), in that it includes a spineflower preserve on the Valencia Commercial Center (VCC) site. Alternative 4 would accommodate 20,721 residential units and 5.48 msf of commercial space and provide public amenities similar to those of Alternative 2. In addition, this alternative would dedicate 10,425.9 acres of undeveloped land as permanent open space, including 259.9 acres of spineflower preserve. Like Alternative 2, it contemplates the construction of various flood control structures and the modification of some drainages. Ultimately, this alternative would permanently or temporarily disturb 107.1 of the 660.1 acres of jurisdictional waters on site, including 21.0 of the 276.9 acres of on-site wetlands.

Of all impacts to jurisdictional waters, 73.3 acres would consist of permanent (i.e., discharge/fill) impacts, including 9.4 acres of permanent impacts to wetlands. The cost of this alternative is $1,061,458 per net developable acre (2.3 percent greater than the cost of Alternative 2).

Alternative 5 -- Widened Tributary Drainages. Under this alternative, the Applicant would build three bridges across the Santa Clara River -- the Commerce Center Bridge, the Potrero Canyon Road Bridge, and the Long Canyon Bridge. Alternative 5 also calls for the widening, regrading, and realignment of major tributary drainages. This alternative would accommodate 20,196 residential units and 5.42 msf of commercial space and provide public amenities similar to those of Alternative 2. In addition, this alternative would dedicate 10,519.8 acres of undeveloped land as permanent open space, including 338.6 acres of spineflower preserve. Ultimately, this alternative would permanently or temporarily disturb 114.0 of the 660.1 acres of jurisdictional waters on site, including 28.1 of the 276.9 acres of on-site wetlands. Of all impacts to jurisdictional waters, 72.4 acres would consist of permanent (i.e., discharge/fill) impacts, including 14.6 acres of permanent impacts to wetlands. The cost of this alternative is $1,103,985 per net developable acre (6.4 percent greater than the cost of Alternative 2).

Alternative 6 -- Elimination of Planned Commerce Center Bridge. This alternative differs from Alternatives 2 through 5, in that it would eliminate the Commerce Center Bridge but retain the bridge at Potrero Canyon Road. This alternative would accommodate 19,787 residential units and 5.33 msf of commercial space and would provide public amenities similar to those of Alternative 2. In addition, this alternative would dedicate 10,863.4 acres of undeveloped land as permanent open space, including 891.2 acres of spineflower preserve. Ultimately, this alternative would permanently or temporarily disturb 94.6 of the 660.1 acres of jurisdictional waters on site, including 21.5 of the 276.9 acres of on-site wetlands. Of all impacts to jurisdictional waters, 60.7 acres would consist of permanent (i.e., discharge/fill) impacts, including 9.5 acres of permanent impacts to wetlands. The cost of this alternative is $1,193,303 per net developable acre (15 percent greater than the cost of Alternative 2).

Alternative 7 -- Avoidance of 100-Year Floodplain and Elimination of Two Planned Bridges. Under this alternative, only one bridge -- located at Long Canyon -- would be constructed across the Santa Clara River. The Potrero Canyon and Commerce Center bridges would not be built. In addition, development would be situated to avoid the 100-year floodplain of the Santa Clara River. This alternative would accommodate 16,471 residential units and 3.76 msf of commercial space and would provide considerably less public amenities than Alternative 2. In addition, this alternative would dedicate 11,686 acres of undeveloped land as permanent open space, including 660.6 acres of spineflower preserve. Ultimately, this alternative would avoid all permanent and temporary impacts to jurisdictional areas within the FEMA mapped 100-year floodplains on site. The cost of this alternative is $1,590,311 per net developable acre (53.2 percent greater than the cost of Alternative 2).

No Fill Alternative. Under this alternative, all bridges, bank stabilization, and RMDP infrastructure would be sited to avoid discharge of fill into waters of the United States, including wetlands. Flood protection would be accomplished by constructing buried bank stabilization between on-site drainages and adjacent development, but beyond the lateral limits of the Corps' jurisdiction. This alternative would accommodate 18,339 residential units and 4.76 msf of commercial space and would provide less public amenities than Alternative 2. In addition, this alternative would dedicate 11,086.9 acres of undeveloped land as permanent open space. This alternative would have no permanent or temporary impacts on the 660.1 acres of jurisdictional waters on site. The cost of this alternative is $1,347,817 per net developable acre (29.9 percent greater than the cost of Alternative 2).

Each of the above alternatives, except the No Fill Alternative, would require the issuance of a section 404 permit to the Applicant to allow discharge of fill material into waters of the United States. Without the ability to discharge fill material into waters of the United States, the Applicant would not be able to develop the RMDP infrastructure and facilities.

Identification of the Initial LEDPA. Based on a comparative evaluation, this analysis determined that Alternative 3 is the least environmentally damaging practicable alternative among Alternatives 2 through 7, plus the No Fill Alternative. It avoids the most serious aquatic impacts of Alternative 2 by eliminating the bridge at Potrero Canyon Road, yet still satisfies the overall project purpose. Alternative 4, while practicable, has greater permanent impacts on waters of the United States than Alternative 3. Alternative 5 has greater permanent impacts on jurisdictional waters than Alternative 3, particularly in the Santa Clara River mainstem, and would be unreasonably costly. Alternatives 6, 7, and the No Fill Alternative would result in less severe impacts on jurisdictional areas but would not meet the overall project purpose, would be unreasonably costly, and/or have logistical shortcomings, such as inadequate emergency access to the site. For these reasons, the analysis identified Alternative 3 as the "Initial LEDPA."

Section 9: Modifications to Address Regulatory Requirements. Section 9 considers whether the Initial LEDPA (Alternative 3) needs to be modified to comply with state and federal regulatory requirements not directly associated with the section 404(b)(1) Guidelines. Those requirements include the federal and state Endangered Species Acts and the state regulatory program for streambed alteration administered by CDFG under section 1602 of the California Fish and Game Code. This analysis considered three modifications: (1) expanding the spineflower preserves to meet CDFG requirements; (2) further avoiding and minimizing impacts to riparian resources along the Santa Clara River; and (3) modifying tributary designs to incorporate additional riparian mitigation area. As a result of this analysis, the Applicant incorporated the following changes into the Initial LEDPA:

- *Chiquito Canyon*: Through additional channel avoidance, permanent impacts to jurisdictional waters were reduced by 0.33 acres.

- *San Martinez Grande Canyon*: Grade stabilization structures were modified to provide more area for riparian enhancement and mitigation.
- *Long Canyon*: Channel area was redesigned to provide more area for riparian enhancement.
- *Potrero Canyon*: By avoiding and/or reducing impacts to the lowermost portion of Potrero Canyon and the adjacent mesic meadow wetland feature, permanent impacts on jurisdictional areas were reduced by 0.25 acres. (In addition, a new 19.5-acre wetland mitigation site immediately upstream of the mesic meadow would be created.)
- *Santa Clara River*: By avoiding riparian habitat adjacent to the river and lower Castaic Creek, permanent impacts on jurisdictional areas were reduced by 0.26 acres.
- *Middle Canyon Spring*: The Commerce Center Drive Bridge was realigned to provide a larger buffer between development and the special aquatic site located near the bridge.
- *Spineflower Preserves* The spineflower preserves at San Martinez Grande, Potrero, Grapevine Mesa, and Airport Mesa were enlarged, to provide an additional 71.1 acres of preserve area.

After these modifications, the "Revised Initial LEDPA" was reassessed and found to still be practicable.

Section 10: Studies of Additional Avoidance and Identification of LEDPA. Section 10 takes the focused analysis of Section 9 to an even greater level of refinement. It evaluates the Revised Initial LEDPA to determine whether small-scale changes or additional fine-tuning of the design would result in greater protection of the aquatic environment. Specifically, in Section 9, six study areas were established: (1) Santa Clara River Utility Corridor Study Area; (2) Potrero Canyon Study Area; (3) Chiquito Canyon Study Area; (4) Long Canyon Study Area; (5) San Martinez Grande Canyon Study Area; and (6) Middle Canyon Study Area. For each study area, a number of sub-alternatives were devised, each with a unique impact avoidance/minimization strategy. Ultimately, additional avoidance was deemed practicable only in Long Canyon (sub-alternative LC-2). This additional avoidance was incorporated into the Revised Initial LEDPA. With this additional avoidance, the Revised Initial LEDPA was designated as the "Draft LEDPA."

Section 11: Environmental Analysis of LEDPA. This section describes the Draft LEDPA and its environmental effects, which are summarized in Section 1.2 of this Executive Summary.

Section 12: Determination of Compliance with Requirements on Discharge. Section 12 assesses whether the Draft LEDPA would comply with the discharge restrictions found in the section 404(b)(1) Guidelines, which state that a project must not:

- Cause or contribute to violations of any applicable State water quality standard;
- Violate any applicable toxic effluent standard or prohibition under Clean Water Act section 307;

- Jeopardize the continued existence of any species listed under the ESA or result in destruction or adverse modification of critical habitat; or
- Violate requirements imposed to protect any marine sanctuary.

In addition, the Draft LEDPA may not cause or contribute to significant degradation of the waters of the United States, and may not result in significant adverse effects on:

- Life stages of aquatic life and other wildlife dependent on aquatic ecosystems;
- Aquatic ecosystem diversity, productivity, and stability; or
- Recreational, aesthetic, and economic values.

Section 12 concludes that the Draft LEDPA complies with these regulations.

1.4 COMPARING THE DRAFT LEDPA TO THE INITIAL LEDPA AND THE PROPOSED PROJECT (ALTERNATIVE 2)

For ease of reference, set forth below are the key statistics that distinguish the Draft LEDPA from the Initial LEDPA (Alternative 3) and the proposed Project (Alternative 2):

Total Impacts to Waters of the United States (Permanent impacts in parentheses):

- Proposed Project: 126.6 acres (93.3)
- Initial LEDPA: 107.6 acres (70.0)
- Draft LEDPA: 98.5 acres (66.3)

Total Impacts to Wetlands (Permanent impacts in parentheses):

- Proposed Project: 31.7 acres (20.5)
- Initial LEDPA: 20.3 acres (9.2)
- Draft LEDPA: 19.1 acres (7.7)

Spineflower Preserve Area:

- Proposed Project: 140.5 acres
- Initial LEDPA: 148.8 acres
- Draft LEDPA: 220.4 acres

Impacts on Special-Status Aquatic Wildlife:

- Proposed Project: Construction of Potrero Canyon Bridge may result in significant unavoidable impacts on southwestern pond turtle and San Emigdio blue butterfly.
- Initial LEDPA: Elimination of bridge at Potrero Canyon reduces Project impacts on southwestern pond turtle and San Emigdio blue butterfly to less-than-significant levels.

- Draft LEDPA: Elimination of bridge at Potrero Canyon reduces Project impacts on southwestern pond turtle and San Emigdio blue butterfly to less-than-significant levels.

1.5 MITIGATION

Under the section 404(b)(1) Guidelines, it is not appropriate for the Corps to consider compensatory mitigation in determining whether a project is the LEDPA. However, the Corps does consider mitigation in assessing the net effects of a project and determining whether to issue a section 404 permit. (*See, e.g.*, 33 C.F.R. § 332.1(c)-(d).) As detailed in the Draft Mitigation and Monitoring Plan for Impacts to Waters of the United States, (see Appendix 11.0), permanent impacts to Corps jurisdiction are proposed to be mitigated at a minimum ratio of 1:1 through initiation of mitigation prior to impacts. Therefore, a minimum of 66.3 acres of mitigation will be provided to ensure no net loss of jurisdictional acreage or functions and services. However, the Draft LEDPA would result in a net increase of 116.9 acres of waters of the United States on site and a net improvement in the functions and services of jurisdictional waters (as measured by HARC scores for the pre- and post-Project conditions). This would be accomplished by creating or restoring up to 183.2 acres of waters of the United States that are incorporated into the Project design in areas where drainages or river bed are proposed to be recreated (e.g., Santa Clara River, Potrero Canyon, Long Canyon, Salt Creek, Chiquito Canyon, San Martinez Grande, and Lion Canyon). Additional information regarding the proposed mitigation is provided in Appendix F1.0 of the Final EIS/EIR.

1.6 CONCLUSION

This analysis evaluates three off-site alternatives and seven on-site alternatives to identify the Initial LEDPA, which is Alternative 3. It next considers additional modifications to the Initial LEDPA to ensure compliance with regulatory programs other than the section 404(b)(1) Guidelines. These modifications result in the Revised Initial LEDPA. The analysis then evaluates the practicability of additional avoidance in key areas where the Project would have substantial effects on waters of the United States or would impact high-value aquatic resources. The incorporation of practicable additional avoidance in these areas results in the identification of the Draft LEDPA.

As a final step, the analysis evaluates the environmental effects of the Draft LEDPA and its compliance with the discharge restrictions found in the section 404(b)(1) Guidelines. Based on this analysis, the analysis concludes that the Draft LEDPA is the least environmentally damaging practicable alternative and that it complies with the section 404(b)(1) Guidelines.

1.0 INTRODUCTION

This Section 404(b)(1) Alternatives Analysis For the Newhall Ranch Resource Management And Development Plan, Army Corps Permit Application No. 2003-01264-AOA ("Alternatives Analysis") is submitted pursuant to the requirements of section 404(b)(1) of the Federal Water Pollution Control Act of 1972 ("Clean Water Act" or "CWA"). The Applicant is The Newhall Land and Farming Company ("Applicant" or "Newhall"). The Alternatives Analysis addresses the Applicant's Newhall Ranch Resource Management and Development Plan ("RMDP" or "Project").

The Applicant owns the Newhall Ranch Specific Plan site in northwestern Los Angeles County (see **Figure 1-1**, Project Vicinity Map, and **Figure 1-2**, Newhall Ranch Specific Plan Site), which was approved for master-planned urban development by the County on May 27, 2003. Newhall has prepared and submitted the proposed RMDP to facilitate federal permitting for construction of infrastructure necessary for the implementation of the approved Newhall Ranch Specific Plan ("Specific Plan"). Newhall requests that the Corps issue a permit under section 404 of the Clean Water Act for discharges of fill to waters of the United States in order to construct the infrastructure and facilities identified in the RMDP, as these elements would be needed to accommodate build-out of the Specific Plan.

The RMDP is evaluated in the joint Environmental Impact Statement/Environmental Impact Report ("EIS/EIR") prepared by the U.S. Army Corps of Engineers, Los Angeles District, Regulatory Division ("Corps").[1] The EIS/EIR analyzes the effects of implementing both the RMDP and the Specific Plan, which the RMDP serves and facilitates.[2]

1.1 THE NEWHALL RANCH SPECIFIC PLAN

The Specific Plan sets forth a comprehensive set of plans, development regulations, design guidelines, and implementation programs to develop the approximately 12,000-acre Specific Plan site in unincorporated Los Angeles County ("County"), consistent with the goals,

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1 The California Department of Fish and Game ("CDFG"), South Coast Region, as co-author, has prepared the EIR portion to comply with the California Environmental Quality Act ("CEQA") in connection with its proposed actions, including entering into a Master Streambed Alteration Agreement with the Applicant under California Fish and Game Code section 1600, *et seq.*, for activities associated with the Project that divert or obstruct natural flows or change or use material from any river, stream or lake, and issuing incidental take permits under the California Endangered Species Act ("CESA").

2 The EIS/EIR also analyzes the effects of implementation of the Applicant's Spineflower Conservation Plan ("SCP"), which guides the preservation of the San Fernando Valley Spineflower ("spineflower") within the Specific Plan and the Entrada planning area. Implementation of the proposed SCP does not place dredge or fill material in waters of the United States; and, therefore, is not included as part of the Project analyzed herein. However, the SCP will be discussed in this analysis in the context of environmental screening criteria used to determine the least environmentally damaging practicable alternative. The spineflower is a listed endangered plant species under CESA and a candidate species under the federal Endangered Species Act. Any development in the RMDP site must comply with the requirements of CESA.

objectives, and policies of the Los Angeles County General Plan and Santa Clarita Valley Area Plan.[3] The County, in cooperation with the Applicant, initiated the planning and public review process for the Specific Plan in 1996. The County initially approved the Specific Plan and related entitlements and environmental documentation in 1999. Following litigation, the County conducted further environmental review of the Specific Plan, and on May 27, 2003, it approved the Specific Plan, initial and additional environmental documentation, related general plan and zoning designations, and other project approvals.

1.1.1 Specific Plan Land Uses And Villages

The Specific Plan provides for a broad range of residential, mixed-use, commercial and industrial land uses, various public facilities, and public services and utilities, together with preservation of large tracts of open space. At build-out, the Specific Plan would result in approximately 2,550 acres of residential uses (9,081 single-family homes on 1,559 acres, and 11,804 multi-family homes on 991 acres), 5.5 million square feet of commercial uses on 258 acres; and the development of approximately 643 acres devoted to public facilities such as community parks, neighborhood parks, golf course, community lake, new elementary, junior high and high schools, library, electrical substation, fire stations, and a 6.8 million gallon per day water reclamation plant ("WRP"). Open space would be provided on approximately 8,683 acres on the Specific Plan site, and an additional 1,517 acres of open space in the Salt Creek area adjacent to the Specific Plan site (for a total of about 10,200 acres of open space within the Specific Plan/Salt Creek area). The open space would also include land dedicated to the preservation of the spineflower. The configuration of Specific Plan land uses approved for the site is depicted graphically on **Figure 1-3**, Newhall Ranch Specific Plan Approved Land Uses.

The central organizing principle of the Specific Plan is the division of the site into complementary Villages, which are defined by natural landmarks and topographical features. All the Villages will be linked by a comprehensive network of roads and trails, allowing the Villages to function as complementary parts of a cohesive larger community. As described in the EIS/EIR, the Villages are: Landmark Village, Mission Village, Homestead Village, and Potrero Canyon Village.

Within each Village, development will be concentrated around a Village Center, helping to preserve open space and providing residents with convenient access to commercial, recreational and public facilities. Because the Specific Plan area is so large, the creation of Villages as integrated developments, each with a full complement of facilities and amenities to serve residents and visitors, is crucial to providing a sense of community identity. The Village approach also helps to minimize vehicle trip lengths for residents and makes the development more friendly to pedestrians and bicyclists.

The Specific Plan is designed so that all subsequent development plans and subdivision maps that are consistent with the Specific Plan also would be consistent with both the Los Angeles County General Plan and the Santa Clarita Valley Area Plan. Individual projects, such as

3 As amended by General Plan Amendment No. 94-087-(5) (approved May 27, 2003).

residential, mixed-use, commercial, and non-residential developments, roadways, public facilities, and amenities, would be developed over time in accordance with the Specific Plan.

1.1.2 Specific Plan Setting

The Specific Plan area is topographically diverse, with slope gradients ranging from moderate to steep in the hillsides, to very gentle in the Santa Clara River floodplain and in major tributary canyons. Also, there are mesas adjacent to the Santa Clara River (*e.g.*, Grapevine Mesa and Airport Mesa). Site elevations range from 825 feet above mean sea level (AMSL) in the Santa Clara River bottom at the Los Angeles County/Ventura County line, to approximately 3,200 feet AMSL on the ridgeline of the Santa Susana Mountains along the southern boundary of the Specific Plan. The primary ridges trend east, west, and northwest, with secondary ridges trending north and south.

Native and naturalized habitats within the Specific Plan area are representative of those found in this region. Upland habitats dominate the landscape within the Specific Plan area, both north and south of the Santa Clara River. The major upland plant communities include California sagebrush scrub, undifferentiated chaparral, coast live oak and valley oak woodlands, and California annual grassland. However, the Specific Plan site also contains valley oak/grass, mixed oak woodland, chamise chaparral, California walnut woodland, and big sagebrush scrub.

The Santa Clara River supports a variety of riparian plant communities, including southern cottonwood-willow riparian forest, southern willow scrub, southern coast live oak riparian forest, mulefat scrub, elderberry scrub, arrow weed scrub, giant reed, tamarisk scrub, herbaceous wetland, bulrush/cattail wetland, cismontane alkali marsh, and coastal and valley freshwater marsh and seeps. Intermittent and ephemeral drainages on site also provide habitat for alluvial scrubs.

The riparian habitat along the Santa Clara River has been designated as critical habitat by the United States Fish and Wildlife Service ("USFWS") for the state- and federally-listed endangered least Bell's vireo (*Vireo bellii pusillus*). The River also provides habitat for the state- and federally-listed endangered southwestern willow flycatcher (*Empidonax traillii extimus*). In addition, the River supports the unarmored three-spine stickleback (*Gasterosteus aculeatus williamsoni*), which is a state- and federally-listed endangered species, as well as a state fully-protected species.

There are two Significant Ecological Areas ("SEAs") within the boundary of the approved Specific Plan: (1) the High Country Special Management Area ("SMA")/SEA 20, which is comprised of diverse oak woodland habitats that function as a wildlife corridor/linkage between the San Gabriel and Santa Monica Mountains; and (2) the River Corridor SMA/SEA 23, which is comprised of aquatic habitat within the Santa Clara River Corridor that supports the endangered unarmored three-spine stickleback and other listed and sensitive species.

1.2 PROPOSED RESOURCE MANAGEMENT AND DEVELOPMENT PLAN INFRASTRUCTURE

The RMDP guides the construction of infrastructure necessary for implementation of the Specific Plan and provides the conservation, mitigation, and permitting plan for sensitive biological resources within the Specific Plan area. The development plan portion of the RMDP consists of infrastructure and facilities in the Santa Clara River and its tributary drainages within the RMDP study area. For the purpose of this analysis, the "RMDP site" is defined as the Specific Plan area.

The proposed RMDP infrastructure and facilities are briefly summarized, as follows:

1.2.1 Bridges

Two proposed bridges, Potrero Canyon Bridge and Long Canyon Road Bridge, and one previously-approved bridge, Commerce Center Drive Bridge, would be located over the main stem of the Santa Clara River to serve the Specific Plan and to accommodate future traffic associated with development of the Specific Plan and the region. The Commerce Center Drive Bridge was previously analyzed in the Final EIS/EIR prepared and approved by the Corps and CDFG in 1998 in connection with a master streambed alteration agreement and section 404 permit for development activities under the Natural River Management Plan (SCH No. 1997061090, August 1998; "NRMP").

1.2.2 Road Crossing Culverts

Fifteen new road crossing culverts would cross six tributary drainages to the Santa Clara River (Chiquito, San Martinez Grande, Lion, Long, Potrero, and Ayers canyons). The road crossings would be constructed of earthen fill and pre-fabricated arched culverts.

1.2.3 Bank Stabilization

Bank stabilization/protection would be installed along portions of the Santa Clara River Corridor and its tributary drainages within the RMDP site. Bank protection would include buried soil cement, grouted and ungrouted rock riprap, turf reinforcement mats, and limited gunite slope lining in and around bridge abutments. In addition, all affected development areas would be raised above the Federal Emergency Management ("FEMA") flood hazard elevation to protect land uses from potential flooding.

1.2.4 Drainage Facilities

Drainage facilities would be installed as required to comply with the permit requirements of the County's Municipal Separate Storm Sewer System National Pollutant Discharge Elimination System ("NPDES").[4] Such facilities include open and closed drainage systems, inlets, outlets, bank stabilization, and water quality basins. The proposed drainage facilities are intended to minimize the amount of debris entering the drainage system and to maintain the quality of water within the system.

1.2.5 Water Quality Control Facilities

Pursuant to NPDES requirements, best management practices ("BMPs") would be implemented to reduce water quality impacts associated with stormwater and other runoff within the RMDP site. Best management practices include installation of the following water quality control

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[4] NPDES Permit No. CAS004001, Los Angeles Regional Water Quality Control Board ("RWQCB") Order No. 01-182 (2001).

facilities: (1) water quality basins; (2) debris basins, located just upstream of the interface between developed and undeveloped areas, primarily to trap debris coming from the upper watersheds; (3) detention basins, which are typically sized to capture the predicted runoff volume and retain the water volume for a period of time (usually 24 to 48 hours); (4) catch basin inserts or screens/filters installed in storm drains to capture pollutants in the storm water runoff; (5) bioretention, such as vegetated grassy swales, that provide water quality benefits and convey storm water runoff; and (6) solids separator units or in-line structures that reduce or manipulate runoff velocities such that particulate matter falls out of suspension and settles in a collection chamber.

1.2.6 Modified Tributary Drainages – Existing Channels Stabilized

Due to existing degraded conditions, and in order to accommodate the Specific Plan development, portions of the existing major tributary drainages within the RMDP site (portions of Chiquito Canyon, San Martinez Grande Canyon, and Lion Canyon) would require stabilizing treatments to protect the channel and surrounding development from excessive vertical scour and lateral channel migration. The existing drainages would remain intact but would sustain permanent and temporary impacts from construction of stabilization elements, including buried bank stabilization and grade stabilization structures.

1.2.7 Modified Tributary Drainages – Regraded Channels

Due to the existing degraded conditions within portions of some drainages in the RMDP site (Potrero Canyon, Long Canyon, and portions of Chiquito, San Martinez Grande, and Lion canyons), stabilization of the existing drainages is not feasible. Therefore, to accommodate the Specific Plan development, and in order to meet the County's flood protection objectives, these drainages would be graded and a new drainage would be constructed in the same or similar location. The new drainages would be designed to incorporate buried bank stabilization and grade stabilization, and have sufficient hydrologic capacity to pass the Los Angeles County Capital Flood without the need for clearing vegetation from the channels. The new channel banks would be planted with riparian vegetation following construction.

1.2.8 Unmodified (Preserved) Tributary Drainages

Among the minor tributary drainages within the RMDP site, some are not in a degraded condition; others are located in areas where no impacts are proposed; and others are distant enough from surrounding development that bank stabilization is not required. These drainages would remain in their existing condition; the RMDP does not propose to enhance or otherwise affect these drainages. In most situations, unmodified drainages would be located within future open space areas and would maintain their current hydrologic functions, as well as providing linkages for wildlife movement to and from the Santa Clara River.

These unmodified drainages include: (1) an 1,810 foot agricultural ditch used for drainage of the Chiquita Landfill site; (2) the Ayers Canyon watershed; (3) the Dead Canyon watershed; (4) the Exxon Canyon watershed; (5) the Homestead Canyon watershed; (6) the Humble Canyon watershed; (7) the Middle Canyon watershed; (8) the Mid-Martinez Canyon watershed; (9) the Off-Haul Canyon watershed; (10) the Salt Creek Canyon watershed; (11) the Magic Mountain

Canyon watershed; (12) a 0.16 square mile "Unnamed Canyon 1" watershed used for existing development (golf course) drainage; (13) a 0.6 square mile "Unnamed Canyon 2" watershed used for existing development (golf course) drainage; (14) a 0.7 square mile "Unnamed Canyon A" watershed; (15) a 0.05 square mile "Unnamed Canyon B" watershed; (16) a 0.07 square mile "Unnamed Canyon C" watershed; and (17) a 0.04 square mile "Unnamed Canyon D" watershed.

1.2.9 Tributary Drainages Converted To Buried Storm Drain

Some of the drainages within the RMDP site, including many of the smaller drainages, would be graded as part of the grading operations. The wet-weather flows in these drainages are low enough to meet the County's flood criteria (less than 2,000 cubic feet per section ("cfs")) for conveyance by storm drain. The RMDP does not propose to create new drainage channels to replace these impacted drainages. Rather, the wet-weather flows that currently occupy the drainages would be routed into the development's storm drain system, and would be discharged to the Santa Clara River via the proposed storm drain outlets.

1.2.10 Grade Stabilization Structures

Grade stabilization structures would be installed on five existing tributary drainages to the main stem of the Santa Clara River: Chiquito Canyon, Long Canyon, Potrero Canyon, San Martinez Grande Canyon, and Lion Canyon. The grade stabilization structures are designed to contain the hydraulic "jump" that occurs when there is a significant drop in streambed elevation, so that higher velocities are dissipated within the area.[5] The structures would help control erosion and changes to the configuration of the bed of the stream channel. The structures would be constructed of soil cement, sheet piles or reinforced concrete.

1.2.11 Utility Corridor And Crossings

Various electrical, sewer, water, gas and communications lines would be installed across Chiquito Canyon, San Martinez Canyon and Castaic Creek within an approximately 100-foot wide utility corridor. (See EIS/EIR **Figure 2.0-31.**) The utility corridor alignment would extend generally parallel to the south side of State Route 126 ("SR-126") north of the Santa Clara River. Utility lines would be installed in rights-of-way adjacent to bridges where access for installation and maintenance could be easily accommodated. Utilities also would be extended across the Santa Clara River and its tributary drainages to serve the Specific Plan.

1.2.12 Temporary Haul Routes For Grading Equipment

Temporary haul routes across the Santa Clara River would be used during construction to move equipment and excavated soil to locations in the RMDP site in accordance with the Specific Plan Conceptual Grading Plan.

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5 Significant drops in streambed elevation may occur as a result of upstream dredge and/or fill activities. (See, EIS/EIR, **Section 4.2.**)

1.2.13 WRP Outfall Construction Activities

An effluent outfall pipeline would be constructed from the Newhall Ranch WRP through the bank stabilization to the bed of the Santa Clara River. An earthen channel and adjacent walkway also would be constructed to reach the actual flow path of the river.

1.2.14 Roadway Improvements To SR-126

Various roadway improvements, such as the widening of portions of SR-126 and a grade-separated crossing at Long Canyon Road/SR-126, would be needed within the vicinity of the RMDP site.

1.2.15 Recreation Facilities

In addition to the comprehensive system of bicycle, pedestrian, and equestrian trails that would be implemented by the adopted Specific Plan Master Trails Plan, five nature viewing platforms and associated walkways would be constructed in or adjacent to jurisdictional areas in the Santa Clara River.

1.2.16 Maintenance, Habitat Restoration And Other Activities

In addition to construction of the infrastructure and facilities described above, the RMDP proposes various activities that could occur within areas subject to Corps jurisdiction. The Los Angeles County Department of Public Works ("DPW") or another entity would conduct regular and ongoing maintenance of flood, drainage, and water quality protection facilities on the RMDP site. Such activities would include: (1) periodic inspection of structures; (2) monitoring of vegetation growth and sediment buildup to safeguard the integrity of the structures and ensure that planned conveyance capacity is present; (3) routine repairs and maintenance of bridges and bank protection; and (4) emergency maintenance. In addition, to accommodate Specific Plan development, geotechnical investigations and associated activities would be undertaken to ensure that the development would be safely constructed in accordance with applicable geotechnical reports, studies, and standards.

The RMDP also incorporates a variety of measures to restore and enhance native habitat, such as rehabilitating habitat areas that have been disturbed by past activities or invaded by non-native plant species. To the extent that these and other activities affect jurisdictional waters, they are addressed in this analysis and would be covered by a section 404 permit.

Construction of the RMDP infrastructure and facilities will require the placement of dredge and fill materials into the waters of the United States, which requires a permit from the Corps. Before such a permit can be issued, federal regulations require an analysis of alternatives to the proposed fill to ensure that the Project as proposed is the least environmentally damaging practicable alternative. This document is intended to assist in making that determination.

2.0 REGULATORY FRAMEWORK OF THE SECTION 404(b)(1) ALTERNATIVES ANALYSIS

2.1 SECTION 404 OF THE CLEAN WATER ACT

Under section 404(a) of the CWA, any person proposing to discharge dredge or fill material in waters of the United States must first obtain a permit from the Corps. 33 U.S.C. § 1344, subd. (a). Before making a section 404 permit decision, the Corps must make a finding that the proposed permit action complies with federal regulations established by the U.S. Environmental Protection Agency ("EPA") under section 404(b)(1) of the CWA. 40 C.F.R. Part 230.[6] These guidelines are known as the section 404(b)(1) guidelines ("404(b)(1) Guidelines" or "Guidelines"). This Alternatives Analysis is intended to assist the Corps in complying with the Guidelines in connection with its decision whether to issue a section 404 permit for the Project.

2.2 THE 404(b)(1) GUIDELINES

The 404(b)(1) Guidelines prohibit discharge of dredge or fill materials to waters of the United States if there is a "practicable alternative to the proposed discharge that would have less adverse impact on the aquatic ecosystem, so long as the alternative does not have other significant environmental consequences." (40 C.F.R. § 230.10, subd. (a).) A project that meets this requirement is known as the "least environmentally damaging practicable alternative" ("LEDPA"). An alternative is practicable "if it is available and capable of being done after taking into consideration cost, existing technology, and logistics *in light of overall project purposes*." (40 C.F.R. § 230.10, subd. (a)(2), § 230.3, subd. (q); italics added.) Thus, to be the LEDPA, the chosen alternative must meet the overall project purpose for which an applicant requests fill authorization, as well as the cost, logistics, technology, and availability criteria found in the Guidelines. "If it is otherwise a practicable alternative, an area not presently owned by an applicant which could reasonably be obtained, utilized, expanded or managed in order to fulfill the basic purpose of the proposed activity may be considered." (40 C.F.R. § 230.10, subd. (a)(2).)

The Guidelines extend additional protection to certain sensitive aquatic habitats. These are termed "special aquatic sites" and include six categories: sanctuaries and refuges, wetlands, mudflats, vegetated shallows, coral reefs, and riffle/pool complexes. (40 C.F.R. §§ 230.40-230.45.) Of the six categories of special aquatic sites, only wetlands are at issue with respect to this proposed Project. For proposed activities involving discharges into special aquatic sites, the Guidelines require consideration of whether the activity is dependent on access or proximity to, or siting within, a special aquatic site in order to fulfill its basic project purpose -- *i.e.*, whether

[6] Even if the Corps decides to issue a section 404 permit, the EPA has the authority to prohibit the discharge of dredged or fill material under section 404, subdivision (c) of the CWA, if EPA determines that the proposed fill would have unacceptable impacts on municipal water supplies, shellfish beds or fishery areas, wildlife or recreational areas. (33 U.S.C. § 1344, subd. (c).)

the activity is "water-dependent."[7] If an activity is determined *not* to be water-dependent, the 404(b)(1) Guidelines establish the following two presumptions: (1) that practicable alternatives not involving discharges of fill material into special aquatic sites are available; and (2) that all practicable alternatives to the proposed discharge have less adverse impact on the aquatic ecosystem. (40 C.F.R. § 230.10, subd. (a)(3).) For non-water-dependent projects that propose to fill special aquatic sites, the applicant must rebut these presumptions in order to demonstrate compliance with the 404(b)(1) Guidelines.

In addition to requiring the identification of the LEDPA and protection of special aquatic sites, the Guidelines establish certain restrictions on discharge. A project may not violate any applicable toxic effluent standard or prohibition, 40 C.F.R. § 230.10, subdivision (b)(2); jeopardize the continued existence of any endangered or threatened species (or adversely modify critical habitat), 40 C.F.R. § 230.10, subdivision (b)(3); cause or contribute to violations of any applicable state water quality standard, 40 C.F.R. § 230.10, subdivision (b)(1); or cause or contribute to significant degradation of waters of the United States, 40 C.F.R. § 230.10, subdivision (c). Compliance with each of these provisions is mandatory. If the Corps cannot make these findings, it will not issue a section 404 permit even if a proposed action is the LEDPA.

7 An example of a water-dependent activity is the construction of a marina that must be located within a wetland or vegetated shallows in order to provide access to navigable waters. *Florida Clean Water Network v. Grosskruger*, 587 F.Supp.2d 1236, 1243 (M.D. Fla. 2008). See also *Friends of the Earth v. Hintz*, 800 F.2d 822, 831-832 (9th Cir. 1986).

3.0 PROJECT PURPOSE

3.1 LEGAL REQUIREMENTS FOR PROJECT PURPOSE

The definition of the project purpose involves two steps. First, the Corps must define the "basic project purpose," which is used to determine whether the project is water-dependent. (40 C.F.R. § 230.10, subd. (a)(3).) As explained above, if the project is not water-dependent and involves a proposed discharge to a special aquatic site, it is presumed that practicable alternatives not involving a discharge to a special aquatic site are available, unless the applicant clearly demonstrates otherwise. (*Id.*)

Next, the Corps must define the "overall project purpose," which is more specific to the applicant's project and should reflect the applicant's needs. (See Updated Standard Operating Procedures for the U.S. Army Corps of Engineers Regulatory Program, 15 (July 1, 2009).) The definition of the overall project purpose is a critical step in the alternatives analysis, because the overall project purpose is used to evaluate what alternatives are practicable. (See 40 C.F.R. § 230.10, subd. (a)(2) [defining practicability "in light of overall project purposes"].) The Corps has the final responsibility to define the overall project purpose, but in doing so the Corps should give some deference to the objectives of the applicant. A number of courts have explained that "it would be bizarre if the Corps were to ignore the purpose for which the applicant seeks a permit and to substitute a purpose it deems more suitable." (*Sylvester v. U.S. Army Corps of Engineers*, 882 F.2d 407, 409 (9th Cir. 1989) [*quoting Louisiana Wildlife Federation v. York*, 761 F.2d 1044, 1048 (5th Cir. 1985].)

While the Corps needs to consider the applicant's project purpose, it also must ensure that the statement of overall project purpose is specific enough to allow meaningful analysis of the practicability of alternatives, but not so narrow as to exclude alternatives unnecessarily, "thus mak[ing] what is practicable appear impracticable." (*Sylvester, supra*, 882 F.2d at 409.) Therefore, elements included in the project purpose and used to evaluate alternatives must be "necessary" and "legitimate," not merely "incidental" to the basic project purpose.[8] (*Id.*)

A number of cases involving the issuance of section 404 permits help to explain the distinction between "legitimate" and "incidental" elements of the project purpose. These cases demonstrate that a project purpose may legitimately include location-specific or even site-specific elements that foreclose some alternatives when, for example:

- The project is intended to serve a specific community. (*E.g., Great Rivers Habitat Alliance v. Army Corps of Engineers*, 437 F.Supp. 2d 1019 (E.D. Mo. 2006) [finding that project purpose properly limited alternatives to sites within city of St. Peters, Missouri, where project was intended to accommodate economic development of city]; *Butte Environmental Council v. U.S. Army Corps of Engineers*, 2009 WL 497575, No. 2-08-cv-1316 (E.D. Cal. 2009) [project purpose was to construct a medium to large sized regional

[8] Put another way, the Corps may not allow components of a project that are merely incidental to the basic project purpose to "control the Corps' decision-making process." (*Florida Clean Water Network v. Grosskruger*, 587 F. Supp. 2d 1236, 1246 (M.D. Fla. 2008).)

business park with associated roads, utilities and infrastructure within the City of Redding's sphere of influence]; *Stewart v. Potts,* 996 F. Supp. 668 (S.D. Tex 1998) [project purpose was to provide an affordable, quality public golf course for the citizens of Lake Jackson]; USACOE Permit Elevation Decision, Old Cutler Bay Associates (Oct. 9, 1990) [acceptable project purpose was to construct a viable, upscale residential community with an associated regulation golf course in the South Dade County area].)

- The project is intended to complement a particular development in a specific location or to redevelop a specific site. (*E.g., Sylvester v. United States,* 882 F.2d 407 (9th Cir. 1989) [project purpose was to construct an 18-hole, links style, championship golf course and other recreational amenities in conjunction with the development of the proposed Resort at Squaw Creek]; *Friends of the Earth v. Hintz,* 800 F.2d 822, 833 (9th Cir. 1986) [project purpose was to develop an area adjacent to sawmill and dock as a "log storage and sorting area"]; *Nat'l Wildlife Federation v. Whistler,* 27 F.3d 1341 (8th Cir. 1994) [project purpose was to provide boat access to a particular residential development].)
- The project relies on resources or infrastructure found in a certain location. (*E.g., Northwest Environmental Defense Center v. Wood,* 947 F.Supp. 1371 (D. Or. 1996) [proximity of educated labor pool, transportation infrastructure, and other amenities justified limiting geographic scope of analysis to alternatives within the area of Eugene, Oregon].)

Likewise, a project purpose may legitimately include elements that constrain the size and configuration of a project when, for example:

- **The elements are required by concerns of safety, efficiency, or the commercial viability of the type of project contemplated.** (*E.g., Alliance for Legal Action v. U.S. Army Corps of Engineers,* 314 F.Supp. 2d 534 (M.D.N.C. 2004) [approving project purpose that dictated the minimum runway length, runway configuration, and location of support facilities necessary to support a viable overnight express air cargo hub]; *Florida Clean Water Network, Inc., v. Grosskruger,* 587 F.Supp. 2d 1236, 1244-1245 (M.D. Fla. 2008) [Corps' project purpose for airport relocation properly took into account federal airport safety and design standards, and applicant's need for a runway long enough to accommodate international flights].)
- **The elements are necessary for consistency with planning decisions made by the local or regional land use authority.** (*E.g., Florida Clean Water Network,* 587 F.Supp. 2d at 1244-1247 [Corps' project purpose for airport relocation project properly included consistency with comprehensive local and regional planning efforts].)

In contrast to these examples, elements that are merely incidental to a project purpose include:

- The exact number of residential units to be included in a development, or the identity of the designer of a golf course. (*USACOE Permit Elevation Decision, Old Cutler Bay Associates* (Oct. 9, 1990).)

- The development of a single source of water to supply both a city and an adjacent water district. (*Simmons v. U.S. Army Corps of Engineers*, 120 F.3d 664 (7th Cir. 1997) [finding that the Corps should have considered alternatives that involved the development of separate sources, because the use of a single source was not essential to the objective of supplying both users with water].)
- The exact view of a waterway from a particular parcel on which an applicant proposed to build a home. (*Schmidt v. U.S. Army Corps of Engineers*, 2009 WL 579412, No. 2-08-cv-0076 (W.D. Mich. 2009) [finding that the precise view offered by the proposed site was not essential to the project purpose of building a home].)

The Applicant has carefully considered the above authorities in arriving at its statement of overall project purpose.

3.2 PLANNING BACKGROUND OF THE SPECIFIC PLAN AND RMDP

Los Angeles County is the most populated county in the United States. (U.S. Census Bureau, Population Division, Resident Population Estimates for the 100 Largest U.S. Counties (March 19, 2009).) Northern Los Angeles County has experienced and will continue to experience significant growth, resulting in a high demand for housing and jobs and a corresponding need for large-scale residential and commercial development to accommodate approved and planned growth in the region. This need will continue despite the current short-term decline in demand due to the recession. The County, in partnership with other local, state and federal agencies, has engaged in years of study and planning to facilitate the orderly accommodation of the high demand for housing and jobs. As the culmination of that process, the Los Angeles County Board of Supervisors approved the Specific Plan on May 27, 2003. The Specific Plan is incorporated by reference into the Alternatives Analysis, and key elements of the Specific Plan are discussed below.

The Specific Plan site is located immediately west of developed and currently developing portions of unincorporated Santa Clarita Valley and the City of Santa Clarita. The site is in a census tract designated for development to urban uses by the Growth Management Plan of the Southern California Association of Governments ("SCAG"). The site is within a few miles of major existing and planned regional employment centers that will provide approximately 73,000 jobs when completed. These include Valencia Industrial Center, currently the third largest business park in Los Angeles County, and Valencia Commerce Center ("VCC"). Together these two centers will contain approximately 54,000 jobs at completion. Six Flags Magic Mountain Amusement Park, Valencia Town Center, Valencia Marketplace, Valencia Corporate Center and Valencia Auto Center, collectively, will provide approximately 19,000 jobs at completion. (*See* Newhall Ranch Specific Plan, Volume II (May 2003), p. 7.2-2.) By virtue of its location in proximity to Valencia, the Specific Plan site has excellent access to the Santa Clarita Valley's major hospital, Henry Mayo Newhall Memorial Hospital and Medical Office Complex. Also available are higher education facilities such as the College of the Canyons Community College, California Institute of the Arts, and the Master's College. A complete range of shopping opportunities, including neighborhood shopping centers, auto sales, regional shopping and value merchandise, are available near the site as well.

The Specific Plan was prepared pursuant to the provisions of the California Government Code, which allows preparation, review, and adoption of Specific Plans as may be required for the systematic execution of a General Plan. The Code authorizes jurisdictions to adopt specific plans as policy documents by resolution, or as regulatory documents by ordinance. (Cal. Gov. Code §§ 65450-65457.) In addition, the Los Angeles County Planning and Zoning Code provides procedures for the processing of Specific Plans in Los Angeles County. (Los Angeles County Planning and Zoning Code Title 22, Chapter 22.46.) Pursuant to those procedures, the Los Angeles County Regional Planning Commission recommended certification of the EIR and approval of the Specific Plan, and the Los Angeles County Board of Supervisors certified the EIR and adopted the Specific Plan on May 27, 2003.

3.3 BASIC OBJECTIVES OF THE SPECIFIC PLAN

The Specific Plan implements the goals and policies of the Los Angeles County General Plan and the Santa Clarita Valley Area Plan within the Specific Plan Area. The Specific Plan includes a total of thirty-six objectives, which provide the foundation for the Specific Plan development program. These include Land Use, Economic, Mobility, Resource Conservation, and Parks, Recreation and Open Area objectives. (See Specific Plan § 2.1.) For the purposes of this Alternatives Analysis, the applicant has identified the Land Use and Economic objectives listed below as the "Basic Objectives" of the Specific Plan that help to define the essential elements of the proposed Project. The Mobility, Resource Conservation, and Parks, Recreation and Open Area objectives are important considerations for the Specific Plan as a whole, but they do not relate directly to the activities for which the applicant seeks a section 404 permit. Accordingly, it is not necessary to include them in the overall project purpose. Likewise, some of the Land Use and Economic objectives in the Specific Plan are not considered Basic Objectives for purposes of this Alternatives Analysis because they relate to factors that are not properly considered under the 404(b)(1) Guidelines.

Land Use Basic Objectives:

1. Create a major new community with interrelated Villages that allows for residential, commercial and industrial development, while preserving significant natural resources, important landforms and open areas.
2. Avoid leapfrog development and accommodate projected regional growth in a location which is adjacent to existing and planned infrastructure, urban services, transportation corridors, and major employment centers.
3. Cluster development within the site to preserve regionally significant natural resource areas, sensitive habitat, and major landforms.
4. Provide development and transitional land use patterns which do not conflict with surrounding communities and land uses.
5. Arrange land uses to reduce vehicle miles traveled and energy consumption.

6. Provide a complementary and supportive array of land uses which will enable development of a community with homes, shopping, employment, schools, recreation, cultural and worship facilities, public services, and open areas.

7. Organize development into Villages to create a unique identity and sense of community for each.

8. Design Villages where a variety of higher intensity residential and nonresidential land uses are located in proximity to each other and to major road corridors and transit stops.

9. Establish land uses and development regulations that permit a wide range of housing densities, types, styles, prices, and tenancy (for sale and rental).

10. Designate sites for needed public facilities such as schools, fire stations, libraries, water reclamation plant and parks.

11. Allow for the development of community services and amenities by the public and private sectors, such as medical facilities, child care, colleges, worship facilities, cultural facilities, and commercial recreation.

12. Create a physically safe environment by avoiding building on fault lines and avoiding or correcting other geologically unstable landforms; by constructing flood control infrastructure to protect urban areas; and by implementing a fuel modification program to protect against wildfire.

Economic Basic Objectives:

1. Adopt development regulations which provide flexibility to respond to changing economic and market conditions over the life of Newhall Ranch.

2. Provide a tax base to support public services.

3. Adopt development regulations and guidelines which allow site, parking, and facility sharing and other innovations which reduce the costs of providing public services.

(Specific Plan § 2.1.)

Consistent with these Basic Objectives, the Specific Plan, as approved by the County, would provide 20,885 homes, including affordable housing. The County has further determined that the Specific Plan would provide a tax base to support public services and would provide approximately 20,000 jobs to the Santa Clarita Valley. In addition, the County has required the Applicant to set aside significant open space areas for the benefit of its residents and the region. These areas are located in and adjacent to the Specific Plan area, and include the River Corridor SMA/SEA 23, High Country SMA/SEA 20, Salt Creek area, designated Open Areas, spineflower preserve areas, and oak resources. The County has determined that implementation of the Specific Plan, by providing residential, commercial, mixed-use and nonresidential uses, and by setting aside significant open space acreage, will facilitate a balanced development in northern Los Angeles County where residents may both live and work and where sensitive biological resources are conserved, managed, and protected in perpetuity.

3.4 DEVELOPMENT OF APPLICANT'S OVERALL PROJECT PURPOSE UNDER THE 404(b)(1) GUIDELINES

The evaluation of overall project purpose will consider a variety of issues related to the Project. In this section, the analysis will discuss the project purpose as described in the Draft EIS/EIR; the treatment of the Spineflower Conservation Plan and RMDP; regulatory requirements other than those of the section 404 program; the role of the Specific Plan; the Project elements; the size of the Project; and the location of the Project.

3.4.1 Draft EIS/EIR Project Purpose.

In **Section 2.0** of the EIS/EIR, the Corps identified the overall project purpose as follows:

> To practicably and feasibly achieve the basic objectives of the Specific Plan, thereby helping to meet the regional demand for housing and jobs. Specifically, the RMDP component of the proposed Project would address the long-term management of sensitive biological resources in conjunction with the construction and maintenance of RMDP infrastructure needed to implement the approved Specific Plan in a manner that complies with federal and state environmental protection requirements. (Draft EIS/EIR, p. 2.0-8.)

Section 2.0 states that a second project purpose is:

> To develop and implement a practicable and feasible SCP that would permanently protect and manage a system of preserves designed to maximize the long-term persistence of the spineflower within the applicant's land holdings containing known spineflower populations, and to authorize the take of spineflower in areas located outside of designated preserves.

The 404(b)(1) Guidelines explain that, when an action is subject to NEPA and the Corps is the permitting agency, the analysis of alternatives prepared for NEPA will in most cases provide the information needed for analysis under the Guidelines. The Guidelines also state that, in some cases, the NEPA document may have addressed "a broader range of alternatives than required to be considered under [the Guidelines] or may not have considered alternatives in sufficient detail to respond to the details of these Guidelines. In the latter case, it may be necessary to supplement these NEPA documents with this additional information." (40 C.F.R. 230.10, subd. (a)(4).) In light of this statement in the Guidelines, and because the project purpose statement under NEPA and the Guidelines are not necessarily identical, the applicant, in consultation with the Corps, has reviewed and refined the project purpose found in the Draft EIS/EIR to ensure it meets the standards of the 404(b)(1) Guidelines.

3.4.2 Consideration Of San Fernando Valley Spineflower Objective

In revising the project purpose found in the EIS/EIR, the first issue to be addressed is the development of spineflower preserves. The spineflower is a federal candidate plant species under the federal Endangered Species Act ("ESA") and is a state-listed endangered species under CESA. The spineflower has been observed in four general areas within the Specific Plan area: Airport Mesa, Grapevine Mesa, Potrero Canyon, and San Martinez Grande Canyon. This species has also been observed on the Entrada and VCC planning areas, which are not part of the RMDP site.

Because the spineflower is a listed species under CESA, any development that results in take of spineflower must obtain authorization to do so under CESA and must fully mitigate its impacts to spineflower. The CESA mitigation requirements are an important element of the proposed Project, as the Project cannot proceed without them. They may affect the configuration and practicability of the Project, because areas set aside for spineflower are not available for Project infrastructure and facilities. However, for purposes of the 404(b)(1) Alternatives Analysis, it is not appropriate to include these spineflower mitigation measures in the overall project purpose, as they have no direct effect on waters of the United States or related habitat. They are more properly viewed as requirements imposed on the Project by regulatory programs -- similar to other regulatory requirements that the Project is obligated to meet. For example, because the Project site may provide habitat for wildlife species listed as endangered or threatened under the federal ESA, the Corps will consult with USFWS regarding potential impacts to such species or their habitat that may occur on the Project site. The USFWS will issue a biological opinion that will contain terms and conditions for the Project that are needed to avoid jeopardizing the survival and recovery of any listed species or causing adverse modification to designated critical habitat. (16 U.S.C. § 1536.) These measures will be included in whatever project alternative is chosen as the LEDPA.

Excluding the spineflower conservation measures from the project purpose does not mean that this Alternatives Analysis will fail to account for impacts to spineflower. Although the spineflower is an upland species, is not part of the aquatic ecosystem, and is not normally found within areas subject to Corps jurisdiction, the 404(b)(1) Guidelines provide a process to consider impacts to sensitive species that are not part of the aquatic ecosystem. The Guidelines require the Corps to consider "other significant adverse environmental consequences" as part of the process of identifying the LEDPA. Consideration of these non-aquatic environmental impacts allows the Corps to balance the goal of preserving aquatic resources against the possible effects that pursuing such a goal may have on non-aquatic resources.[9]

We note that the alternatives in the Draft EIS/EIR provide for a broad range of approaches to spineflower conservation, in terms of avoiding existing spineflower populations and establishing the size and location of spineflower preserves. This approach ensures that the EIS/EIR provides a full analysis of alternatives that could reduce impacts to spineflower, consistent with CEQA. In the context of this Alternatives Analysis, these alternatives will allow the Corps to fully consider the interplay between avoidance of aquatic resources and "other environmental impacts" in determining the LEDPA.

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9 For example, in some development scenarios, complete avoidance of aquatic resources may push development into upland areas that contain sensitive non-aquatic resources. In determining the LEDPA, it is appropriate for the Corps to consider whether in some cases it might be preferable to, *e.g.*, allow the fill of low-value aquatic resources in order to preserve high-value upland resources.

In summary, the overall project purpose for the 404(b)(1) Alternatives Analysis does not expressly include the element of establishing a spineflower preserve. Instead, the Alternatives Analysis treats the requirement of complying with CESA the same as it does the requirements for protecting federally-listed species and other impacts to the non-aquatic environment. Potential impacts and mitigation measures related to spineflower will be considered under the rubric of "other significant environmental consequences."

3.4.3 The Role Of The RMDP

Achieving the Basic Objectives of the Specific Plan necessarily requires development-related infrastructure, including roads, bridges and road crossing culverts, bank stabilization/ protection, drainage facilities, water quality control facilities, and trails. The infrastructure is described in the RMDP, which is intended to facilitate implementation of the Specific Plan. In addition, the RMDP describes the conservation and mitigation measures that are intended to ensure that the proposed Project complies with state and federal environmental protection requirements.

However, it is unnecessary to include the RMDP as an element of the overall project purpose for this Alternatives Analysis. To the extent the infrastructure described in the RMDP is necessary to achieve the Basic Objectives of the Specific Plan, the need for that infrastructure is adequately captured by including the Specific Plan Basic Objectives in the project purpose. An alternative that does not allow for development of sufficient infrastructure to achieve the Basic Objectives of the Specific Plan would not be considered practicable. On the other hand, an alternative that achieves the Basic Objectives of the Specific Plan should be explored, and may be considered practicable under the Guidelines (depending on consistency with other criteria), even if it relies on infrastructure/facilities that differ somewhat from those described in the RMDP. Including consistency with the RMDP as an element of the project purpose for this Alternatives Analysis could unnecessarily curtail analysis of such alternatives.

For the same reasons, requiring compliance with the precise conservation and mitigation measures described in the RMDP would define the overall project purpose too narrowly for this Alternatives Analysis. First, to the extent the RMDP addresses aquatic resources, the Corps nonetheless must exercise its independent judgment regarding the level of avoidance and mitigation of impacts that is necessary to comply with the Guidelines. Second, to the extent that the RMDP conservation and mitigation measures pertain to non-aquatic resources, strict adherence to the RMDP could unnecessarily constrain consideration of alternatives that otherwise have the potential to achieve the Basic Objectives of the Specific Plan. Therefore, consistency with the RMDP will not be included as an element of the overall project purpose in this Alternatives Analysis. The conservation goals of the RMDP that address non-aquatic resources will be considered under the rubric of "other significant adverse environmental consequences" similar to the treatment of the proposed spineflower preserve discussed above.

3.4.4 Compliance With Other Regulatory Requirements

As noted above, some of the measures included in the RMDP are intended to comply with the requirements of regulatory programs other than the Corps' section 404 permitting program.

Likewise, the spineflower conservation measures found in the SCP are intended to comply with CESA. In addition, permitting agencies that have jurisdiction over the Project may require further conservation measures. These may include, for example, the conditions of the section 1603 streambed alteration agreement required by CDFG, and any additional conditions imposed by the USFWS to protect endangered or threatened wildlife species.

As with the spineflower conservation and mitigation measures required by CESA, any project modifications required by these agencies would properly be considered as requirements imposed by regulatory programs, rather than as essential elements of the proposed Project itself. Therefore, these measures will not be included in the Applicant's statement of project purpose. Instead, the required measures will be incorporated into whatever alternative is found to be the LEDPA. The conservation goals of these additional regulatory requirements will be analyzed under the category of "other environmental impacts."

3.4.5 Consideration Of Specific Plan Basic Objectives

The County's extensive study and planning that produced the Specific Plan are significant in defining the project purpose under the 404(b)(1) Guidelines. California counties exercise their police powers to regulate the development of land under Article XI, section 7 of the California Constitution. Their authority is broad and inclusive. The California Supreme Court has noted that "[u]nder the police powers granted by the [California] Constitution, counties and cities have plenary authority to govern, subject only to the limitation that they exercise this power within their territorial limits and subordinate to state law." (*Candid Enters., Inc. v. Grossmont Union High Sch. Dist.*, 39 Cal. 3d 878, 885 (1985).)

State law further establishes a comprehensive framework which, among other things, establishes local planning agencies, commissions and departments (Cal. Gov. Code § 65100 *et seq.*); sets standards for preparing general plans and specific plans (Cal. Gov. Code § 65300 *et seq.*); sets standards for zoning (Cal. Gov. Code § 65800 *et seq.*); governs development of subdivisions (Cal. Gov. Code § 66410 *et seq.*); and establishes rules for development agreements (Cal. Gov. Code § 65864 *et seq.*) In addition, each local jurisdiction separately adopts planning and zoning laws and policies. Each city and county regulates every aspect of the scale, intensity, timing and scope of development, including all direct, indirect and cumulative impacts. All development must be done in a manner that is consistent with these requirements and the provisions in a general plan. Other applicable laws include, among others, the Porter Cologne Act (Cal. Water Code § 13000 *et seq.*), which regulates water rights and water quality; and California Fish and Game Code sections, which regulate activities that alter lakes, rivers and streams or that affect threatened and endangered plants and wildlife.

Every detail of a proposed development and its environmental consequences is examined under these and other laws, including CEQA (Cal. Pub. Resources Code § 21000 *et seq.*). CEQA provides comprehensive review of environmental impacts. CEQA requires a lead agency to consider significant environmental impacts, alternatives to the proposed project, and feasible mitigation measures. (Cal. Pub. Resources Code §§ 21001, 21002, 21002.1, 21081.) Mitigation measures must be accompanied by a monitoring program that ensures their implementation. (Cal. Pub. Resources Code § 21081.6.)

Given the extent of local government authority, it is reasonable for the Corps to take into account the years of planning and study that produced the Specific Plan when defining the project purpose. (*Friends of the Earth v. Hintz*, 800 F.2d at 833; *Louisiana Wildlife Federation v. York*, 761 F.2d at 1048.) Specifically, because the Specific Plan represents the fruit of the County's planning efforts and identifies the County's goals for the Specific Plan, it is appropriate for this analysis to include attainment of the Specific Plan Basic Objectives as an element of the overall project purpose under the 404(b)(1) Guidelines.

Taking the Specific Plan into account is consistent with the Corps' regulations, which state that state and local governments have primary responsibility for land use decisions and that the Corps normally accepts those decisions. (33 C.F.R. § 320.4, subd. (j)(2).) Case law also shows that it is proper for the Corps, in defining the project purpose, to take into account the objectives of local land use and planning authorities.

For example, in *Great Rivers Habitat Alliance*, 437 F.Supp. 2d 1019, the Corps issued a section 404 permit to the City of St. Peters, Missouri, to fill wetlands in connection with a mixed use business park project, which also included construction of a levee. The Corps defined the project purpose as, "[T]o construct a new levee providing flood protection to a proposed development area known as Lakeside Business Park . . . for the creation of a new mixed-use development area that would include office/warehouse, manufacturing, office, dining/entertainment, hotel/conference, cultural and recreational uses." (*Id.*, 437 F. Supp. 2d at 1025.) The Corps also determined that the following criteria were necessary elements of the project: "(1) located in the City [of St. Peters]; (2) a total area of approximately 1,200 to 1,400 acres; (3) not . . . adjacent to substantial residential areas; (4) a "usable" area of approximately 500 to 800 acres, excluding rights-of-ways, open space, environmentally unavailable areas, drainage areas, and utilities; and (5) located on an interstate highway or major thoroughfare close to a major intersection with good connections to existing highway arteries." *Id.*

The Corps' project purpose in Great Rivers was based primarily on the alternatives analysis commissioned by the City, which explained that "after years of study," the City had determined that the proposed project was the best means of providing a suitable site to accommodate projected future economic growth. (*Id.* at 1025-1026, 1026 n. 11.) The City's determination, in turn, was informed by a number of studies (included in the administrative record) that addressed the ideal size, location and composition of the project. (*Id.* at 1025-1026.)

Plaintiffs challenged the permit, alleging that the Corps had defined the project purpose too narrowly, in order to exclude alternative sites. The court rejected this claim, finding that the Corps properly took into account the City's objectives in defining the project purpose. (*Id.* at 1025-1027.)

Similarly, in *Florida Clean Water Network, Inc., v. Grosskruger*, 587 F.Supp. 2d 1236, the Corps issued a section 404 permit for an airport relocation project. The Corps' project purpose included three objectives, one of which was compatibility with comprehensive planning efforts for the region. (*Id.* at 1244-1245.) The plaintiffs alleged that this element of the project purpose was unduly narrow, because it restricted the sites that could be considered practicable alternatives. The court, however, found that a large infrastructure project such as the proposed relocation, "[b]y its very nature . . . depends upon forecasted growth . . . and the sheer size of such an undertaking essentially requires that it be commercially viable and consistent with local and regional planning efforts." (*Id.* at 1247.) It was appropriate, therefore, for the Corps to consider compatibility with regional planning efforts in defining the range of possible locations and project configurations that could be deemed to meet the project purpose. (See *id.*)

Like the projects in *Great Rivers* and *Florida Clean Water Network*, the proposed Project is a major investment in infrastructure and development that is intended to accommodate anticipated population growth and economic development based on local and regional land-use planning decisions. The comprehensive nature of land use regulation in California, the complexity of developing a project of this scale, and the interrelated effects on transportation, jobs, housing, recreation, public finance, and open space underscore the importance of the decisions made by the County in approving the Specific Plan. Although the details of the Project may be modified by the section 404 process, the applicant is constrained by the need to maintain consistency with the County's decisions. Consequently, achieving the Basic Objectives of the Specific Plan is a necessary and not incidental component of the project purpose.

The statement of project purpose and need found in the draft EIS/EIR is consistent with this approach. The EIS/EIR states that the project purpose is to "practicably and feasibly achieve the Basic Objectives of the Specific Plan, thereby helping to meet the regional demand for housing and jobs." (EIS/EIR **Section 2.0.**) This description takes into account the County's planning efforts but allows deviation from the details of the Specific Plan where that deviation does not prevent the accomplishment of the Specific Plan Basic Objectives.

The Applicant, therefore, proposes an overall project purpose for the Alternatives Analysis that incorporates the element of achieving the Basic Objectives of the Specific Plan.

3.4.6 Project Elements Related To Basic Objectives Of The Specific Plan

As permitted by law, the major elements of the proposed Project form part of the overall project purpose. These elements are found in the Specific Plan, which provides for a master planned community with a broad range of residential, mixed-use, commercial and industrial uses, public services (including schools, parks, recreational facilities, fire stations, libraries and worship facilities), and a water reclamation plant, together with preservation of large tracts of open space. (See Specific Plan pp. 1-6.) In addition, the Specific Plan provides for these land uses to be organized into distinct but complementary Villages, each with a balance of land uses and public facilities to serve Village residents and visitors. (Specific Plan pp. 2-18-2-23.)

Each of these elements is a necessary and legitimate part of the Project and is essential to achieving the Specific Plan Basic Objectives; none is incidental to the Project. These elements are contemplated by the Specific Plan and are found in comparable communities. Adding these elements to the goal of achieving the Specific Plan Basic Objectives produces the following statement of the overall project purpose:

> A master planned community with interrelated Villages that achieves the Basic Objectives of the Specific Plan with a broad range of residential, mixed-use,

commercial and industrial uses, public services (schools, parks, *etc.*) and a water reclamation plant, together with preservation of large tracts of open spaces.

3.4.7 Size

Whether stated explicitly or implicitly, the size of a project often is an important element of the project purpose and can be critical in evaluating alternatives. For example, a housing development that is too small will not meet the identified market need. A reservoir or hydroelectric power plant that is undersized will not supply its users with adequate water or electricity. A golf course with fairways only 100 yards long will not satisfy the demand for a regulation golf course. (See *USACOE Permit Elevation Decision, Old Cutler Bay Associates* (Oct. 9, 1990).) A runway of insufficient length will not satisfy the demand for an international airport. (*Fla. Clean Water Network v. Grosskruger*, 587 F. Supp. 2d. 534.)

At the same time, Corps guidance shows that the size of the project should not be defined more narrowly than is necessary to ensure that the overall project purpose can be achieved. For example, the attainment of a residential development project's basic objectives does not require that the project contain an exact number of housing units. (See *USACOE Permit Elevation Decision, Old Cutler Bay Associates* (Oct. 9, 1990) [rejecting a project purpose which specified the exact number of housing units to be constructed].) Likewise, a reservoir need not contain a *precise* number of gallons of water to accomplish its purpose; a hydroelectric power plant need not generate an *exact* number of megawatts of electricity; and a golf course need not have fairways of *precisely* the length envisioned by the course designer. Thus, although the Specific Plan contains land use statistics that are precise in terms of the acreage and unit count of the anticipated land uses, as shown in **Table 3-1**, Approved Newhall Ranch Specific Plan Land Use Plan Statistics, below, it would not be consistent with the Guidelines or with Corps guidance to require that an alternative match those figures without deviation.

It is easy to identify the extremes in this discussion -- changes in size that are so large as to be clearly significant, or so small as to be obviously trivial. It is much more difficult to define those points in the middle ground where a change in size just begins to become significant -- *i.e.*, where it begins to interfere with the accomplishment of the project purpose or to turn the project that was proposed into a different project altogether. The Corps must exercise independent judgment in reviewing and approving the project purpose, but "the Corps is not a business consulting firm" and is not in a position to evaluate the needs of an applicant and determine the characteristics of the project that is capable of meeting those needs; it is entitled to give substantial weight to an applicant's analysis of those questions. (*Friends of the Earth v. Hintz*, 800 F.2d 822, 835 [*citing River Road Alliance, Inc. v. Army Corps of Engineers*, 764 F.2d 445, 453 (7th Cir. 1985), *cert. denied*, 475 U.S. 1055 (1986)].)

Table 3-1
Approved Newhall Ranch Specific Plan Land Use Plan Statistics

Land Uses	Gross Acres	Dwelling Units	Second Units[1]	Land Use Overlays	Approximate Acre Allocation
Residential				10 Neighborhood Parks	50 acres
Estate[1]	1,324.0	423	423	5 Elementary Schools	35 acres
Low[1]	744.4	671	0	1 Junior High School	25 acres
Low Medium	1,781.7	6,000	0	1 High School	45 acres
Medium	841.0	7,371	0	1 Golf Course	180 acres
High	121.8	2,319	0	2 Fire Stations	2 acres
Subtotal	**4,812.9**	**16,784**	**423**	1 Library	2 acres
Mixed Use and Nonresidential				1 WRP	15 acres
Mixed Use[2]	628.7	4,101	0	1 Lake	15 acres
Commercial	67.2	0	0	3 Community Parks	186 acres
Business Park	248.6	0	0	1 Electrical Substation	2 acres
Visitor Serving	36.7	0	0	Arterial Roads	331 acres
Subtotal	**981.2**	**4,101**	**0**		
Major Open Areas					
High County SMA	4,184.6	0	0		
River Corridor SMA	974.8	0	0		
Open Area	1,010.4	0	0		
Subtotal	**6,169.8**	**0**	**0**		
Total	**11,963.9**	**20,885**	**423**		

Notes:
1 Within both the Estate and Low Residential land use designation lot, one (1) Second Unit is eligible to be constructed with the approval of a Conditional Use Permit (CUP). This may increase the total number of permitted dwelling units by 423, to a maximum total of 21,308.[10]
2 Mixed-Use includes commercial and residential uses.

Source: Draft EIS/EIR, **Section 4.14**, Land Use (April 2009)

10 The Specific Plan allows up to 423 second units in the Estate Residential land use designation, subject to regulations, including the following: (a) second units are only permitted on issuance of a CUP; and (b) second units must be on the same lot as the primary residence, cannot be subdivided or sold, and must meet other applicable requirements for the Estate Residential land use designation. The Specific Plan's stated purpose for second units is to provide affordable housing opportunities for seniors and extended family members. (Specific Plan, Section 3.9.) The vehicular trips from the 423 second units are already accounted for in the 20,885 total number of allowed dwelling units within the Specific Plan; and, for that reason, the EIS/EIR references the Specific Plan's permitted dwelling unit count of 20,885. In addition, the development footprint would remain the same even if one or more of the 423 second units were allowed under a CUP, because the Specific Plan's regulations require the second units to be on the same lot as the primary residence.

In this case, the size of the proposed Project inherently reflects the project's relation to local and regional needs, land use policies and other planned infrastructure[11] and development. (See *Fla. Clean Water Network*, 587 F. Supp. 2d at 1245-1247 [emphasizing the importance of comprehensive regional planning efforts]; *Great Rivers Habitat Alliance v. U.S. Army Corps of Eng'rs*, 437 F. Supp. 2d 1019 [approving a project purpose that required a total area of 1,200 to 1,400 acres, and a developable area of 500 to 800 acres, based on evidence in the record that included City's economic, transportation and demographic studies].) The County has thoroughly evaluated the needs of the region and determined that there is a need for additional housing in the Santa Clarita Valley area of northwestern Los Angeles County, and in particular for housing and complementary uses[12] adjacent to existing transit corridors and proximate to existing regional job centers. The Specific Plan embodies the County's judgment that a large, mixed use project of the approximate size reflected in the Specific Plan offers the best way of meeting that need and achieving the County's Basic Objectives for growth in the region. (See *Great Rivers Habitat*, 437 F. Supp. 2d at 1026-1027, 1027 n.13 [finding that the Corps' project purpose, which reflected the City's judgment that a single large business park was the best means of accommodating economic development, was not arbitrary and capricious, despite plaintiffs' arguments that sufficient growth could be achieved through smaller, scattered developments].)

Given the nature of the planning process that has produced the Specific Plan and the proposed Project, the approved project must be of "approximately the same size" as the development described in the Specific Plan[13] to accomplish its overall purpose. The term "approximately the same" describes a range of values without precisely defined limits, but some general guidelines will be helpful in assessing whether an alternative is of sufficient size to be capable of meeting the project purpose.

In this analysis, an alternative will be presumed capable of meeting the project purpose (at least with regard to size) if it is within ten percent of the size parameters found in the Specific Plan. Conversely, an alternative will be presumed incapable of meeting the project purpose if it is more than ten percent smaller than the parameters found in the Specific Plan. A ten percent reduction for a project of this size corresponds to a loss of more than 300 net developable acres.

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11 An example of planned infrastructure is the planned improvements to Interstate 5 ("I-5") in the vicinity of the proposed Project, including the addition of high-occupancy vehicle ("HOV") and truck lanes, which are intended in part to handle the additional traffic generated by growth in the Santa Clarita Valley, including the Specific Plan area.

12 Some of the complementary uses provide essential public services to the planned residential community, while others, such as commercial development, allow for the provision of goods, services, and employment opportunities on site, which in turn help achieve the County's goals of reducing traffic generation and trip lengths.

13 The proposed Project, Alternative 2, reflects the development parameters described in the Specific Plan, including developable acreage, unit counts, *etc.* Each of the other alternatives considered in this Alternatives Analysis provides less development potential than the proposed Project, in order to allow for greater avoidance of aquatic resources and other sensitive site features.

(Compare *Great Rivers, supra,* 437 F. Supp. 2d at 1025 [approving a project purpose that specified a total acreage of 1,200 to 1,400 acres and a developable acreage of 500 to 800 acres].) Regardless of which presumption applies, each alternative will undergo thorough analysis to determine whether it is actually capable of meeting the project purpose.

The concept of "size" as used in the Specific Plan encompasses both the overall land area devoted to each land use (*e.g.,* net developable acreage) and the construction that can occur on that land (*e.g.,* numbers of residential units, square feet of commercial floor space). This dual meaning of "size" reflects the fact that different segments of the real estate industry focus on different aspects of a project. A land developer may focus on net developable acres, as will the developer of a school or other facility that typically requires a minimum acreage. A homebuilder, on the other hand, may focus on the number of residential units that can be constructed.

The use of dual metrics for size also allows for maximum flexibility in considering alternatives. An alternative will not be considered incapable of achieving the project purpose unless it fails to provide either approximately the same developable acreage or approximately the same unit counts as found in the Specific Plan. For example, an alternative that provides 12 percent less developable acreage than described in the Specific Plan, but is within four percent of the Specific Plan unit counts due to increased density, would be presumed to be capable of achieving the project purpose (at least with regard to size).

3.4.8 Location

The final consideration relating to project purpose is whether alternative locations will meet the project purpose. The 404(b)(1) Guidelines make it clear that an alternative location can be a practicable alternative even if the land is not owned by the Applicant. However, any examination of alternative locations must assume certain geographic limits. The issue of geographic scope has been frequently litigated, and the cases discussed above provide useful guidance in defining the geographic scope of potentially practicable alternative sites. (See, *e.g., Great Rivers Habitat Alliance v. Army Corps of Engineers,* 437 F.Supp. 2d 1019 [finding that project purpose properly limited alternatives to sites within city of St. Peters, Missouri, where project was intended to accommodate economic development of city]; *Butte Environmental Council v. U.S. Army Corps of Engineers,* 2009 WL 497575, No. 2-08-cv-1316 [project purpose was to construct a medium to large sized regional business park with associated roads, utilities and infrastructure within the City of Redding's sphere of influence]; *Stewart v. Potts,* 996 F. Supp. 668 [project purpose was to provide an affordable, quality public golf course for the citizens of Lake Jackson]; *USACOE Permit Elevation Decision, Old Cutler Bay Associates* (Oct. 9, 1990) [acceptable project purpose was to construct a viable, upscale residential community with an associated regulation golf course in the South Dade County area].)

The Specific Plan was adopted, after years of study and planning, in order to meet the identified needs of Los Angeles County for housing and related land uses. In light of those needs, and in the context of California's extensive land-use planning framework and the holdings of the cases cited above, alternative sites, to meet the overall project purpose, should be located in the same part of Los Angeles County as the proposed Project. Sites located in other counties or in distant parts of Los Angeles County do not meet the Basic Objectives of the Specific Plan.[14] For these reasons, alternatives sites must be located in the area generally described as the vicinity of the Santa Clarita Valley in northwestern Los Angeles County.

3.5 APPLICANT'S STATEMENT OF PROJECT PURPOSE

The "basic project purpose" is to provide housing and commercial/industrial/mixed-use development. The basic project purpose is not water dependent.

The "overall project purpose" is the development of a master planned community with interrelated Villages in the vicinity of the Santa Clarita Valley in northwestern Los Angeles County that achieves the Basic Objectives of the Specific Plan by providing a broad range of land uses of approximately the same size and proportions as approved in the Specific Plan, including residential, mixed-use, commercial and industrial uses, public services (schools, parks, *etc.*), a water reclamation plant, and large tracts of open space.

3.6 APPLICANT'S STATEMENT OF PROJECT NEED

The residential and commercial uses approved under the Specific Plan are intended to provide housing and employment to meet anticipated regional population growth. **Table 3-1**, shown above, provides the statistical breakdown for the Specific Plan. As of January 1996, the State Department of Finance estimated that the population of Los Angeles County had reached 9.37 million. SCAG projections adopted in 1994 forecast that the County would grow to 11.9 million people by 2015. State Department of Finance projections forecast a County population of 12.1 million by 2015 and 12.9 million by 2020.

The addition of Newhall Ranch Specific Plan to all known past and future cumulative development would result in less population and fewer housing units than are projected for the Santa Clarita Valley by SCAG for 2015, but would result in a greater amount of employment, as shown in **Table 3-2**, Santa Clarita Valley Regional Population Growth, below. Therefore, the Specific Plan is consistent with the Growth Management Element of the SCAG Regional Comprehensive Plan.

The addition of the Specific Plan land uses to the General Plan would result in a jobs/housing balance of approximately 1.30 jobs per housing unit when all General Plan land uses and the Newhall Ranch Specific Plan are built out.

[14] The EIS/EIR screens all potential alternative sites in the vicinity of the proposed Project without regard for whether they are located in Los Angeles County. Indeed, two of the three potentially viable alternative sites analyzed in detail in the EIS/EIR are located in eastern Ventura County. Although this fact alone would prevent the two sites from meeting the project purpose for this Alternatives Analysis, the sites are nonetheless analyzed in detail below and are found to be impracticable for other reasons as well.

Table 3-2
Santa Clarita Valley Regional Population Growth

	Population	Housing Units	Employment
1990 Census	151,052	48,883	51,594
County General Plan Plus Build-out	230,719	82,038	131,398
Specific Plan for Newhall Ranch	59,707	22,038	19,226
SCAG 2015 Projections	552,796	170,657	123,903

Source: Resolution of the Board of Supervisors of the County of Los Angeles Adopting General Plan Amendment and Area Plan Amendment for Newhall Ranch Specific Plan (May 2003).

4.0 JURISDICTIONAL WATERS OF THE UNITED STATES

This section describes the location and extent of waters of the United States within the RMDP site that would be subject to the Corps' jurisdiction under the CWA section 404 regulatory program, including the results of the Hybrid Assessment of Riparian Condition ("HARC") that was conducted in the RMDP site, in order to characterize and evaluate the condition of wetland and riparian habitats within the RMDP site. Delineation of Corps jurisdictional areas is discussed in **Section 4.4**, and the HARC is discussed in **Section 4.5**, below.

4.1 THE SANTA CLARA RIVER

The Santa Clara River is the largest watercourse within the RMDP site, and all other drainages within the site are tributary drainages to this river (see **Figure 4-1**). The river originates in the San Gabriel Mountains in Los Angeles County and flows west through Los Angeles and Ventura counties before discharging into the Pacific Ocean. The river extends approximately 5.5 miles east to west across the RMDP site (Draft EIS/EIR, **Figure 2.0-3**). Major tributary drainages in the Santa Clara River watershed include Castaic and San Francisquito Creeks in Los Angeles County and Sespe, Piru and Santa Paula Creeks in Ventura County. Approximately 40 percent of the Santa Clara River watershed is located in Los Angeles County and 60 percent is in Ventura County. Much of the watershed is in mountainous terrain within either the Angeles National Forest or the Los Padres National Forest.

The river exhibits some perennial flow in its eastern-most stretches within the Angeles National Forest then flows intermittently westward within Los Angeles County. The principal tributary drainages of the upper river watershed in Los Angeles County are Castaic Creek, Bouquet Canyon Creek, San Francisquito Creek, and the South Fork of the Santa Clara River. Placerita Creek is a large tributary draining the western-most end of the San Gabriel Mountains; it joins the South Fork, which flows directly into the Santa Clara River. Castaic Creek is a south-trending creek that confluences with the Santa Clara River downstream of the City of Santa Clarita. Castaic Lake is a Department of Water Resources ("DWR")-owned reservoir located on Castaic Creek. San Francisquito Canyon Creek is an intermittent stream in the watershed adjacent to Bouquet Canyon to the southeast.

The braided Santa Clara River mainstem consists of sandy and gravelly soils and is highly permeable over much of its length, which results in surface water infiltration into the groundwater basin.

The principal sources of water contributing to the base flow of the Santa Clara River are: (1) groundwater from the Alluvial aquifer basin in Los Angeles County, which seeps into the riverbed near, and downstream of, Round Mountain (located just below the mouth of San Francisquito Creek); (2) tertiary treated water discharged to the Santa Clara River from two existing Los Angeles County Sanitation District WRPs, the Saugus WRP, located near Bouquet Canyon Road bridge, which creates surface flows from the WRP outfall near I-5, and the Valencia WRP, located immediately downstream of I-5, which creates surface flows extending through the RMDP site; and (3) in some years, DWR-released flood flows from Castaic Lake into Castaic Creek during winter and spring months. Five additional wastewater treatment facilities in the lower reaches of the river in Ventura County also discharge secondary- and tertiary-treated water to the river. (RWQCB, 2006.)

Due to the effluent discharges and other water sources, the braided river main stem of the Santa Clara River through the RMDP site flows perennially until upstream of the confluence with Piru Creek, where it generally becomes dry as water seeps through the highly-permeable soils and enters the ground water below the river bed surface. Perennial above-ground flows generally return downstream of the confluence with Hopper Canyon Creek in Ventura County and continue through Piru, Sespe, and Santa Paula Creeks, and into the Oxnard Plain in Ventura County.

The braided, active river main stem channel is largely barren of riparian vegetation due to scouring by seasonal storm flows. However, vegetation types on the adjacent terraces, which vary based on elevation relative to the active channel bottom and flood frequency, consist of emergent herbaceous, woody shrubs, and trees. Within the RMDP site, the Santa Clara River Corridor supports three general categories of habitat: (1) aquatic habitats, consisting of flowing or ponded water; (2) wetland habitats, consisting of emergent herbs rooted in ponded water or saturated soils along the margins of the active channel; and (3) riparian habitat, consisting of woody vegetation along the margins of the active channel and on the floodplain. Both year-round and seasonal aquatic habitats are provided and are subject to periodic disturbances from winter storm flows. These flows inundate areas that are dry most of the year. They also carry and deposit sediment, seeds, and organic debris; form new sandbars and destroy old ones; and erode stands of vegetation. New stands of vegetation are created where vegetation becomes established by seeds or buried stems. Thus, the aquatic habitats of the river are in a constant state of creation, development, disturbance, destruction, and re-creation.

4.2 ASSOCIATED TRIBUTARY DRAINAGES

There are 21 jurisdictional drainages within the RMDP site (including a five-mile reach of the Santa Clara River). The tributary drainages are located within an area that is generally delineated by SR-126 and the lower portions of Chiquito Canyon, San Martinez Grande Canyon, and Homestead Canyon to the north, the Six Flags Magic Mountain Amusement Park to the east, the crest of the Santa Susana Mountains to the south, and the Los Angeles County/Ventura County jurisdictional line to the west.

All of the tributary drainages within the RMDP site are unimproved, with the exception of five drainage crossings under SR-126 constructed as part of the SR-126 roadway widening project completed by the California Department of Transportation ("Caltrans").

Several of the on-site drainages have been mapped as blue-line streams by the U.S. Geological Survey ("USGS"). While it is the intent of USGS to indicate that blue-line streams are flowing perennial streams, in arid states such as California, and particularly in southern California, this is not always the case. For example, the designated USGS blue-line stream in upper Potrero Canyon contains water only during the rainy periods; during non-rainy periods (which is the majority of the time in southern California), flows in this drainage are ephemeral (*i.e.*, flows only in response to storm events). Aside from the lower portions of Salt and Potrero Canyons, each of the tributary drainages within the RMDP boundary is classified as intermittent[15] or ephemeral.

Similar to drainages in other arid west regions of the United States, the tributary drainages within the RMDP boundary do not occupy a significant percentage of the overall land surface of the RMDP area. (See, *e.g., Save Our Sonoran, Inc. v. Flowers*, 408 F.3d 1113, 1119-23 (9th Cir. 2005) [discussing drainages that ran through entire 608-acre housing development site in Arizona, but occupied only five percent of the surface of the site].)

The majority of the tributary drainages are characterized by both rugged and steeply developed foothills that have numerous smaller tributary canyons that dissect the watershed, connecting to the narrow alluvial valley associated with the main stem drainage. Generally, the soils in the watersheds consist of silty clay loams from both the Castaic and Saugus formations. Also, the soils within the watersheds can be predominately classified as being in hydrologic soil group C (higher runoff potential) with the exception of areas adjacent to the main stem drainages that are group A (lowest runoff potential) and group B (lower runoff potential) in the lower reaches.[16]

4.3 POTENTIAL DEGRADATION FROM EXISTING LAND USES

The Applicant leases out portions of the RMDP site for oil and natural gas production, as well as for cattle grazing, ranching, and agricultural operations. Grazing activities and oil and natural gas production, occurring for decades, have disturbed much of the natural habitat on site, including the aquatic features. Scrub habitats have been displaced by annual grasslands as a result of grazing and land clearing for agriculture and other historic land uses. In addition, the RMDP site has been fragmented by dirt and asphalt roads, graded oil well pads and pipelines, and pumping, storage, and transmission facilities.

4.4 WATERS OF THE UNITED STATES WITHIN THE RMDP SITE

The initial URS jurisdictional delineation of the RMDP site identified 492.9 acres of waters of the United States within the RMDP site (see Draft EIS/EIR **Appendix 4.6** for correspondence and documentation relating to the initial URS jurisdictional delineation for the RMDP site that was exchanged between the Applicant and the Corps in 2004). This delineation mapped areas within the Ordinary High Water Mark, but did not include adjacent wetlands. Subsequent modifications, including more refined, higher accuracy mapping of the Ordinary High Water Mark along the Santa Clara River in spring 2004 and a delineation of wetlands in 2007 (see Draft EIS/EIR **Appendix 4.6** for URS' 2009 composite wetlands delineation), yielded an adjusted total of 636 acres of waters of the United States, including 251 acres of Corps wetlands.

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15 Intermittent drainages carry flows due to seasonal high groundwater in addition to storm flows.

16 Soils are classified by the U.S. Department of Agriculture, Natural Resource Conservation Service, into four Hydrologic Soil Groups based on the soil's runoff potential. The four Hydrologic Soils Groups are A, B, C and D. Soil Group A is generally the lowest runoff potential and Soil Group D the highest runoff potential.

Subsequent to release of the Draft EIS/EIR in April 2009, the Corps and CDFG received comments from the public regarding the boundary of a riparian area along the Santa Clara River mainstem to the north of the proposed bridge site at Potrero Canyon Road. The area in question had been identified in the 2004 delineation as a part of the CDFG's jurisdictional river bank due to the presence of riparian vegetation, but was not included within the delineated waters of the United States as the area is well beyond the ordinary high water mark in a relic channel that is only inundated by storm events with approximately a 20-year return interval. In addition, the area in question is also adjacent to existing roads and agricultural facilities that augment the natural hydrology in the channel. The 2009 composite wetland delineation did not include this area within the mapped wetland boundary, but had based this determination on interpretation of aerial photography rather than on field mapping techniques that would account for modified hydrologic regime. Because the area in question would sustain some level of impact under all alternatives considered, including substantial impacts under Alternative 2, the Corps requested that additional field work be conducted to ascertain the wetland boundary. Staff from URS undertook this effort in December 2009, and produced a revised, field-mapped wetland boundary. As an extension of this effort, the wetland maps for the entire site was reviewed and compared to the overall Corps and CDFG jurisdictional boundaries. Minor areas of mapping discrepancies within the GIS database were corrected to ensure that all wetlands were also included in the overall Corps and as an extension, CDFG jurisdiction boundaries. The updated boundaries yielded an additional 24.11 acres of waters of the U.S., including wetlands. Some areas of non-wetland waters of the U.S. were reclassified as wetlands during this review, which resulted in the total wetlands on site being increased by 25.9 acres.

These changes result in a site-wide total of 660.1 acres of waters of the United States, of which 276.9 acres are wetlands. Of the total Corps jurisdictional waters on the site, 471.2 acres (71 percent) comprise the Santa Clara River Corridor, and the remaining portion represents tributary drainages to the Santa Clara River. Corps jurisdictional acreages within the RMDP site are shown in **Table 4-1**, below. The smallest, ephemeral drainages on site have been combined into a single heading, and have jurisdictional area totaling 34.4 acres (five percent of total Corps jurisdiction on the RMDP site). These delineations have been compiled and submitted to the Corps in a preliminary jurisdictional determination for the RMDP site. (See Draft EIS/EIR, **Appendix 4.6**, for URS' 2009 preliminary jurisdictional determination for the RMDP site and Entrada planning area.) (See also Final EIS/EIR, **Appendix F4.6**, for the revised jurisdictional determination.).

Table 4-1
Areas of Waters of the United States, Including Wetlands, and CDFG Jurisdictional Streams Within the RMDP Site by Drainage (In Acres)

Drainage	Non-Wetland Waters of the United States	Corps Wetlands	Total Waters of the United States	CDFG Jurisdictional Streams
RMDP Site				
Santa Clara River	212.5	258.8	471.2	760.3

Salt Creek	79.7	8.7	88.5	94.1
Potrero Canyon	31.4	7.3	38.7	43.0
San Martinez Grande Canyon	2.6	0.0	2.6	2.6
Chiquito Canyon	12.2	0.0	12.2	18.3
Long Canyon	5.7	0.0	5.7	5.7
Lion Canyon	6.9	0.0	6.9	6.9
Other Drainages Within RMDP Site	32.3	2.1	34.4	35.0
Total RMDP Site	**383.2**	**276.9**	**660.1**	**965.7**

Source: URS (RMDP Waters/Streams-2004, RMDP Wetlands-2009); Glenn Lukos Associates (as revised September 15, 2008); see Draft EIS/EIR, **Appendix 4.6**.

4.5 HARC EVALUATION

The Corps required the preparation of a HARC that would supplement the EIS/EIR impact analysis for the proposed Project and alternatives. The purpose of this assessment is to evaluate the relative functional quality of the jurisdictional areas within the RMDP site, so that direct and indirect impacts of the proposed Project and alternatives on the functional capacity of these waters can be determined and compared. Although this assessment was requested by the Corps, the HARC included all Corps and CDFG jurisdictional areas within the RMDP site. The limits of CDFG jurisdiction were used as the boundaries for the area assessed by the HARC because these areas support riparian vegetation, and are a reasonable approximation of the flood-prone area surrounding the drainages on the RMDP site. Functional assessments are often required to supplement CWA section 404 permit applications when any of the following apply:

- A project site is large;
- The aquatic resources present on site are perceived to be of high value; or
- The Corps believes it is necessary to supplement the traditional alternatives analysis with a function-based assessment.

Because no established functional assessment method exists that fits the Corps' needs in evaluating the aquatic resources on the RMDP site, a hybrid method was developed to suit the needs of the RMDP site. Development of the HARC method included combining and adapting components of three established methods (the Santa Margarita River Hydrogeomorphic ("HGM") approach, the California Rapid Assessment Method ("CRAM"), and the Landscape-Level Functional Equivalent ("LLFA") method) to derive a Project-specific method in coordination with the Corps. For a detailed description of the way these three established methods were blended to create the HARC method, please refer to the HARC report prepared by URS, located in **Appendix 4.6** of the Draft EIS/EIR. The Regulatory Division of the Corps (Los Angeles District) requested that the HARC take into account the following criteria:

- The method must be able to account for differences between the Santa Clara River mainstem and the tributaries;

- The method must be able to assess mitigation and avoidance sites, as well as potential impact areas, and the method must result in scores that rate assessment areas both pre- and post-Project; and
- The method must be based on hydrogeomorphic method principles and other established methods.

Like the hydrogeomorphic method, the HARC evaluates the extent to which wetland or riparian reaches perform various physical, chemical, and biological attributes. The HGM method assesses functions based on mathematically complex models derived through substantial testing. Developing such complex models for the current project would have been beyond the scope of analysis required by NEPA. Attributes assessed in the HARC included general hydrology, biogeochemical, and habitat quality evaluators, as well as an overall total score that incorporates all three of these elements.

A total of 15 field parameters, termed "metrics," were evaluated within each assessment reach and were scored on a scale from zero (completely degraded condition) to one (pristine condition, unaffected by human activities). A total of five hydrological, 10 biogeochemical, and seven habitat metrics were used, although some metrics fall into more than one of these categories. All metrics were assessed at all study sites, but only a relevant subset of the metrics was used for the scoring of each attribute. For a detailed discussion of the criteria used to score each metric, along with the scores assigned to each assessment reach within the Project area, please refer to the HARC report, located in **Appendix 4.6** of the Draft EIS/EIR.

In addition to the attributes and metrics used in the HARC, the HARC also included a total score attribute designed to generate a general, all-encompassing numerical score for each assessment reach. The HARC total score was calculated by computing the arithmetic mean of the 15 metric scores for each reach. The RMDP site was divided into a total of 57 reaches: seven along the Santa Clara River, 15 within the tributaries on the north side of the River, and 35 within the southern tributaries. For a detailed discussion of the assessment reaches and methods, please refer to the HARC report, located in **Appendix 4.6** of the Draft EIS/EIR.

HARC total scores for all reaches are shown geographically on **Figure 4-2**, Existing HARC Scores. All attribute and metric scores were evaluated on a scale of zero to 1.0, and HARC total scores ranged from 0.10 to 1.00. **Table 4-2**, below, shows the number of HARC Area Wide ("AW") scores present in each drainage.

Table 4-2
HARC Summary

Drainage	Corps Jurisdiction Total Acreage	HARC AW-Total	Avg. HARC Score
Santa Clara River Mainstem			
Santa Clara River	471.2	*364.82*	0.77
Tributaries			
Lion Canyon	6.9	**5.41**	**0.79**
Long Canyon	5.7	**3.55**	**0.62**

Chiquito Canyon	12.2	*8.2*	**0.79**
Potrero Canyon	38.7	*31.6*	**0.62**
Salt Creek Canyon	88.5	*71.9*	**0.67**
San Martinez Grande Canyon	2.6	*2.1*	**0.82**
Agricultural Ditch	1.6	*0.2*	**0.10**
Ayers Canyon	2.6	*2.2*	**0.85**
Dead-End Canyon	1.3	*0.8*	**0.60**
Exxon Canyon	1.2	*1.0*	**0.82**
Homestead Canyon	0.2	*0.1*	**0.59**
Humble Canyon	1.9	*1.7*	**0.90**
Magic Mountain Canyon	6.4	*4.4*	**0.68**
Middle Canyon	5.7	*3.2*	**0.56**
Middle Canyon Spring Complex	2.1	*2.1*	**1.00**
Mid-Martinez Canyon	2.0	*0.9*	**0.47**
Off Haul Canyon	5.8	*2.7*	**0.47**
Unnamed Canyon 1	0.3	*0.1*	**0.42**
Unnamed Canyon 2	0.3	*0.1*	**0.39**
Unnamed Canyon A	0.8	*0.5*	**0.60**
Unnamed Canyon B	0.7	*0.6*	**0.85**
Unnamed Canyon C	0.7	*0.6*	**0.85**
Unnamed Canyon D	0.8	*0.7*	**0.82**
Tributary Totals	**188.9**	***144.6***	**0.77**
RMDP Project Area Total	**660.1**	***509.4***	0.77

Source: Draft EIS/EIR (April 2009) **Appendix 4.6.**

The number of HARC AW-score units present is influenced by size as well as quality; for example, Salt and Potrero are two of the largest tributary drainages, and the HARC scores are high. Due to its large size and relatively high quality, the vast majority of the attribute value within the RMDP site is located in the Santa Clara River reaches (**Figure 4-2**). The presence of very high and low scores suggests that the HARC, in fact, captured the range of riparian conditions present in the RMDP site and was sensitive enough to detect variability among reaches.

For the hydrology, biogeochemical, and habitat attributes, the southern tributaries generally outscored the northern drainages. In general, the scores for these three attributes showed similar geographic trends, and high quality sites were rated as such within each functional category. This correlation between the hydrology, biogeochemical, and habitat attributes is partially because many of the HARC metrics were used in the calculation of more than one attribute score. In addition, the metrics used were detailed enough that impacts to an assessment reach rarely affected only one metric. For example, a reach that has been constrained by the presence of a road along one bank, such as reach PO-6 (**Figure 4-2**), received reduced scores for the buffer condition, buffer width, floodplain connection, flood prone area, riparian vegetation condition, and riparian corridor continuity metrics. As these metrics are used in the calculations for the HARC hydrology, biogeochemical, and habitat scores, an impact such as this would affect all attribute scores. For a more detailed discussion of the existing hydrology, biogeochemical, and habitat attribute scores, please see the HARC report, included in **Appendix 4.6** of the Draft EIS/EIR.

The HARC identified three distinct wetland types within the Project area: riverine, seep, and slope wetlands. These wetland types are regionally rare, and the latter two types are supported by groundwater discharge. This hydrological situation results in the formation of hydric soils supporting wetland plant communities adapted to alkaline conditions, which often display a high proportion of native plant species. These wetland communities would be difficult to re-create or mitigate elsewhere if impacted by development activities. The six reaches within which these wetlands occur were among the highest scoring reaches across the RMDP site, and included SA-3, SA-4, PO-4, PO-7, MI-5, and MI-6 (**Figure 4-2**). These wetlands also are sensitive to indirect impacts, such as changes in upstream hydrology that may cause a "type conversion" of vegetation (*e.g.*, a *Typha* sp. invasion into an alkali marsh after freshwater flow augmentation), a reduction in flow from expansion of impermeable surfaces, and increased runoff in their respective watersheds.

5.0 FILL OF WATERS OF THE UNITED STATES

This section describes the activities proposed under the RMDP and alternatives that would result in placement of fill material within waters of the United States. These activities would typically be related to installation of roads and infrastructure, including flood conveyance and water quality control facilities, required for the build-out of the Specific Plan. For a detailed description of these facilities, please refer to **Subsection 2.6** of the Draft EIS/EIR.

5.1 INFRASTRUCTURE COMPONENTS WITHIN WATERS

The RMDP and alternatives propose to construct infrastructure in the Santa Clara River and its tributary drainages within the RMDP study area. The major infrastructure consists of debris and detention basins, bank stabilization, bridges, and road crossings. In addition, the existing channels of some drainages would be realigned, recontoured, or converted to buried storm drain systems to accommodate development.

5.1.1 Bridges And Road Crossings

The proposed bridges and roadway crossings are essential to the Specific Plan development, as these facilities would allow vehicle traffic to traverse the site's drainages and circulate within the development area. Proposed bridges across the Santa Clara River also would be necessary from a public safety perspective, as these crossings would serve as points of egress from the site in the event of an emergency. Bridges and road crossings are proposed in all of the alternatives considered in this analysis, but the number, type, and locations of these facilities vary among the alternatives. Generally speaking, bridges would result in lesser impacts to the aquatic environment than culvert-type road crossings, but would have greater costs. The types of bridges and road crossings considered in this analysis are described below. For more information, please refer to **Section 2.0** of the Draft EIS/EIR.

5.1.1.1 Bridges Across The Santa Clara River Mainstem

The proposed RMDP and alternatives propose to construct up to three bridges across the Santa Clara River mainstem to accommodate future traffic associated with development of the Specific Plan and the region. These include two proposed bridges, at Potrero Canyon Road and Long Canyon Road, and one previously-approved bridge at Commerce Center Drive.[17] The Potrero Canyon Road Bridge would serve the most westerly segment of the Specific Plan site, while the Long Canyon Road Bridge would serve the central portion of the site. The Commerce Center Drive Bridge, which was approved by the Corps and CDFG as a component of the previously adopted Natural River Management Plan, or NRMP, would serve the easternmost portion of the Specific Plan site. The locations of the three proposed bridges are shown on **Figure 5-1**, Location of Proposed RMDP Santa Clara River Major Features, and a typical mainstem bridge crossing is depicted on **Figure 5-2**, Typical Mainstem Bridge Crossing.

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[17] The Commerce Center Drive Bridge was previously analyzed in the Final EIS/EIR prepared and approved in 1998 by the Corps and CDFG in connection with the previously adopted NRMP (SCH No. 1997061090, August 1998).

The proposed bridges would consist of concrete roadway decks atop concrete, pier walls, columns and/or piers spaced approximately 100 feet apart. Each bridge would require an abutment on either bank of the river, and the bridge piers would be either poured in place or constructed by pile-driving, depending on circumstances. Where pile-driving technology is used, the piers would be constructed without the need to place fill material into waters of the United States. Instead, the piles would be driven sequentially, and equipment would be supported by one pile while driving the next. Where poured-in-place technology is employed, construction equipment would need to enter the riverbed, excavate to suitable depth, and construct forms for the piers, which would then be filled with concrete. This construction method could potentially require dewatering of the channel, if the proposed pier location is within the active channel of if subsurface flows are encountered. Bridge construction using poured-in-place technology would require a work zone of approximately 100 feet on either side of the proposed bridge alignment.

Following completion of the proposed bridges, the structures would be maintenance free under normal circumstances. However, the supports or decks of the proposed bridges may require occasional structural repairs, which might require that work be conducted from within the riverbed. When practical, repairs or maintenance to bridges would be made from the bridge deck; when this is not practical, encroachment upstream and/or downstream of the bridge would be necessary. The work area for structural repairs would be no larger than necessary to complete the work, generally 30 feet on either side of the bridge and under the bridge itself. Access ramps, as necessary, would be placed as close to the repair site as feasible, with preference given to locations with minimal mature vegetation, lacking flowing water, and requiring minimal bank disturbance to create access ramps. Utilities mounted to the exterior of bridge structures may require similar access for maintenance purposes. Where utilities are located within the bridge superstructure, access to utilities will likely be from the bridge deck surface.

After major storms, accumulated debris could present risks to bridge supports. Removing this hazard may necessitate the use of heavy equipment within the channel, depending on the type and quantity of debris at issue.

5.1.1.2 Bridges Across Tributary Drainages

The RMDP (Alternative 2) does not propose any bridges across tributary drainages; but many of the other alternatives include them as a means for reducing the fill impacts associated with culvert drainage crossings (see **Section 5.1.1.3**, below). The design of bridges crossing tributary drainages would be substantially similar to that proposed for bridges across the river mainstem, except that, in many cases, the tributary drainage channels are narrow enough that piers would not be needed. In these cases, fill of waters of the United States would be limited to impacts along the banks caused by the bridge abutments. Where interior supports are needed, the same technologies proposed for the Santa Clara River bridges would be considered (pile-driving, concrete poured in place). Because the bridges crossing tributary channels would be smaller than those proposed across the river mainstem, the construction zone would not be as large, and would extend approximately 60 feet on either side of the bridge. Impacts associated with maintaining tributary bridges would be similar to bridge maintenance impacts along the river mainstem.

5.1.1.3 Culvert Road Crossings On Tributary Drainages

The proposed RMDP and alternatives would utilize culvert road crossings as an economical and efficient means of allowing vehicle traffic to traverse tributary drainages. These crossings would accomplish the same basic function as bridges across tributary drainages, discussed above, but would result in greater fill of waters. Under the proposed RMDP, 15 new road crossing culverts would cross six of the larger on-site tributaries of the Santa Clara River (Chiquito, San Martinez Grande, Lion, Long, Potrero, and Ayers Canyons). Extension of Magic Mountain Parkway to the west, as envisioned in the approved Specific Plan, likewise would require culvert road crossings on an additional two unnamed drainages. Each road crossing would be constructed of earthen fill and pre-fabricated arched culverts, and would temporarily disturb a 60-foot wide (approximate) corridor on each side of the crossing, in addition to a permanent impact within the actual footprint of the crossing. Following construction, the temporary impact zone would be restored to channel grade and revegetated with native riparian and upland species as appropriate. A typical culvert road crossing is depicted graphically on **Figure 5-3**, Typical Tributary Road Crossing. Note that under Alternatives 7 and 8, which are more protective of aquatic resources, culvert road crossings are not proposed, and all crossings of tributary drainages would be accomplished using bridges.

5.1.1.4 Widened Bridges And Culvert Extensions

In addition to the new bridges and road crossings described above, the proposed RMDP and alternatives would also widen two existing bridges along SR-126 to accommodate projected future traffic. The first is at the Castaic Creek drainage (six existing lanes would be expanded to eight), and the second is at San Martinez Grande Canyon (four lanes would be expanded to six). One culvert extension is also proposed where the Chiquito Canyon drainage passes beneath SR-126 via a box culvert (four existing lanes would be expanded to six by lengthening the culvert). These widened bridges and culvert extension are components of a Caltrans project to accommodate increased traffic flow along SR-126.

A previously-approved project processed by the Applicant allowed for expansion of the SR-126/Castaic Creek bridge from four to six lanes, which widened the bridge by an additional 50 feet. The proposed RMDP would widen this previously-approved bridge from six to eight lanes. An additional 50 feet of width, plus a separate ten-foot wide pedestrian/bike lane would be located on the south side of the bridge, with utility crossings located on both the north and south sides of the bridge in a 100-foot wide disturbance zone.

5.1.2 Bank Stabilization

Los Angeles County prohibits urban development in areas subject to inundation under the Capital Flood, a hypothetical worst-case storm event the County uses as a design criterion to ensure adequate flood protection.[18] To meet this requirement and ensure that Specific Plan development is not at risk of loss due to flooding, the RMDP includes bank protection along portions of the Santa Clara River mainstem and the major on-site tributary drainages. The approved Specific Plan contemplates installation of buried bank stabilization along portions of the Santa Clara River to protect development from flood hazards while preserving the river as a natural resource.[19]

The proposed bank protection would include buried soil cement, grouted and ungrouted rock riprap, turf reinforcement mats, and limited gunite slope lining around bridge abutments. These types of bank protection can be divided into two different categories, flexible and rigid revetments. Ungrouted rock riprap and turf reinforcement mats are flexible revetment systems that would be used as exposed bank protection in areas without earthen cover where stream velocities are low enough that the stabilization can resist erosive hydraulic forces in a Los Angeles County capital storm. Generally, this would be a maximum stream velocity of 12-14 feet per second ("fps"). Rigid revetments can resist much higher velocities (20+ fps) and erosive forces; however, they do not adjust or move like flexible systems. The bank stabilization improvements would be installed over an approximate 20-year period to coincide with development of individual tracts within the Specific Plan, and in accordance with the Specific Plan's phasing program. All Specific Plan development areas would be raised above the FEMA flood hazard elevation to protect land uses from potential flooding. A typical cross-section of installed buried soil cement bank stabilization is presented on **Figure 5-4**, Conceptual Design/Soil Cement/Bank Stabilization.

Along the river mainstem, the vast majority of the bank stabilization proposed would be constructed of buried soil cement, although gunite and rip-rap would be used in the immediate vicinity of bridges and storm drain outlets. Installation of buried soil cement would involve placement of fill material in the footprint of the stabilization itself, as well as temporary impacts in the construction zone on the riverward side of the structure. Bank stabilization along the river would be installed under all of the alternatives considered, but the location and extent of the stabilization would vary. However, the bank stabilization would be constructed outside the lateral limits of waters of the United States under all alternatives, and fill of waters would be limited to temporary impacts during construction. By locating bank stabilization outside the active channel, hydrologic impacts of bank stabilization would be reduced under some alternatives. Alternative 7 would avoid placement of bank stabilization within the river's 100-year floodplain.

Along tributary drainages, buried bank stabilization would be installed in post-development channels to limit lateral channel migration and protect adjacent land uses. The construction methods would be identical to those employed along the river mainstem, but the stabilization

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18 The "Capital Flood" is defined as a 50-year storm having greatest rainfall on the fourth day, with a bulking factor to simulate a newly burned watershed.

19 The approved Specific Plan contains criteria for such drainage and flood control improvements to be followed by projects implementing the Specific Plan. (Specific Plan, May 2003, Chapter 2, pp. 2-71 - 2-75.)

would be constructed within waters of the United States in many cases. The alternatives considered in this analysis would generally reduce impacts from bank stabilization by featuring wider channels, with bank stabilization set back laterally from the active channel. Alternative 7 would avoid construction of bank stabilization within any FEMA-mapped 100-year tributary floodplain (Potrero, Long, Chiquito, and Middle canyons).

For a more detailed description of the bank stabilization proposed, please refer to **Subsection 2.6** of the Draft EIS/EIR for the Project. The configuration of bank stabilization proposed under each alternative, as well as the associated level of impact, is described in **Section 8.0** of this report.

5.1.3 Grade Stabilizing Design Measures And Bank Protection

Due to their existing degraded conditions, portions of the existing major tributary drainages within the RMDP site (portions of Chiquito Canyon, Lion, Long, Potrero, and San Martinez Grande Canyon) would require stabilizing treatments to protect the channel and surrounding development from excessive vertical scour and lateral channel migration. The existing drainages would remain intact, but would sustain permanent and temporary impacts from construction of stabilization elements.

Under each of the alternatives, the five modified drainages described above (Chiquito, Lion, Long, Potrero, and San Martinez Grande) would contain bank and channel-bed protection designed to mimic natural features and use a combination of structural and vegetative methods to provide drainages that are stable, visually aesthetic, and support the desired habitat following Project implementation. The applicant's drainage design objectives include accommodating runoff flows from existing and future development, stabilizing the channel-bed and banks so they do not degrade, protecting proposed adjacent development, implementing improvements compatible with the environment, and allowing access for limited maintenance activities after modifying the tributary drainages. **Figures 5-5**, Example of Modified/Engineered Natural Channel, and **Figure 5-6**, Typical Grade Stabilization Structure Design and Installation, provide examples of modified/engineered drainage channels after stabilizing and revegetating the area. Because grade stabilizing structures would minimize drainage bed lowering, reduce velocities and shear stresses, and improve hydraulic stability, the potential for bank erosion and undercutting would be minimized, thereby reducing the level of bank protection required in the five modified drainages. Various bank protection options are available for the five modified drainages based on specified application criteria.

Drop structures/grade stabilizers and bank protection would be used in the design of the improved drainages within the RMDP boundary. Such improvements are required to accommodate drops in drainage elevation related to development. Construction of such features would likely include large boulders, soil cement or concrete, and generally would mimic natural features in appearance and hydraulic function.

The grade stabilization structures are designed to contain the hydraulic "jump" that occurs when there is a significant drop in streambed elevation, so that higher velocities are dissipated within the area; the structures would help control erosion and changes to the configuration of the streambed channel. Such structures would be constructed of soil cement, sheet piles, or reinforced concrete.

For a more detailed description of the channel stabilization features proposed, please refer to **Subsection 2.6** of the Draft EIS/EIR for the Project. The configuration of channel stabilization features proposed under each alternative, as well as the associated level of impact, is described in **Section 8.0** of this report.

5.1.4 Water Quality Control Facilities

Pursuant to NPDES requirements, BMPs would be implemented at the RMDP site under all alternatives. These BMPs include the following water quality control facilities: (1) water quality basins; (2) debris basins, located just upstream of the interface between developed and undeveloped areas, primarily to trap debris coming from the upper watersheds; (3) detention basins, which are typically sized to capture the predicted runoff volume and retain the water volume for a period of time (usually 24 to 48 hours); (4) catch basin inserts or screens/filters installed in existing or new storm drains to capture pollutants in the stormwater runoff; (5) bioretention, such as vegetated grassy swales, that provide water quality benefits and convey storm water runoff; and (6) solids separator units or in-line structures that reduce or manipulate runoff velocities such that particulate matter falls out of suspension and settles in a collection chamber. Many of these facilities would constructed outside waters of the United States or as components of storm drain systems or newly created channels. However, some of the proposed water quality facilities would require work in jurisdictional areas, as described below.

5.1.4.1 Water Quality Treatment/Detention Basins

The RMDP and alternatives propose NPDES water quality treatment/detention basins throughout the RMDP site, although the exact locations vary depending on the configurations of stream channels and development under each alternative. **Figure 5-7**, Typical Water Quality Treatment/Detention Basins, illustrates typical water quality treatment/ detention basins that would be used within the RMDP site. Typically, water quality treatment/detention basins are sized to capture the predicted runoff (first flush) volume and retain the design volume for a period between 24 and 48 hours. Detention basins can be designed with multiple stages to provide both flood control and water quality benefits. The upper stage is designed to store a large volume of runoff to reduce flood peaks. The lower, smaller volume stage provides slower drainage times (longer detention) to promote water quality through the settling of particulates and removal of nutrients, heavy metals, and other pollutants that might be present in the sediment. In most cases, detention basins would be excavated in uplands and located in off-line locations. However, due to the number of basins required and the need to maintain an appropriate gradient between upstream development and the detention basins, construction of detention basins would result in impacts to waters of the United States at some locations.

5.1.4.2 Debris Basins

Post-development, the RMDP site would consist of numerous open drainage channels, buried storm drains, and natural drainage areas fed by the overall watershed. To ensure the proper function of the engineered portions of the storm drainage system, debris basins are proposed in certain areas where development interfaces with undeveloped areas upstream. The primary function of a debris basin is to trap debris coming from the upper watersheds. Debris basins are proposed in various natural slope and tributary locales in the RMDP area. The precise locations of the basins, including access thereto, would be defined by subsequent tract maps that implement the Specific Plan. However, these facilities would be required under all alternatives considered, and would necessitate construction within waters of the United States. **Figure 5-8**, Typical Debris Basin, illustrates a typical debris basin that would be used within the RMDP study area.

Debris control structures would be constructed downstream of natural watersheds to protect developed area drainage systems from debris flows. The design capacity for such structures would take into account the classifications stated in the debris production maps provided in Appendix A of the DPW 1991 Hydrology Manual. Debris control structure capacity and transportation rates would be based on the specification stated in the DPW Sedimentation Manual. Maintenance of the basins would include the periodic removal of accumulated sediment and other debris.

For a more detailed description of the water quality features proposed, please refer to **Subsection 2.6** of the Draft EIS/EIR. The configuration of water quality features proposed under each alternative, as well as the associated level of impact, is described in **Section 8.0** of this report.

5.2 PROPOSED TRIBUTARY DRAINAGE TREATMENTS

The proposed Project and alternatives incorporate various treatments of tributary drainages to accommodate approved land uses within the RMDP site. In order to optimize the location of development within portions of the RMDP site, mass grading would occur in portions of the northern and southern tributary watersheds. Generally, some higher areas would be graded or "cut" and some lower valley areas would be elevated or "filled," balancing the distribution of cut and fill soil throughout the RMDP site. In many cases, the excavation of native material and placement of compacted fill is necessary to achieve geotechnically-stable development pads. Tributaries requiring grading treatment or other modification have been studied extensively to ensure that the channel designs provide adequate hydrologic and ecological functions and services.

Within the tributary drainages in the RMDP study area, certain drainages would remain undisturbed, while other drainage areas would be graded, reconstructed to a soft-bottom drainage channel with buried bank stabilization along each side of the drainage, or converted to buried storm drain. These conceptual drainage treatments are described below.

5.2.1 Drainages To Be Relocated

Due to the existing degraded conditions within portions of some drainages in the RMDP site (Potrero Canyon, Long Canyon, and portions of Chiquito, San Martinez Grande, and Lion canyons), stabilization of the existing drainages is not feasible. In order to meet the County's flood protection objectives, these drainages would be graded, and a new drainage would be constructed in the same or similar location. The new drainages would be designed to incorporate buried bank stabilization and grade stabilization, and would have sufficient hydrologic capacity to pass the Los Angeles County Capital Flood without the need for clearing vegetation from the channels. The new channel banks would be planted with riparian vegetation following construction. For a more detailed description of drainages to be relocated, please refer to **Subsection 2.6** of the Draft EIS/EIR. The configuration of drainages proposed for relocation under each alternative, as well as the associated level of impact, is described in **Section 8.0** of this report.

5.2.2 Drainages Converted To Buried Storm Drains

Some of the drainages within the RMDP site, including many of the smaller, ephemeral drainages, would be graded as part of the construction operations required to facilitate build-out of the Specific Plan. The wet-weather flows in these drainages meet the Los Angeles County flood criteria (less than 2,000 cfs) to be conveyed by storm drain. The RMDP does not propose to replace these affected drainages with new drainage channels. Instead, the wet-weather flows that currently occupy the drainages would be routed into the development's storm drain system, and would be discharged to the Santa Clara River via the proposed storm drain outlets. The location of drainages proposed for conversion to buried storm drain under each alternative, as well as the associated level of impact, is described in **Section 8.0** of this report.

5.2.3 Drainages To Be Reconstructed

Where large-scale removal of drainages are not required, the alternatives would integrate the flood control and grade stabilizing measures described in **Section 5.1**, above, to maintain sediment equilibrium and protect the channel bed and banks from hydromodification while providing flood protection to adjacent developed lands. This design methodology is intended to create stable drainage channels that will support the in-channel habitat following project implementation. The approach focuses on developing channel width, depth, slope, and other parameters based on the future flow and sediment regime of each drainage. The intent is to predict stable characteristics, and then use structures and other measures only in those drainage locations where erosional forces would exceed the natural stability of the drainage channel. All such structures (bank and channel bed protection) are designed to mimic natural features and use a combination of structural and vegetative methods to provide drainage channels that are stable, visually aesthetic, and maintain the desired habitat (*i.e.*, riparian, wetland, upland) after project implementation. Road crossing culverts and bridges would cross various drainages, but only where necessary to accommodate the approved Specific Plan circulation system. For a more detailed description of drainages to be reconstructed, please refer to **Subsection 2.6** of the Draft EIS/EIR. The location of drainages proposed for reconstruction under each alternative, as well as the associated level of impact, is described in **Section 8.0** of this report.

5.2.4 Drainages To Be Geomorphically Corrected

In some instances, existing conditions within on-site drainages are such that if no modifications were implemented, excessive vertical scour or lateral channel migration would occur. In these locations, grade control measures are proposed regardless of any need to provide flood protection, as complete avoidance of such drainages would allow existing degradation to worsen. The grade control measures proposed would include installation of grade control structures, described in **Section 5.1**, above, and could also require recontouring of existing banks to restore stable channel morphology and prevent channel incision. These activities would result in permanent and temporary fill of waters of the United States. For a more detailed description of the drainages to be geomorphically corrected, please refer to **Subsection 2.6** of the Draft EIS/EIR. The location of drainages proposed for correction under each alternative, as well as the associated level of impact, is described in **Section 8.0** of this report.

6.0 OVERVIEW OF ALTERNATIVES ANALYSIS METHODOLOGY

In accordance with the Guidelines, this Alternatives Analysis involves several distinct steps. First, the Corps must analyze off-site and on-site alternatives to determine whether the RMDP is the LEDPA. Once the LEDPA is established, the Corps still must evaluate the RMDP for compliance with the other restrictions on discharge and requirements found in the Guidelines. Consistent with the Guidelines, this Alternatives Analysis employs the following methodology.

6.1 ANALYSIS OF OFF-SITE ALTERNATIVES

The analysis of off-site alternatives began with an evaluation of whether any alternative locations were available that would be able to meet the overall project purpose, as determined by the Corps in consideration of the Applicant's stated project purpose. After potential alternative sites were identified, each site was screened to determine the practicability of constructing a development that would meet the overall project purpose, and to determine whether such construction would result in a less adverse impact on the aquatic environment than construction on the proposed RMDP site. A preferred location (either the proposed RMDP site or a less damaging alternative site) was selected based on the results of this analysis, and was carried forward for analysis of on-site alternatives. The evaluation of off-site alternatives is presented in **Section 7.0** of this report.

6.2 SELECTION AND ANALYSIS OF ON-SITE ALTERNATIVES

In accordance with the Guidelines, after a preferred Project location was identified, a range of reasonable[20] on-site project alternatives that varied the amount of aquatic resource avoidance were considered. These alternatives were screened against a series of criteria for practicability and environmental impacts, to determine which alternative would result in the least impact on the aquatic ecosystem and avoid significant adverse environmental effects to other resources, while still being practicable. This alternative was identified as the Draft LEDPA, but was derived through a multi-step process described below.

The analysis began with the range of alternatives evaluated in the Corps' Draft EIS/EIR for the Project, but went into greater detail to ensure that the range of alternatives considered was adequate to accurately identify the LEDPA, and that the analysis of alternatives addressed all the factors required by the Guidelines.

Although a thorough alternatives analysis is required, the analysis must remain manageable.[21] This presented a special challenge for the RMDP, in part, because the proposed Project would have impacts both to jurisdictional waters and to sensitive upland resources such as the protected San Fernando Valley spineflower. Because of this, avoidance of jurisdictional waters would have the potential to shift development into upland areas that might otherwise be used for spineflower mitigation (*i.e.*, spineflower preserves). Given this tension, and the size and

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[20] The Section 404(b)(1) Guidelines do not "require consideration of the extreme or truly absurd, but only those alternatives that are truly practicable." 44 Fed. Reg. 54224 (1979).

[21] "It is axiomatic that the Corps need not examine every conceivable alternative." *Simmons v. U.S. Army Corps of Engineers*, 120 F.3d 664, 669 (7th Cir. 1997).

complexity of the RMDP, the number of theoretically possible on-site alternatives is nearly limitless. To balance these demands, the following methods were employed for this Project for analyzing on-site alternatives. A flow chart depicting the process is presented below.

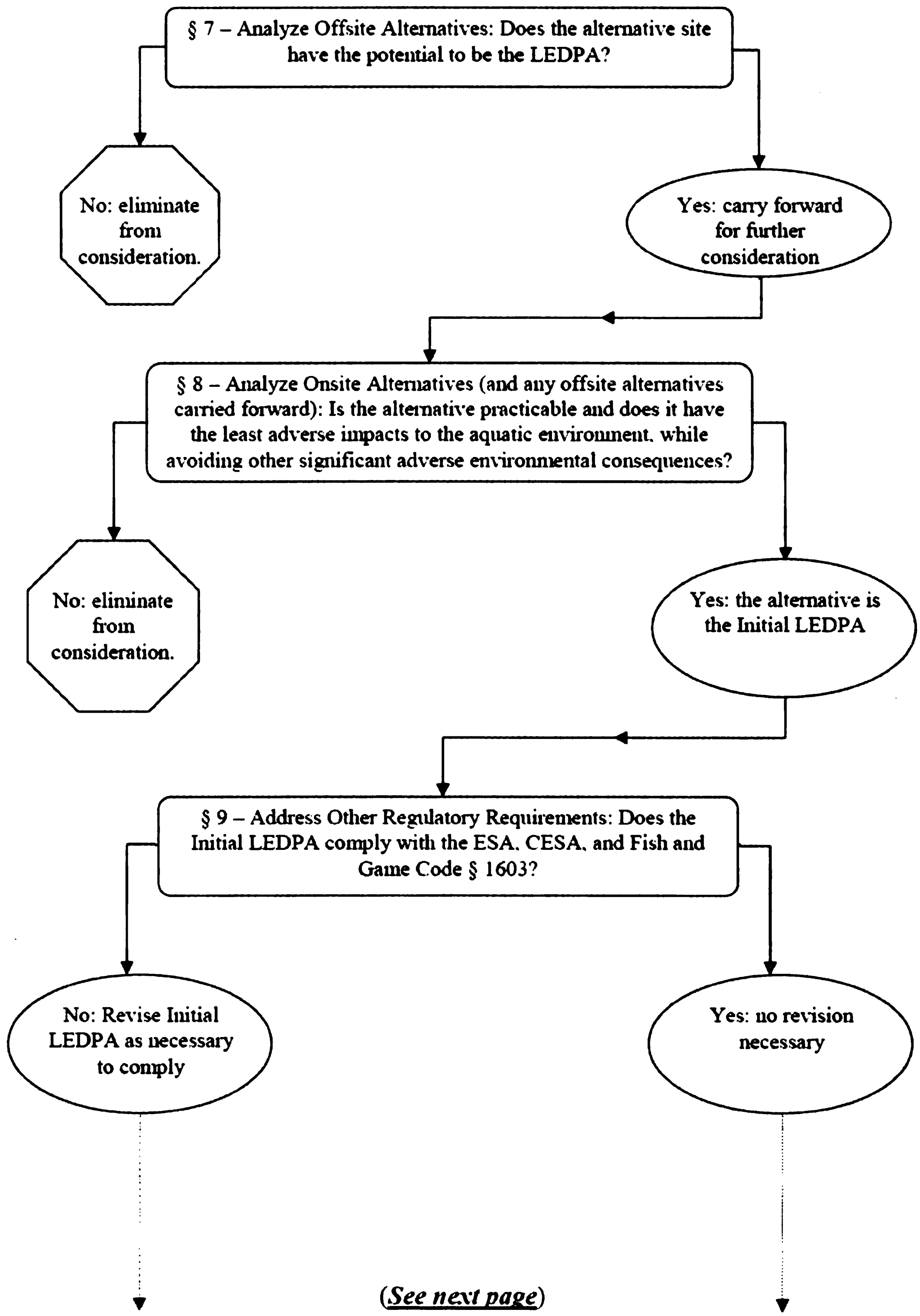
6.2.1 Screening On-Site Alternatives And Determination Of Initial LEDPA

The Corps' Draft EIS/EIR previously selected and analyzed a number of on-site alternatives as required by NEPA , and this range of alternatives was used as the starting point for the analysis of on-site alternatives. A "no fill" alternative, evaluating the possibility of constructing the Project in a manner that would avoid discharges of fill material into waters of the United States was also included. Each of these seven alternatives (six from the Draft EIS/EIR plus the "no fill" alternative) was screened to determine whether the alternative would achieve the overall project purpose, was practicable, and would be less environmentally damaging than the proposed Project. Because the Corps' Draft EIS/EIR contained a comprehensive analysis of most of the alternatives, the Draft EIS/EIR was referenced to avoid redundancy as allowed by NEPA and the CWA. Of those practicable alternatives that would meet the overall project purpose, the alternative with the lowest level of environmental impact was selected. This alternative was termed the "Initial LEDPA." Evaluation of on-site alternatives and identification of the Initial LEDPA is described in **Section 8.0** of this report.

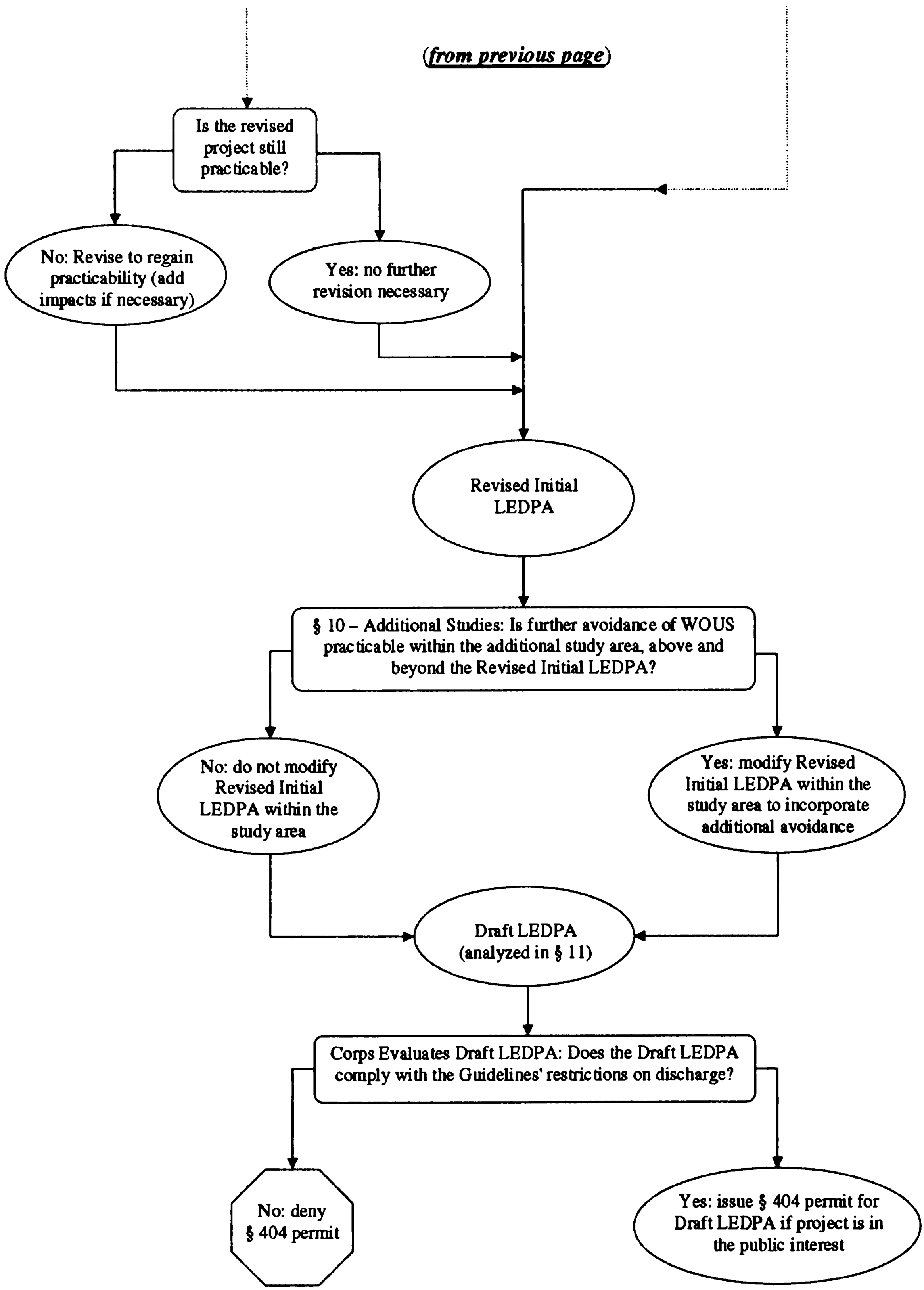
6.2.2 Addressing Regulatory Requirements And Determination Of Revised Initial LEDPA

Although the Initial LEDPA represented the least environmentally damaging practicable alternative among those included in the Draft EIS/EIR, revisions to this alternative were necessary due to the complex and overlapping regulatory framework governing the resources within the RMDP site. The proposed Project would be subject to the requirements of regulatory programs other than the section 404 program, including the CESA requirement to fully mitigate for impacts to state-listed species, including the San Fernando Valley spineflower; CDFG requirements associated with the project's section 1605 Master Streambed Alteration Agreement; conditions imposed by the USFWS to protect wildlife listed as threatened or endangered under the federal ESA; and any other applicable requirements. The Initial LEDPA was modified to address these requirements, and was again screened to ensure that the alternative remained practicable. The resulting configuration was termed the Revised Initial LEDPA. The revisions incorporated into the Initial LEDPA to derive the Revised Initial LEDPA are described in **Section 9.0** of this report.

Methodology for Newhall Ranch 404(b)(1) Alternatives Analysis



(*See next page*)


(from previous page)
Is the revised project still practicable?
No: Revise to regain practicability (add impacts if necessary)
Yes: no further revision necessary
Revised Initial LEDPA
§ 10 – Additional Studies: Is further avoidance of WOUS practicable within the additional study area, above and beyond the Revised Initial LEDPA?
No: do not modify Revised Initial LEDPA within the study area
Yes: modify Revised Initial LEDPA within the study area to incorporate additional avoidance
Draft LEDPA (analyzed in § 11)
Corps Evaluates Draft LEDPA: Does the Draft LEDPA comply with the Guidelines' restrictions on discharge?
No: deny § 404 permit
Yes: issue § 404 permit for Draft LEDPA if project is in the public interest

6.2.3 Evaluation Of Sub-Alternatives And Determination Of Draft LEDPA

The final step in determining the Draft LEDPA was to consider small-scale changes to the site plan that could reduce impacts in key areas. Locations such as Potrero Canyon, which contains a substantial acreage of wetlands, were evaluated in greater detail so that fine-tuning of the Project design in those areas to practicably minimize impacts could be evaluated. A total of seven areas warranting this sort of additional analysis were identified, and were termed "Special Study Areas." Within each Special Study Area, a range of location-specific alternatives was considered, including an avoidance alternative, an alternative featuring avoidance except as required for channel stability, and one or more alternatives featuring varying degrees of impact to the aquatic resource. The additional studies focused on the following:

- The practicability of avoiding each of the special aquatic sites located within the RMDP site (Santa Clara River, Potrero Canyon, Salt Creek, Middle Canyon spring complex).
- The practicability of alternative configurations for tributary drainages that would further reduce or completely eliminate fill of waters of the United States (Potrero Canyon, Chiquito Canyon, Long Canyon, San Martinez Grande Canyon, Lion Canyon, Middle Canyon).
- The practicability of further avoidance and minimization of fill of waters of the United States in connection with bridge protection and tributary confluences.
- The practicability of any further avoidance or minimization measures suggested by the Corps.

Where the additional studies revealed that further avoidance was practicable, the Revised Initial LEDPA was modified to accommodate these additional avoidance measures. The configuration resulting from these modifications was identified as the Draft LEDPA. The additional avoidance studies performed and determination of the Draft LEDPA are presented in **Section 10.0** of this report.

6.3 EVALUATION OF DRAFT LEDPA FOR COMPLIANCE WITH THE GUIDELINES

Once the Draft LEDPA was established, the analysis evaluated whether the LEDPA complies with the other restrictions on discharge found in the Guidelines at 40 C.F.R. § 230.10. This process is presented in **Section 11.0** of this report.

7.0 ANALYSIS OF ALTERNATIVE PROJECT LOCATIONS

7.1 INITIAL SCREENING OF POTENTIAL SITES

The Guidelines require the consideration of alternative sites that may be available and suitable for a proposed project, even if not owned by an applicant. "If otherwise a practicable alternative, an area not presently owned by the applicant which could reasonably be obtained, utilized, expanded or managed in order to fulfill the basic purpose of the proposed activity may be considered." (40 C.F.R. § 230.10, subd. (a)(2).)

The Draft EIS/EIR initially identified 23 alternative sites within the region that were considered potentially available. These sites were evaluated using initial screening criteria to determine whether they might have the potential to accommodate the proposed Project. Twenty of the sites were eliminated from further analysis at this stage, for one or more of the following reasons.

- Site is too small to meet the basic objectives of the Specific Plan and accommodate the development approved by the Specific Plan;
- Site is located outside the Santa Clarita Valley market/planning area, which is the area in which the Specific Plan is situated;
- Site is in an isolated location that cannot be connected efficiently with existing infrastructure, which is contrary to the Specific Plan objectives of avoiding leapfrog development and accommodating projected regional growth in a location adjacent to existing and planned infrastructure, urban services, transportation corridors, and major employment centers;
- Site is entitled for development and is actively being planned for development by the current owner or is already under construction.

(See Draft EIS/EIR, pp. 3.0-2 - 3.0-7, **Table 3.0-2**, for a summary of sites considered and reasons for elimination.)

7.2 CRITERIA FOR DETAILED ANALYSIS OF ALTERNATIVE LOCATIONS

Based on the initial screening, the EIS/EIR identified three potential alternative sites that have the potential to meet most or all of the basic objectives of the Specific Plan, consistent with the overall project purpose, and carried them forward for further analysis: Temescal Ranch (Alternative Site A), the Newhall-Ventura Property (Alternative Site B), and Hathaway Ranch (Alternative Site C). This section will evaluate the same three sites using criteria that reflect the requirements of the 404(b)(1) Guidelines. The following criteria have been established to determine whether the alternative locations are available and capable of being used after taking into consideration cost, existing technology, and logistics in light of the overall project purpose, and whether they have the potential to reduce impacts to the aquatic ecosystem without causing other significant adverse environmental consequences.

As will be discussed in more detail below, the Temescal Ranch site and the Newhall-Ventura property are located in Ventura County; and, therefore, are subject to Ventura County's strict rural lands preservation ordinances. Under these ordinances, the conversion of open space and agricultural land to urban uses is prohibited without voter approval. The Hathaway Ranch site, by contrast, is located in Los Angeles County and is not subject to these same constraints.

7.2.1 Availability

In order for development on a particular site to be practicable, the subject property must be under the Applicant's control or ownership, or reasonably available for acquisition. The Corps' general practice is to assess the availability of alternative sites as of the date of the application for a Corps permit. The application for the Newhall Ranch Specific Plan was filed on September 24, 2003. Therefore, the availability of the alternative sites for acquisition is evaluated as of that date.

A few courts in other circuits have applied a "market entry theory" of availability, under which the availability of alternative sites is evaluated as of the date when an applicant "entered the market" for a site on which to build the proposed project. (See *Bersani v. Robichaud*, 850 F.2d 36 (2nd Cir 1988); *Choate v. U.S. Army Corps of Engineers*, 2008 WL 4833113 (E.D. Ark. 2008).) However, the Ninth Circuit has not accepted the market entry theory , nor have other circuits adopted the theory widely. One problem with the theory is that the date of market entry is difficult to determine in cases where an applicant has owned property for many years prior to proposing development of the site. In these cases, using the date of property acquisition as the date of market entry would lead to absurd results, because it would require an applicant to evaluate the availability of alternative sites as of a date when the applicant may have had no intention of developing the proposed project. The Applicant's ownership of the RMDP site is one such situation.

The Applicant's ownership of the 46,000-acre Rancho San Francisco property, which includes the proposed RMDP site, dates to the late 1800s. During its ownership, the Applicant has conducted extensive agricultural and oil and gas resource development activities on various portions of the property. Because of the Applicant's long ownership and history of different uses, it would be impractical and unreasonable to evaluate the availability of alternative sites for the proposed Project as of the date that the Applicant acquired the Newhall Ranch property. Instead, this analysis uses the date of application for a Corps permit, which approximates the date on which the Applicant reasonably could have considered alternative site locations.

7.2.2 Project Purpose

For an off-site alternative to meet the overall project purpose, the site must: (1) allow the development of a master planned community with interrelated villages, and (2) achieve the Basic Objectives of the Specific Plan by providing a broad range of land uses of approximately the same size and proportions as approved in the Specific Plan, including residential, mixed-use, commercial and industrial uses, public services (schools, parks, *etc.*), a water reclamation plant and large tracts of open space.[22] Specific criteria used to determine whether off-site locations meet this standard are presented below.

7.2.2.1 Location

- *Is the alternative site located in the vicinity of the Santa Clarita Valley in northwestern Los Angeles County?*
- *Would the alternative site avoid leapfrog development and accommodate projected regional growth in a location that is adjacent to existing and planned urban services, transportation corridors, and major employment centers?*
- *Is the alternative site reasonably proximate to existing or proposed transportation, sewer, water and other utility infrastructure, and capable of being served by that infrastructure?*

7.2.2.2 Size

- *Would the alternative site allow approximately the same net developable acreage as approved in the Specific Plan, along with large tracts of open space?*
- *Would the alternative site allow approximately the same number of units and amount of commercial space (i.e., within 10 percent) as approved in the Specific Plan?*

7.2.2.3 Form

- *Would the alternative site allow the creation of a major new community with interrelated villages that allows for residential, mixed-use, commercial and industrial development, while preserving significant natural resources, important landforms and open areas on the site?*
- *Does the alternative site contain developable parcels sufficiently contiguous to be linked by an efficient and safe circulation design?*

7.2.3 Logistics

Specific criteria used to determine whether development of the Project at an off-site location would be logistically practicable include:

- *Is the alternative site available for development consistent with the Basic Objectives of the Specific Plan, based on such factors as zoning, general plan designations, and other potential obstacles to development?*
- *Would it be feasible to construct the infrastructure necessary for development of the alternative location consistent with the Basic Objectives of the Specific Plan?*
- *Does the alternative site possess adequate water rights or access to water supplies to serve a project that otherwise meets the project purpose? If not, can adequate water supplies be obtained for the site?*

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[22] Note that only the objectives of the Specific Plan that are most relevant to a comparison of alternative locations have been included in this screening for the overall project purpose criterion. Other objectives more relevant to a comparison of on-site alternatives are not addressed here.

- *Would the alternative site allow for development and transitional land use patterns that would not conflict with surrounding communities and land uses?*
- *Would the alternative location allow the creation of a physically safe environment by avoiding building on fault lines and avoiding or correcting other geologically unstable landforms; by avoiding areas subject to flooding or by constructing flood control facilities to protect urban areas; and by avoiding areas prone to wildfire or implementing appropriate measures to protect against wildfire risk?*

7.2.4 Cost

Specific criteria used to determine whether development of the Project at an off-site location would be practicable in terms of costs include:

- *Would development of the alternative site consistent with the Basic Objectives of the Specific Plan be economically practicable, taking into account acquisition costs, development costs, and construction costs?*
- *Would construction of any required extensions of infrastructure to the site, including roadways, power, and water and wastewater lines, be economically practicable?*

7.2.5 Impacts To Aquatic Ecosystem

Specific criteria used to determine whether development of the Project at an off-site location would result in less impact to the aquatic ecosystem include:

- *Would development of the alternative location result in significantly less impact to the aquatic ecosystem than development on the proposed RMDP site?*

7.2.6 Other Environmental Impacts

Specific criteria used to determine whether development of the Project at an off-site location would result in other significant adverse environmental consequences include:

- *Would development of the alternative location have other significant adverse environmental consequences that would exclude it from consideration, such as impacts to endangered species and/or their habitat?*

7.3 ANALYSIS OF ALTERNATIVE A: TEMESCAL RANCH

The Temescal Ranch site is approximately 7,580 acres in size and is located approximately two miles northwest of the RMDP site in unincorporated Ventura County, northeast of the community of Piru (see **Figure 7-1**, below). Lake Piru, formed within the Piru Creek watershed by the San Felicia Dam at the southern end of the Lake, extends through the northern third of the Temescal Ranch site. Lake Piru serves Ventura County and provides water conservation, flood control, seawater intrusion abatement, groundwater recharge, irrigation, and municipal and industrial water supplies. The Piru recreational area, which provides lake access, is located on the western side of the lake, while the Santa Felicia Dam extends across the southern edge of the lake.

Piru Canyon and Piru Creek traverse the central portion of the site, extending from the dam to the property's southern boundary. The topography of the Temescal Ranch site is highly variable, with elevations ranging from approximately 780 feet AMSL to approximately 3,000 AMSL, with high peaks and valley flood plain area surrounding Piru Creek. Lands along the eastern side of Piru Canyon consist of steep, hilly terrain, while the western side offers gentler slopes and features plateaus overlooking the canyon. Historic uses of the site include cattle grazing, agriculture, and oil production. Other than Lake Piru, the site is undeveloped. Vehicular access is available to the Temescal Ranch site from SR-126, via Piru Canyon Road, but no water or wastewater lines serve the site. A portion of the Temescal Ranch site is within the United Water Conservation District ("UWCD") service area.

7.3.1 Availability

In 2003, the Temescal Ranch site was not listed for sale. The applicant has no other information regarding availability. In the absence of definitive information regarding availability, this analysis assumes that the site may have been available. If other screening factors show that Temescal Ranch is a practicable alternative, further inquiry will be made.

7.3.2 Project Purpose

7.3.2.1 Location

The Temescal Ranch site is located in the general vicinity of the Santa Clarita Valley, but not within Los Angeles County. Instead, it is located in unincorporated Ventura County. As a result, the site would not meet the need for additional housing, employment, and related land uses within Los Angeles County.

Compared to the RMDP site, the Temescal Ranch site is more distant from existing job centers and transit corridors. In addition, Temescal Ranch is not served directly by SR-126 or any other major state highway, and is much farther away from I-5, one of the state's major north-south freeway corridors (**Figure 7-1**). Consequently, the amount of transportation infrastructure needed to reach Temescal Ranch would be substantially greater than that needed for the proposed RMDP site. Travel distances between Temescal Ranch and the surrounding employment centers found in the Santa Clarita Valley would also be greater than at the proposed RMDP site.

Temescal Ranch is also further from existing sewer, water, and other existing utilities than the proposed RMDP site, and would require that such utilities be extended significantly to serve development in accordance with the Applicant's project purpose.

7.3.2.2 Size

The total area of the Temescal Ranch site is 7,580 acres, which is smaller than the 11,999-acre Specific Plan/RMDP site (**Figure 7-1**). Site development constraints also exist on the Temescal Ranch site, including Lake Piru and Piru Creek, which would further limit the area available for new urban development. Because of the need to avoid these features, as well as the topography of the site, the Applicant estimates that only about one-third of the site would be suitable for development. This makes it unlikely that the site would be able to provide approximately the same amount of development as approved in the Specific Plan. In addition, the smaller size of the site could require the Applicant to acquire off-site property to compensate for impacts to on-site habitat and provide open space comparable to the proposed Project, adding to the cost of development.

7.3.2.3 Form

Assuming that the Applicant could obtain land use approvals for urban development on the Temescal Ranch site, the site would provide developable parcels sufficiently contiguous to support a coherent residential community capable of being linked by efficient and safe circulation design.

7.3.3 Logistics

7.3.3.1 Entitlement

The entire Temescal Ranch is designated as Open Space (80-acre minimum lot size) under the Ventura County General Plan. Because this designation would not allow development comparable to the density/urban uses contemplated by the Specific Plan, a General Plan amendment would have to be obtained to facilitate development consistent with the 'project purpose. In addition, given the configuration of the Temescal Ranch site (with Lake Piru dominating the land in the northern third of the area), existing agricultural areas on site would have to be converted to urban uses.

There are, however, more significant obstacles to entitling any urban development on Temescal Ranch. On November 3, 1998, the Ventura County voters approved the Ventura County Save Open Space and Agricultural Resources ("SOAR") initiative, which limits future development of land in Ventura County. The SOAR initiative requires that land designated as Agricultural, Open Space, or Rural in the County General Plan remain so designated unless redesignated by vote of the people. Although there are some exceptions to the SOAR requirements, they are very limited and none would cover the scope of development contemplated here. The initiative remains in effect through December 31, 2020.

In addition, on October 10, 2000, the County of Ventura and the City of Fillmore jointly adopted by ordinance the Fillmore/Piru Greenbelt ("Greenbelt Ordinance"), the purpose of which is to promote the agricultural and open space land conservation goals and policies contained in the General Plans of the City of Fillmore and the County of Ventura. The Greenbelt designation covers land located between the City of Fillmore and the Ventura County/Los Angeles County boundary, including Temescal Ranch.

As indicated above, development of the Temescal Ranch site would require a general plan amendment, which would have to be approved by the Ventura County electorate. Development proposals requiring a SOAR vote in other nearby Ventura County communities have largely failed at the ballot box, demonstrating that County residents continue to disfavor converting agricultural or open space lands to urban uses. Here, the area to be developed would be a significant distance from the nearest City (Fillmore). This fact makes a Temescal Ranch project even less likely to be approved than past proposals (largely rejected by the voters) that sought merely to expand the development footprint of an existing City. Further, the conversion of agricultural lands to urban uses is inconsistent with the Greenbelt Ordinance, which promotes preservation of open space and agricultural uses within the Fillmore/Piru Greenbelt. In light of these considerations, it would be extremely unlikely that the County and voters would grant the necessary approvals for development on Temescal Ranch consistent with the project purpose. For this reason, development of the site consistent with the project Purpose is not logistically feasible.

7.3.3.2 Infrastructure

Infrastructure needs associated with developing the Temescal Ranch site were not evaluated in detail. However, infrastructure needed to facilitate development of the Temescal Ranch site would likely be similar to that required for the proposed Project, although proportionately reduced in scale to reflect the somewhat smaller amount of development that would be possible on this site. Construction of this infrastructure would be logistically feasible.

7.3.3.3 Compatibility With Surrounding Land Uses

The Temescal Ranch property is close to the Sespe Condor Sanctuary. Therefore, development of the Temescal Ranch site would have the potential to affect recovery efforts for the California condor that are ongoing at the Sespe Condor Sanctuary. Biological surveys of the Temescal Ranch site were not conducted, but due to the proximity of the site to the Sespe Condor Sanctuary, it is likely that California condors use the site for foraging habitat. As discussed in the Draft EIS/EIR, some aspects of urban development, such as power lines and microtrash, are potentially detrimental to condors within their foraging range. (See Draft EIS/EIR, pp. 4.5-706-4.5-707.) Development of Temescal Ranch would likely reduce condor foraging habitat and cause other hazards to the species. Given that Temescal Ranch is closer than the RMDP site to the Sespe Condor Sanctuary, it would result in greater potential impacts to the California condor and would not be compatible with adjacent land uses.

7.3.3.4 Water Supply

Assuming Temescal Ranch could obtain land use approvals for urban development consistent with the overall project purpose, the potable water demands of Temescal Ranch generally would be the same as the proposed RMDP site. However, Temescal Ranch currently does not have access to water to support development consistent with the overall project purpose. Temescal Ranch is only partially within the service area boundary of UWCD, and is not served by a water retailer. Also, groundwater supplies are likely not of sufficient quantity to serve the development facilitated by the proposed RMDP. Consequently, Temescal Ranch would need to be annexed into the UWCD service area, and would have to either annex to the nearest water retailer service area (in the community of Piru) or create a new water retail agency. Currently, it is UWCD's policy to allow annexation into its service area only if enough water is concurrently brought into the district to serve the development proposed on the annexed land. Given its limited on-site water resources, Temescal Ranch likely would not be eligible for annexation into UWCD, which means that any project on the Temescal Ranch site would likely have to import water. By contrast, the Specific Plan site, which would be facilitated by the RMDP, receives its potable water supplies primarily from the local groundwater basin. Based on the above, development of the Temescal Ranch site is not logistically practicable given the identified water supply constraints.

7.3.3.5 Public Safety

Past and present uses of the Temescal Ranch site (namely, recreation, oil production, grazing, and some agriculture) are similar in nature to the uses within the Project area. Given its location, Temescal Ranch likely does not contain the number of natural gas and electric transmission lines as exist on the Project area. For this reason, Temescal Ranch has a slightly lower fire risk as compared to the RMDP site. However, a portion of Temescal Ranch is within the potential inundation zone of Santa Felicia Dam, which presents a potential public safety hazard in the unlikely event of catastrophic dam failure. Despite these differences, the Temescal Ranch and the proposed RMDP site are considered similar from a public safety standpoint.

7.3.4 Costs

Costs associated with developing the Temescal Ranch site were not evaluated in detail. On-site development costs associated with the Temescal Ranch site are assumed to be comparable to those for the RMDP area, although fixed costs may be spread across a somewhat smaller development area under this alternative as compared to the proposed Project. Off-site costs for extension of infrastructure would be greater than for the RMDP area because the Temescal Ranch site is located further from existing development and infrastructure. Due to the increased off-site costs, development of the site is considered to be significantly higher. .

7.3.5 Impacts To The Aquatic Ecosystem

Development of Temescal Ranch would have the potential to reduce impacts to the aquatic ecosystem compared to development of the proposed RMDP site, assuming that key aquatic resources such as Lake Piru and Piru Creek were largely avoided. Note, however, that this assumption limits the ability of the site to provide sufficient development area to fulfill the overall project purpose. Additional development could occur if a portion of Lake Piru were filled, but this is not considered a practicable alternative given the importance of this feature for water supply, flood control and other purposes.

7.3.5.1 Water Quality

Both Temescal Ranch and the RMDP site are located within the greater Santa Clara River watershed. Flows from Temescal Ranch reach the Santa Clara River via Piru Creek, while flows from the proposed RMDP site reach the River either directly or through immediate tributary drainages. Temescal Ranch, if developed consistent with the overall project purpose, would likely require its own water reclamation plant similar to the WRP. Further, it is assumed that Temescal Ranch would use reclaimed water on site, and would implement similar BMPs to minimize impacts to water quality and hydromodification. Based these assumptions, water quality impacts associates with development of the Temescal Ranch site would be similar to those associated with development of the proposed RMDP site.

7.3.5.2 Jurisdictional Waters and Streams

Lake Piru encompasses the majority of the jurisdictional area within Temescal Ranch, approximately 995 acres. The largest stream within Temescal Ranch is Piru Creek, which is fed perennially by releases from Santa Felicia Dam at the downstream end of Lake Piru. The on-site jurisdictional area of Piru Creek is approximately 250 acres. In addition to Piru Creek and Lake Piru, Temescal Ranch contains approximately 11.7 miles of intermittent and ephemeral tributary drainages to these waters, constituting an additional 47 acres of jurisdiction.. Development of Temescal Ranch would likely disturb all or most of these additional jurisdictional areas. Assuming, however, that Lake Piru and Piru Creek were largely avoided, development of the site has the potential to reduce impacts to jurisdictional waters compared to the proposed Project, which would permanently affect 93.3 acres of the approximately 660.1 acres of jurisdictional waters of the United States of the United States, and permanently affect 122.3 acres of the total combined CDFG and Corps jurisdictional area of 965.7 acres within the RMDP area.

7.3.5.3 Biological Impacts

The California Natural Diversity Database ("CNDDB") contained one record of the Santa Ana sucker, a federally-listed threatened species, occurring on Temescal Ranch. Development of the site could affect individuals of the species, if present, and could affect habitat for the species. Therefore, the potential for biological effects on the aquatic ecosystem would be similar to that of the proposed Project.

7.3.6 Other Environmental Impacts

Due to its relatively remote location, development within the Temescal Ranch site would likely result in adverse impacts related to traffic, air quality, greenhouse gas emissions, noise stemming from construction traffic and long-term commuter traffic that would exceed those of the proposed RMDP. In addition, the need to extend infrastructure to the site would result in potential adverse impacts to biological, aesthetic, visual, and other resources. The magnitude of these impacts would be significantly greater than those anticipated on the proposed RMDP site. As discussed above, development of Temescal Ranch also would have greater impacts on the California condor than the proposed Project, due to the site's proximity to the Sespe Wilderness and Sespe Condor Sanctuary.

7.3.7 Overall

Development of the Temescal Ranch site consistent with the overall project purpose has the potential to reduce impacts to the aquatic ecosystem compared to the proposed Project, assuming that Lake Piru and Piru Creek were largely avoided. Under this assumption, however, the site would not allow enough development to achieve the overall project purpose. In addition, large-scale development of the site would not be logistically feasible because it would be inconsistent with applicable Ventura County policies and ordinances regarding conversion of land from agricultural and open space uses, and because the site has no readily available source of potable water. Even if these obstacles could be overcome, the site would have significantly higher costs, result in greater environmental impacts to non-aquatic resources due to its more remote location, the need to extend infrastructure to the site, and the site's proximity to the Sespe Wilderness and Sespe Condor Sanctuary. Therefore, the Temescal Ranch site does not have the potential to be the LEDPA because this site would not meet several basic objectives of the Specific Plan, would not be practicable in light of the substantial increase in infrastructure costs, and would result in other significant adverse environmental consequences in upland areas..

7.4 ANALYSIS OF ALTERNATIVE B: NEWHALL-VENTURA PROPERTY

The Newhall-Ventura property is an approximately 15,000-acre site located in unincorporated Ventura County adjacent to the western boundary of the proposed Project site (See **Figure 7-1**). It is generally bounded by SR-126 on the north, the Santa Susana Mountains on the south, Los Angeles County on the east, and extends approximately two miles west of the community of Piru. The northwest portion of the Newhall-Ventura property encompasses a portion of the Santa Clara River floodplain and extends north of SR-126. Like the proposed RMDP site, the topography of the Newhall-Ventura property is highly variable, with elevations ranging from approximately 630 feet AMSL in the Santa Clara River valley to approximately 3,000 AMSL in the Santa Susana Mountains. Historic uses of the site include cattle grazing, agriculture and oil production. The site is heavily developed with agricultural uses (row crops, citrus, *etc.*) and also maintains a number of rural-type residences and structures. Vehicular access is available to this site from SR-126. The site is within both the UWCD and Castaic Lake Water Agency ("CLWA") service areas; however, no wastewater lines serve the site.

7.4.1 Availability

The Applicant owns the Newhall-Ventura site; and, therefore, the site is available to the Applicant as an alternative site.

7.4.2 Project Purpose

7.4.2.1 Location

The Newhall-Ventura property is more distant from existing job centers and transit corridors than the proposed RMDP site, and is further removed from I-5, one of the state's major north-south freeway corridors. Travel distances between the Newhall-Ventura property and the surrounding employment centers found in the Santa Clarita Valley would be greater than at the proposed RMDP site. In addition, development of the Newhall-Ventura property, consistent with the overall project purpose, would likely necessitate road widening and street infrastructure along SR-126, both adjacent to the Newhall-Ventura property and extending east through the proposed RMDP site.

The Newhall-Ventura property is also further from existing sewer, water, and other utilities than the proposed RMDP site, and would require incrementally greater infrastructure construction to adequately serve development.

7.4.2.2 Size

The total size of the Newhall-Ventura property site is approximately 15,000 acres, which would accommodate the development facilitated by the RMDP.

7.4.2.3 Form

Assuming the Applicant could obtain land use approvals for urban development on the Newhall-Ventura property, the site provides sufficient area to develop parcels into a coherent residential community linked by efficient and safe circulation design.

7.4.3 Logistics

7.4.3.1 Entitlement

The Newhall-Ventura property is currently designated Agriculture (40-acre minimum lot size) and Open Space (80-acre minimum lot size) in the Ventura County General Plan. Ventura County goals and policies, including the Greenbelt Ordinance, restrict conversion of land from agricultural production to urban land uses. A General Plan Amendment to change these designations to urban land use would also require voter approval under the requirements of the Ventura County SOAR initiative, discussed above. As with the Temescal Ranch site, County and voter approval for large-scale urbanization of the Newhall-Ventura site is considered extremely unlikely. Therefore, it is not considered feasible to entitle the site for development consistent with the overall project purpose.

7.4.3.2 Infrastructure

Infrastructure needs associated with developing the Newhall-Ventura property were not evaluated in detail. On-site infrastructure needed to facilitate development of the Newhall-Ventura site would be similar to that required for the Proposed Project, given the similarities in site location, topography, and jurisdictional features. Construction of this infrastructure is considered logistically feasible.

7.4.3.3 Compatibility With Surrounding Land Uses

The Newhall-Ventura property is surrounded by agricultural lands and open space, and is not adjacent to any urban land uses. Compared to the RMDP site, which is adjacent to a large urban area to the east, the potential for conflict with surrounding land uses would be incrementally greater for the Newhall-Ventura property.

7.4.3.4 Water Supply

The Newhall-Ventura property is expected to have the same potable water availability as the proposed RMDP site, given that both properties lie within similar water provider jurisdictions.

Assuming the Applicant could obtain land use approvals for urban development on the Newhall-Ventura property, potable water demands at the site would generally be the same as water demands for the proposed RMDP location. Because the Newhall-Ventura property is adjacent to the proposed RMDP site, and because the Applicant owns both properties and has similar access to groundwater, water availability would be similar in both cases. Overall, the Newhall-Ventura property meets this logistics criterion.

7.4.3.5 Public Safety

Past and present uses of the Newhall-Ventura property (namely oil and natural gas operations, grazing and some agriculture) are similar in nature to those on the RMDP site. The Newhall-

Ventura site has some of the same natural gas and electrical transmission lines traversing it as are found on the RMDP site and both sites are within the inundation area of Castaic Dam. Consequently, potential public safety impacts relating to these uses would be similar on both sites. Given the above, development of the Newhall-Ventura alternative site would be logistically feasible from a public safety standpoint.

7.4.4 Costs

Costs associated with developing the Temescal Ranch site were not evaluated in detail. On-site costs associated with developing the Newhall-Ventura alternative site are assumed to be comparable to costs for the proposed Project. Off-site costs for extension of infrastructure would be greater than for the RMDP area because the Newhall Ventura site is located further from existing development and infrastructure. Due to the increased off-site costs, the cost of developing the site is considered to be significantly higher than for the RMDP area.

7.4.5 Impacts To The Aquatic Ecosystem

7.4.5.1 Water Quality

The majority of the Newhall-Ventura property drains to the Santa Clara River. Intermittent drainages on the site include those in Tapo Canyon, Eureka Canyon, Smith Canyon, the mouth of Salt Creek, and the headwaters of Tripas Canyon. The Newhall-Ventura property would have to be improved with water reclamation, water quality and reclaimed water distribution systems similar to those contemplated under the proposed Project. Based on these assumptions, development of the Newhall-Ventura property would result in water quality impacts similar to those expected from development of the RMDP site.

7.4.5.2 Jurisdictional Waters And Streams

The Santa Clara River runs through the Newhall-Ventura property, just as it does through the RMDP site. In addition, several intermittent drainages drain to the River throughout the site. Because the Newhall-Ventura property and the proposed RMDP site contain similar reaches of the Santa Clara River and tributary drainages, both sites, if developed to meet the overall project purpose, would yield comparable impacts to river geomorphic and hydrologic changes.

The Newhall-Ventura property is located immediately adjacent to the west of the proposed RMDP site and has similar aquatic features, habitat and topography. The Newhall-Ventura property contains approximately 946 acres of the Santa Clara River and 53.8 miles of intermittent and ephemeral drainages that ultimately convey flows to the Santa Clara River, for a total of approximately 990 acres of jurisdictional waters. It is assumed, based on its proximity to the RMDP location, that the Newhall-Ventura property contains palustrine fringe wetlands along the edges of the Santa Clara River. Depressional wetlands also may occur on site, but are likely limited in extent due to relatively steep topography and arid climate conditions.

At approximately 15,000 acres, the Newhall-Ventura site is larger than the proposed RMDP site. Therefore, even though the quantity and quality of jurisdictional streams and wetlands on these two sites are similar, development on the Newhall-Ventura property could be designed to affect a smaller percentage of jurisdictional streams and wetlands. As a result, the Newhall-

Ventura property site could potentially be developed with fewer impacts to jurisdictional streams and wetlands as compared to the proposed RMDP site.

7.4.5.3 Biological Impacts

The CNDDB indicates that least Bell's vireo, Western yellow-billed cuckoo, and the Santa Ana sucker, among others, have been observed on the Newhall-Ventura property. In addition, the site contains sensitive habitats, including Southern Coast Live Oak Riparian Forest, Valley Oak Woodland, and California Walnut Woodland. Like the RMDP area, the Newhall-Ventura site is within the critical habitat of the endangered least Bell's vireo and contains habitat suitable for the unarmored three-spine stickleback and other riparian species. Given that the proposed RMDP site and the Newhall-Ventura property support similar types and amounts of sensitive habitats and species, the biological impacts to the aquatic ecosystem associated with development of the two sites would be substantially similar.

7.4.6 Other Environmental Impacts

Because the Newhall-Ventura property is slightly larger than the RMDP site and contains similar resource values, on-site impacts of development on this site would be similar to those of the proposed Project. However, because the site is further removed from existing urban services, impacts associated with long-term traffic, including air quality and noise impacts, would be greater under this alternative.

7.4.7 Overall

The Newhall-Ventura site has the potential to reduce impacts to the aquatic ecosystem compared to the proposed Project. However, development of the site would conflict with at least two basic objectives of the Specific Plan, avoiding leapfrog development and reducing vehicle miles traveled, which are components of the overall project purpose. In addition, development of the site consistent with the overall project purpose is not logistically feasible because it would be inconsistent with applicable Ventura County policies and ordinances and, therefore, is extremely unlikely to be approved and, even if these obstacles could be overcome, the site would have significantly higher cost due to off-site costs. Finally, development of the site could have greater adverse effects than the proposed Project in the form of traffic, air quality, and noise impacts due to its greater distance from existing urban centers. The Newhall-Ventura site, therefore, does not have the potential to be the LEDPA because the site would not meet several basic objectives of the Specific Plan and would not be practicable in light of the substantial increase in infrastructure costs..

7.5 ANALYSIS OF OFF-SITE ALTERNATIVE C: HATHAWAY RANCH

The Hathaway Ranch site is approximately 6,195 acres in size, and is located approximately five miles north of the RMDP site in unincorporated Los Angeles County, generally between the Ventura County line to the west, I-5 to the east, Hasley Canyon to the south, and the Angeles National Forest to the north (see **Figure 7-1**). Topography on the Hathaway Ranch site is highly variable, with elevations ranging from approximately 1,100 feet AMSL to more than 2,500 AMSL; very little flat land exists on this site. According to a slope analysis performed by Hunsaker and Associates ("Hunsaker Technical Memorandum"), both the RMDP site and

Hathaway Ranch have hilly terrain, the chief difference between them is that Hathaway Ranch has a higher percentage of land within the 25-50 percent slope range, while the RMDP site has a higher percentage of land in the 0-25 percent slope range and the >50 percent slope range.[23] Historic uses of the Hathaway site include cattle grazing, oil and natural gas operations, and mineral resource mining. As Hathaway Ranch is undeveloped, no vehicular access is available via improved roadways, and no water or wastewater lines serve the site.

7.5.1 Availability

In 2003, the Hathaway Ranch site was not listed for sale. The applicant has no other information regarding availability. In the absence of definitive information regarding availability, this analysis assumes that the site may have been available. If other screening factors show that Temescal Ranch is a practicable alternative, further inquiry will be made.

7.5.2 Project Purpose

7.5.2.1 Location

Hathaway Ranch lies five miles north of the proposed Project site and is located in the vicinity of the Santa Clarita Valley in northwestern Los Angeles County (**Figure 7-1**). However, Hathaway Ranch is more distant from existing employment centers and transit corridors than the proposed RMDP site. In addition, Hathaway Ranch is not served directly by a major state highway (*e.g.*, SR-126, which serves the proposed Project site) and is further removed from the major north-south freeway corridor in the region, I-5. In fact, no vehicular access to Hathaway Ranch is available via improved roadways. Therefore, the amount of transportation infrastructure needed to reach Hathaway Ranch would be substantially greater than that needed for the proposed RMDP site. Moreover, development of this site would be expected to generate more traffic and vehicle miles traveled than would development on the proposed RMDP site, given its additional distance from job centers.

Hathaway Ranch also is further from existing sewer, water, and other utilities than the proposed RMDP site. Therefore, it would require significantly greater infrastructure construction to extend utilities to the location in order to serve development in accordance with the project purpose.

7.5.2.2 Size

The total area of the Hathaway Ranch site is approximately 6,000 acres, which is approximately one-half the size of the 11,999-acre Newhall Ranch Specific Plan site. For this reason, it would not be possible for the site to provide sufficient development area to meet the development objectives of the Specific Plan while also providing substantial open space and mitigation for habitat impacts. In order to allow sufficient development on site, the Applicant would need to purchase additional property off-site to provide open space and compensate for on-site habitat impacts.

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23 Hunsaker Technical Memorandum, dated February 9, 2010, at p.1. A copy of the Hunsaker Technical Memorandum, including exhibits, is attached as **Appendix 7.0** to this report.

7.5.2.3 Form

Assuming the Applicant could obtain the necessary approvals to develop Hathaway Ranch consistent with the project purpose, the site could accommodate developable parcels sufficiently contiguous to support a coherent residential community capable of being linked by efficient and safe circulation design.

7.5.3 Logistics

7.5.3.1 Entitlement

'The Hathaway Ranch property is currently zoned A-2, Heavy Agriculture, by Los Angeles County, with a general plan designation of HM, Hillside Management. Because these designations would not allow development comparable to the density/urban uses contemplated by the project purpose, this Alternative would require General Plan amendments (or a Specific Plan) and rezoning.[24] Los Angeles County and the City of Santa Clarita are currently undergoing a multi-phase effort called "One Valley One Vision" or "OVOV" to create a General Plan document to govern build-out of the entire Santa Clarita Valley. (see http://www.santa-clarita.com/vgp/index.asp.) As part of that effort, the land use designation for the Hathaway Ranch property is proposed to be changed to NU1/RR1 (Non-Urban/ Rural Residential), which would allow only one dwelling unit per 20 acres. (OVOV Preliminary Land Use Policy Map, Jan. 2010, http://www.santa-clarita.com/vgp/_pdf/OVOV11x17.pdf.) Both the existing and proposed designations on the Hathaway Ranch site show that the County has envisioned only low density development for this site as part of its regional planning strategy. Thus, the County would not likely approve a General Plan amendment or Specific Plan to allow development consistent with the project purpose on the Hathaway Ranch site.

7.5.3.2 Infrastructure

The *on-site* infrastructure necessary to serve the Hathaway Ranch site, including highways, drainage, sewer, water, and utility distribution systems, would be generally similar to that required to serve the RMDP site, as both properties would support developments of similar size.

The chief difference between the two properties relates to *off-site* infrastructure. Due to its remote location, Hathaway Ranch would require a significant amount of new off-site infrastructure improvements, the cost of which, in terms of additional environmental impact and additional financial burden, is prohibitive.

'The following sections discuss in more detail the off-site infrastructure required for development of Hathaway Ranch. All proposed infrastructure for this analysis was assumed to be included in the proposed highway grading footprint, as this is the most cost effective method for providing services to the site. Any services (such as electrical) installed outside of the highway grading would have a greater cost.

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[24] By way of comparison, the proposed development of the Specific Plan site is consistent with the Los Angeles County General Plan and the Santa Clarita Valley Area Plan.

7.5.3.2.1 Roads, Off-Site Access, And Interchange Improvements

The RMDP site is located adjacent to the freeway system and existing major highways. Therefore, no additional major off-site improvements would be required to connect the site to existing transportation infrastructure, and the only major highway construction associated with the proposed Project would be located within the RMDP site itself.

By contrast, Hathaway Ranch is in a remote location, and off-site improvements would be required to provide access to the site. Austin Foust, traffic engineers, reviewed the site concept and determined that four points of access would be required to service the Hathaway Ranch site. The four access points must be major or secondary highways.[25]

Connecting the site to these highways would require extensive off-site roadway construction, with substantial costs, including right of way acquisition, and significant environmental impacts, as well as impacts to existing developed properties located between the site and existing roadways. As shown on Exhibit 1 to the Hunsaker Technical Memorandum, the four access roads would total 16.2 miles in length and require 5.8 miles of widening to existing roads (approximate cost $149 million). Approximately 236 acres of right of way would have to be acquired to construct the roads, and an additional 595 acres of land would be affected as a result of necessary grading.

Road construction would require 87 million cubic yards of cut and 6 million cubic yards of fill, at a cost of approximately $130 million, resulting in potentially significant traffic and air quality impacts associated with fill disposal. These impacts would be in addition to those associated with road construction generally. Moreover, construction would require the alteration of major ridge lines, thereby resulting in potentially significant visual and grading impacts.

Once constructed, the access routes would traverse primarily undeveloped lands, resulting in potentially significant impacts on aesthetics and visual quality, sensitive biological resources, and archaeological/paleontological resources, as well as impacts to jurisdictional waters at San Martinez Grande, Hasley Creek, and other drainage crossings. Further, three of the access routes (Hillcrest, Sloan Canyon, and Hasley Canyon) would traverse existing development, thereby increasing vehicle traffic through these established neighborhoods and resulting in potentially significant traffic, noise, and air quality impacts.

In addition, improvements to existing highways would be required, as well as improvements to or replacement of two interchanges located on I-5 -- Sloan Canyon (Hughes Road) and Hasley Canyon Road. These interchange improvements represent substantial costs (approximately $25 million) that would not be incurred in developing the RMDP site.

For purposes of this analysis, all access is assumed to be provided from the south. Additional scenarios in which access would be provided from north and/or west of Hathaway Ranch were studied but eliminated from consideration for the reasons stated below.

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25 The roadway improvements necessary to any development on Hathaway Ranch are shown graphically on Exhibit 1 to the Hunsaker Technical Memorandum (see Appendix A).

Hathaway Ranch abuts Angeles National Forest and any northerly access would run through the National Forest, which would not be feasible.

Access to the west through Lake Piru faces practical and political obstacles. The access to Lake Piru would require improvements to existing local/rural roads from Lake Piru to the SR-126 located in Piru, resulting in environmental effects. Such access also creates a jurisdictional anomaly, in that all of the access routes and impacts necessary to serve a project located in *Los Angeles County* would be located within *Ventura County*. Ventura County would not be expected to approve such a proposal, especially in light of its local SOAR and Greenbelt Ordinances, discussed above.

Finally, development of the Hathaway Ranch site would result in longer vehicle trips for residents. According to Austin-Faust, most traffic from the site will move toward I-5 to gain access to the primary employment centers. (Hunsaker Technical Memorandum, at p. 6.) This will require that drivers make a westerly detour of 6.9 miles to SR-126. (*Id.*) From SR-126 to I-5 it is an additional 12.1 miles, resulting in a total detour of 19.0 miles, of which 13.3 miles would be located in Ventura County. (*Id.*)

7.5.3.2.2 Roadway Grading

Grading for the roads accessing the Hathaway Ranch site would include a 120-foot wide roadway width with 2:1 cut and fill slopes to daylight. Remedial grading was assumed to be a uniform 15 feet of removals and/or mitigation over the grading footprint.

7.5.3.2.3 Drainage

As determined in the Hunsaker Technical Memorandum, significant road drainage infrastructure would have to be installed at the Hathaway Ranch site if it were to be developed consistent with the project purpose. Aside from the typical storm drain systems required to collect runoff from the roads, additional costs would be incurred at all crossings with blue line streams. The Hunsaker Technical Memorandum assumed box culverts would be utilized at the crossings. For comparative purposes, an average double 6-foot wide x 6-foot high reinforced concrete box culvert would be used for each crossing. Drainage within the road right-of-way was also included in the road costs.[26]

Based on these assumptions, Hunsaker determined that the cost of road-related drainage facilities at the Hathaway Ranch site would be $6,405,000. (Hunsaker Technical Memorandum, at p.10.) Such costs would not be incurred if the proposed project were developed on the RMDP site.

7.5.3.2.4 Sewer

Development on Hathaway Ranch would require sewer improvements consisting of local main lines, pump stations, and a treatment facility. Development on the RMDP site would require

[26] While the roads are adjacent to drainage courses, detailed studies have not been prepared, and the roads are assumed to be located outside of the floodplains, and no bank lining is included in the estimates.

similar sewer facilities, so the costs are considered equivalent. However, the Hathaway Ranch site will require the construction of a main line to discharge any treated but unrecycled waste water to the river or other receiving waters. For purposes of estimating costs, Hunsaker assumed that a 24-inch discharge line would be installed, with all appurtenant structures included in the unit price. With these assumptions in place, Hunsaker determined that the added cost to construct sewer infrastructure capable of serving urban development at Hathaway Ranch would be $6,336,000. Such costs would not be incurred if the proposed Project were developed on the RMDP site. Note also that a new discharge permit would be required for any discharge from the Hathaway site into receiving waters.

7.5.3.2.5 Water

Like the RMDP site, Hathaway Ranch would have to be improved with on-site reservoirs and distribution lines if it is to serve a development consistent with the project purpose. The two sites differ, however, in that Hathaway Ranch would also require new off-site transmission mains to provide potable water to the site. Currently, the site is not located within any provider's service area. However, it does abut two service providers -- Los Angeles County Water District and Newhall County Water District -- and it is assumed that the site could be served by one or both of these districts. To accomplish this and provide redundancy, two 24-inch diameter transmission mains would have to be installed, along with two turnouts and four booster stations. The estimated cost of these water utility improvements is $18,807,200. (Hunsaker Technical Memorandum, at p. 10.) These costs would not be incurred if the proposed Project were developed on the RMDP site.

7.5.3.2.6 Dry Utilities

All dry utilities necessary to serve development on Hathaway Ranch would have to be brought to the site. Typically, the utility provider will construct and pay for the improvements of the transmission facilities. The cost of the conduit would be a part of the road costs.

Improvements likely to be required include an electrical substation and transmission lines to get the power on site and into the local distribution lines. Similar improvements are anticipated for gas, telephone, and other utilities. Since the costs are the responsibility of the utility provider, costs are not included in this analysis, but it is important to note that the provider will incur additional costs in providing service(s) to Hathaway Ranch.

7.5.3.3 Compatibility With Surrounding Land Uses

As discussed above, in light of its regional planning strategy, Los Angeles County is unlikely to grant the General Plan amendments and zone changes necessary to develop Hathaway Ranch with uses consistent with the project purpose. If such a project were approved, however, it would likely result in significant conflicts with surrounding land uses. The site is directly south of lands within the Angeles National Forest, and north/northwest of lands proposed for low density residential development. (See, *e.g.*, OVOV Preliminary Land Use Policy Map, Jan. 2010, http://www.santa-clarita.com/vgp/_pdf/OVOV11x17.pdf.) Thus, development of Hathaway Ranch with uses consistent with the project purpose, would be incompatible with adjacent low density and National Forest uses. Conflicts with adjacent uses would include increased light impacts in the area, increased noise and traffic, and changes in the rural/open space character of the vicinity. Therefore, when compared to the proposed development on the RMDP site, development on Hathaway Ranch would result in greater potential for conflict with surrounding land uses.

7.5.3.4 Water Supply

Assuming Hathaway Ranch could obtain land use approvals for urban development consistent with the project purpose, the potable water demands of Hathaway Ranch generally would be the same as the proposed RMDP site. However, Hathaway Ranch currently does not have access to water to support development consistent with the project purpose. Hathaway Ranch is not within the service area of a retail water purveyor. Also, groundwater supplies are likely not to be of sufficient quantity to serve the development facilitated by the proposed RMDP. Therefore, future annexation actions would be required. By contrast, the Specific Plan site, which would be facilitated by the RMDP, receives potable water supplies primarily from the local groundwater basin. Based on the above, development on the Hathaway Ranch site is not logistically feasible given the identified water supply constraints.

7.5.3.5 Public Safety

Past and present uses of the Hathaway Ranch alternative site (oil production, grazing, and agriculture) are similar in nature to those within the RMDP site. Consequently, potential public safety impacts relating to these uses would be similar as between the two sites. However, given its more remote location, Hathaway Ranch site would not be as affected by natural gas lines and electrical transmission lines; nor is it within the inundation area of the Castaic Dam. For these reasons, public safety impacts would be potentially less on the Hathaway Ranch site than on the RMDP site.

7.5.4 Costs

Costs described in this analysis cover off-site improvements only, and are in addition to the on-site development costs (which are assumed to be similar to the RMDP site development costs). As such, the off-site costs represent costs unique to development of the Hathaway Ranch site (*i.e.*, costs that would not be incurred if the proposed project were developed on the RMDP site). Unit prices for the cost items are based upon the Newhall Ranch cost estimates to maintain consistency. Costs for major improvements such as the freeway interchanges are also based upon Newhall Ranch Specific Plan improvements and are approximations only..

The per-unit cost to acquire rights-of way is assumed to be similar for both sites, and does not account for any improvements on the properties to be acquired. Additional fees required for litigation and/or condemnation proceedings have not been included in this estimate. Acquisition of property outside of the road right-of-way (for slopes and grading) can be reduced by constructing retaining walls.

Finally, as mentioned above, development of Hathaway Ranch, if consistent with the project purpose, would require off-site mitigation for habitat loss and open space, which is an additional cost of development. To determine this cost, this analysis assumes that the Applicant would have to acquire approximately 2,000 acres of open space for mitigation purposes. Based on this assumption, the cost of acquiring off-site mitigation land was estimated to be $99,180,000. (Hunsaker Technical Memorandum, at p. 8.)

When the additional development costs of the Hathaway Ranch site are totaled, they come to $591,269,184 (plus an additional $99,180,000 for off-site mitigation land).[27] Again, these are costs over and above those the Applicant would expect to incur if it developed the proposed project on the RMDP site.[28]

7.5.5 Impacts To The Aquatic Ecosystem

7.5.5.1 Water Quality

The Hathaway Ranch site includes several tributary drainages to Lake Piru, an important water resource for the region, and development of the site would have the potential to cause water quality impacts to the lake from waste water discharges and sedimentation. To provide a comparison of potential water quality impacts, it is assumed that development of Hathaway Ranch would require its own water reclamation plant, similar to the WRP planned for the proposed RMDP site.[29] It is also assumed that, similar to the proposed RMDP site, Hathaway Ranch would create a reclaimed water system where reclaimed water would be used on site, and would implement similar best management practices to minimize water quality and hydromodification impacts. Based on these assumptions, waste water discharges associated with development of the Hathaway Ranch site would be comparable to those associated with the proposed RMDP site. Therefore, water quality impacts associated with development of Hathaway Ranch would be similar to those associated with development of the proposed RMDP site.

7.5.5.2 Jurisdictional Waters And Streams

The Hathaway Ranch site is located in the mountains on the north side of the Santa Clara River Valley and does not contain any major rivers or impoundments. The site contains a total of approximately 25.5 linear miles of intermittent and ephemeral drainages on site, encompassing a total jurisdictional area of approximately 101 acres. Although available information was not sufficient to allow the mapping of wetlands on Hathaway Ranch, it is unlikely that palustrine

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27 This figure includes costs associated with the following improvements and tasks: (1) new roadway lengthening; (2) widening of existing roads; (3) right-of-way acquisition; (4) grading slope easement acquisition; (5) mass excavation cut; (6) remedial grading; (7) interchange improvements; (8) drainage improvements; (9) sewer improvements; (10) dry utility installation within roads; (11) record map (design, plan check, and permit fees); (12) construction "soft" costs (soils, geology, and construction staking); and (13) contingency. (Hunsaker Technical Memorandum, at pp. 10-11.)

28 All off-site improvements required for development of Hathaway Ranch are described in Table 2 of the Hunsaker Technical Memorandum (**Appendix A**). The costs associated with these off-site improvements are set forth in Table 3 of the Hunsaker Technical Memorandum.

29 Without this assumption, alternative locations would necessarily appear to have greater impacts than the proposed RMDP site due to storm and waste water discharges that the WRP is intended to prevent.

wetlands exist on the site due to the lack of perennial water sources. Although depressional wetlands may occur on site, these are likely limited in extent due to the relatively steep topography and arid conditions.

The total size of the Hathaway Ranch site is approximately 6,000 acres, and build out of a development facilitated by the proposed Project would require virtually all of the site. This constraint would make avoidance of sensitive aquatic resources difficult, and would likely lead to a high percentage of impacted waters if the site were developed. However, development of Hathaway Ranch would likely disturb fewer total acres of jurisdictional waters than would development of the RMDP site, which contains approximately 660.1 acres of jurisdictional waters of the United States of the United States, and a total combined CDFG and Corps jurisdictional area of 965.7 acres within the RMDP area. The RMDP would result in permanent impacts of 93.3 acres to jurisdictional waters of the United States of the United States, and permanently affect 122.3 acres of the total combined CDFG and Corps jurisdictional, and temporary impacts to 33.3 acres of waters of the United States, and 75.2 acres to the combined CDFG and Corps jurisdictional area.

7.5.6 Other Environmental Impacts

The CNDDB database does not contain any records of sensitive plants or animals on the Hathaway Ranch site, although it indicated that limited patches of a sensitive habitat, Southern Coast Live Oak Riparian Forest, are present. No on-site biological surveys were conducted because the applicant does not control the site; thus, sensitive species may exist within the site that have not been detected. However, because Hathaway Ranch is not located within a County-designated SEA, does not contain known occurrences of listed species, is not within the critical habitat of the endangered least Bell's vireo, and does not have habitat suitable for the unarmored three-spine stickleback or other sensitive aquatic species, development of the Hathaway Ranch site would likely have fewer impacts on biological resources than would development on the proposed RMDP site.

An exception to this general conclusion relates to impacts on the California condor. Due to the proximity of Hathaway Ranch to the Sespe Condor Sanctuary, development of the site could affect ongoing recovery efforts for the California condor. Biological surveys of Hathaway Ranch were not conducted, but it is likely that California condors use the site for foraging habitat. As discussed in the Draft EIS/EIR, some aspects of urban development, such as power lines and microtrash, are potentially detrimental to condors within their foraging range. (See Draft EIS/EIR, pp. 4.5-706-4.5-707.) Therefore, development of the Hathaway Ranch site, if consistent with the project purpose, would likely result in impacts to the California condor due to reduction in foraging habitat and other urban-related hazards. These impacts would be greater at the Hathaway Ranch site than at the RMDP site.

7.5.7 Overall

The Hathaway Ranch alternative site has the potential to reduce impacts to the aquatic ecosystem. However, the site is not currently zoned for urban development, and amending the General Plan to allow high density development of the site would not be consistent with local and regional planning efforts and is not considered feasible. The site also would not meet the Specific Plan Basic Objectives of avoiding leapfrog development, locating housing proximate to transit corridors and employment centers, and reducing vehicle miles traveled. In addition, because the site is located farther from existing utility and transportation infrastructure, it would require extension of infrastructure that could render the project cost prohibitive. Moreover, these infrastructural improvements would increase adverse environmental impacts. Finally, it may not be practicable to obtain sufficient water supply to serve the proposed project if constructed on the Hathaway Ranch site. Therefore, the site is not a practicable alternative and does not have the potential to be the LEDPA because it would not meet the overall project purpose and would not be practicable in light of the substantial increase in infrastructure costs.

7.6 CONCLUSIONS REGARDING ALTERNATIVE LOCATIONS

The Temescal, Hathaway Ranch and Newhall-Ventura alternatives have the potential to reduce impacts on the aquatic ecosystem compared to the proposed RMDP site. However, none of the sites has the potential to be the LEDPA. Neither the Temescal Ranch site nor the Newhall-Ventura site meets the overall project purpose, as both are located in Ventura County and do not meet the need for development within Los Angeles County. The Hathaway Ranch site conflicts with the overall project purpose of avoiding leapfrog development, reducing vehicle miles traveled and avoiding conflict with surrounding land uses.

In addition, none of the alternative sites meets the logistics criteria. None of the sites is available for development within the timeframe identified, mainly due to restrictions on conversion from agricultural or open space land use designations to urban development, and to potential conflict with the Santa Clarita Valley OVOV plan. Furthermore, the Hathaway Ranch and Temescal Ranch alternatives cannot provide sufficient access to potable water to support a development that meets the overall project purpose, because both would have to rely on speculative water supplies. The Hathaway Ranch and Temescal Ranch alternatives are also much further from existing utilities infrastructure, and would require significant new infrastructure to support development in accordance with the overall project purpose. Likewise, the Hathaway Ranch and Temescal Ranch alternatives are not proximate to existing transportation facilities and, if developed to meet the project purpose, would require the construction of significant additional infrastructure. The Newhall-Ventura site would require at least incrementally additional transportation infrastructure.

Finally, each of the alternative sites would occur additional costs that would render development economically impracticable. Thus, none of the alternative locations merits further consideration as the potential LEDPA.

8.0 ANALYSIS OF ON-SITE PROJECT ALTERNATIVES AND DETERMINATION OF INITIAL LEDPA

This section compares seven on-site alternatives. These include the proposed RMDP (Alternative 2); the five other "build" alternatives evaluated in the Draft EIS/EIR for the Project (Alternatives 3 through 7); and a "total avoidance" alternative (No Fill Alternative), under which a project would be constructed without depositing fill material into waters of the United States. For convenience, the names and numbers of the on-site alternatives evaluated in this analysis are identical to those used in the Draft EIS/EIR for Alternatives 2 through 7. (Because the No Action/No Project alternative, identified as Alternative 1 in the Draft EIS/EIR, is not included in this analysis, numbering of the alternatives herein commences with Alternative 2). Land use plans for the seven alternatives are provided graphically with the discussion of each alternative. At the conclusion of this section, the analysis will identify an Initial LEDPA from among the alternatives considered.

Alternative 2 (the proposed RMDP) would implement the RMDP as proposed by the Applicant and would facilitate development consistent with the approved Specific Plan. The six additional alternatives (Alternatives 3 through 8) address a broad range of different configurations for the major RMDP infrastructure in or adjacent to waters of the United States (Santa Clara River and tributary drainages). The No Fill Alternative addresses the possibility of constructing the RMDP infrastructure and associated development without filling waters of the United States. These alternatives also include different configurations for the spineflower preserves, which, in turn, affect the configuration of infrastructure and development.

Alternatives 3 through 8 focus on avoiding or minimizing impacts to jurisdictional waters. These impacts are primarily associated with construction of major RMDP infrastructure, including bridges, bank stabilization, the grading and realigning of tributary drainages, and the conversion of minor tributary drainages to buried storm drains. Therefore, different configurations for the major RMDP infrastructure are reflected in each alternative. Alternatives 3 through 8 generally reduce the extent of proposed infrastructure compared to Alternative 2, resulting in reduced development and reduced impacts to waters of the United States.

8.1 SCREENING CRITERIA FOR ON-SITE ALTERNATIVES

The 404(b)(1) Guidelines prohibit discharge of dredge or fill materials to waters of the United States if there is a "practicable alternative to the proposed discharge that would have less adverse impact on the aquatic ecosystem, so long as the alternative does not have other significant environmental consequences." (40 C.F.R. § 230.10, subd. (a).) The Applicant has developed screening criteria, described in this section, to determine whether the on-site alternatives described above would be practicable, have less adverse impact on the aquatic ecosystem, or have other significant environmental consequences. The criteria generally are presented in the form of yes/no questions and call for quantitative comparisons unless impracticable.

8.1.1 Screening Criteria For Practicability

The term "practicable," as defined in the 404(b)(1) Guidelines, means "available and capable of being done after taking into consideration cost, existing technology, and logistics in light of overall project purposes." (40 C.F.R. § 230.10, subd. (a)(2).) Reflecting this definition, this Alternatives Analysis uses four categories of screening criteria to determine whether an alternative is practicable: (1) those related to overall project purposes; (2) those related to costs; (3) those related to existing technology: and (4) those related to logistics.

8.1.1.1 Criteria Related To Project Purpose

To achieve the overall project purpose defined in **Section 3.0** of this Alternatives Analysis, an alternative must be able to achieve the Basic Objectives of the Specific Plan. This requires that the alternative accommodate interrelated villages that provide a range of residential, commercial and industrial uses, schools, parks and recreational facilities, a water reclamation plant and other public services and utilities. It must also preserve large tracts of open space. Screening criteria related to achieving the overall project purpose include:

- **Size** -- *Would the alternative provide approximately the same (within 10 percent) net developable acreage as approved in the Specific Plan, or otherwise meet the approximate development targets of the Specific Plan - e.g., through increased density?*

The size criterion takes into account the alternative's potential to provide each of the land uses that is essential to achieving the Basic Objectives of the Specific Plan, including residential uses (acreage and units), commercial uses (acreage and floor space), public facilities (acreage), and open space (acreage).

- **Village Viability** - *Would the alternative allow for the development of interrelated villages, each providing a balanced complement of land uses, services and facilities for residents and visitors?*

The Village Viability criterion takes into account any disproportionate effects on development within a particular village that would render the village incapable of providing a viable mix of land uses and necessary facilities.

8.1.1.2 Criteria Related To Costs

In defining "practicable," the Guidelines do not explain how the Corps is to take cost into account. (See 40 C.F.R. § 230.10, subd. (a)(2).) But the 1980 preamble to the Guidelines clarifies the treatment of cost, stating that alternatives that are "unreasonably expensive to the applicant" or "unreasonably costly" are not practicable. (45 Fed. Reg. 85335, 85343 (Dec. 24, 1980).) The preamble adds, "Our intent is to consider those alternatives which are reasonable in terms of the overall scope/cost of the proposed project." (45 Fed. Reg. 85339.)

The preamble to the Guidelines further indicates that, in assessing cost, the Corps should not consider the particular financial circumstances of the applicant. It is for this reason that the Guidelines use the term "cost" rather than "economic": "[T]he term economic might be construed to include consideration of the applicant's financial standing, or investment, or market share, a cumbersome inquiry which is not necessarily material to the objectives of the Guidelines." (45

Fed. Reg. 85339.) Likewise, Corps permit elevation decisions show that the consideration of cost does not include the particular applicant's ability to earn a profit on a project. See, *e.g.*, *Permit Elevation Decision, Twisted Oaks Joint Venture* (rejecting a project purpose that included "allow[ing] the applicant to realize a profit on [their] investment"); *Permit Elevation Decision, Hartz Mountain Development Corporation* (reversing a permit decision that relied on the applicant's profitability information to screen off-site alternatives); *Permit Elevation Decision, Old Cutler Bay* (stating that what is a "reasonable" cost to bear should be determined by reference to a hypothetical "typical" applicant); *Permit Elevation Decision, Klatt Bog* (reversing a permit decision that evaluated the cost of alternatives in terms of the applicant's ability to realize a "reasonable profit").

The alternatives analysis should use cost metrics that are appropriate to the type of project proposed. For example, in *Friends of the Earth v. Hintz*, 800 F.2d 822 (9th Cir. 1986), the Corps used the cost per unit of materials handled (logs) to evaluate alternatives for a proposed log export sorting yard. In *Sierra Club v. Flowers*, 423 F.Supp. 2d 1273, 1333, 1358 (S.D. Fla. 2006), the court faulted the Corps for *not* using the standard industry metric of "rock yield per acre" to evaluate the cost of alternatives to a proposed rock mining operation.

For a master-planned development project, it is appropriate to use standard industry metrics such as cost per developable acre, that capture the relationship of cost to development potential. Like the cost metrics endorsed by the courts in *Friends of the Earth* and *Sierra Club v. Flowers*, cost per developable acre is an objective measure that is not tied to any subjective or unique characteristic of the applicant. It is thus unlike the cost measures rejected in permit elevation decisions such as *Old Cutler Bay* and *Twisted Oaks*, which relied on profitability. Cost per net developable acre is based on verifiable information that is neither proprietary nor applicant-specific. In addition, it allows a direct and meaningful comparison of the relative costs associated with alternatives of different sizes or different amounts of development potential, in a way that total project cost does not. Therefore, it is well-suited to evaluating whether the costs associated with additional avoidance are reasonable, compared either to the typical costs for that type of project or to the applicant's proposed project.

The total cost per net developable acre for the proposed Project and alternatives includes the following costs:

(1) Site Development Costs:

  (a) Record Map Costs:

    (i) Construction drawing preparation

    (ii) Grading

    (iii) Street

    (iv) Storm drain

    (v) Sewer

    (vi) Water

(vii) Reclaimed water

(viii) Dry utilities

(ix) Plan check fees

(x) Permit Fees

(b) Land Development Costs:

(i) Site development costs to get to blue top improvements

(ii) Grading

(iii) Streets

(iv) Storm Drain

(v) Sewer

(vi) Water

(viii) Reclaimed water

(viii) Dry utilities

(ix) Engineering certification costs

(c) Landscape Costs

(i) Landscape and irrigation of disturbed areas.

(ii) Landscape and irrigation of street medians and parkways

(iii) Landscape and irrigation of parks

(2) Infrastructure costs

(a) Costs for design and construction of major and secondary roadways within the project boundary

(b) Utilities within right-of-way.

(c) Bridges included where appropriate.

(d) Costs for design and construction of Newhall Ranch WRP

(e) Design and construction of utility corridor between Newhall Ranch WRP and existing WRP #32

(f) Potable and reclaimed water tanks

(g) Freeway improvements SR 126 and I-5

Further detail regarding the basis of analysis for the Newhall Ranch RMDP project alternatives is provided in Appendix 8.0, "Newhall Ranch 404B1 Cost Analysis Procedure", June 2010, prepared by Hunsaker & Associates.

In light of these considerations, screening criteria related to project costs include:

- **Cost** – *Would the costs associated with the alternative be reasonable for a project of this type?*

In order to help determine what magnitude of costs would be reasonable for a project of this type, the Applicant commissioned a comparison of development costs for master-planned communities from Developers Research, an economic consultant. Developers Research prepared a report that provides cost data for eight master-planned communities located in Southern California that are representative of lot improvement costs for this region. (Newhall Ranch - Database Study of Lot Improvement Costs For Representative Master Planned Communities May 6, 2010 ("Comparison Report"), attached as Appendix 8.0 to the Alternatives Analysis.) For these purposes, a master-planned community is one that, in addition to residential uses, includes other land use components such as commercial, retail or office. The Comparison Report also includes cost data for seven additional projects for which only information on residential components is available.

As shown in the Comparison Report, the size and costs of these representative projects vary widely, both for master planned communities and for residential-only communities.

a. Among the eight representative master-planned communities located in the Southern California region, the cost per net developable acre ranges from a low of $493,889 to a high of $928,504.

b. The average (mean) cost per net developable acre among the eight master-planned communities is $707,784 (unweighted). Weighted to reflect the relative size of the various projects (*i.e.*, larger projects are given more weight than smaller projects in determining the average), the average cost per acre is $673,114.

c. Among the seven representative residential projects located in the Southern California region, the cost per net developable acre ranges from a low of $388,335 to a high of $1,097,298.

d. The average (mean) cost per net developable acre among the seven residential projects is $724,152 (unweighted). Weighted to reflect the relative size of the various projects (i.e., larger projects are given more weight than smaller projects in determining the average), the average cost per acre is $573,843.

e. For comparison, the cost of the proposed Project is $1,038,000 per net developable acre. Overall, the size, complexity and cost per net developable acre of the Newhall Ranch Project are at the upper end of both master-planned communities and residential communities for those criteria.

These data show that development costs for master-planned communities vary widely. Although each master-planned community must establish certain basic elements such as roads, parks, schools and homes, the cost to provide these elements depends on a wide range of factors, including the size of the project, the regulatory standards of the local land use authority, the physical setting (e.g., topography), the availability of infrastructure (i.e., existing utilities and roads), the kind of community being built (urban, suburban or rural) and environmental considerations (e.g., presence of sensitive environmental features). Given the wide variance in these factors, there is no "typical" cost for a master planned community. Instead, what is a "reasonable" cost for developing a given master-planned community will depend on the unique needs of that community given its physical and regulatory environment.

Given the site-specific nature of development costs and the fact that the cost of the proposed Project is already outside the typical range for master-planned communities in this region, it is appropriate to consider the costs associated with the proposed Project (Alternative 2) as a baseline for evaluating the reasonableness of costs associated with alternatives. The proposed Project reflects the Specific Plan, which is the product of intensive planning and study by local, state and federal agencies. It complies with all applicable land use regulations and incorporates extensive measures to avoid, minimize and mitigate adverse environmental effects, including effects on aquatic resources. The Draft EIS/EIR found that it would have no significant adverse impacts on water quality. As such, the proposed Project represents a reasonable basis for evaluating the additional costs associated with further avoidance and minimization of effects on aquatic resources.

Accordingly, the Alternatives Analysis uses the proposed Project as the base case for evaluating the reasonableness of development costs. Alternatives that have a substantially higher overall cost per net developable acre will be eliminated. In addition, the Alternatives Analysis will examine sub-areas within the Specific Plan (the Additional Studies found in **Section 10.0**) to evaluate whether additional avoidance is practicable with regard to those features. The Additional Studies look at increased costs within each sub-area, taking into account the degree of additional avoidance that is attainable and the need to go beyond standard engineering practices in order to achieve it.

To put into perspective the effect of increasing cost per net developable acre relative to the proposed Project, a 20 percent increase in cost per net developable acre compared to the proposed Project is approximately $207,000 per acre. An increase of 10 percent is approximately $103,500 per acre, and an increase of five percent is approximately $51,750 per acre. If these increased *per-acre* costs are applied to the 2,957 acres of development in the proposed Project, the total increases in development cost are $612,000,000, $306,000,000, and $153,000,000, respectively. These increases in total overall costs must be viewed in light of the amount of additional avoidance of waters of the United Stats that they make possible. A significant cost increase may be reasonable if impacts also are reduced significantly, while a large increase in cost associated with a minimal reduction in impacts may not be reasonable.

Based on all of the above considerations, we have selected an increase in cost per net developable acre of five percent, compared to the proposed Project, as the threshold for screening alternatives. This approximates the same cost per acre as the highest-cost project in the Comparison Report and represents an increase of approximately $153,000,000 in total development costs. Costs beyond this threshold are not reasonable for a project of this type.

8.1.1.3 Criteria Related To Technology

All of the alternatives evaluated in this analysis are capable of being accomplished using existing technology, without the need for prerequisite technological advancements. The limits of existing technology are, therefore, not useful discriminating factors for distinguishing among the alternatives, and no screening criteria related to technology are assessed.

8.1.1.4 Criteria Related To Logistics

The planning of large, master-planned urban developments that include residential and commercial uses, public facilities and necessary services is a complex process. Proper consideration of logistics is essential for the eventual success, safety, and desirability of the new community. Logistical failures could result in safety hazards or lack of critical services (*e.g.*, unsafe circulation networks, insufficient water supplies, poor emergency response times, and insufficient flood protection), and in many cases would be noncompliant with County development standards. Screening criteria related to logistics include:

- **On-site Traffic Circulation** -- *Would the alternative provide for safe, efficient internal circulation and adequate access to existing adjacent road networks?*
- **Flood Protection** -- *Would the alternative provide adequate flood conveyance and detention for flood events up to and including the 100-year event?*
- **Water Treatment and Reclamation** -- *Would the alternative provide adequate capacity for water treatment and reclamation?*
- **Grading Balance** -- *Would the alternative avoid major exports of grading spoils from the RMDP area that would result in other adverse impacts to the environment?*

Note: Given the scale of the proposed Project, major exports of grading spoils from the RMDP area would result in "other environmental impacts" that would render the alternative unacceptable under the Guidelines. Such impacts include traffic and air quality effects (from haul truck emissions). In addition, major exports have the potential to render an alternative impracticable due to cost considerations. For these reasons, all on-site alternatives have been designed to avoid major exports of grading spoils from the RMDP area.

8.1.2 Screening Criteria For Impacts To The Aquatic Ecosystem

The aquatic ecosystem comprises the chemical, physical, and biological components that sustain life within bodies of water. Plant and animal communities are dependent on these components and may be disrupted by chemical, physical, or biological perturbations. For example, physical changes in water temperature or substrate condition may cause an aquatic area to become unsuitable for a particular species; and chemical changes, such as the introduction of pollutants, could prove deleterious to aquatic life. Biological changes, such as increases or decreases in the distribution or abundance of species, can have profound effects on the overall composition of a site through predation, competition, and other interspecies interactions.

In accordance with the 404(b)(1) Guidelines, this document analyzes both direct impacts and secondary effects on the aquatic ecosystem. Direct impacts include those effects that result from the actual placement of dredged or fill material into waters of the United States. Secondary effects are those effects that are associated with a discharge of dredged or fill materials but do not result from the actual placement of the fill material, such as surface runoff from development that occurs on fill. (40 C.F.R. § 230.11, subd. (h).) However, the Corps considers indirect/secondary impacts as interchangeable and the impacts are not generally considered by the Corps to be separate and distinct.

Implementation of the proposed Project and alternatives would involve placing varying quantities of fill material into waters of the United States on site, including the Santa Clara River mainstem and tributaries. These activities could affect the physical structure of the watercourses and the functions provided by those waters.

8.1.2.1 Effects On Chemical Characteristics Of The Aquatic Environment

The proposed Project and alternatives would involve large-scale construction operations and would result in permanent changes to the channels and watersheds of most tributary drainages within the RMDP site. During construction, concentrations of sediment (Total Suspended Solids ("TSS") and turbidity), nutrients, heavy metals, and pesticides in tributary drainages could potentially be altered when vegetation removal, grading, and trenching activities expose soils to wind and water erosion. On a long-term basis, many of the on-site watersheds would be largely comprised of impervious surfaces following build out of the Specific Plan, and natural drainage patterns would be replaced with engineered paths reaching the tributaries via storm drains and detention basins. Screening criteria related to chemical components of the aquatic environment address water quality impacts and loss of biogeochemical function.

8.1.2.1.1 Water Quality Impacts

The proposed Project and alternatives would change most of the RMDP drainages. These changes could contribute to increased runoff volumes and velocities, increased levels of pollutants in runoff, and other factors, which in turn have the potential to affect water quality characteristics, such as circulation, suspended particulates, and turbidity. Water quality characteristics are sometimes referred to as chemical characteristics of waters of the United States. Screening criteria related to water quality include:

- **Water Quality** - *Would the alternative's impacts on the quality of the waters of the United States be significantly less than those of the proposed Project, taking into account water circulation, suspended particulates and turbidity, and other changes that might result from the project?*

8.1.2.1.2 Loss Of Biogeochemical Function

Due to the size and complexity of the proposed Project, and due to the high value of the site's aquatic resources, a customized functional assessment was prepared to supplement the evaluation of fill acreages. This assessment -- termed the HARC (see **Appendix 4.6** to the Draft EIS/EIR) -- was specifically designed to suit the Corps' needs in evaluating the proposed RMDP, and was used to evaluate the existing functional condition of all waters of the United States within the site. The HARC method is based on three established and accepted functional assessment methods: (1) the hydrogeomorphic method traditionally used by the Corps; (2) the California Rapid Assessment Method employed by the CDFG; and (3) the Landscape Level Functional Assessment method employed on SMAs in Southern California. The HARC assessment measured a suite of physical, chemical, and biological indicators to yield a total "HARC score" for each reach, thus indicating the overall quality of each jurisdictional area within the RMDP site. These scores were assessed on a scale ranging from zero (theoretical completely degraded condition) to 1.0 (theoretical completely pristine condition).

Because each jurisdictional area on site was evaluated and assigned a HARC score, and because these scores are numerical in nature, it is possible to use the HARC scores as a "weighting factor" to distinguish impacts on high-quality resources from impacts on low-quality resources.

For example, if a project were to result in five acres of impact on each of two theoretical waters of the United States on site, an evaluation based purely on acreage would indicate that the impacts to the two sites would be equal (each site sustaining the same five acres of impact). However, if the two sites were of different quality and had differing HARC scores, say, 0.33 and 0.66, respectively, then an analysis using the HARC scores as a weighting factor would indicate a greater impact at the higher quality site. (Five acres at 0.33 would total 1.65 HARC-weighted acres affected, whereas five acres at 0.66 would total 3.3 HARC-weighted acres affected).

To discern losses of biogeochemical function, the HARC biogeochemical score was used as a weighting factor applied to the acreage of waters of the United States impacted by the Project. Screening criteria related to biogeochemical function include:

- **Biogeochemical Function** -- *Would the alternative's impacts on biogeochemical function of waters of the United States be significantly less than those of the proposed Project, as measured by the HARC assessment?*

8.1.2.2 Effects On Physical Characteristics Of The Aquatic Environment

Implementation of the proposed Project and alternatives would involve placing varying quantities of fill material within waters of the United States on site, including the Santa Clara River mainstem and tributaries, and would facilitate urban development in surrounding uplands. These activities would have the potential to affect the physical structure of the tributaries, both through immediate re-shaping during construction and by altering the flow regimes that shape the stream channels over time. In addition, the range of activities proposed would affect the functional condition of on-site waters through alterations of the streams and surrounding sub-watersheds. Screening criteria related to physical components of the aquatic environment have been divided in to three categories: (1) those related to acreages permanently or temporarily filled; (2) those related to long-term geomorphic effects on substrate and sediment dynamics; and (3) those related to effects on hydromorphic functions and services.

8.1.2.2.1 Permanent And Temporary Fill Of Waters Of The United States

Under the proposed Project and alternatives, permanent impacts to waters of the United States would occur in areas where permanent facilities, such as bridges and bank stabilization, are proposed for installation, or where grading or filling would occur within waters of the United

States. Temporary impacts generally would occur adjacent to permanent impact areas due to construction disturbance. These temporary impact areas would be restored and revegetated after completion of construction activities. In other cases, temporary impacts would occur as a result of beneficial activities, such as corrective recontouring of incised channels and other restoration practices. For a more complete description of the types of fill activities proposed and the associated levels of impact, please refer to **Section 5.0** of this report.

The evaluation of permanent and temporary fill effects focused on the location and extent of waters of the United States that would be eliminated by the proposed fill. The HARC scores for the impacted waters of the United States were also considered, to provide an assessment of the overall functions and services lost due to fill activities. Special aquatic sites received additional consideration in this analysis because of their important role in the aquatic ecosystem and the special presumption that applies to these sites under the Guidelines. Screening criteria related to permanent and temporary fill within waters of the United States include:[30]

- **Permanent and Temporary Fill** -- *Would the alternative's permanent and temporary fill of waters of the United States be significantly less than that of the proposed Project?*
- **Avoidance** -- *Would the alternative's avoidance of waters of the United States site-wide be significantly greater than that of the proposed Project?*
- **Fill in the Santa Clara River** -- *Would the alternative's permanent and temporary fill of waters of the United States in the Santa Clara River mainstem be significantly less than that of the proposed Project?*
- **Fill in On-site Tributary Drainages** -- *Would the alternative's permanent and temporary fill of waters of the United States in on-site tributary drainages be significantly less than that of the proposed Project?*
- **Fill in Special Aquatic Sites** -- *Would the alternative's permanent and temporary fill of waters of the United States in special aquatic sites (wetlands) be significantly less than that of the proposed Project?*

8.1.2.2.2 Effects On Substrate And Sediment Dynamics (Geomorphic Effects)

Changes (natural or otherwise) to the watershed and within the floodplain of a drainage can cause a variety of adverse or beneficial outcomes, including altered sediment production, storage, and transport through the stream corridor. In watercourses with natural beds and banks, physical characteristics such as channel shape and size are driven by interrelated erosional and depositional sediment processes. Because the proposed Project and alternatives would substantially affect many of the on-site drainages and surrounding watersheds, these alternatives may alter the sediment dynamics in the affected streams. In the long term, changes in the supply of sediment reaching the bed and banks of a drainage may alter the width and depth of the drainage, as well as the bank morphology. For example, an increase in hydraulics might change the course of a drainage, cause the drainage to become deeper or wider, increase

30 Under all of these criteria, HARC scores were used to determine loss of stream function.

scour, or cause stream banks to fail. On a larger scale, decreases in sediment production from stream and river systems can result in inadequate recruitment of sand onto ocean beaches, thus exacerbating losses of beach sand due to tidal erosion. Criteria related to substrate and sediment dynamics include:

- **Effects on the Substrate and Sediment Dynamics of the Santa Clara River** -- *Would the alternative's impacts on the geomorphology of waters of the United States in the Santa Clara River be significantly less than those of the proposed Project?*
- **Effects on the Substrate and Sediment Dynamics of Tributary Drainages** -- *Would the alternative's impacts on the geomorphology of waters of the United States in on-site tributary drainages be significantly less than those of the proposed Project?*
- **Effects on Beach Replenishment** -- *Would the alternative's impacts related to the recruitment of sand on beaches in Ventura County be significantly less than those of the proposed Project?*

8.1.2.2.3 Loss Of Hydrologic Function

Hydrologic functioning of on-site drainages is affected by many factors, including the source of water; the duration and magnitude of flows (hydroperiod); whether flows reach the floodplain; the presence of flow restrictions, the duration of ponding within the creek or on the floodplain; and the width of the floodplain. Circulation and fluctuation of water are also considered components of hydrologic function. The HARC hydrology score (see **Appendix 4.6** to the Draft EIS/EIR) is an indicator of the relative extent to which the assessment reaches on site perform this function. Lost hydrologic function due to the proposed fill was calculated by applying the HARC hydrology score as a weighting factor to the acreages filled. Screening criteria related to hydrologic function include:

- **Hydrologic Function** - *Would the alternative's impacts to the hydrologic function (using HARC hydrology function scores) of waters of the United States be significantly less than those of the proposed Project?*

8.1.2.3 Effects On Biological Characteristics Of The Aquatic Ecosystem

Waters of the United States within the RMDP area, consisting of the Santa Clara River mainstem and several tributaries, support a wide range of aquatic and riparian plants and wildlife species, including sensitive vegetation communities and federally-protected species. In addition, a portion of the site generally adjacent to the river mainstem has been designated as critical habitat for the least Bell's vireo (*Vireo bellii pusillus;* 59 FR 4845). By filling or altering waters of the United States on site, the proposed Project and alternatives could induce changes affecting the recolonization and existence of indigenous aquatic organisms or communities. Due to the broad range of potential impacts that the proposed Project and alternatives could have on biological components of the aquatic ecosystem, groups of screening criteria have been crafted to assess effects on riparian vegetation, effects on : sensitive aquatic and riparian wildlife, loss of habitat function, fish, crustaceans and other aquatic organisms, other wildlife, and riparian vegetation. Note that biological resources inhabiting mostly uplands are not considered part of the aquatic ecosystem; screening criteria related to these resources are presented in **Section 8.1.3.1** of this report.

8.1.2.3.1 Effects On Sensitive Aquatic And Riparian Wildlife

Waters of the United States within the RMDP site, particularly the perennially-flowing Santa Clara River mainstem, provide habitat for a broad diversity of aquatic, semi-aquatic, and riparian fishes, amphibians, reptiles, and birds. Some of the species present on site have been formally listed as endangered or threatened under the federal ESA and/or CESA, and are protected from unauthorized take by these statutes. Also, a substantial portion of the Santa Clara River corridor within the RMDP site has been designated by the USFWS as critical habitat for the federally-listed endangered least Bell's vireo. Section 7 of the ESA prohibits agency actions, including the Corps' issuance of a section 404 permit, that would jeopardize the continued existence of any listed species or result in destruction or adverse modification of designated critical habitat.

Based on the analysis provided in the Draft EIS/EIR, the proposed Project is not expected to result in jeopardy or adverse modification. However, the Project could adversely affect listed wildlife species that utilize the river and tributaries on site. Impacts include mortality of individual fishes or wildlife during construction, as well as long-term loss or alteration of suitable habitat. Screening criteria related to sensitive aquatic and riparian wildlife include:

Special-status aquatic and riparian species – *Would the alternative result in significant adverse impacts to the following plant and animal species?*

- Unarmored Threespine Stickleback (ESA-endangered, CESA-endangered, fully protected)
- Least Bell's Vireo (ESA-endangered, CESA-endangered, critical habitat present on site)
- Southwestern Willow Flycatcher (ESA-endangered, CESA-endangered)
- Arroyo Toad (ESA-endangered)
- California red-Legged frog (ESA-threatened)
- Undescribed Sunflower Species (no ESA or CESA status)
- Undescribed spring snail (no ESA or CESA status)
- Southwestern pond turtle (no ESA or CESA status)
- Western yellow billed cuckoo (ESA-candidate, CESA-endangered)
- Tricolored blackbird (no ESA or CESA status)

8.1.2.3.2 Loss Of Habitat Function

Habitat suitability for particular species can vary depending on specific requirements. However, there are several basic elements, such as the overall vegetation condition, continuity, structural diversity, and absence of invasive species, that are generally indicative of habitat quality. The HARC habitat score (see **Appendix 4.6** to the Draft EIS/EIR) is an indicator of the relative extent to which the affected reaches on site perform this function. Lost habitat function due to proposed fill was calculated by applying the HARC habitat score as a weighting factor to the acreages filled. Screening criteria related to habitat function include:

- **Habitat Function** -- *Would the alternative's impacts to the habitat function (based on HARC habitat function scores) of waters of the United States be significantly less than those of the proposed Project?*

8.1.2.3.3 Fish, Crustaceans, Mollusks, And Other Aquatic Organisms In The Food Web

Perennial aquatic habitats can support a diversity of fishes, some of which depend on a prey base of insects, crustaceans, mollusks, and other benthic invertebrates. Modifications to waters of the United States could potentially alter the composition of the benthic macroinvertebrate community, ultimately disrupting the food web. Screening criteria related to the aquatic food web include:

- **Aquatic Organisms** -- *Would the alternative's impact on fish, crustaceans, mollusks and other aquatic organisms in the food web be significantly less than that of the proposed Project?*

8.1.2.3.4 Other Wildlife

In addition to the special-status species that are addressed individually in this Alternatives Analysis, the RMDP site also supports a variety of other species lacking federal sensitivity designations. Screening criteria related to these species include:

- **Other Wildlife** -- *Would the alternative's impact on non-sensitive wildlife species be less than that of the proposed Project?*

8.1.2.3.5 Effects On Riparian Vegetation

The Santa Clara River and its tributaries within the RMDP area contain substantial quantities of early to late successional riparian communities, ranging from sand and gravel bars dominated by sandbar willow saplings and cattails to mature galleries of Fremont cottonwood with complex understories of woody and herbaceous vegetation. Riparian communities in the proposed Project area are of high sensitivity and biological value, and were treated as sensitive plant communities in the Draft EIS/EIR for the proposed Project. In total, the RMDP site contains approximately 367.2 acres of riparian vegetation within Corps jurisdiction and 758 acres of riparian vegetation within the RMDP site, the majority of which is located within and adjacent to the Santa Clara River mainstem and tributaries. The proposed Project and alternatives would remove varying quantities of riparian vegetation to accommodate construction of RMDP infrastructure and development. In areas where Project components are proposed, vegetation removal would be permanent. However, where riparian areas would be disturbed during construction merely because they are adjacent to proposed Project components, vegetation removal would be temporary, and these areas would be revegetated following completion of construction in the area. Screening criteria related to effects on riparian vegetation include:

- **Removal of Riparian Vegetation in the Santa Clara River** -- *Would the alternative's permanent removal of riparian vegetation in the Santa Clara River Corridor be significantly less than that of the proposed Project?*
- **Removal of Riparian Vegetation in On-site Tributary Drainages** -- *Would the alternative's permanent removal of riparian vegetation in on-site tributary drainages be significantly less than that of the proposed Project?*
- **Temporary Removal of Riparian Vegetation** -- *Would the alternative's temporary removal of riparian vegetation be significantly less than that of the proposed Project?*

8.1.2.4 Cumulative Effects On The Aquatic Ecosystem

Aside from effects caused by the RMDP alone, the proposed Project and alternatives could also contribute to cumulative adverse environmental effects on the aquatic ecosystem. Screening criteria related to cumulative effects include:

- **Cumulative Effects** -- *Would the alternative's cumulative effects on the aquatic ecosystem be significantly less than those of the proposed Project?*

8.1.2.5 Human Use Characteristics

As required by the section 404(b)(1) Guidelines (40 C.F.R. §§ 230.50 through 230.54), this analysis considers the proposed Project's effects on human use characteristics of the aquatic environment, including municipal and private water supplies, recreational and commercial fisheries, water-related recreation, aesthetics, and preserve areas. Screening criteria related to these human uses include:

- **Water Supplies** -- *Would the alternative's demand on municipal and private water supplies be significantly less than that of the proposed Project?*
- **Recreational and Commercial Fisheries** -- *Would the alternative's impact on recreational and commercial fisheries be significantly less than that of the proposed Project?*
- **Water-related Recreation** -- *Would the alternative's impact on water-related recreation be significantly less than that of the proposed Project?*
- **Aesthetics** -- *Would the alternative result in significant adverse aesthetic impacts due to visual incompatibility between the proposed uses on site and the surrounding lands?*
- **Parks and Preserves** -- *Would the alternative's impact on parks, national and historical monuments, national seashores, wilderness areas, research sites, and similar preserves be significantly less than that of the proposed Project?*

8.1.3 Screening Criteria For Other Significant Environmental Consequences

The Guidelines provide that an alternative cannot be the LEDPA if it has "other significant adverse environmental consequences," even if it has less impact on aquatic resources than other alternatives. The following criteria have been developed to determine whether the alternatives considered would pass this threshold test and remain eligible to be the potential LEDPA.

8.1.3.1 Non-Aquatic Biological Resources

This section presents screening criteria for impacts on terrestrial/upland biological resources that are not considered part of the aquatic ecosystem, and thus were not included in **Section 8.1.2.2**, above. Due to the broad range of potential impacts that the proposed Project and alternatives may have on upland biological resources, groups of screening criteria have been crafted to assess effects on sensitive upland vegetation, effects on sensitive terrestrial/upland plants and wildlife species, and effects on wildlife movement.

8.1.3.1.1 Effects On Sensitive Upland Vegetation Communities

In addition to sensitive riparian vegetation communities, the RMDP site also contains several upland plant communities, including oak woodlands, native grasslands, and California walnut woodlands, which are identified as sensitive by the CDFG. Because woodlands are characterized by the presence of mature trees, which can require decades to reach this point in their life cycles, permanent and temporary removal of these communities are evaluated collectively. In contrast, because grassland communities can be re-established much more quickly, only permanent impacts to grasslands are considered. Screening criteria related to sensitive upland vegetation communities include:

- **Sensitive Upland Vegetation Communities** -- *Would the alternative result in significant adverse impacts due to removal of the following vegetation communities?*
  - Oak Woodland Vegetation Communities -- both permanent and temporary impacts
  - California Walnut Woodland -- both permanent and temporary impacts
  - Purple Needlegrass Grassland -- permanent removal only

8.1.3.1.2 Effects On Special-Status Terrestrial/Upland Plants And Wildlife

The RMDP site supports a substantial number of plant and animal taxa which maintain federal and/or state sensitivity designations. While the Draft EIS/EIR for the proposed Project evaluated impacts to all of these species as required by NEPA and CEQA, the screening criteria below focus on those species with the highest level of regulatory protection or sensitivity. Screening criteria related to special-status upland plants and wildlife include:

- **Special-status terrestrial/upland species** -- *Would the alternative result in significant adverse impacts to the following plant and animal species?*
  - Coastal California gnatcatcher (ESA-threatened)
  - San Fernando Valley spineflower (ESA-candidate, CESA-endangered)
  - San Emigdio blue butterfly (no ESA or CESA status)

8.1.3.1.3 Effects On Wildlife Movement

The proposed RMDP would facilitate build-out of a large-scale, urban development in an area that is currently in a largely natural state. Because the site is adjacent to natural open space to the north, south, and west, and because it contains the Santa Clara River, a vital resource for wildlife in the region, the site is used as a wildlife movement route. Large-scale movements typically include east-west travel along the river corridor, as well as north-south movements by animals accessing the river from adjacent uplands. Due to the site's large size, movement within the site by less mobile wildlife also occurs. The Project and alternatives could disrupt wildlife movement patterns, both on a localized scale within the site and on a larger, regional scale. Screening criteria related to wildlife movement include:

- **Local Wildlife Movement** -- *Would the alternative result in significant adverse impacts to wildlife travel routes on site and between the site and immediately adjacent lands?*
- **Regional Wildlife Movement** -- *Would the alternative result in significant adverse impacts due to obstruction of regional wildlife movement corridors?*

8.1.3.2 Hazards, Hazardous Materials, And Public Safety

Because portions of the RMDP area have historically supported oil and gas production, the proposed Project and alternatives could expose future site residents to residual hazards associated with these historic uses. Screening criteria related to hazards and hazardous materials include:

- **Oil and Gas Field Exposure** – *Would the alternative expose future residents to significantly fewer historic oil and gas production hazards?*
- **Emergency Egress** – *Would the alternative provide sufficient egress from developed areas to allow timely evacuation in the event of an emergency?*

8.1.4 Overall

The screening criteria presented above have been applied to each of the seven on-site alternatives evaluated in this Alternatives Analysis to determine the initial LEDPA. Results of this screening process are presented in **Section 8.2** through **Section 8.8** of this document and are graphically presented in Summary Charts 2 through 8.

8.2 ANALYSIS OF ALTERNATIVE 2: PROPOSED RMDP

Under the proposed Project, the RMDP would be approved as proposed by the Applicant, and the requested long-term, individual section 404 Permit would be granted. Three major bridges across the Santa Clara River and associated bank stabilization would be constructed, including the Commerce Center Drive Bridge (already approved by the Corps and CDFG in 1999), the Potrero Canyon Road Bridge, and the Long Canyon Road Bridge. Major tributary drainages would be regraded and realigned to facilitate and protect Specific Plan development. Several minor tributary drainages would be graded and converted to buried storm drain systems. The proposed RMDP would facilitate build-out of the Specific Plan, including 20,885 residential units and 5.55 million square feet (msf) of commercial/industrial/business park floor area. The proposed configuration of infrastructure facilities and land uses that would occur under Alternative 2 is presented graphically on **Figure 8-1**, Alternative 2 Infrastructure Facilities And Land Uses. For a complete description of the proposed RMDP, including infrastructure proposed and urban development facilitated, please refer to **Section 2.0** and **Section 3.0** of the EIS/EIR for the Project.

8.2.1 Project Purpose

The proposed RMDP would facilitate build-out of the Specific Plan development, which would meet all aspects of the overall project purpose.

8.2.1.1 Size

The proposed Project would facilitate build-out of the Newhall Ranch Specific Plan, a master-planned urban development that would comprise 2,957.7 net developable acres of residential, commercial, and industrial uses and public facilities. This alternative would meet the Specific Plan development targets for both developable acreage and unit count.

8.2.1.2 Residential Uses

The proposed RMDP would facilitate the development of 20,885 residential dwelling units on 2,550.3 acres, as approved in the Specific Plan.

8.2.1.3 Commercial Uses

The proposed RMDP would facilitate the development of 5.55 msf of commercial floor space on 258.1 acres, as approved in the Specific Plan.

8.2.1.4 Public Facilities

The proposed RMDP would facilitate the development of 149.3 acres of public facilities, as approved in the Specific Plan.

8.2.1.5 Open Space

The proposed RMDP would dedicate 10,200.2 acres of land that is currently under private ownership to conservation entities for preservation in perpetuity, consistent with the Specific Plan.

8.2.1.6 Villages

The proposed RMDP would facilitate build-out of the Newhall Ranch Specific Plan, a master-planned urban development that would be composed of interrelated "villages," or subdivisions. As envisioned in the Specific Plan, each of the villages would provide a complementary range of land uses and services for residents and visitors. The interrelated villages would function to create a larger sense of community while helping to reduce trip generation and trip length.

8.2.1.7 Conclusion

Because the proposed Project would facilitate the development of interrelated villages that provide a balance of land uses in the sizes and proportions approved in the Specific Plan, it would achieve the Basic Objectives of the Specific Plan and the overall project purpose.

8.2.2 Costs

This section evaluates the practicability of constructing the proposed Project in light of costs, including those associated with site development and construction.

8.2.2.1 Site Development Costs

As contemplated in the Specific Plan, the proposed Project would yield a total of 2,957.8 net developable acres at a total development cost of $3,069,918,000. This would result in an average cost of $1,037,906 per net developable acre. This cost is considered reasonable for a Project of this type.

8.2.3 Logistics

8.2.3.1 Site Circulation

The Specific Plan development, as facilitated by the RMDP, would be served by an internal network of new roads. These roads would connect the proposed Project to the existing regional transportation network via three proposed bridges across the Santa Clara River (Potrero Canyon Road, Long Canyon Road, and Commerce Center Drive), and by extending two existing roadways (Magic Mountain Parkway and Pico Canyon Road) westward into the site. The proposed Project would be designed to handle emergency evacuations, with five points of access to the north and east. Under the proposed RMDP, the internal circulation network would comply with applicable County standards, and all on-site roadway segments would operate at acceptable levels of service (LOS D or better). The proposed RMDP would provide for safe, efficient circulation and adequate access to existing adjacent road networks.

8.2.3.2 Flood Protection

The proposed RMDP would authorize the construction of flood control features, such as bank stabilization, grade control structures, storm drains, and debris and detention basins, throughout the RMDP site to protect Specific Plan development from flooding. All facilities would be constructed to County standards, which require that they be sized to convey flows from the Capital Flood, a worst-case situation combining a modeled 50-year storm with a bulking factor simulating a burned watershed. Because the Capital Flood substantially exceeds the 100-year flood in magnitude in all modeled watersheds within the RMDP site, the proposed facilities would be adequate to protect Specific Plan development from 100-year storm events. The proposed RMDP would provide for adequate flood conveyance.

8.2.3.3 Water Treatment And Reclamation

Under the proposed Project, Specific Plan development would be accompanied by a WRP intended to serve the new community. The WRP was approved by the County as a component of the Specific Plan approval, in May 2003. Treatment capacity of the WRP would be 6.8 million gallons per day (mgd), and would be adequate to serve the wastewater treatment needs of the Specific Plan development when fully built out. The proposed RMDP would, therefore, provide adequate capacity for water treatment and reclamation.

8.2.3.4 Grading Balance

When it approved the Specific Plan, the County required, as a condition of approval that the proposed development balance quantities of cut and fill material on site. The proposed RMDP was designed to be consistent with this requirement, and Specific Plan build-out would not require import or export of soils to or from the RMDP site. The proposed RMDP would, therefore, avoid major exports of grading spoils that would result in other adverse environmental consequences.

8.2.3.5 Conclusion

The proposed Project would provide for safe and efficient circulation; provide adequate flood conveyance and detention; provide adequate capacity for water treatment and reclamation; and avoid major exports of grading spoils. Therefore, the proposed Project is practicable in terms of logistics.

8.2.4 Impacts To The Aquatic Ecosystem

This section describes the potential direct impacts of the proposed Project on the aquatic ecosystem as well as the indirect impacts stemming from Specific Plan build-out.

8.2.4.1 Effects On Chemical Characteristics Of The Aquatic Environment

The proposed RMDP has the potential to affect surface water quality and biogeochemical functions of waters of the United States through construction activities and discharges from development. Construction activities would include removal of vegetation, grading and trenching. For more information, please refer to **Section 4.4** of the EIS/EIR for the Project.

8.2.4.1.1 Effects On Water Quality

The proposed RMDP could have immediate water quality impacts on waters of the United States caused by construction activities such as removal of vegetation, grading, and trenching. In addition, the proposed RMDP could have long-term effects on water quality associated with build-out of the approved Specific Plan. However, the proposed Project and alternatives would be subject to regulatory requirements that would ensure that water quality standards are met and that water quality is not significantly degraded.

Construction Activities. The potential water quality impacts from construction activities, construction materials, and non-stormwater runoff during the construction phase relate primarily to sediment (TSS and turbidity) and non-sediment related pollutants, such as nutrients, heavy metals, and certain pesticides, including legacy pesticides. Construction-related sediment releases are most often caused by exposing soils to rain/runoff and wind. A number of pollutants not related to sediment also pose water quality problems during the construction phase. These include construction materials (*e.g.*, paint), chemicals, liquid products, and petroleum products used in facility construction or the maintenance of heavy equipment; and concrete-related pollutants.

Construction impacts will be minimized through compliance with the NPDES permit for stormwater discharges from construction sites ([NPDES No. CAR000002] Water Quality Order 2009-0009-DWQ, State Water Resources Control Board [SWRCB] NPDES General Permit for Stormwater Discharges Associated with Construction Activity [Construction General Permit]). This permit imposes specific, tiered requirements depending on which of three risk levels are assigned to the project's discharges, by watershed, based on prescribed formulas. These formulas determine sediment and receiving water risk during periods of soil exposure, using calculation tools provided in Appendix 1 of permit. Receiving water risk is categorized as either "high" or 'low," and sediment risk is categorized as "low," "medium" or "high." Under the Construction General Permit, Risk Level 1 applies if both sediment risk and receiving water risk are deemed to be "low;" such sites have minimum BMP requirements but require no effluent monitoring (except for non-visible pollutants, if identified as potentially present). Risk Level 2 applies at all other sites unless both sediment risk and receiving water risk are determined to be "high." Risk Level 2 sites are subject to numeric action levels for turbidity and pH, and effluent monitoring requirements. If both receiving water and sediment risk are calculated to be "high," then the project is assigned Risk Level 3, and the site is subject to turbidity and pH numeric effluent limits and more rigorous monitoring requirements.

All projects must prepare and implement a SWPPP. The SWPPP itself must include erosion and sediment control BMPs to reduce or eliminate the discharge of sediment and other potential construction-related pollutants. The SWPPP must also contain a Construction Site Monitoring Program that identifies monitoring and sampling requirements during construction. Preliminary analysis indicates that the Project will most likely be categorized as a Risk Level 2. BMPs and monitoring required by the Construction General Permit will be incorporated into the Project to comply with the Risk Level 2 requirements, as described in Attachment D of the Construction General Permit. If final design analysis indicates that the Project will fall under Risk Level 3, the additional Level 3 permit requirements will be implemented as necessary.

Construction of the in-stream elements within the RMDP boundary would require dewatering discharges as well as discharges not related to stormwater. For example, excavation depths needed for bank protection would be below the river bottom and, as a result, would frequently encounter groundwater that would have to be removed during the construction period. The dewatering activity would place shallow wells close to the excavation, drawing down the groundwater in the construction zone. Typically, soil composition within the dry streambed would allow the discharged dewatering flows to percolate quickly back into the ground. However, in some instances, the amount of discharged water may create sufficient flow during dewatering operations to form a continuous wetted channel from the work site to the Santa Clara River or a tributary.

In general, the Construction General Permit authorizes construction dewatering activities and other non-stormwater discharges related to construction not subject to a separate general permit adopted by a Regional Board, as long as: (1) they do not cause or contribute to violation of any water quality standards; (2) they do not violate any other provisions of the permit; (3) they are not prohibited by a Basin Plan provision; (4) the discharger has included and implemented specific BMPs required by the permit to prevent or reduce the contact of the non-stormwater discharge with construction materials or equipment; (5) the discharge does not contain toxic constituents in toxic amounts or (other) significant quantities of pollutants; (6) the discharge is monitored and meets the applicable numeric action levels ("NALs") and numeric effluent limitations ("NELs"); and (7) the discharger reports the sampling information in the Annual Report.

BMPs would be implemented to protect receiving waters from dewatering and construction related non-stormwater discharges. In the case of dewatering discharges, such BMPs would include source control and treatment control BMPs in compliance with either: (a) the Los Angeles RWQCB's general waste discharge requirements ("WDRs") (under Order No. R4-2003-0111; NPDES No. CAG994004) governing construction-related dewatering discharges within the Project area; or (b) an individual WDR/NPDES permit specific to the Project dewatering activities. Typical BMPs for in-stream construction dewatering include infiltration of clean groundwater or on-site treatment using an engineered system, such as a weir tank, that is designed to remove suspended particulates from the water before it is discharged. To avoid significant impacts to receiving waters from dewatering activities, discharged water would be allowed to "sheet-flow" from energy dissipaters so that it soaks into the dry soils, or it would be routed through a sprinkler field and sprayed over a large upland area adjacent to the river/streambed with the intent to percolate the entire discharge.

Implementation of erosion and sedimentation source control BMPs during the construction of the proposed RMDP infrastructure would prevent significant erosion and sediment transport from the Project site during the RMDP construction phase. These same BMPS would also prevent the transport of other pollutants potentially entrained in the sediment. The BMPs will meet best available technology ("BAT")/best conventional pollutant control technology ("BCT") standards to ensure that discharges during construction will not cause or contribute to any exceedance of water quality standards in the receiving waters. During Project build-out, the BMPs will be implemented in compliance with the Construction General Permit and the general waste discharge requirements in the Dewatering General WDRs, or in compliance with an individual WDR/NPDES permit specific to the Project dewatering activities. All discharges from qualifying storm events will be sampled for turbidity and pH, and the results will be compared to NALs to ensure that BMPs are functioning as intended. If discharge sample results fall outside of these action levels, the existing site BMPs and potential causative agents will be reviewed. In addition, the existing BMPs will be maintained and/or repaired -- and/or additional BMPs will be provided - to ensure that future discharges meet these criteria. For more information, please refer to **Section 4.4** of the Draft EIS/EIR for the Project.

Long-term Effects. The proposed Project would facilitate the development of 20,885 residential dwelling units and approximately 5.5 msf of nonresidential uses on the Specific Plan site. Runoff volume and all pollutant loads, with the exception of TSS and nitrate + nitrite-N, are predicted to increase with the Project when compared to existing conditions. Concentrations of all pollutants, with the exception of dissolved copper, are predicted to decrease under the proposed Project when compared to existing conditions; dissolved copper concentrations are predicted to increase. All concentrations are predicted to be below benchmark criteria and within the range of observed concentrations in Santa Clara River Reach 5.

For the qualitatively assessed pollutants of concern, concentrations of hydrocarbons and MBAS are expected to increase once the Project is implemented. Concentrations of pathogens, pesticides, trash and debris, and cyanide also may increase under the proposed Project when compared to existing conditions, resulting in a potentially significant impact to water quality. However, none of the pollutants of concern are expected to significantly impact receiving waters, as these pollutants will be effectively reduced by implementation of the comprehensive site design/low impact development, source control, and treatment control BMPs specified in the Newhall Ranch Specific Plan Sub-Regional Stormwater Mitigation Plan. This plan, developed by the Applicant consistent with local stormwater regulatory requirements, sets forth the urban runoff management program that would be implemented for the Project build-out.

Wastewater generated by the Specific Plan build-out will be treated in the Newhall Ranch WRP. Treatment at the WRP will consist of screening, activated sludge secondary treatment with membrane bioreactors, nitrification/denitrification, ultraviolet disinfection, and partial reverse osmosis. Treated effluent from the Newhall Ranch WRP would be used to supply distribution of recycled water throughout the Specific Plan area in the form of irrigation of landscaping and other approved uses. As required by the CWA, NPDES Permit and WDRs for the Newhall Ranch WRP (Order No. R4-2007-0046, effective October 27, 2007 (Los Angeles RWQCB, 2007)) include effluent limitations that are protective of surface receiving water quality and designated beneficial uses. For more information, please refer to **Section 4.4** of the Draft EIS/EIR for the Project.

8.2.4.1.2 Loss Of Biogeochemical Function

The proposed RMDP could result in a loss of biogeochemical function of waters of the United States on the Project site. Biogeochemical function measures the ability of wetland and riparian areas to perform specific processes such as maintenance of water quality, cycling of nutrients, retention of particulates, and export of organic carbon. The HARC biogeochemical score indicates the relative extent to which the assessment reaches on site perform this function. Lost biogeochemical function due to the proposed fill was calculated by applying the HARC biogeochemical score as a weighting factor to the acreages filled. The fill from implementation of the proposed RMDP would result in the permanent loss of 60.3 HARC biogeochemical-weighted acres and a temporary loss of 25.7 HARC biogeochemical-weighted acres of waters of the United States.

8.2.4.2 Effects On Physical Characteristics Of The Aquatic Environment

The Project's impacts to physical components of the aquatic environment would generally consist of impacts related to: fill of jurisdictional waters, losses of stream and wetland functions and services, and loss of the geomorphic stability of the site's waters in the long term.

8.2.4.2.1 Permanent And Temporary Fill Of Waters Of The United States

Of the 660.1 acres of waters of the Unites States within the Project area, the proposed Project would permanently fill 93.3 acres, or 14 percent of waters of the United States on site. Temporary impacts would occur in jurisdictional areas where necessary to allow construction of Project facilities. Note, however, that these temporary impacts would occur outside the actual footprint of the facility once constructed, thereby allowing rehabilitation. For example, construction of bridges across the Santa Clara River would require disturbance of lands on either side of the proposed bridge location during construction, but these lands would not be occupied by the bridge once completed. Temporary impact zones would be restored to appropriate grade and revegetated, following completion of construction in the area. In total, the proposed RMDP would temporarily fill 33.3 acres. For more detail regarding the fill activities associated with the proposed Project, see **Section 4.0** and **Section 5.0** of this report.

Avoidance. There are 660.1 acres of waters of the United States within the RMDP site. Of these, 533.5 acres (81 percent of total acreage), would be avoided under the proposed Project. Key avoided areas under the proposed Project would include the majority of the Santa Clara River mainstem, the Middle Canyon spring complex (a high-quality wetland), and the entire Salt Creek sub-watershed.

Fill in the Santa Clara River. Of the 471.2 acres of waters of the United States within the Santa Clara River mainstem on site, the proposed RMDP would permanently disturb 15.1 acres, and would temporarily disturb an additional 18.7 acres. These impacts would be associated with the construction of three proposed bridges across the river, and would represent seven percent of the total jurisdictional acreage in the river. This demonstrates that the RMDP has been designed to largely avoid impacts to the river mainstem.

Fill in On-Site Tributary Drainages. Of the total 188.9 acres of waters of the United States within tributary drainages on site, the proposed Project would permanently disturb 78.3 acres, and would temporarily disturb an additional 14.5 acres. Impacts would include converting existing drainages to buried storm drains, eliminating drainages for realignment, and grading drainages to accommodate site development. The permanent impact would represent 41 percent of the total jurisdictional acreage in the on-site tributaries. Impacts to tributaries under the proposed Project would generally affect all classes of tributaries on site (small and large tributaries), and no particular aquatic resource would be disproportionately affected.

Fill in Special Aquatic Sites. The RMDP site contains a total of 276.9 acres of federal jurisdictional wetlands.[31] Because the site does not contain any other type of special aquatic site, the Project's impact on wetlands would constitute the whole of the impact on special aquatic sites. Most of the site's wetlands are located adjacent to the active channel of the Santa Clara River, which exhibits perennial flows and supports extensive riparian vegetation. However, two of the site's larger tributary drainages, Salt Creek and Potrero Canyon, also support wetlands along perennial reaches. In addition, the RMDP site contains a spring complex, located near Middle Canyon, the entirety of which is also a wetland.

The proposed Project would permanently disturb 20.5 acres of wetlands, and would temporarily disturb an additional 11.2 acres. These impacts would occur primarily due to bridge construction along the Santa Clara River mainstem, but the proposed RMDP would also affect two cismontane alkali marsh wetlands in lower and middle Potrero Canyon. The entire Salt Creek watershed and the Middle Canyon spring complex would be preserved under this alternative, and no impacts to wetlands in those areas would occur. In total, the proposed RMDP would avoid 89 percent of all wetlands on site.

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31 Wetland acres are a subset of waters of the United States within the Santa Clara River mainstem and the tributary drainages.

8.2.4.2.2 Effects On Substrate And Sediment Dynamics

The proposed RMDP could disrupt the sediment equilibrium in the Santa Clara River mainstem or tributaries, thereby causing adverse geomorphic impacts on waters of the United States. In addition, the conversion of existing undeveloped lands to a non-erodible urban condition would slightly reduce the available sand supply reaching beaches in Ventura County. These effects generally would be minor.

Santa Clara River. The proposed RMDP could increase sediment flows downstream during storm events, resulting in substantial erosion and deposition impacts downstream. Under the proposed RMDP, the total floodplain area subject to potentially erosive velocities (four fps or greater) would decrease for all modeled storms with the exception of the 5-year return period, under which the area susceptible to erosion increases by 0.6 acre. However, this minor increase during the 5-year return interval is not considered significant relative to the substantial decrease in area subject to erosive velocities during 2-, 10-, 20-, 50-, 100-year, and capital flood events. In some areas, velocities greater than four fps would correspond with outlet structures, access ramps, or bridge abutments, which could result in localized erosion impacts. Where necessary to minimize erosion and structural damage, materials such as grouted riprap or reinforced concrete would be used according to the standards, criteria, and specifications developed by the County. No changes in flow velocity would be realized upstream or downstream of the Project area.

The proposed Project would result in localized variations in scour and sedimentation due to the changes in flow velocity described above. The precise location and extent of material removal and deposition would shift with the installation of the various Project components, much as it does in the existing condition over time. Modeling results indicate that there would be no significant changes in local patterns of sediment deposition and erosion. In some areas, velocities greater than four fps would correspond with outlet structures, access ramps, or bridge abutments, which could result in a significant localized erosion impact. To minimize erosion and structural damage to such structures, erosion resistant materials such as concrete, soil cement or secured rip-rap would be used according to the standards, criteria, and specifications developed by the County to ensure long-term stability. For more information, please refer to **Section 4.2** of the EIS/EIR for the Project.

Tributaries. Within the tributary drainages in the Project area, certain drainages would not be graded and would remain undisturbed, while other drainage areas would be graded, reconstructed to a soft-bottom drainage channel with buried bank stabilization along each side of the drainage, or converted to buried storm drains. In channels where reconstructed drainages are proposed, the channel designs would integrate flood control and grade stabilizing measures (*i.e.*, a combination of drop structures/grade stabilizers and bank protection) to maintain sediment equilibrium and protect the channel bed and banks from hydromodification impacts. This design methodology is intended to create stable drainage channels that would support the in-channel habitat following project implementation.

The approach focuses on developing channel width, depth, slope, and other parameters based on the future flow and sediment regime of each drainage. The intent is to predict stable characteristics through an integrated analysis, and then use structures and other measures only in those drainage locations where erosional forces are shown to exceed the natural stability of the drainage channel. All such structures (*i.e.*, bank and channel bed protection) would be designed to mimic natural features and use a combination of structural and vegetative methods to provide drainage channels that are stable, aesthetic, and maintain the desired habitat (*e.g.*, riparian, wetland, and upland habitat) after Project implementation. Road crossing culverts and bridges would traverse various drainages, but only where necessary to accommodate the approved Specific Plan circulation system. The exact channel configuration within each drainage would be determined at the final design stage of Project implementation, but would be submitted to the Corps for final verification and approval.

Under the proposed RMDP, the site's five largest tributary drainages (Chiquito, San Martinez Grande, Potrero, Long, and Lion Canyons) would be modified or reconstructed, but would not be entirely replaced by storm drain systems. The modified channels would be designed for geomorphic equilibrium in terms of channel stability, sediment transport, and flow conveyance under future conditions. The channels and floodplains would be designed to meet the following criteria:

- **Geomorphic stability** -- The channel would not aggrade with sediment or erode its banks or bed substantially. The bankfull channel would be sized for the dominant (channel forming) discharge.
- **Flood conveyance** -- The floodplain would convey the Capital Flood (Q_{cap}) with a minimum of three feet of freeboard, and meet Los Angeles County standards for flood channels.
- **Ecological function** -- The channel and floodplain would support a combination of riparian habitat, coastal sage scrub, oak woodland, *etc.*, as appropriate. Grade stabilizer structures, culverts, and other hydraulic structures would be designed to accommodate wildlife requirements.
- **Hydromodification** -- The combined urban runoff management program, in conjunction with the channel design, would address potential "hydromodification" impacts resulting from development of the RMDP and SCP areas. The channel would not aggrade or generate excess sediment from erosion. Nor would it create a larger than natural downstream impact from sedimentation associated with hydrograph modification.
- **Low maintenance** -- The channel and associated structures would require minimum maintenance. The channel and floodplain would not require sediment removal or vegetation clearance. Following construction, a monitoring and management plan would be implemented to evaluate compliance with the design criteria to ensure that the engineered channels function as intended.
- Although the final design details of the proposed modified and reconstructed drainages are not yet known, the criteria listed above would ensure that the channels would be free from geomorphic instabilities in the post-Project condition.

Beach Replenishment. The effects of the Project components on beach replenishment are a function of the sediment load delivered through the Project reach. The Santa Clara River watershed contributes approximately 60 percent of beach sand within Ventura County, with other streams and sand from upcoast providing the remaining 40 percent. In total, the Santa Clara River watershed yields approximately 4.08 million tons of sediment per year (1,170 tons per square mile) from its mouth into the Santa Barbara Channel. By reducing the erodible area within the RMDP site, the proposed Project could cause a reduction in this floodwater sediment, which could negatively affect beaches, as incrementally less sediment would be available for their replenishment.

The proposed RMDP and Specific Plan would convert 5,307 acres of currently undeveloped lands to a non-erodible, urban condition. This conversion would translate to an average loss of approximately 9,700 tons of sediment per year, or 0.24 percent of the river's total annual yield. Because this reduction is very slight, the proposed Project would not substantially affect recruitment of sand onto Ventura County beaches. For more information, please refer to **Section 4.2** of the Draft EIS/EIR for the Project.

8.2.4.2.3 Loss Of Hydrologic Function

The proposed RMDP could reduce hydrologic function of waters of the United States on the Project site. Hydrologic function is affected by the source of water, the duration and magnitude of flows (hydroperiod), whether flows reach the floodplain, the presence of flow restrictions, the duration of ponding on the floodplain, and the width of the floodplain. The HARC hydrology score indicates the relative extent to which the assessment reaches on site perform this function. Lost hydrologic function due to the proposed fill was calculated by applying the HARC hydrology score as a weighting factor to the acreages filled. Fill from the proposed RMDP would cause the permanent loss of 66.1 HARC hydrology-weighted acres, and the temporary loss of 27.7 HARC hydrology-weighted acres of waters of the United States. Losses of hydrologic function could include changes to the fluctuations in water level that occur within the on-site drainages during storm events. The storm hydrograph is dictated by a number of factors, including rainfall intensity, slope and permeability of the watershed, channel slope and width, and the presence of any manmade features that would detain or attenuate flows. Adverse changes to some of these parameters (*e.g.*, increased impervious surfaces in the watershed, narrowed stream channels) could result in more severe fluctuations in water depth, while changes to others (*e.g.*, installation of detention basins) would make the fluctuations less severe. Because all of the waters within the RMDP site are riverine, rather than impoundments or tidal waters, on-site surface flows are unidirectional. Therefore, the hydrologic functioning of these waters does not include large-scale water circulation. For more information, please refer to **Section 4.1** of the Draft EIS/EIR.

8.2.4.3 Effects On Biological Characteristics Of The Aquatic Ecosystem

The proposed Project (Alternative 2) would have impacts on biological resources, including sensitive vegetation communities, federally-listed species, and other selected special-status plant and wildlife species. The comparative quantitative and qualitative (where applicable) impacts resulting from the RMDP for Alternatives 2 through 7 plus the No Fill Alternative are provided in more detail below for:

- Riparian vegetation;
- Sensitive aquatic, semi-aquatic, and riparian wildlife and plants;
- Sensitive upland vegetation communities;
- Selected sensitive non-aquatic wildlife and plants; and
- Loss of habitat function, as measured by the HARC analysis.

8.2.4.3.1 Effects On Sensitive Aquatic And Riparian Plants And Wildlife

Alternative 2 would have impacts on habitat for sensitive aquatic, semi-aquatic, and riparian plants and wildlife. These impacts are discussed in greater detail below.

Unarmored Threespine Stickleback. The unarmored threespine stickleback occurs in portions of the Santa Clara River mainstem where suitable backwater refuge habitat (*i.e.*, zero to two fps flow) is available. It does not occur in tributaries to the Santa Clara River.

The proposed RMDP could result in permanent physical changes to the Santa Clara River corridor and surrounding watershed, including changes in hydrology and fluvial process. Such impacts could affect habitat suitable for unarmored threespine stickleback. Impacts to individuals and secondary impacts could also occur absent mitigation. These potential impacts are described in detail in **Subsection 4.5.5.3**, of the Draft EIS/EIR for the Project, and are summarized here.

ENTRIX (2009) analyzed Project-related hydrologic changes in the Santa Clara River and tributaries and their potential effects on the unarmored threespine stickleback. Parameters evaluated included potential changes in floodplain width, backwater refuge habitat (zero to two feet fps flow) area, and water velocity. Such changes were evaluated during various theoretical flood frequency events including 20- and 100-year occurrences (Draft EIS/EIR, **Figure 4.5-61a** and **Figure 4.5-61b**). The following summarizes the results of this analysis.

Under Alternative 2, implementation of the RMDP between Salt Creek and Middle Canyon would include:

- 32,334 linear feet of buried bank stabilization in upland and riparian areas along the mainstem of the Santa Clara River (approximately one-half of the north bank and one-third of the south bank of the Santa Clara River within Newhall Ranch);
- the construction of bridges at Potrero Canyon, Long Canyon, and Commerce Center Drive; and
- a Newhall Ranch WRP outfall in the Santa Clara River (Draft EIS/EIR, **Figures 4.5-33-A1- 4.5-33-D2**).

The bridge piers would be placed within the Santa Clara River floodplain. During summer low flows, no more than two piers per bridge crossing would be in contact with the wetted channel.

During storm flows several to all piers would be in contact. This would result in the direct loss of habitat occupied by stickleback. However, the large width and hydrology of the river would maintain the formation of natural channels to support this species.

Of the various impacts caused by construction within the river channel, the two of greatest concern are alteration of natural stream hydrology and reduction of available stickleback habitat. ENTRIX (2009) determined that unarmored threespine stickleback in the Santa Clara River require flood refugia velocities of two fps or less in natural river floodplain in order to avoid being washed downstream during flood events. Under existing conditions (dry and wet season conditions), most of the wetted channel of the Santa Clara River supports flows greater than two fps, which make them unsuitable as stickleback refugia. In the RMDP area, therefore, stickleback tend to occur in areas along the margin of the river where velocities are less than two fps, and in backwater areas outside of the higher velocity portions of the wetted channel.

Frequency hydraulic modeling shows that, under Alternative 2, the available habitat area with less than two fps velocity increases by 1.3 acres at the five-year flood event and by 5.5 acres at the 10-year flood event. During the 20-, 50-, and 100-year events, the habitat area with less than two fps velocity decreases by 12.5 acres, 11.1 acres, and 8.9 acres, respectively. The decrease is not expected to be significant, as the area lost during these flood events is in terraced agricultural land that is not suitable floodplain refugia habitat for the stickleback; suitable floodplain refugia requires microhabitat elements, such as vegetative cover, substrate, and stream topography (ENTRIX 2009). Agricultural land is not considered refuge, as it presents a greater threat to fish stranding during high flood events.

The ENTRIX report further indicates that the alteration of the stream hydrology would not result in significant impacts related to stickleback access to floodplain refugia during flood events, since the general morphology of the Santa Clara River, adjacent rearing habitat, and high-flow floodplain refugia would not be substantially altered. This is illustrated on RMDP-SCP EIS/EIR **Figures 4.5-61a** and **4.5-61b**, which indicate stream flow areas with less than two fps during the 20- and 100-year flood events, respectively (see entire set of graphics in ENTRIX 2009 report, **Appendix 4.5** to the Draft EIS/EIR).

Note that most of the tributaries to the Santa Clara River do not support perennial flows, and none has surface water connectivity with the river, except for Middle and Potrero canyons, which have substantial blockages (bedrock headcuts or cascades) that are impassable to fish (ENTRIX 2009). For these reasons, stickleback are absent from the tributaries to the Santa Clara River, and would not be affected by Alternative 2's modifications of those tributaries.

***Least Bell's Vireo*.** The least Bell's vireo, in the form of breeding pairs, territorial males, and/or nests, has been observed almost every year along the Santa Clara River within the RMDP area and adjacent to the Project site in riparian scrub habitat at Castaic Junction, but with yearly fluctuations in level of occupancy and breeding activity. Each of the alternatives, including Alternative 2, would have permanent and temporary impacts on suitable least Bell's vireo riparian nesting/foraging habitat, and on "foraging only" habitat adjacent to nesting habitat.

Specifically, Alternative 2 would permanently disturb 28.1 acres of suitable habitat for least Bell's vireo within the Corps' jurisdiction. Of these, 25.6 acres would be nesting/foraging habitat and 2.6 acres would be adjacent foraging only habitat. Alternative 2 would also temporarily disturb 8.1 acres of vireo nesting/foraging habitat and 0.1 acre of foraging only habitat within Corps jurisdiction.

Regarding impacts to individuals, the Least Bell's vireo is a relatively mobile species, so the Project's construction activities would not likely result in the loss of individual adults. However, construction activities, if conducted during the nesting season, could adversely impact nests and young vireos.

Potential secondary effects to least Bell's vireo include short-term construction-related impact and long-term post-development impacts. These potential secondary effects are briefly identified here and analyzed in detail in **Subsection 4.5.5.3**, of the Draft EIS/EIR for the project.

If construction takes place during the least Bell's vireo nesting season (typically March through August), breeding individuals are likely to be substantially affected by several construction-related secondary effects, including noise, ground vibration, increased human activity, and nighttime illumination. These effects could alter essential behaviors such as foraging and breeding, induce physiological stress, and increase predation rates. In addition, fugitive dust, diminished water quality, and altered hydrology (*e.g.*, runoff, erosion, sedimentation) could reduce habitat quality, including insect prey.

Potential long-term secondary impacts could include nest parasitism by cowbirds; increased disturbances from human activity, including noise from motor vehicle traffic; reduced habitat quality due to diminished water quality; and invasion by exotic plant species, such as giant reed and tamarisk, and infestation from Argentine ants, which are attracted to riparian areas and may prey on nestlings. All of these effects could result in lower reproductive success for the least Bell's vireo within the RMDP site.

By facilitating urban development, the RMDP may also have long-term secondary effects on the hydrology and geomorphology in the Santa Clara River, resulting in additional impacts on least Bell's vireo habitat. However, these impacts are not likely to be significant. According to the Flood Hydraulics Impacts Assessment (PACE 2009), neither the proposed Project nor the alternatives would significantly affect water flows, velocities, depth, sedimentation, or floodplain and channel conditions downstream of the RMDP area. The Flood Hydraulics Impact Assessment also determined that these hydrologic effects were insufficient to alter the amount, location, and nature of aquatic and riparian habitats within the RMDP area and downstream into Ventura County over the long term. The technical analysis further determined that the river would still retain sufficient width to allow natural fluvial processes to continue. As a result, the mosaic of habitats in the river that support various special-status species, including the least Bell's vireo, would be maintained, and the population of the species within and immediately adjacent to the river corridor would not be significantly affected by the proposed Project or the alternatives.

RMDP facilities under Alternative 2 would include a public trail and viewing platforms adjacent to and along the northern edge of the Santa Clara River corridor, as shown on **Figure 4.5-88** in the Draft EIS/EIR for the Project. The easternmost trail and viewing platform would be adjacent to the key population area segment extending from the Indian Dunes area to the confluence with Humble Canyon. There is a potential for secondary impacts to least Bell's vireo individuals nesting in this location. These impacts would include noise and general increases in human activity that could increase physiological stress and disrupt behavioral activities such as foraging, territory defense, and nesting. In addition, there is a potential for increased trash along the trail that could enter the river corridor. Due to the very close proximity of viewing platforms and trails to riparian habitats, there is the potential for unauthorized trespass by the public into sensitive habitat areas. Although there would be no lighting provided for evening use of the trail and viewing platforms, public access during night hours may still occur and could introduce fugitive light and noise. These impacts have the potential to affect the health of young birds, and potentially reduce survivorship and reproductive success.

The only designated critical habitat within the RMDP site is critical habitat for the least Bell's vireo. The RMDP site includes a portion of the Santa Clara River critical habitat unit located in Ventura and Los Angeles counties (see **Figure 4.5-85** in the Draft EIS/EIR for the Project).[32] The Santa Clara River critical habitat unit comprises approximately 4,410 acres (approximately 12 percent) of the total 38,000 acres of least Bell's vireo critical habitat. Of this total, least Bell's vireo critical habitat within the RMDP site totals 2,252 acres.

The 443 acres of the 2,252-acre least Bell's vireo critical habitat within the RMDP area contain the primary constituent elements ("PCE") of vireo critical habitat. PCEs are defined here as southern willow scrub, southern cottonwood-willow riparian, arrow weed scrub, mule fat scrub, and Mexican elderberry scrub and woodland that provide the nesting/foraging habitat for the least Bell's vireo, and native shrub habitats (big sagebrush scrub, alluvial scrub, California sagebrush scrub, chaparral, and coyote brush scrub) and woodland habitats (coast live oak, valley oak) within 100 feet of the edge of nesting habitat that also may be used for foraging late in the breeding season.

All of the impacts indicated above occur within designated least Bell's vireo critical habitat containing PCEs. Therefore, 25.5 acres of nesting/foraging habitat will be permanently lost.

Southwestern Willow Flycatcher. Willow flycatchers have been observed in the RMDP area during migration. The southwestern willow flycatcher subspecies has not been known to nest in the RMDP area. However, recent nesting in the Santa Clara River has been documented near Fillmore, downstream of the RMDP site. Two breeding pairs were observed in 2006 by J. Gallo, with one nest producing two successful fledglings and the other failing (Root 2008). Therefore,

32 The Santa Clara River unit includes all land within a 3,500-foot wide zone along the Santa Clara River south of SR-126 from a point approximately 2.3 miles east of the intersection of Main Street and SR-126 in Piru on the west to the intersection of SR-126 and The Old Road and eastward and southward along The Old Road to its intersection with Rye Canyon Road.

impacts to potential southwestern willow flycatcher riparian nesting/ foraging habitat were analyzed.

Suitable habitat for the southwestern willow flycatcher would be permanently impacted and temporarily impacted under all of the alternatives, including Alternative 2. Under Alternative 2, 28.1 acres of suitable habitat for southwestern willow flycatcher within Corps jurisdiction would be permanently impacted due to implementation of the RMDP, and an additional 8.1 acres would be temporarily impacted.

The proposed Project is not likely to cause the loss of individual adult Southwestern willow flycatchers, as the species is relatively mobile. However, if the southwestern willow flycatcher were to nest within the RMDP site in the future, and if construction/grading activities were to take place during the nesting season, the proposed Project could adversely impact nests and young birds.

Potential secondary impacts to southwestern willow flycatcher include short-term construction-related effects and long-term effects. The nature of these impacts would be similar to those affecting the least Bell's vireo, described above.

Arroyo Toad. Arroyo toad adults and subadults have not been detected within the RMDP site during protocol surveys. However, during surveys conducted in 2000, Aquatic Consulting Services found arroyo toad tadpoles in the Santa Clara River upstream and downstream of the proposed Commerce Center Drive Bridge site and near the Valencia Water Treatment Plant.

This analysis assumes that arroyo toads could occur in suitable habitat within the Santa Clara River floodplain and adjacent upland areas. Suitable arroyo toad habitat was assigned to three categories. "Category 1" habitats are defined as habitats that are capable of supporting all life history phases. In the RMDP area, Category 1 habitat falls primarily within the 100-year floodplain of the Santa Clara River. "Category 2" habitats may support some phases of the arroyo toad's life history, such as foraging and aestivation/hibernation, but do not generally support adequate hydrology for breeding. "Category 3" habitats are missing two or more elements, especially where the hydrologic regime is absent, and thus would be limited to supporting aestivation/hibernation, dispersal, and foraging, but less frequently than Category 2 habitats. Category 3 habitat primarily includes upland areas, including agriculture, outside the Santa Clara River floodplain. For a more detailed discussion of these habitat suitability categories, please refer to **Subsection 4.5.5.3** of the Draft EIS/EIR for the Project.

Each of the alternatives, including Alternative 2, would have permanent and temporary impacts on all three categories of arroyo toad habitat. Within Corps jurisdiction, Alternative 2 would permanently affect 14.3 acres of Category 1 habitat, 0.9 acres of Category 2 habitat, and 9.0 acres of Category 3 habitat, for a total of 24.2 acres. Alternative 2 would also result in temporary impacts to 17 acres of Category 1 habitat, 0.3 acres of Category 2 habitat, and 1.2. acres of Category 3 habitat, for a total of 18.4 acres.

With respect to impacts on arroyo toad individuals, these effects are not expected to be significant under Alternative 2 or any other alternative, as the species is generally not present at the project site. Although the RMDP area supports suitable habitat for the arroyo toad, only a few tadpoles and no adult or subadult arroyo toads have been observed during multiple surveys conducted over the last fifteen years. However, the fact that a breeding population of arroyo toad was not detected within the RMDP site does not mean that one does not exist. Given the presence of upstream populations of arroyo toad, documented observations of tadpoles in the eastern portion of the RMDP area, and the presence of suitable habitat, a breeding population of the arroyo toad could be present in the Santa Clara River within the RMDP site as well as in surrounding riparian and upland habitats. The implementation of the RMDP would include the construction of bridges and bank stabilization within areas containing Category 1 arroyo toad habitat. Other construction activities would occur in areas containing Category 2 and Category 3 habitat, although these habitats generally occur outside the Corps' jurisdiction. Should arroyo toad adults, subadults, tadpoles, or egg masses be present within the disturbance footprint, these activities could result in injury or mortality of arroyo toad individuals due to direct contact with construction equipment, entombment in burrows, and disturbances to aquatic breeding sites that could disturb egg masses and tadpoles.

Potential secondary impacts to arroyo toad include short-term construction-related effects and long-term development-related effects. These potential secondary impacts are briefly identified here and are analyzed in detail in **Subsection 4.5.5.3** of the Draft EIS/EIR for the Project.

Potential short-term construction-related impacts include ground vibration; dispersion of sediments and pollutants; chemical pollution; increased turbidity; excessive sedimentation; flow interruptions; changes in water temperature; fugitive dust; and trash. Long term effects could include invasion of the on-site habitat by exotic plants (*e.g.*, giant reed, tamarisk, and pampas grass) and wildlife species (*e.g.*, Argentine ants, bullfrogs, African clawed frogs, exotic fish, and crayfish).

***California Red-Legged Frog*.** The California red-legged frog has not been observed in the RMDP site, and conditions generally do not support suitable breeding habitat. While there are no records of California red-legged frog from the site in the numerous wildlife surveys conducted since 1992, the species is known in the Project region from verified records upstream and downstream of the RMDP site. The RMDP site is within the potential distribution of the California red-legged frog along the Santa Clara River. Therefore, potential impacts on this species are evaluated in this alternatives analysis.

Alternative 2 would permanently disturb 24.2 acres, and temporarily disturb 18.4 acres, of the 329.98 acres of suitable habitat for red-legged frog within Corps jurisdiction on the Project site.

The potential for impacts to individual red-legged frogs is considered very low, due to the lack of evidence that the species is present on site. But should California red-legged frog adults, subadults, tadpoles, or egg masses be present within the disturbance footprint, these activities could result in injury or mortality of California red-legged frog individuals due to direct contact with construction equipment, entombment in burrows, and disturbances to aquatic breeding sites that could disturb egg masses and tadpoles.

Potential secondary impacts to California red-legged frog, were it to occur in the RMDP area, include short-term construction-related effects and long-term development-related effects.

These potential secondary impacts would be similar to those affecting the arroyo toad, discussed above.

Undescribed Sunflower Species. An undescribed sunflower (*Helianthus* sp. *nova*) was observed growing in a seep area south of the Santa Clara River between Middle Canyon and San Jose Flats in 2002. Implementation of the RMDP would not result in the direct loss of individuals of the undescribed sunflower species under any of the alternatives, including Alternative 2. The seep area is within the River Corridor SMA, which would be protected and managed under all of the alternatives. No undescribed sunflower individuals or habitat are expected to occur within the RMDP impact areas.

Potential short-term construction-related and long-term development-related secondary impacts associated with implementation of the RMDP could occur under all alternatives, including Alternative 2. Potential short-term impacts resulting from construction-related activities include runoff, sedimentation, erosion, and chemical and toxic compound pollution; exposure to fugitive dust; and hydrologic alterations and water quality impacts. Potential long-term impacts include the introduction of non-native, invasive plant species; hydrologic alterations and water quality impacts. GSI (2008) concluded that based on an evaluation of current hydrogeologic conditions and modeled post-development conditions the future spring hydrology and water quality would not be substantially altered.

Undescribed Spring Snail. In 2006, an undescribed species of snail (*Pyrgulopsis* sp. *nova*) was found on the RMDP site within portions of the Middle Canyon spring complex. Since that time, the snail has been described and named *Pyrgulopsis castaicensis*. Implementation of the RMDP under Alternative 2 would result in direct permanent impacts to the Middle Canyon drainage but not to Middle Canyon Spring, where this species occurs. A span bridge, abutment, and flood control modification within the Middle Canyon drainage would be installed as part of the RMDP under Alternative 2, resulting in temporary and permanent impacts to an area in the lower Middle Canyon drainage that was formerly occupied by the snail. (Recent surveys of the area detected no spring snails.) Middle Canyon Spring, currently the only known occurrence of *Pyrgulopsis castaicensis*, would not be directly affected by implementation of the proposed RMDP under Alternative 2.

Potential secondary impacts to *Pyrgulopsis castaicensis* would include short-term construction-related effects and long-term development effects. Construction activities associated with the RMDP facilities have the potential to affect the snail in areas adjacent to construction zones. RMDP facilities (road with bridge abutments and flood control features) would be constructed within the Middle Canyon drainage under Alternative 2. Potential secondary impacts associated with this construction include impacts to hydrology and water quality. GSI (2008) concluded that, based on an evaluation of current hydrogeologic conditions and modeled post-development conditions, the future spring hydrology and water quality would not be substantially altered.

Southwestern Pond Turtle. The southwestern pond turtle has been documented within the RMDP site at several locations along the Santa Clara River and in the Salt Creek tributary during various field surveys conducted between 1996 and 2006. In addition, lower Potrero

Canyon has been identified as a potentially important area for nesting, hatchling and juvenile refugia, and upland refugia outside the Santa Clara River during 100-year storm events. Thus, for purposes of protecting the pond turtle, it is important that the lower Potrero Canyon habitat, as well as the habitat connection between the canyon and the Santa Clara River, be maintained.

Impacts to suitable southwestern pond turtle habitat would occur under all of the alternatives, but impacts under Alternative 2 would be the most significant because the habitat connection between lower Potrero Canyon and the Santa Clara River would be obstructed by development, as described below. Specifically, Alternative 2 would permanently disturb 24.2 acres of suitable riparian and wetland habitat for pond turtle within waters of the United States out of the 539.6 acres of habitat within Corps jurisdiction on the Project site. An additional 18.4 acres would be temporarily disturbed.

In addition to quantitatively analyzing impacts to riparian and wetland habitats required by pond turtles, potential impacts to southwestern pond turtle wet and dry refugia during severe flooding in the Santa Clara River were qualitatively analyzed. The portions of the river corridor within the RMDP area, as well as the reaches just upstream and downstream of the RMDP area, that would provide potential wet and dry refugia during 100-year storm events were delineated for Alternatives 2 through 7 and the No Fill Alternative. The purpose of this delineation was to determine whether refugia would be available during extreme flood conditions. Wet refugia are defined as areas within the 100-year floodplain that would provide slow moving flow areas (zero to two fps) for pond turtles, thus allowing them to avoid the high flow areas that could wash them downstream. Dry refugia are defined as upland areas adjacent to the 100-year floodplain that would be available for pond turtles to escape severe flood events. Dry refugia includes natural habitat such as annual grassland, shrublands, and woodlands that may provide long-term refuge; it also includes agricultural lands that would provide temporary refuge. Dry refugia consists of those areas immediately adjacent to the river corridor and the main tributaries south of the river corridor. The northern boundary for the dry refugia area was defined as SR-126.

Substantial wet and dry refugia would be maintained along the Santa Clara River under all of the alternatives, although Alternative 2 would have the least amount. The main difference between Alternative 2 and the other alternatives is that bridge and road construction at the mouth of Potrero Canyon could preclude pond turtles from using the lower portion of Potrero Canyon, where pond turtles have been observed and which may be important for nesting and use by hatchling and juvenile turtles. This area also provides dry refuge habitat during severe flooding in the Santa Clara River, such as might occur during a 100-year storm event. Use of lower Potrero Canyon by pond turtles would not be precluded under the other alternatives because RMDP facilities would be substantially reduced in this area.

Regarding impacts to southwestern pond turtle individuals, each of the alternatives, including Alternative 2, would require the construction of various facilities within the river corridor and adjacent upland areas, as well as in portions of Potrero Canyon that support suitable habitat for the southwestern pond turtle. Construction and/or grading for these facilities, where it occurs within waters of the United States could adversely impact southwestern pond turtles as a result of direct contact with construction equipment by adults, subadults, and juveniles. In addition, construction and/or grading activities that result in degradation of aquatic habitats, such as the introduction of mud, silt, or chemical pollutants, may cause pond turtles to abandon the site, thus making them more vulnerable to impacts such as vehicle collisions and predation. Hatchlings, in particular, are extremely vulnerable to predation by ravens and crows that are attracted to construction areas.

Potential secondary impacts to southwestern pond turtle include short-term construction-related effects and long-term development-related effects. These potential secondary impacts are briefly identified here and are analyzed in detail in **Subsection 4.5.5.3** of the Draft EIS/EIR for the Project.

Short-term construction-related impacts resulting from implementation of the RMDP include noise, ground vibration, dust, changes in hydrology, and adverse edge effects, such as increased human activity and nighttime illumination. Each of these potential impacts could result in habitat degradation or increased vulnerability of southwestern pond turtle individuals.

Over the long term, the proximity of urban development to suitable pond turtle habitat could disrupt essential behavioral activities, including foraging, basking, nesting, and overwintering. Lighting associated with RMDP facilities (*e.g.*, bridges) could affect behavioral activities and increase the risk of predation by nocturnal predators. Other potential impacts include predation on hatchlings by introduced aquatic species (*e.g.*, bullfrogs, largemouth bass, and catfish); and invasion of exotic plant species, such as tamarisk, giant reed, and pampas grass. Should exotic plant species become established, they may alter hydrology and channel morphology, which degrades southwestern pond turtle habitat. Increased moisture along habitat edges due to urban runoff, irrigation, or wet fuel modification zones may also affect nesting success.

***Western Yellow-Billed Cuckoo*.** The western yellow-billed cuckoo has occasionally been documented within the river corridor during surveys conducted between 1988 and 2007, including 1979, 1981, and 1992; however, no observations of nesting, paired, or territorial western yellow-billed cuckoos have been documented within the RMDP area. Currently, the Project site appears to be a migratory stop for individual western yellow-billed cuckoos; however, it may also be used for post-migratory movements. Some suitable nesting and foraging habitat is present on site and if the species becomes more abundant, it may expand its breeding range to suitable areas of the Santa Clara River.

Alternative 2 would permanently disturb 24.2 acres, and temporarily disturb 18.4 acres, of suitable habitat for western yellow-billed cuckoo out of the 96.5 acres of habitat within Corps jurisdiction on the Project site.

Regarding potential impacts to individuals, Western yellow-billed cuckoo is a relatively mobile species, so it is unlikely that Project-related construction activities would result in the loss of individual adults. However, if the western yellow-billed cuckoo were to nest in the RMDP area in the future, all of the alternatives, including Alternative 2, could result in injury or mortality of western yellow-billed cuckoos due to destruction of nests and loss of young if such construction/grading activities occurred during the nesting season.

Potential secondary impacts to western yellow-billed cuckoo would include short-term construction-related effects and long-term development-related effects. These potential secondary impacts would be similar to those affecting the least Bell's vireo, discussed above.

Tricolored Blackbird. The tricolored blackbird was observed in the RMDP area during focused bird surveys conducted 1988 to 2007, but nesting was only documented in 1994 when two colonies were observed. The first, consisting of about 200 breeding pairs was observed in a small marsh area along the side of the Santa Clara River at the Castaic Junction east of the RMDP site. The second, a smaller colony of about 20 breeding pairs was observed in a pond beside Castaic Creek, which appeared to be an old borrow pit left over from work on the flood control dikes.

Each of the alternatives, including Alternative 2, would affect suitable tricolored blackbird riparian nesting/foraging habitat and upland foraging only habitat located adjacent to nesting habitat.

Of the 224.9 acres of suitable habitat within Corps jurisdiction on the Project site, Alternative 2 would permanently disturb 24.2 acres of suitable tricolored blackbird habitat, of which 1.6 acres are nesting habitat and 22.6 acres are foraging habitat. Alternative 2 would also temporarily disturb 18.4 acres of suitable tricolored blackbird habitat all of which would be foraging habitat.

Potential impacts to tricolored blackbird individuals would be similar to those affecting the least Bell's vireo, discussed above.

8.2.4.3.2 Loss Of Habitat Function

The proposed Project could reduce habitat function of waters of the United States on the Project site. Habitat function takes into account such factors as plant species diversity, percentage of native plant species, biological structure, and evidence of vegetation recruitment (*i.e.*, the presence of seedlings and/or saplings), and the width of the floodplain. The HARC habitat score indicates the relative extent to which the assessment reaches on site perform this function. Lost habitat function due to the proposed fill was calculated by applying the HARC habitat score as a weighting factor to the acreages filled. The fill from implementation of the proposed RMDP would result in the permanent loss of 67.7 HARC habitat-weighted acres and the temporary loss of 25.9 HARC habitat-weighted acres of waters of the United States.

8.2.4.3.3 Fish, Crustaceans, Mollusks, And Other Aquatic Organisms In The Food Web

Each of the alternatives, including Alternative 2, could result in permanent physical changes to the Santa Clara River corridor and surrounding watershed, including changes to hydrology and fluvial processes, which could affect suitable fish habitat, as discussed in the stickleback analysis section (**8.2.4.3.1**). ENTRIX (2009) analyzed Project-related hydrologic changes in the Santa Clara River and tributaries. While the placement of bridge footings would result in the loss of river channel, the large width and hydrology of the river would maintain the formation of natural channels to support fish species. Most of the tributaries do not support perennial flows; and none of the tributaries has surface water connectivity with the Santa Clara River, except for Middle and Potrero canyons, which, although they contain perennial flow, have substantial blockages (bedrock headcuts or cascades) that are impassable to fish (ENTRIX 2009).

Impacts to crustaceans, mollusks, and other aquatic organisms in the food web would be minor as the diversity of invertebrates is generally low due to the substrate being dominated by sand and gravel. Impacts to these organisms would be caused by the changes in water quality, substrate and sediment dynamics, and hydrologic function as discussed in **Sections 8.2.4.1.1, 8.2.4.2.2**, and **8.2.4.2.3**, respectively. No significant water quality-related effects are anticipated as the Project would comply with all applicable water quality regulations. Hydrologically, the Project would reconfigure some in-channel habitat through alterations of the velocity distribution regime. The two most important effects of construction within the river channel are alteration of natural stream hydrology and loss of available fish habitat. The ENTRIX report indicates that the alteration of the stream hydrology would not result in significant impacts related to fish access to floodplain refugia during flood events, since the general morphology of the Santa Clara River, adjacent rearing habitat, and high-flow floodplain refugia would not be substantially altered. Therefore, there would not be large-scale changes in the distribution or abundance of aquatic organisms as a result of construction of the Project.

8.2.4.3.4 Other Wildlife

The impact upon other, non-sensitive species, that could potentially occur within the Project site's aquatic ecosystem would be similar to effects on sensitive species of the same type (fishes, birds, *etc.*), as discussed in **Section 8.2.4.3.1**.

8.2.4.3.5 Effects On Riparian Vegetation

Out of the 367.2 acres of riparian vegetation communities within Corps jurisdiction on the Project site, Alternative 2 permanently impacts 49.7 acres and temporarily impacts 14.2 acres of riparian vegetation. **Table 4.5-27** of the RMDP-SCP EIS/EIR provides a detailed summary of overall impacts to riparian vegetation by floristic alliance (*i.e.*, columns for RMDP Direct Impacts and Specific Plan Indirect Impacts).

8.2.4.4 Cumulative Effects On The Aquatic Ecosystem

Following the incorporation of project-specific mitigation set forth in **Section 4.5** and **Section 4.6** of the Draft EIS/EIR, the proposed Project does not result in a cumulative contribution to any significant aquatic ecosystem impacts. In addition, many of the mitigation measures proposed for the proposed Project, if adopted for other projects in the watershed, would further ensure that cumulative impacts on the aquatic ecosystem impacts remain less than significant. For more information see **Section 6.0** of the Draft EIS/EIR.

8.2.4.5 Human Use Characteristics

As required by the section 404(b)(1) Guidelines (40 C.F.R. §§ 230.50 through 230.54), this section evaluates the potential loss of values that would result relative to human use characteristics including municipal and private water supplies, recreational and commercial fisheries, water-related recreation, aesthetics, and preserve areas.

8.2.4.5.1 Municipal And Private Water Supplies

The proposed RMDP would not involve any activities that would render municipal or public water supplies unfit for consumption. The WRP associated with the Specific Plan would be designed to comply with applicable NPDES requirements, ensuring that downstream water quality would not be impaired. The quantity of water passing through the RMDP site within the Santa Clara River and tributaries would not be affected by the proposed RMDP.

8.2.4.5.2 Recreational And Commercial Fisheries

The proposed Project would not have an impact upon recreational or commercial fisheries on the site as it is private land, where such use of the site is not authorized. Potential effects upon water quality would be mitigated to comply with applicable standards such that build-out of the Project would not affect recreational or commercial fishing downstream of the Project area.

8.2.4.5.3 Water-Related Recreation

As stated in the previous section, the site is on private land, where recreational use of the site is not authorized. Further, the proposed Project would not cause off-site impacts to water quality or hydrologic function that would adversely affect water-related recreation upstream and downstream of the Project area.

8.2.4.5.4 Aesthetics

Build-out of the Specific Plan would permanently alter the visual character of the RMDP area as a whole, primarily due to the construction of major development that would be visible to viewers traveling along I-5 and SR-126. (See **Section 4.15** of the Draft EIS/EIR.) However, visual impacts of the activities proposed within Corps jurisdiction would largely be confined to bridges, grade control structures, storm drain outlets, and similar facilities. These facilities would contrast with existing natural stream banks, but are not expected to result in significant adverse impacts to the aesthetic values of the jurisdictional areas overall. Proposed bank stabilization activities would cause a substantial change in the appearance of jurisdictional areas during construction, but because the stabilization would be buried and revegetated, these impacts would be temporary. In addition, the proposed Project will do substantial on-site creation and restoration, which will largely replace lost values; and the activities take place in the context of a master-planned community, which will integrate the resources with the community. Therefore, the proposed Project would not cause significant adverse impacts to aesthetic values of waters of the United States.

8.2.4.5.5 Parks, National And Historical Monuments, National Seashores, Wilderness Areas, Research Sites, And Similar Preserves

The proposed RMDP would not impact parks, national and historical monuments, national seashores, wilderness areas, research sites, or similar preserves, as the RMDP site is privately owned and does not contain any such designated features.

8.2.5 Other Significant Environmental Consequences

This section describes the effects of the proposed RMDP on aspects of the natural and built environment outside the aquatic ecosystem. For more information regarding the effects described below, please refer to **Section 4.0** of the Draft EIS/EIR for the Project.

8.2.5.1 Non-Aquatic Biological Resources

Because non-aquatic species typically do not occur within waters of the United States, impacts on such species would generally be limited to indirect effects associated with build-out of the Specific Plan. Alternative 2 would result in impacts to non-aquatic biological resources, including sensitive terrestrial plants and wildlife, sensitive upland vegetation communities, and wildlife movement corridors. These impacts are discussed below.

8.2.5.1.1 Effects On Sensitive Upland Vegetation Communities

For purposes of this analysis, three upland vegetation communities are considered sensitive: (1) oak woodlands (including coast live oak woodland, mixed oak woodland and forest, valley oak woodland, and valley oak/grass); (2) California walnut woodland; and (3) purple needlegrass grassland (the only native grassland type found within the RMDP site). Only oak woodlands occur within the limits of Corps jurisdiction. There are 34.9 acres of oak woodlands identified within Corps jurisdiction on the Project site. The Proposed project impacts approximately 0.75 acres of oak woodlands within Corps jurisdiction on the project site.

8.2.5.1.2 Effects On Special-Status Terrestrial/Upland Plants And Wildlife

Alternative 2 would have impacts on habitat for sensitive non-aquatic plants and wildlife. For two species -- San Fernando Valley spineflower and San Emigdio blue butterfly -- the Draft EIS/EIR determined that impacts under Alternative 2 would be significant and unavoidable. With respect to the spineflower, this determination was made because the proposed Project under Alternative 2 would permanently affect a relatively large proportion of occupied habitat on the site (31 percent) for this highly endemic species. Impacts on San Emigdio blue butterfly were deemed significant and unavoidable because, under Alternative 2, RMDP facilities in lower Potrero Canyon would fragment the butterfly population west of the Potrero Reserve Area, whereas the other alternatives would avoid fragmenting this population. These impacts, and impacts to other non-aquatic resources, are discussed below.

Coastal California Gnatcatcher. Protocol surveys have not documented the coastal California gnatcatcher in the RMDP area, but the species has been observed twice in the Project vicinity during the course of biological monitoring for other projects. Specifically, gnatcatchers were observed in October 2007 in the Valencia Commerce Center (VCC) planning area and in August 2008 at the Del Valle Training Center Road located south of the town of Val Verde. Due to the timing (late summer/fall) and limited number of sightings, the birds observed in both instances are believed to have been dispersing or transient individuals, perhaps from isolated populations of California gnatcatchers that have been periodically observed to the east of the Project site.

Alternative 2 would permanently disturb 1,351 acres of suitable habitat for the California gnatcatcher. There are 13.2 acres of suitable habitat identified within Corps jurisdiction on the Project site. Temporary impacts under Alternative 2 would be limited to two acres.

Regarding impacts to individuals, California gnatcatcher is a relatively mobile species that is expected to occasionally occur on site during dispersal, so it is unlikely that Project-related construction activities would result in the loss of individual adults. However, if the California gnatcatcher were to nest in the RMDP area in the future, and if construction/grading activities took place during the nesting season, implementation of the RMDP under any of the alternatives could adversely impact nests and/or young gnatcatchers.

Potential secondary impacts to California gnatcatcher include short-term construction-related effects and long-term development-related effects. These potential impacts on dispersing or transient individuals would be relatively minor, but could be more substantial if the species were to establish territories and breed on site in the future. These potential secondary impacts are briefly identified here and are analyzed in detail in **Subsection 4.5.5.3** of the Draft EIS/EIR.

Short-term impacts could include exposure to construction-related dust, noise, ground vibration, and nighttime lighting. Potential long-term development-related secondary impacts include habitat fragmentation; habitat degradation from frequent wildfires; increased disturbance from human activity; nighttime lighting; harassment by humans and pet cats and dogs; harassment from stray and feral cats and dogs and other mesopredators; loss of food sources and secondary poisoning from pesticides; and predation of nestlings by Argentine ants along the open space-development interface.

***San Fernando Valley Spineflower*.** Annual plant surveys conducted from 2002 through 2007 indicate that the number of individual San Fernando Valley spineflower plants in the RMDP site (*i.e.*, Airport Mesa, Grapevine Mesa, Potrero, and San Martinez Grande) varies considerably from year to year (see Draft EIS/EIR, **Table 4.5-57**). Potential impacts to this species are, therefore, evaluated in terms of loss of cumulative area occupied by spineflower mapped between 2002 and 2007 rather than number of individuals. The cumulative spineflower occurrence data show 17.6 acres occupied by spineflower within the RMDP area (*i.e.*, the maximum occupied polygon boundaries; see Draft EIS/EIR, **Table 4.5-58**). Under Alternative 2, implementation of the RMDP would result in the permanent loss of 6.4 acres (31 percent) of spineflower cumulative occurrence area. The Draft EIS/EIR determined that this impact was significant and unavoidable, as it could not feasibly be mitigated to a less-than-significant level.

Secondary short-term construction-related impacts and long-term development-related impacts to spineflower could occur, and would be similar, under any of the alternatives, including Alternative 2. These include hydrologic alterations and water quality impacts; accidental clearing, trampling, and grading; runoff, sedimentation, erosion and chemical and toxic compound pollution; exposure to fugitive dust; the introduction of non-native, invasive plant and animal species; increased human activity and trampling and soil compaction; and increased risk of fire.

***San Emigdio Blue Butterfly*.** Surveys for San Emigdio blue butterfly were conducted in the RMDP area in 2004 and 2005. In 2004 the butterfly was documented within the RMDP area at the west-central edge of Potrero Canyon. During the 2005 survey, five adult San Emigdio blue butterflies were again observed at this location and one individual was also observed in the High Country SMA at the northwestern edge of Salt Creek. This butterfly usually is associated with its primary host plant, the four-wing saltbush (*Atriplex canescens*), but has also been observed in association with quail brush (*A. lentiformis*) in the RMDP area.

Vegetation clearing under Alternative 2 would remove quail brush plants associated with the San Emigdio blue butterfly colony that occurs west of and outside the Potrero Preserve Area. In addition, this colony would be permanently bisected by RMDP facilities in lower Potrero Canyon. These vegetation clearing and construction activities would result in the loss of San Emigdio blue butterfly adults, eggs, and/or larvae occurring on quail brush plants.

Note that quail brush plants would also be removed from other portions of the RMDP, but these areas were not found to support the San Emigdio blue butterfly during the 2004 and 2005 surveys.

Short-term construction-related and long-term development-related secondary impacts to the San Emigdio blue butterfly colony could result from implementation of the RMDP under any of the alternatives. Short-term construction-related secondary impacts include vegetation clearing, trampling, exposure to fugitive dust, contact with polluted runoff, and changes in hydrology. Long-term secondary impacts include intrusion by non-native species, human disturbance, increased fire frequency, isolation of the San Emigdio blue butterfly colony, and use of the proposed road in Potrero Canyon.

8.2.5.1.3 Effects On Wildlife Movement

The Draft EIS/EIR for the project evaluated effects of the RMDP on wildlife movement at three different spatial scales: (1) wildlife landscape habitat linkages; (2) local wildlife corridors; and (3) location-specific wildlife crossings. As part of the analysis, wildlife species were assigned to different guilds based on their similar abilities to move across the landscape, with the assumption that different guilds would interact differently with the habitat linkages, corridors, and crossings.

At the largest spatial scale, the Draft EIS/EIR concluded that impacts to wildlife landscape habitat linkages would be adverse but not significant under any of the alternatives. This conclusion is based on the fact that the three main wildlife landscape habitat linkages on site (the High Country SMA, River Corridor SMA, and Salt Creek area) would remain intact and functional following implementation of the RMDP.

On an intermediate scale, the Draft EIS/EIR evaluated impacts on 17 local wildlife corridors within the RMDP site, each of which is associated with one or more tributary drainage connecting the Santa Clara River to the adjacent uplands on site. The analysis concluded that under Alternative 2, four of the wildlife corridors in the RMDP area would be completely eliminated, three would become dead-ends for wildlife, and six would be constrained by surrounding development, but would provide at least limited wildlife movement function. The remaining four corridors would remain fully functional after implementation of the RMDP.

At the smallest spatial scale, the Draft EIS/EIR evaluated whether the various proposed infrastructure components, such as specific bridges and culverts, might serve as wildlife crossings. Allowing north-south movement of wildlife across SR-126 was an objective, as this roadway represents the most substantial existing obstacle to wildlife movement on site. The Draft EIS/EIR concluded that the proposed bridges would not preclude use of the Santa Clara River corridor as a wildlife undercrossing, and that the proposed culverts beneath SR-126 would be sufficiently open to allow wildlife use. For more information regarding the effects of Alternative 2 on wildlife movement, please refer to **Section 4.5** of the Draft EIS/EIR for the Project.

8.2.5.2 Hazards, Hazardous Materials, And Public Safety

Under Alternative 2, construction activities, such as the temporary transport, storage, and use of potentially hazardous materials, would occur in the project area, and potential impacts would be roughly proportional to the development area and intensity. The new urban population of approximately 69,865 residents would also place additional demand on emergency response services in the project area. Alternative 2 would be adequately designed to handle emergency evacuations, with five points of access to the north and east. For more information, please refer to **Section 4.17** of the Draft EIS/EIR for the Project.

8.2.6 Overall

Alternative 2 would meet the overall project purpose and would be practicable. However, it would cause impacts on the aquatic ecosystem and have other significant adverse environmental consequences. To determine whether a practicable alternative exists that would be less damaging to the aquatic ecosystem, the project-related impacts described above are compared to the impacts of the other on-site alternatives in **Sections 8.3** through **8.8**, below.

8.3 ANALYSIS OF ALTERNATIVE 3: ELIMINATION OF PLANNED POTRERO BRIDGE

Under Alternative 3, the proposed RMDP would be modified in key respects. Like Alternative 2, this alternative calls for the construction of two bridges across the Santa Clara River with associated bank stabilization: (1) the Commerce Center Driver Bridge (already approved by the Corps and CDFG in 1999), and (2) the Long Canyon Road Bridge. The two alternatives differ, however, in that Alternative 3 eliminates the bridge at Potrero Canyon Road. Under Alternative 3, major tributary drainages would be regraded and realigned; but the channels would be wider than those of the proposed under Alternative 2. The cismontane alkali marsh in lower Potrero Canyon would be preserved.

This alternative would facilitate urban development within the Specific Plan site, including 20,433 residential units and 5.48 msf of commercial/industrial/business park floor area. The proposed configuration of infrastructure facilities and land uses that would occur under Alternative 3 is presented graphically on **Figure 8-2**. For a complete description of Alternative 3, including infrastructure proposed and urban development facilitated, please refer to **Section 3.0** of the Draft EIS/EIR for the Project.

8.3.1 Project Purpose

Under Alternative 3, urban development within the RMDP site would be incrementally reduced compared to the Specific Plan as approved by Los Angeles County. These reductions would not prevent Alternative 3 from meeting all aspects of the overall project purpose.

8.3.1.1 Size

Implementation of Alternative 3 would facilitate a master-planned urban development within the RMDP site, comprising 2,702.5 net developable acres of residential, commercial, and industrial uses and public facilities. Compared to the proposed Project, overall developable acreage under this alternative would be reduced by eight percent.

8.3.1.2 Residential Uses

Alternative 3 would facilitate the development of 2,325.7 acres of residential uses, a reduction of nine percent compared to the proposed Project. However, practicable modifications in density would allow the construction of up to 20,433 dwelling units under this alternative, which is two percent less than the number of units contemplated under the proposed Project. Because the number of dwelling units available under Alternative 3 would be within ten percent of the number approved in the Specific Plan, Alternative 3 is presumed to be capable of achieving the Specific Plan Basic Objectives for residential uses.

8.3.1.3 Commercial Uses

Alternative 3 would facilitate the development of 227.0 acres of commercial uses, a reduction of 12 percent compared to the proposed Project. However, feasible modifications in density, such as vertical construction, would allow this acreage to support up to 5.48 msf of commercial floor space under this alternative, a reduction of one percent compared to the proposed Project. Because the commercial floor space available under Alternative 3 would be within ten percent of the floor space that would result from build out of the Specific Plan as approved by the County, Alternative 3 is presumed to be capable of achieving the Specific Plan Basic Objectives for commercial uses.

8.3.1.4 Public Facilities

Under Alternative 3, the development of 149.8 acres of public facilities would be facilitated, representing a less than one percent increase compared to the proposed Project. Because this acreage is within ten percent of the acreage of public services called for in the Specific Plan as approved by the County, Alternative 3 is presumed to be capable of achieving the Specific Plan Basic Objectives for public facilities.

8.3.1.5 Open Space

Under this alternative, 10,438.2 acres of undeveloped lands currently under private ownership would be dedicated to land management entities for preservation in perpetuity. This acreage represents a two percent increase when compared to the proposed RMDP. Because the acreage of open space dedicated under this alternative would exceed that called for in the Specific Plan as approved by the County, Alternative 3 is presumed to meet the Specific Plan Basic Objectives for open space.

8.3.1.6 Village Viability

Alternative 3 would facilitate urban development within the RMDP site, but less than the proposed Project. However, because the reductions in development under this alternative would be relatively minor and would not be concentrated in a single portion of the site, the proposed development reductions would not substantially hinder development of interrelated villages, each of which provides a range of complementary services. Therefore, Alternative 3 would meet the Specific Plan Basic Objectives with regard to villages.

8.3.1.7 Project Purpose Conclusion

Alternative 3 would allow development of interrelated villages that provide a balance of land uses in sizes and proportions similar to those approved in the Specific Plan. Therefore, it would achieve the Basic Objectives of the Specific Plan and the overall project purpose.

8.3.2 Costs

This section compares the costs associated with Alternative 3, including both site development costs and costs of land, with those of the proposed Project (Alternative 2). As stated in **Section 8.1**, above, an alternative would be deemed to be unreasonably costly if the costs exceeded those of the proposed Project by more than five percent.

8.3.2.1 Site Development Costs

Alternative 3 would yield a total of 2,702.5 net developable acres at a total development cost of $2,884,032,000. This yields an average development cost of $1,067,172 per net developable acre (2.8 percent increase compared to the proposed Project). Development costs of this alternative would, therefore, be similar to those of the proposed Project, and would be reasonable for a project of this type.

8.3.2.2 Costs Conclusion

Costs for Alternative 3 would be similar to the normal costs for a project of this type and would be reasonable overall.

8.3.3 Logistics

8.3.3.1 Site Circulation

Under Alternative 3, development facilitated on the RMDP site would be served by an internal network of new roads, which would connect to the existing regional transportation network via two proposed bridges across the Santa Clara River (Long Canyon Road and Commerce Center Drive), and by westward extension of two existing roadways (Magic Mountain Parkway and Pico Canyon Road) onto the site. The development facilitated by Alternative 3 would be adequately designed to handle emergency evacuations, with four points of access to the north and east. Under this alternative, the internal circulation network would comply with applicable

County standards, and all on-site roadway segments would operate at acceptable levels of service (LOS D or better).

8.3.3.2 Flood Protection

Alternative 3 would authorize the construction of flood control features, such as bank stabilization, grade control structures, storm drains, and debris and detention basins, throughout the RMDP site to protect Specific Plan development from flooding. All facilities would be constructed to County standards, which require that facilities be sized to convey flows from the Capital Flood. Because the Capital Flood substantially exceeds the 100-year flood in magnitude in all modeled watersheds within the RMDP site, the proposed facilities would be adequate to protect site development from 100-year storm events.

8.3.3.3 Water Treatment And Reclamation

Under Alternative 3, urban development within the RMDP site would be accompanied by a WRP intended to serve the new community. The WRP would not differ from that approved by the County as a component of the Specific Plan in May 2003. Because the WRP was sized to accommodate the development approved in the Specific Plan, which would have greater demands on wastewater treatment services than the development contemplated under Alternative 3, the WRP would have adequate capacity to serve this alternative.

8.3.3.4 Grading Balance

When it approved the Newhall Ranch Specific Plan, the County required the proposed development to balance quantities of cut and fill material on site. Alternative 3 was designed to be consistent with this requirement and would not require import or export of soils to or from the RMDP site. Alternative 3, therefore, would not result in other adverse environmental consequences associated with the transport of grading spoils.

8.3.4 Impacts To The Aquatic Ecosystem

Like the proposed Project, Alternative 3 would affect the aquatic ecosystem by filling some jurisdictional waters, reducing stream and wetland functions and services, and constructing bridges across the Santa Clara River. Under Alternative 3, however, these impacts would be reduced as compared to the proposed Project. This section describes both the direct impacts of the proposed action, as well as indirect impacts stemming from Specific Plan build out.

8.3.4.1 Effects On Chemical Characteristics Of The Aquatic Environment

Under the proposed RMDP and all alternatives, including Alternative 3, surface water quality would be directly impacted by construction activities, which would include removal of vegetation, grading, and trenching. However, the proposed Project and alternatives would be subject to regulatory requirements, which would ensure that water quality standards are met and that water quality would not be significantly degraded. Thus, the impacts of all alternatives on chemical components of the aquatic environment would be approximately equal. For more information, please refer to **Section 4.4** of the EIS/EIR for the Project.

8.3.4.1.1 Effects On Water Quality

The proposed Project and all alternatives, including Alternative 3, would have the potential to result in direct water quality impacts on waters of the United States caused by construction activities, which would include removal of vegetation, grading, and trenching, as well as the potential to result in indirect effects on water quality associated with build-out of the approved Specific Plan. However, the proposed Project and alternatives would be subject to regulatory requirements that are intended to protect water quality. Thus, the impacts of all alternatives on chemical components of the aquatic ecosystem would be approximately equal. For more information, please refer to **Section 4.4** of the EIS/EIR for the Project.

***Construction Activities*.** Similar to the proposed Project, this alternative's construction-related potential impacts on water quality would consist primarily of sediment (TSS and turbidity) and non-sediment related pollutants, such as nutrients, heavy metals, and certain pesticides, including legacy pesticides.

Under Alternative 3, implementation of erosion and sedimentation source control BMPs during construction would prevent significant erosion and sediment transport impacts from the Project site, similar to the proposed Project. The BMPs would also prevent the transport of other pollutants potentially entrained in the settlement. BMPs would be implemented in compliance with the Construction General Permit and the general waste discharge requirements in the Dewatering General WDRs or an individual WDR/NPDES permit specific to the Project dewatering activities. Water quality impacts would, therefore, not differ significantly from those of the proposed Project. For more information, please refer to **Section 4.4** of the Draft EIS/EIR for the Project.

***Long-term Effects Associated With Project Build-Out*.** Development on the Specific Plan site would be somewhat reduced under Alternative 3, as the net acreage/pad for residential, non-residential, and public facilities uses would be reduced by 255 acres (approximately eight percent). The smaller development area in Alternative 3 would reduce the predicted increase in pollutants of concern resulting from the proposed Project. The site design/low impact development, source control, and treatment control BMPs specified in the Newhall Ranch Specific Plan Sub-Regional Stormwater Mitigation Plan would be implemented for Alternative 3 as well, and water quality impacts would, therefore, not differ significantly from those of the proposed Project. For more information, please refer to **Section 4.4** of the Draft EIS/EIR for the Project.

8.3.4.1.2 Loss Of Biogeochemical Function

Alternative 3 would have the potential to result in a loss of biogeochemical function of waters of the United States on the Project site. This attribute measures the ability of wetland and riparian areas to perform specific processes such as maintenance of water quality, cycling of nutrients, retention of particulates, and export of organic carbon, and the HARC biogeochemical score indicates the relative extent to which the assessment reaches on site perform this function. Lost biogeochemical function due to the proposed fill was calculated by applying the HARC biogeochemical score as a weighting factor to the acreages filled. The fill from implementation of the proposed RMDP would result in the permanent loss of 45.2 HARC biogeochemical-weighted acres (25 percent less than the proposed RMDP) and a temporary loss of 29.4 HARC biogeochemical-weighted acres (15 percent more acreage than the proposed RMDP) of waters of the United States.

8.3.4.2 Effects On Physical Characteristics Of The Aquatic Environment

Impacts on physical components of the aquatic environment would generally consist of impacts related to fill of jurisdictional waters, impacts related to losses of stream and wetland functions and services, and impacts related to the geomorphic stability of the site's waters in the long term. Under Alternative 3, these impacts would generally be less than those of the proposed Project, as described below.

8.3.4.2.1 Permanent And Temporary Fill Of Waters Of The United States

Of the 660.1 acres of waters of the United States on the Project site, implementation of Alternative 3 would result in the permanent fill of 70.0 acres of waters of the United States (10.6% of the total site jurisdiction and 25 percent less acreage than the proposed RMDP), and would temporarily disturb an additional 37.6 acres (13 percent more acreage than the proposed RMDP). These temporary impacts would be associated with construction zones adjacent to proposed Project facilities, which would be restored and revegetated following completion of construction. In some instances temporary impacts would also result from restoration activities, *i.e.*, when such activities require earthwork to be conducted in jurisdictional areas (correction of existing incised channel banks, for example). The increase in temporary impacts to waters under this alternative is due to the implementation of modified channels (temporary impacts) in areas where the proposed RMDP would feature storm drains (permanent impacts).

Avoidance. Alternative 3 would avoid 552.5 acres of waters of the United States within the RMDP site. Of the total 660.1 acres of waters of the United States that occur on the site, Alternative 3 would avoid 84 percent, compared to 81 percent avoidance for the proposed Project. Key avoided areas under this alternative would include the majority of the Santa Clara River mainstem, the Middle Canyon spring complex (a high-quality wetland), and the entire Salt Creek sub-watershed. In addition, a cismontane alkali marsh in lower Potrero Canyon, which would be impacted under the proposed Project, would be avoided under this alternative.

Fill in the Santa Clara River. Of the 471.2 acres of waters of the United States within the Santa Clara River mainstem on site, Alternative 3 would permanently impact 5.7 acres (62 percent reduction in acreage compared to the proposed Project), and would temporarily disturb an additional 17.7 acres (six percent reduction in acreage). The permanent impact would be associated with the construction of two proposed bridges across the river, and would represent only two percent of the total jurisdictional acreage in the river.

Fill in On-Site Tributary Drainages. Of the total 188.9 acres of waters of the United States within tributary drainages on site, Alternative 3 would permanently disturb 64.3 acres (18 percent reduction compared to the proposed Project), and would temporarily disturb an additional 19.9 acres (37 percent increase in acreage). This impact results from converting drainages to buried storm drains, eliminating existing drainages for realignment, and grading to accommodate site development. This impact would represent 34 percent of the total jurisdictional acreage in the on-site tributaries. Impacts to tributaries under this alternative would generally affect all classes of tributaries on site (small and large tributaries), and no type of aquatic resource would be disproportionately affected.

Fill in Special Aquatic Sites. Implementation of Alternative 3 would permanently disturb 9.2 acres of wetlands (55 percent reduction in impact acreage compared to the proposed Project), and would temporarily disturb an additional 11.2 acres (less than one percent decrease in impact acreage compared to the proposed Project). These impacts would occur primarily due to bridge construction along the Santa Clara River mainstem, but this alternative would also impact a cismontane alkali marsh wetland in middle Potrero Canyon. Elimination of the planned bridge across the river at Potrero Canyon Road would reduce impacts to wetlands along the river under this alternative. In addition, the entire Salt Creek watershed and the Middle Canyon spring complex would be preserved and no impacts to wetlands in those areas would occur. Additionally, the cismontane alkali marsh wetland in lower Potrero Canyon, which would be disturbed under the proposed Project, would be avoided under this alternative. In total, Alternative 3 would avoid 93 percent of all wetlands on site, a 4 percent increase in wetland avoidance compared to the proposed Project.

8.3.4.2.2 Effects On Substrate And Sediment Dynamics

Like all alternatives, Alternative 3 could result in geomorphic impacts on waters of the United States caused by disruptions of the sediment equilibrium in the Santa Clara River mainstem and/or tributaries. In addition, the conversion of existing undeveloped lands to a non-erodible, urban condition would slightly reduce the available sand supply reaching the beaches in Ventura County. These effects would be substantially similar to those of the proposed RMDP, and would generally be minor.

Santa Clara River. Similar to the proposed Project, Alternative 3 would involve the installation of facilities along the Santa Clara River that could increase sediment flows downstream during storm events, and could result in substantial erosion and deposition impacts downstream. Under this alternative, the total floodplain area subject to potentially erosive velocities would be reduced compared to the proposed Project for all modeled storms with the exception of the 10-year return period. However, the additional 0.3 acres subject to velocities greater than four fps during the 10-year return interval is not considered significant. Downstream deposition characteristics and potential erosion of the soils covering the proposed buried soil cement bank stabilization would be approximately the same as under the proposed Project. Overall, Alternative 3 would have geomorphic impacts on the Santa Clara River mainstem substantially similar to those of the proposed Project. For more information, please refer to **Section 4.2** of the Draft EIS/EIR for the Project.

Tributaries. Under the proposed Project, tributary drainages with modified or reconstructed channels would be designed to ensure that the channels remain geomorphically stable in the post-development condition. These design criteria would apply to Alternative 3 as well, and geomorphic impacts in the tributaries would, therefore, not differ significantly from those of the proposed Project. For more information, please refer to **Section 4.2** of the Draft EIS/EIR for the Project.

Beach Replenishment. Similar to the proposed Project, Alternative 3 would result in the conversion of currently undeveloped lands to a non-erodible, urban condition. Under this alternative, the total acreage converted would be 4,686 acres. Effectively, this conversion would translate to an average loss of approximately 8,510 tons of sediment per year, or 0.21 percent of the river's total annual yield. The magnitude of this impact represents a 12.5 percent reduction compared to the proposed RMDP, which already would have a very slight impact on beach replenishment. Thus, Alternative 3 would not significantly affect recruitment of sand onto Ventura County beaches. For more information, please refer to **Section 4.2** of the Draft EIS/EIR for the Project.

8.3.4.2.3 Loss Of Hydrologic Function

Alternative 3 would have the potential to result in a loss of hydrologic function of waters of the United States on the Project site. This attribute is affected by the source of water, the duration and magnitude of flows (hydroperiod), whether or not flows reach the floodplain, the presence of flow restrictions, the duration of water flows or ponding within the creek or on the floodplain, and the width of the floodplain, and the HARC hydrology score indicates the relative extent to which the assessment reaches on site perform this function. Lost hydrologic function due to the proposed fill was calculated by applying the HARC hydrology score as a weighting factor to the acreages filled. The fill from implementation of the proposed RMDP would result in the permanent loss of 49.1 HARC hydrology-weighted acres (26 less acreage than the proposed RMDP), and the temporary loss of 32.0 HARC hydrology-weighted acres (14 percent more acreage than the proposed RMDP) of waters of the United States.

8.3.4.3 Effects On Biological Characteristics Of The Aquatic Ecosystem

Compared to Alternative 2, Alternative 3 would have fewer permanent impacts on biological resources. In some areas, however, RMDP facilities are sited differently under Alternative 3 to avoid impacts to jurisdictional areas in the Santa Clara River and its tributaries. In those areas, Alternative 3 would have somewhat higher temporary impacts to some upland biological resources. Impacts to wildlife habitat connectivity and movement would be similar to those of the proposed Project.

8.3.4.3.1 Effects On Sensitive Aquatic And Riparian Plants And Wildlife

Potential impacts to individuals of wildlife species would be similar under each of the alternatives, but the level of risk would be proportionately smaller for alternatives with smaller impacts to suitable habitat for the species. Therefore, Alternative 3 would generally have less impact than Alternative 2 on habitat for sensitive aquatic, semi-aquatic, and riparian plants and wildlife, because Alternative 3 involves a slightly smaller development footprint. One species that would experience substantially less impact would be the southwestern pond turtle. It was determined in the Draft EIS/EIR that impacts to habitat for this species would be significant and unavoidable under Alternative 2 because: (1) lower Potrero Canyon would become permanently unavailable for nesting, hatchling and juvenile use; and (2) upland refugia during

100-year storm events would be lost due to construction of RMDP facilities in the area. Lower Potrero Canyon would remain available to the pond turtle for these uses under Alternatives 3. Impacts of Alternative 3 on special-status aquatic species are summarized in **Appendix 8.0** (Impacts of Alternative 3 on Sensitive Aquatic Species). For further information and species-specific discussions, please refer to **Section 4.5** of the Draft EIS/EIR for the Project.

8.3.4.3.2 Loss Of Habitat Function

Alternative 3 would have the potential to result in a loss of habitat function of waters of the United States on the Project site. This attribute takes into account such factors as plant species diversity, percentage of native plant species, biological structure, and evidence of vegetation recruitment (*i.e.*, the presence of seedlings and/or saplings), and the width of the floodplain, and the HARC habitat score indicates the relative extent to which the assessment reaches on site perform this function. Lost habitat function due to the proposed fill was calculated by applying the HARC habitat score as a weighting factor to the acreages filled. The fill from implementation of Alternative 3 would result in the permanent loss of 41.4 HARC habitat-weighted acres (28 percent less than the proposed RMDP) and the temporary loss of 27.2 HARC habitat-weighted acres (13 percent more than the proposed RMDP) of waters of the United States.

8.3.4.3.3 Fish, Crustaceans, Mollusks, And Other Aquatic Organisms In The Food Web

Implementation of Alternative 3 could result in permanent physical changes to the Santa Clara River Corridor and surrounding watershed, including changes in hydrology and fluvial processes, that could affect suitable fish habitat, as discussed in the stickleback analysis section (**8.3.4.3.1**).However, these impacts are expected to be minor under both Alternative 2 and Alternative 3.

Impacts to crustaceans, mollusks, and other aquatic organisms in the food web would be minor as the diversity of invertebrates in the substrate is generally low due to the substrate being dominated by sand and gravel. Impacts to these organisms under Alternative 3 would be similarly minor as under Alternative 2, caused by the changes in water quality, substrate and sediment dynamics, and hydrologic function as discussed in **Sections 8.3.4.1.1, 8.3.4.2.2,** and **8.3.4.2.3,** respectively. Therefore, there would not be large-scale changes in the distribution or abundance of aquatic organisms as a result of construction of the Project under Alternative 3.

8.3.4.3.4 Other Wildlife

Alternative 3's impact upon non-sensitive species that could potentially occur within the aquatic ecosystem will be generally similar to effects on sensitive species of the same type (fishes, birds, *etc.*), as discussed in **Section 8.3.4.3.1**. More detailed information on these effects can also be found in **Section 4.5** of the Draft EIS/EIR for the Project.

8.3.4.3.5 Effects On Riparian Vegetation

Out of the 367.2 acres of riparian vegetation communities within Corps jurisdiction on the Project site, Alternative 3 permanently impacts 32.2 acres and temporarily impacts 17.0 acres of riparian vegetation (compared to Alternative 2, which has 49.7 acres of permanent and 14.2

acres of temporary impacts). **Table 4.5-27** of the RMDP-SCP EIS/EIR provides a detailed summary of overall impacts to riparian vegetation by floristic alliance (*i.e.*, columns for RMDP Direct Impacts and Specific Plan Indirect Impacts).

8.3.4.4 Cumulative Effects On The Aquatic Ecosystem

Following incorporation of project-specific mitigation set forth in **Section 4.5** and **Section 4.6** of the Draft EIS/EIR, Alternative 3 would not result in a cumulative contribution to any significant aquatic ecosystem impacts. In addition, many of the mitigation measures proposed for the proposed Project, if adopted for other projects in the watershed, would further ensure that cumulative impacts on the aquatic ecosystem impacts remain less than significant. For more information see **Section 6.0** of the Draft EIS/EIR for the Project.

8.3.4.5 Human Use Characteristics

As required by the section 404(b)(1) Guidelines (40 C.F.R. §§ 230.50 through 230.54), this section evaluates the potential loss of values that would result relative to human use characteristics including municipal and private water supplies, recreational and commercial fisheries, water-related recreation, aesthetics, and preserve areas.

8.3.4.5.1 Municipal And Private Water Supplies

Alternative 3 would not involve any activities that would render municipal or public water supplies unfit for consumption. The WRP associated with the Specific Plan would be designed to comply with applicable NPDES requirements, ensuring that downstream water quality would not be impaired. The quantity of water passing through the RMDP site within the Santa Clara River and tributaries would not be affected by this alternative.

8.3.4.5.2 Recreational And Commercial Fisheries

Alternative 3 would not have an impact upon recreational or commercial fisheries on the site as it is private land, where such use of the site is not authorized. Potential effects upon water quality would be mitigated to comply with applicable standards such that build-out of the Project would not affect recreational or commercial fishing downstream of the Project area.

8.3.4.5.3 Water-Related Recreation

As stated in the previous section, the site is on private land, where recreational use of the site is not authorized. Further, Alternative 3 would not result in off-site impacts to water quality or hydrologic function such that water-related recreation upstream and downstream of the Project area would not be affected.

8.3.4.5.4 Aesthetics

While Alternative 3 would result in a slight reduction in Specific Plan development and slightly larger spineflower preserves, this alternative would nevertheless establish a new urban community, in a highly visible, currently undeveloped area. (See **Section 4.15** of the Draft EIS/EIR.) However, visual impacts of the activities proposed within Corps jurisdiction would largely be confined to bridges, grade control structures, storm drain outlets, and similar facilities. These facilities would contrast with existing natural stream banks, but are not expected to result in significant adverse impacts to the aesthetic values of the jurisdictional areas overall. Proposed bank stabilization activities would cause a substantial change in the appearance of jurisdictional areas during construction, but because the stabilization would be buried and revegetated, these impacts would be temporary. In addition, Alternative 3 contemplates substantial on-site creation and restoration, which will largely replace lost values and the activities take place in the context of a master-planned community, which will integrate the resources with the community. Therefore, Alternative 3 would not cause significant adverse impacts to aesthetic values of waters of the United States.

8.3.4.5.5 Parks, National And Historical Monuments, National Seashores, Wilderness Areas, Research Sites, And Similar Preserves

Alternative 3 would not impact parks, national and historical monuments, national seashores, wilderness areas, research sites, or similar preserves, as the RMDP site is privately owned and does not contain any such designated features.

8.3.5 Other Significant Environmental Consequences

As noted in **Section 8.1**, the purpose of this subsection is to identify areas where an alternative may have other (non-aquatic) significant adverse environmental consequences that would exclude it from consideration as the potential LEDPA, even if it had less impact on aquatic resources and was otherwise practicable.

8.3.5.1 Non-Aquatic Biological Resources

Because these species do not typically occur within waters of the United States, impacts on non-aquatic biological resources would generally be limited to indirect effects associated with build-out of the Specific Plan. The effects of Alternative 3 on non-aquatic biological resources would generally be slightly less severe than those of Alternative 2, as described below.

8.3.5.1.1 Effects On Sensitive Upland Vegetation Communities

Under Alternative 3, impacts to oak woodlands within Corps jurisdiction would be slightly reduced when compared to the proposed Project (Alternative 2; 0.8 acres of permanent impact). California walnut woodland and native grasslands do not occur within Corps jurisdiction within the Project site.

8.3.5.1.2 Effects On Special-Status Terrestrial/Upland Plants And Wildlife

The impacts of Alternative 3 on special-status terrestrial species would generally be slightly less than those of the proposed Project, due to the reduced extent of upland development facilitated. These impacts are summarized in **Appendix 8.0** (Impacts of Alternative 3 on Sensitive Non-Aquatic Species). For detailed analyses of the effects of Alternative 3 on special-status species, please refer to **Section 4.5** of the Draft EIS/EIR.

8.3.5.1.3 Effects On Wildlife Movement

Both Alternative 3 and Alternative 2 contemplate significant urban development and would negatively affect long-term habitat connectivity in the RMDP. Compared to Alternative 2, however, Alternative 3 would result in less overall development and would install more bridge crossings instead of culverts. These factors would tend to make Alternative 3 more conducive to wildlife movement.

8.3.5.2 Hazards, Hazardous Materials, And Public Safety

Under Alternative 3, construction activities, including the temporary transport, storage and use of potentially hazardous materials, would be reduced when compared to the proposed Project, because Alternative 3 would facilitate development on approximately eight percent less acreage and would result in the construction of slightly fewer residential units and square feet of commercial space.

The demand on emergency response services would be proportional to the post-development population served. Under Alternative 3, the population at risk would be approximately 66,514 residents (a 4.5 percent reduction when compared to the proposed Project). Development under this alternative would be adequately designed to handle emergency evacuations, with four points of access to the north and east. This alternative would result in hazards/hazardous materials impacts substantially similar to those of the proposed Project. For more information, please refer to **Section 4.17** of the EIS/EIR for the Project.

8.3.5.3 Conclusion

Alternative 3 would not result in any other significant adverse environmental consequences that the proposed Project would not have and which would exclude it from consideration as the potential LEDPA.

8.3.6 Overall

Alternative 3 would achieve the overall project purpose and would be practicable in terms of cost and logistics. It would be less damaging to the aquatic ecosystem compared to the proposed Project and would not have other significant adverse environmental consequences that would prevent it from being considered as the LEDPA.

8.4 ANALYSIS OF ALTERNATIVE 4: ELIMINATION OF PLANNED POTRERO BRIDGE AND ADDITION OF VCC SPINEFLOWER PRESERVE

Under this alternative, the proposed RMDP would be modified in key respects. Two bridges across the Santa Clara River and the associated bank stabilization would be constructed, including the Commerce Center Driver Bridge (already approved by the Corps and CDFG in 1999) and the Long Canyon Road Bridge. The Potrero Canyon Road Bridge, however, would not be constructed under this alternative. Major tributary drainages would be regraded and realigned under this alternative. The cismontane alkali marsh in lower Potrero Canyon would be preserved.

This alternative would facilitate urban development within the Specific Plan site, including 20,721 residential units and 5.48 msf of commercial/industrial/business park floor area. The proposed configuration of infrastructure facilities and land uses that would occur under Alternative 4 is presented graphically on **Figure 8-3**. For a complete description of Alternative 4, including infrastructure proposed and urban development facilitated, please refer to **Section 3.0** of the Draft EIS/EIR for the Project.

8.4.1 Project Purpose

Under Alternative 4, urban development within the RMDP site would be incrementally reduced compared to the Specific Plan as approved by Los Angeles County. These reductions would not prevent Alternative 4 from meeting all aspects of the overall project purpose.

8.4.1.1 Size

Alternative 4 would facilitate a master-planned urban development within the RMDP site, comprising 2,712.1 net developable acres of residential, commercial, and industrial uses and public facilities. Compared to the proposed Project, overall developable acreage under this alternative would be reduced by eight percent.

8.4.1.2 Residential Uses

Alternative 4 would facilitate the development of 2,329.6 acres of residential uses, a reduction of nine percent compared to the proposed Project. However, feasible modifications in density would allow the construction of up to 20,721 dwelling units under this alternative, which is only one percent less than the number of units contemplated under the proposed Project. Because the number of dwelling units available under Alternative 4 would be within ten percent of the number approved in the Specific Plan, Alternative 4 is presumed to be capable of achieving the Specific Plan Basic Objectives for residential uses.

8.4.1.3 Commercial Uses

Alternative 4 would facilitate the development of 226.8 acres of commercial uses, a reduction of 12 percent compared to the proposed Project. However, feasible modifications in density, such as vertical construction, would allow this acreage to support up to 5.48 msf of commercial floor space under this alternative, a reduction of one percent compared to the proposed Project. Because the commercial floor space available under Alternative 4 would be within ten percent of the floor space that would result from build out of the Specific Plan as approved by the County, Alternative 4 is presumed to be capable of achieving the Specific Plan Basic Objectives for commercial uses.

8.4.1.4 Public Facilities

Under Alternative 4, the development of 155.7 acres of public facilities would be facilitated, representing a four percent increase compared to the proposed Project. Because this acreage exceeds the acreage of public services called for in the Specific Plan as approved by the County, Alternative 4 is presumed to be capable of achieving the Specific Plan Basic Objectives for public facilities.

8.4.1.5 Open Space

Under Alternative 4, 10,452.9 acres of undeveloped lands currently under private ownership would be dedicated to land management entities for preservation in perpetuity. This acreage represents a 2.5 percent increase when compared to the proposed Project. Because the acreage of open space dedicated under this alternative would exceed that called for in the Specific Plan as approved by the County, Alternative 4 is presumed to be capable of achieving the Specific Plan Basic Objectives for open space.

8.4.1.6 Village Viability

Alternative 4 would facilitate urban development within the RMDP site, but less than the proposed Project. However, because the reductions in development under this alternative would be relatively minor and would not be concentrated in a single portion of the site, the proposed development reductions would not substantially hinder development of interrelated villages, each of which provides a range of complementary services. Therefore, Alternative 4 would meet the Specific Plan Basic Objectives with regard to villages.

8.4.1.7 Project Purpose Conclusion

Alternative 4 would allow the development of interrelated Villages that provide a balance of land uses in sizes and proportions that are approximately the same as those approved in the Specific Plan. It would achieve the Basic Objectives of the Specific Plan and the overall project purpose.

8.4.2 Costs

This section compares the costs associated with Alternative 4, including both site development costs and costs of land, with those of the proposed Project (Alternative 2). As stated in **Section 8.1**, above, an alternative would be unreasonably costly if the total development costs per net developable acre exceeded those of the proposed Project by more than five percent.

8.4.2.1 Site Development Costs

Alternative 4 would yield a total of 2,712.1 net developable acres at a total development cost of $2,878,781,000. This yields an average development cost of $1,061,458 per net developable acre (2.3 percent increase compared to the proposed Project). Development costs of this alternative would, therefore, be similar to those of the proposed Project, and would be reasonable for a Project of this type.

8.4.2.2 Conclusion

Costs for Alternative 4 would be similar to the costs of the proposed Project and would be reasonable overall.

8.4.3 Logistics

8.4.3.1 Site Circulation

Under Alternative 4, development facilitated on the RMDP site would be served by an internal network of new roads, which would connect to the existing regional transportation network via two proposed bridges across the Santa Clara River (Long Canyon Road and Commerce Center Drive), and by westward extension of two existing roadways (Magic Mountain Parkway and Pico Canyon Road) onto the site. The development facilitated by Alternative 4 would be adequately designed to handle emergency evacuations, with four points of access to the north and east. Under this alternative, the internal circulation network would comply with applicable County standards, and all on-site roadway segments would operate at acceptable levels of service (LOS D or better).

8.4.3.2 Flood Protection

Alternative 4 would authorize the construction of flood control features, such as bank stabilization, grade control structures, storm drains, and debris and detention basins, throughout the RMDP site to protect Specific Plan development from flooding. All facilities would be constructed to County standards, which require that facilities be sized to convey flows from the Capital Flood. Because the Capital Flood substantially exceeds the 100-year flood in magnitude in all modeled watersheds within the RMDP site, the proposed facilities would be adequate to protect site development from 100-year storm events.

8.4.3.3 Water Treatment And Reclamation

Under Alternative 4, urban development within the RMDP site would be accompanied by a WRP intended to serve the new community. The WRP would not differ from that approved by the County as a component of the Specific Plan approval in May 2003. Because the WRP was sized to accommodate the development approved in the Specific Plan, which would have greater demands on wastewater treatment services than the development facilitated under Alternative 4, the WRP would have adequate capacity to serve this alternative.

8.4.3.4 Grading Balance

When it approved the Specific Plan, the County required the proposed development to balance quantities of cut and fill material on site. Alternative 4 was designed to be consistent with this requirement and would not require import or export of soils to or from the RMDP site. Alternative 4, therefore, would not have other adverse environmental consequences associated with the transport of grading spoils.

8.4.4 Impacts To The Aquatic Ecosystem

Like the proposed Project, Alternative 4 would affect the aquatic ecosystem by filling some jurisdictional waters, reducing stream and wetland functions and services, and constructing bridges across the Santa Clara River. Under Alternative 4, however, these impacts would be reduced slightly as compared to the proposed Project.

8.4.4.1 Effects On Chemical Characteristics Of The Aquatic Environment

Under the proposed RMDP and all alternatives, including Alternative 4, surface water quality would be directly impacted by construction activities, which would include removal of vegetation, grading, and trenching. However, the proposed Project and alternatives would be subject to regulatory requirements, which would ensure that water quality standards are met and that water quality would not be significantly degraded. Thus, the impacts of all alternatives on chemical components of the aquatic environment would be approximately equal. For more information, please refer to **Section 4.4** of the Draft EIS/EIR for the Project.

8.4.4.1.1 Effects on Water Quality.

The proposed Project and all alternatives, including Alternative 4, would have the potential to result in direct water quality impacts on waters of the United States caused by construction activities, which would include removal of vegetation, grading, and trenching, as well as the potential to result in indirect effects on water quality associated with build-out of the approved Specific Plan. However, the proposed Project and alternatives would be subject to regulatory requirements that are intended to protect water quality. Thus, the impacts of all alternatives on chemical components of the aquatic ecosystem would be approximately equal. For more information, please refer to **Section 4.4** of the Draft EIS/EIR for the Project.

***Construction Activities*.** Similar to the proposed Project, this alternative's construction-related impacts on water quality would consist primarily of sediment (TSS and turbidity) and non-sediment related pollutants, such as nutrients, heavy metals, and certain pesticides, including legacy pesticides.

Under the proposed Project, implementation of erosion and sedimentation source control BMPs during construction would prevent significant erosion and sediment transport impacts, as well as transport of other potential pollutants from the Project site. BMPs will be implemented in compliance with the Construction General Permit and the general waste discharge requirements in the Dewatering General WDRs or an individual WDR/NPDES permit specific to the Project dewatering activities. These erosion and sedimentation source control BMPs would be implemented for Alternative 4 as well, and water quality impacts would, therefore, not differ significantly from those of the proposed Project. For more information, please refer to **Section 4.4** of the Draft EIS/EIR for the Project.

***Long-Term Effects Associated With Project Build-Out*.** Development on the Specific Plan site would be reduced under Alternative 4, as the net acreage/pad for residential, non-residential, and public facilities uses would be reduced by 245.6 acres (approximately 7.6 percent). The smaller development area in Alternative 4 would reduce the predicted increase in pollutants of concern that would result from the proposed Project. The site design/low impact development, source control, and treatment control BMPs specified in the Newhall Ranch Specific Plan Sub-Regional Stormwater Mitigation Plan would be implemented for Alternative 4 as well, and water quality impacts would, therefore, not differ significantly from those of the proposed Project. For more information, please refer to **Section 4.4** of the Draft EIS/EIR for the Project.

8.4.4.1.2 Loss Of Biogeochemical Function

Alternative 4 would have the potential to result in a loss of biogeochemical function of waters of the United States on the Project site. This attribute measures the ability of wetland and riparian areas to perform specific processes such as maintenance of water quality, cycling of nutrients, retention of particulates, and export of organic carbon, and the HARC biogeochemical score indicates the relative extent to which the assessment reaches on site perform this function. Lost biogeochemical function due to the proposed fill was calculated by applying the HARC biogeochemical score as a weighting factor to the acreages filled. The fill from implementation of Alternative 4 would result in the permanent loss of 47.4 HARC biogeochemical-weighted acres (21 percent reduction compared to the proposed RMDP) and a temporary loss of 25.8 HARC biogeochemical-weighted acres (one percent reduction compared to the proposed RMDP) of waters of the United States.

8.4.4.2 Effects On Physical Characteristics Of The Aquatic Environment

Impacts on physical components of the aquatic environment would generally consist of impacts related to fill of jurisdictional waters, impacts related to losses of stream and wetland functions and services, and impacts related to the geomorphic stability of the site's waters in the long term. Under Alternative 4, these impacts would generally be slightly less than those of the proposed Project, as described below.

8.4.4.2.1 Permanent And Temporary Fill Of Waters Of The United States

Implementation of Alternative 4 would facilitate urban development in the RMDP site, and would result in the placement of fill within waters of the United States. In total, this alternative would permanently fill 73.3 acres of waters of the United States (21 percent reduction compared to the proposed RMDP), and would temporarily disturb an additional 33.8 acres (two percent increase compared to the proposed RMDP). Temporary impacts would be associated with construction zones adjacent to proposed Project facilities. Waters temporarily affected by the Project would be restored and revegetated after completion of construction in the area. In some instances temporary impacts would also result from restoration activities, *i.e.*, when such activities require earthwork to be conducted in jurisdictional areas (correction of existing incised channel banks, for example).

***Avoidance*.** Alternative 4 would avoid 553.0 acres of waters of the United States within the RMDP site. Of the total 660.1 acres of waters of the United States that occur on the site, Alternative 4 would avoid 84 percent, compared to 81 percent avoidance for the proposed Project. Key avoided areas under this alternative would include the majority of the Santa Clara River mainstem, the Middle Canyon spring complex (a high-quality wetland), and the entire Salt Creek sub-watershed. In addition, a cismontane alkali marsh in lower Potrero Canyon, which would be impacted under the proposed RMDP, would be avoided under this alternative.

***Fill in the Santa Clara River*.** Of the 471.2 acres of waters of the United States within the Santa Clara River mainstem on site, Alternative 4 would permanently disturb 5.7 acres (62 percent reduction in acreage compared to the proposed Project), and would temporarily disturb an additional 18.3 acres (two percent reduction in acreage). The permanent impact would be associated with the construction of two proposed bridges across the river, and would represent only one percent of the total jurisdictional acreage in the river.

***Fill in On-Site Tributary Drainages*.** Of the total 188.9 acres of waters of the United States within tributary drainages on site, Alternative 4 would permanently disturb 67.6 acres (14 percent reduction compared to the proposed RMDP), and would temporarily disturb an additional 15.5 acres (a six percent increase in acreage). This impact results from converting existing drainages to buried storm drains, eliminating existing drainages for realignment, and grading to accommodate site development. This impact would represent 36 percent of the total jurisdictional acreage in the on-site tributaries. Impacts to tributaries under this alternative would generally affect all classes of tributaries on site (small and large tributaries), and no type of aquatic resource would be disproportionately affected.

Fill in Special Aquatic Sites. Implementation of Alternative 4 would permanently disturb 9.4 acres of wetlands (54 percent reduction in acreage compared to the proposed RMDP) and would temporarily disturb an additional 11.7 acres (a four percent increase in acreage compared to the proposed RMDP). These impacts would occur primarily due to bridge construction along the Santa Clara River mainstem; but this alternative would also eliminate a cismontane alkali marsh wetland in middle Potrero Canyon. Elimination of the planned bridge across the river at Potrero Canyon Road would reduce impacts to wetlands along the river under this alternative. In addition, the entire Salt Creek watershed and the Middle Canyon spring complex would be preserved under this alternative, and no impacts to wetlands in those areas would occur. Additionally, the cismontane alkali marsh wetland in lower Potrero Canyon, which would be disturbed under the proposed Project, would be avoided under this alternative. In total, Alternative 4 would avoid 93 percent of all wetlands on site, a four percent increase in avoidance compared to the proposed Project.

8.4.4.2.2 Effects On Substrate And Sediment Dynamics

Alternative 4 would have the potential to result in geomorphic impacts on waters of the United States caused by disruptions of the sediment equilibrium in the Santa Clara River mainstem and/or tributaries. In addition, the conversion of existing undeveloped lands to a non-erodible, urban condition would slightly reduce the available sand supply reaching the beaches in Ventura County. These effects would be substantially similar to those of the proposed RMDP, and would generally be minor.

Geomorphic Impacts to the Santa Clara River. Similar to the proposed Project, Alternative 4 would involve the installation of facilities along the Santa Clara River that could increase sediment flows downstream during storm events and cause substantial erosion and deposition impacts downstream. Under this alternative, the total floodplain area subject to potentially erosive velocities would be decreased for all modeled storms with the exception of the 10-year return period. However, the additional 0.3 acres subject to velocities greater than four fps during the 10-year return interval is not considered significant relative to the substantial decrease in area subject to erosive velocities during 2-, 20-, 50-, 100-year, and capital flood events. Downstream deposition characteristics and potential erosion of the soils covering the proposed buried soil cement bank stabilization would be approximately the same as under the proposed Project. Overall, Alternative 4 would have geomorphic impacts on the Santa Clara River mainstem substantially similar to those of the proposed Project. For more information, please refer to **Section 4.2** of the Draft EIS/EIR for the Project.

Geomorphic Impacts to Tributaries. Under the proposed Project, tributary drainages with modified or reconstructed channels would be designed to ensure that the channels remain geomorphically stable in the post-development condition. These design criteria would apply to Alternative 4 as well, and geomorphic impacts in the tributaries would, therefore, not differ significantly from those of the proposed Project. For more information, please refer to **Section 4.2** of the EIS/EIR for the Project.

Beach Replenishment. Similar to the proposed Project, implementation of Alternative 4 and subsequent build-out of urban development would result in the conversion of currently undeveloped lands to a non-erodible, urban condition. Under this alternative, the total acreage converted would be 4,944 acres. Effectively, this conversion would translate to an average loss of approximately 9,039 tons of sediment per year, or 0.22 percent of the river's total annual yield. The magnitude of this impact represents an 8.3 percent reduction compared to the proposed RMDP, which already would have a very slight impact on beach replenishment. Thus, Alternative 4 would not significantly affect recruitment of sand onto Ventura County beaches. For more information, please refer to **Section 4.2** of the Draft EIS/EIR for the Project.

8.4.4.2.3 Loss Of Hydrologic Function

Alternative 4 could result in a loss of hydrologic function of waters of the United States on the Project site. This attribute is affected by the source of water, the duration and magnitude of flows (hydroperiod), whether or not flows reach the floodplain, the presence of flow restrictions, the duration of water flows or ponding within the creek or on the floodplain, and the width of the floodplain, and the HARC hydrology score indicates the relative extent to which the assessment reaches on site perform this function. Lost hydrologic function due to the proposed fill was calculated by applying the HARC hydrology score as a weighting factor to the acreages filled. The fill from implementation of Alternative 4 would result in the permanent loss of 51.8 HARC hydrology-weighted acres (22 percent less than the proposed RMDP), and the temporary loss of 27.9 HARC hydrology-weighted acres (one percent more than the proposed RMDP) of waters of the United States.

8.4.4.3 Effects On Biological Characteristics Of The Aquatic Ecosystem

Compared to Alternative 2, Alternative 4 would have fewer permanent impacts on biological resources. In some areas, however, RMDP facilities are sited differently under Alternatives 4 to avoid impacts to jurisdictional areas in the Santa Clara River and its tributaries. In those areas, Alternative 4 would have somewhat higher temporary impacts to some upland biological resources. Impacts to wildlife habitat connectivity and movement would be similar to the proposed Project.

8.4.4.3.1 Effects On Sensitive Aquatic And Riparian Plants And Wildlife

Potential impacts to individuals of wildlife species would be similar under each of the alternatives, but the level of risk would be proportionately smaller for alternatives with smaller impacts to suitable habitat for the species. Therefore, Alternative 4 would generally have less impact than Alternative 2 on habitat for sensitive aquatic, semi-aquatic, and riparian plants and wildlife, because Alternative 4 involves a slightly smaller development footprint. One species that would experience substantially less impact is the southwestern pond turtle. It was determined in the Draft EIS/EIR that impacts to habitat for this species would be significant and unavoidable under Alternative 2 because lower Potrero Canyon would become permanently unavailable for nesting, hatchling and juvenile use, and upland refugia during

100-year storm events due to construction of RMDP facilities in the area. Lower Potrero Canyon would remain available to the pond turtle for these uses under Alternative 4. Impacts of Alternative 4 on special-status aquatic species are summarized in **Appendix 8.0** (Impacts of Alternative 4 on Sensitive Aquatic Species). For further information and species-specific discussions, please refer to **Section 4.5** of the Draft EIS/EIR for the Project.

8.4.4.3.2 Loss Of Habitat Function

Alternative 4 would have the potential to result in a loss of habitat function of waters of the United States on the Project site. This attribute takes into account such factors as plant species diversity, percentage of native plant species, biological structure, and evidence of vegetation recruitment (*i.e.*, the presence of seedlings and/or saplings), and the width of the floodplain, and the HARC habitat score indicates the relative extent to which the assessment reaches on site perform this function. Lost habitat function due to the proposed fill was calculated by applying the HARC habitat score as a weighting factor to the acreages filled. The fill from implementation of Alternative 4 would result in the permanent loss of 43.2 HARC habitat-weighted acres (25 percent reduction compared to the proposed Project) and the temporary loss of 24.2 HARC habitat-weighted acres (no change compared to the proposed Project) of waters of the United States.

8.4.4.3.3 Fish, Crustaceans, Mollusks, And Other Aquatic Organisms In The Food Web

Implementation of Alternative 4 could result in permanent physical changes to the Santa Clara River Corridor and surrounding watershed, including changes in hydrology and fluvial processes, that could affect suitable fish habitat, as discussed in the stickleback analysis section (**8.3.4.3.1**). However, these impacts would be minor under both Alternative 2 and Alternative 4.

Impacts to crustaceans, mollusks, and other aquatic organisms in the food web would be minor as the diversity of invertebrates in the substrate is generally low due to the substrate being dominated by sand and gravel. Impacts to these organisms under Alternative 4 would be similarly minor as under Alternative 2, caused by the changes in water quality, substrate and sediment dynamics, and hydrologic function as discussed in **Sections 8.4.4.1.1**, **8.4.4.2.2**, and **8.4.4.2.3**, respectively. Therefore, there would not be large-scale changes in the distribution or abundance of aquatic organisms as a result of construction of the Project under Alternative 4.

8.4.4.3.4 Other Wildlife

The impact upon other, non-sensitive species, that could potentially occur within the aquatic ecosystem will be generally similar to effects on sensitive species of the same type (fishes, birds, *etc.*), as discussed in **Section 8.4.4.3.1**.

8.4.4.3.5 Effects On Riparian Vegetation

Out of the 324.0 acres of riparian vegetation communities within Corps jurisdiction on the Project site, Alternative 4 permanently impacts 33.1 acres and temporarily impacts 15.8 acres of riparian vegetation (compared to Alternative 2, which has 49.7 acres of permanent and 14.2 acres of temporary impacts). **Table 4.5-27** of the RMDP-SCP EIS/EIR provides a detailed summary of overall impacts to riparian vegetation by floristic alliance (*i.e.*, columns for RMDP Direct Impacts and Specific Plan Indirect Impacts).

8.4.4.4 Cumulative Effects On The Aquatic Ecosystem

Following incorporation of project-specific mitigation set forth in **Section 4.5** and **Section 4.6** of the Draft EIS/EIR, Alternative 4 would not result in a cumulative contribution to any significant impact on aquatic ecosystems. In addition, many of the mitigation measures proposed for the proposed Project, if adopted for other projects in the watershed, would further ensure that cumulative impacts on the aquatic ecosystem impacts remain less than significant. For more information please refer to **Section 6.0** of the Draft EIS/EIR for the Project.

8.4.4.5 Human Use Characteristics

As required by the section 404(b)(1) Guidelines (40 C.F.R. §§ 230.50 through 230.54), this section evaluates the potential loss of values that would result relative to human use characteristics including municipal and private water supplies, recreational and commercial fisheries, water-related recreation, aesthetics, and preserve areas.

8.4.4.5.1 Municipal And Private Water Supplies

Alternative 4 would not involve any activities that would render municipal or public water supplies unfit for consumption. The WRP associated with the Specific Plan would be designed to comply with applicable NPDES requirements, ensuring that downstream water quality would not be impaired. The quantity of water passing through the RMDP site within the Santa Clara River and tributaries would not be affected by this alternative.

8.4.4.5.2 Recreational And Commercial Fisheries

Alternative 4 would not have an impact upon recreational or commercial fisheries on the site as it is private land, where such use of the site is not authorized. Potential effects upon water quality would be mitigated to comply with applicable standards such that build-out of the Project would not affect recreational or commercial fishing downstream of the Project area.

8.4.4.5.3 Water-Related Recreation

As stated in the previous section, the site is on private land, where recreational use of the site is not authorized. Further, Alternative 4 would not result in off-site impacts to water quality or hydrologic function such that water-related recreation upstream and downstream of the Project area would not be affected.

8.4.4.5.4 Aesthetics

While Alternative 4 would result in a slight reduction in Specific Plan development and larger spineflower preserves compared to the proposed RMDP, this alternative would nevertheless establish a new urban community, in a highly visible, currently undeveloped area. (See **Section 4.15** of the Draft EIS/EIR.) However, visual impacts of the activities proposed within Corps jurisdiction would largely be confined to bridges, grade control structures, storm drain outlets, and similar facilities. These facilities would contrast with existing natural stream banks, but are not expected to result in significant adverse impacts to the aesthetic values of the jurisdictional areas overall. Proposed bank stabilization activities would cause a substantial change in the appearance of jurisdictional areas during construction, but because the stabilization would be buried and revegetated, these impacts would be temporary. In addition, Alternative 4 contemplates substantial on-site creation and restoration, which will largely replace lost values and the activities take place in the context of a master-planned community, which will integrate the resources with the community. Therefore, Alternative 4 would not cause significant adverse impacts to aesthetic values of waters of the United States.

8.4.4.5.5 Parks, National And Historical Monuments, National Seashores, Wilderness Areas, Research Sites, And Similar Preserves

Alternative 4 would not impact parks, national and historical monuments, national seashores, wilderness areas, research sites, or similar preserves, as the RMDP site is privately owned and does not contain any such designated features.

8.4.5 Other Significant Environmental Consequences

As noted in **Section 8.1**, the purpose of this subsection is to identify areas where an alternative may have other (non-aquatic) significant adverse environmental consequences that would exclude it from consideration as the potential LEDPA, even if it had less impact on aquatic resources and was otherwise practicable.

8.4.5.1 Non-Aquatic Biological Resources

Because these species do not typically occur within waters of the United States, impacts on non-aquatic biological resources would generally be limited to indirect effects associated with build-out of the Specific Plan. Alternative 4's impacts on non-aquatic biological resources would generally be less severe than those of Alternative 2, due to the slightly reduced extent of urban development facilitated.

8.4.5.1.1 Effects On Sensitive Upland Vegetation Communities

Under Alternative 4, impacts to oak woodlands within Corps jurisdiction would be the same as for Alternative 2 (0.75 acres of permanent impact). California walnut woodland, and native grasslands do not occur within Corps jurisdiction within the Project site.

8.4.5.1.2 Effects On Special-Status Terrestrial/Upland Plants And Wildlife

The impacts of Alternative 4 on special-status terrestrial species would generally be slightly less than those of the proposed Project, due to the reduced extent of upland development facilitated. These impacts are summarized in **Appendix 8.0** (Impacts of Alternative 4 on Sensitive Non-Aquatic Species). For detailed analyses of the effects of Alternative 4 on special-status species, please refer to **Section 4.5** of the Draft EIS/EIR.

8.4.5.1.3 Effects On Wildlife Movement

Both Alternative 4 and Alternative 2 contemplate significant urban development and would negatively affect long-term habitat connectivity in the RMDP. Compared to Alternative 2, however, Alternative 4 would result in less overall development and would install more bridge crossings instead of culverts. These factors would tend to make Alternative 4 more conducive to wildlife movement compared to the proposed Project.

8.4.5.2 Hazards, Hazardous Materials, And Public Safety

Under Alternative 4, construction activities, such as the temporary transport, storage and use of potentially hazardous materials, would be reduced by approximately 4.5 percent when compared to the proposed Project, because Alternative 4 would facilitate approximately 4.5 percent less development.

The demand on emergency response services would be proportional to the post-development population served. Under Alternative 4, the population at risk would be approximately 67,500 residents (a 3.4 percent reduction when compared to the proposed Project). Development under this alternative would be adequately designed to handle emergency evacuations, with four points of access to the north and east. This alternative would result in hazards/hazardous materials impacts substantially similar to those of the proposed Project. For more information, please refer to **Section 4.17** of the Draft EIS/EIR for the Project.

8.4.5.3 Conclusion

Alternative 4 would not result in significant adverse environmental consequences that the proposed Project would not have. Therefore, it remains eligible for consideration as the potential LEDPA.

8.4.6 Overall

Alternative 4 would achieve the overall project purpose and would be practicable in terms of costs and logistics. It would be less damaging to the aquatic ecosystem compared to the proposed Project and would not have other significant adverse environmental consequences that would prevent it from being considered as the LEDPA.

8.5 ANALYSIS OF ALTERNATIVE 5: WIDENED TRIBUTARY DRAINAGES

Under this alternative, the proposed RMDP would be modified in key respects. Three bridges across the Santa Clara River and the associated bank stabilization would be constructed, including the Commerce Center Driver Bridge (already approved by the Corps and CDFG in 1999) the Potrero Canyon Bridge, and the Long Canyon Road Bridge. Major tributary drainages would be regraded and realigned under this alternative, but would result in impact reductions in the Chiquito Canyon, San Martinez Grande Canyon, and Potrero Canyon drainages compared to the proposed Project (Alternative 2).

This alternative would facilitate urban development within the Specific Plan site, including 20,196 residential units and 5.42 msf of commercial/industrial/business park floor area. The proposed configuration of infrastructure facilities and land uses that would occur under Alternative 5 is presented graphically on **Figure 8-4**. For a complete description of Alternative 5, including infrastructure proposed and urban development facilitated, please refer to **Section 3.0** of the Draft EIS/EIR for the Project.

8.5.1 Project Purpose

Under Alternative 5, urban development within the RMDP site would be incrementally reduced compared to the Specific Plan as approved by Los Angeles County. These reductions would not prevent Alternative 5 from meeting all aspects of the overall project purpose.

8.5.1.1 Size

Implementation of Alternative 5 would facilitate a master-planned urban development within the RMDP site, comprising 2,621.9 net developable acres of residential, commercial, and industrial uses and public facilities. Compared to the proposed Project, overall developable acreage under this alternative would be reduced by 11 percent.

8.5.1.2 Residential Uses

Alternative 5 would facilitate the development of 2,232.0 acres of residential uses, a reduction of 12 percent compared to the proposed Project. However, feasible modifications in density would allow the construction of up to 20,196 dwelling units under this alternative, which is only three percent less than the number of units contemplated under the proposed Project. Because the number of dwelling units available under Alternative 5 would be within ten percent of the number approved in the Specific Plan, Alternative 5 is presumed to be capable of achieving the Specific Plan Basic Objectives for residential uses.

8.5.1.3 Commercial Uses

Alternative 5 would facilitate the development of 239.8 acres of commercial uses, a reduction of seven percent compared to the proposed Project. However, feasible modifications in density, such as vertical construction, would allow this acreage to support up to 5.42 msf of commercial floor space under this alternative, a reduction of two percent compared to the proposed Project. Because the commercial floor space available under Alternative 5 would be within ten percent of the floor space that would result from build-out of the Specific Plan as approved by the County, Alternative 5 is presumed to be capable of achieving the Specific Plan Basic Objectives for commercial uses.

8.5.1.4 Public Facilities

Under Alternative 5, the development of 150.1 acres of public facilities would be facilitated, representing a one percent increase compared to the proposed Project. Because this acreage is within ten percent of the acreage of public services called for in the Specific Plan as approved by the County, Alternative 5 is presumed to be capable of achieving the Specific Plan Basic Objectives for public facilities.

8.5.1.5 Open Space

Under Alternative 5, 10,519.8 acres of undeveloped lands currently under private ownership would be dedicated to land management entities for preservation in perpetuity. This acreage represents a three percent increase when compared to the proposed RMDP. Because the acreage of open space dedicated under this alternative would exceed that called for in the Specific Plan as approved by the County, Alternative 5 is presumed to be capable of achieving the Specific Plan Basic Objectives for open space.

8.5.1.6 Villages Viability

Alternative 5 would facilitate urban development within the RMDP site, but less than the proposed Project. However, because the reductions in development under this alternative would be relatively minor and would not be concentrated in a single portion of the site, the proposed development reductions would not substantially hinder development of interrelated villages, each of which provides a range of complementary services. Therefore, Alternative 5 would meet the Specific Plan Basic Objectives with regard to villages.

8.5.1.7 Project Purpose Conclusion

Alternative 5 would allow facilitate the development of interrelated Villages that provide a balance of land uses in sizes and proportions that are approximately the same as those approved in the Specific Plan. It would achieve the Basic Objectives of the Specific Plan and the overall project purpose.

8.5.2 Costs

This section compares the costs associated with Alternative 5 with those of the proposed RMDP. As stated in **Section 8.1**, above, an alternative would be unreasonably costly if the total development costs per net developable acre exceeded those of the proposed Project by more than five percent.

8.5.2.1 Site Development Costs

Alternative 5 would yield a total of 2,621.9 net developable acres at a total development cost of $2,894,539,000. This yields an average development cost of $1,103,985 per net developable acre (6.4 percent increase compared to the proposed Project). Development costs of this alternative would, therefore, exceed the 5 percent cost increase threshold, and would not be reasonable for a Project of this type.

8.5.2.2 Costs Conclusion

Costs for Alternative 5 would be similar to the normal costs for a project of this type and would be reasonable overall.

8.5.3 Logistics

8.5.3.1 Site Circulation

Under Alternative 5, development facilitated on the RMDP site would be served by an internal network of new roads, which would connect to the existing regional transportation network via three proposed bridges across the Santa Clara River (Potrero Canyon Road, Long Canyon Road, and Commerce Center Drive), and by westward extension of two existing roadways (Magic Mountain Parkway and Pico Canyon Road) onto the site. The development facilitated by Alternative 5 would be adequately designed to handle emergency evacuations, with five points of access to the north and east. Under this alternative, the internal circulation network would comply with applicable County standards, and all on-site roadway segments would operate at acceptable levels of service (LOS D or better).

8.5.3.2 Flood Protection

Alternative 5 would authorize the construction of flood control features, such as bank stabilization, grade control structures, storm drains, and debris and detention basins, throughout the RMDP site to protect Specific Plan development from flooding. All facilities would be constructed to County standards, which require that facilities be sized to convey flows from the Capital Flood. Because the Capital Flood substantially exceeds the 100-year flood in magnitude in all modeled watersheds within the RMDP site, the proposed facilities would be adequate to protect site development from 100-year storm events.

8.5.3.3 Water Treatment And Reclamation

Under Alternative 5, urban development within the RMDP site would be accompanied by a WRP intended to serve the new community. The WRP would not differ from that approved by the County as a component of the Specific Plan approval in May 2003. Because the WRP was sized to accommodate the development approved in the Specific Plan, which would have greater demands on wastewater treatment services than the development facilitated under Alternative 5, the WRP would have adequate capacity to serve this alternative.

8.5.3.4 Grading Balance

When it approved the Newhall Ranch Specific Plan, the County required the proposed development to balance quantities of cut and fill material on site. Alternative 5 was designed to be consistent with this requirement and would not require import or export of soils to or from the RMDP site. Alternative 5, therefore, would not have other adverse environmental consequences associated with the transport of grading spoils.

8.5.4 Impacts To The Aquatic Ecosystem

Like the proposed Project, Alternative 5 would affect the aquatic ecosystem by filling some jurisdictional waters, reducing stream and wetland functions and services, and constructing bridges across the Santa Clara River. Under Alternative 5, however, these impacts would be reduced slightly as compared to the proposed Project.

8.5.4.1 Effects On Chemical Characteristics Of The Aquatic Environment

Under the proposed RMDP and all alternatives, including Alternative 5, surface water quality would be directly impacted by construction activities, which would include removal of vegetation, grading, and trenching. However, the proposed Project and alternatives would be subject to regulatory requirements, which would ensure that water quality standards are met and that water quality would not be significantly degraded. Thus, the impacts of all alternatives on chemical components of the aquatic environment would be approximately equal. For more information, please refer to **Section 4.4** of the EIS/EIR for the Project.

8.5.4.1.1 Effects On Water Quality

The proposed Project and all alternatives, including Alternative 5, would have the potential to result in direct water quality impacts on waters of the United States caused by construction activities, which would include removal of vegetation, grading, and trenching, as well as the potential to result in indirect effects on water quality associated with build-out of the approved Newhall Ranch Specific Plan. However, the proposed Project and alternatives would be subject to regulatory requirements that are intended to protect water quality. Thus, the impacts of all alternatives on chemical components of the aquatic ecosystem would be approximately equal. For more information, please refer to **Section 4.4** of the Draft EIS/EIR for the Project.

Construction Activities. Similar to the proposed Project, Alternative 5's construction-related impacts on water quality during the construction phase would consist primarily on sediment (TSS and turbidity) and non-sediment related pollutants, such as nutrients, heavy metals, and certain pesticides, including legacy pesticides.

Under the proposed Project, implementation of erosion and sedimentation source control BMPs during construction would prevent significant erosion and sediment transport impacts and transport of other potential pollutants from the Project site. BMPs will be implemented in compliance with the Construction General Permit and the general waste discharge requirements in the Dewatering General WDRs or an individual WDR/NPDES permit specific to the Project dewatering activities. These erosion and sedimentation source control BMPs would be implemented for Alternative 5 as well, and water quality impacts would, therefore, not differ significantly from those of the proposed Project. For more information, please refer to **Section 4.4** of the Draft EIS/EIR for the Project.

Long-Term Effects Associated with Project Build-Out. Development on the Specific Plan site would be reduced under Alternative 5, as the net acreage/pad for residential, non-residential, and public facilities uses would be reduced by 338 acres (approximately 10 percent). The smaller development area in Alternative 5 would reduce predicted increase in pollutants of concern that would result from the proposed Project. The site design/low impact development, source control, and treatment control BMPs specified in the Newhall Ranch Specific Plan Sub-Regional Stormwater Mitigation Plan would be implemented for Alternative 5 as well, and water quality impacts would, therefore, not differ significantly from those of the proposed Project. For more information, please refer to **Section 4.4** of the Draft EIS/EIR for the Project.

8.5.4.1.2 Loss Of Biogeochemical Function

Alternative 5 would have the potential to result in a loss of biogeochemical function of waters of the United States on the Project site. This attribute measures the ability of wetland and riparian areas to perform specific processes such as maintenance of water quality, cycling of nutrients, retention of particulates, and export of organic carbon, and the HARC biogeochemical score indicates the relative extent to which the assessment reaches on site perform this function. Lost biogeochemical function due to the proposed fill was calculated by applying the HARC biogeochemical score as a weighting factor to the acreages filled. The fill from implementation of Alternative 5 would result in the permanent loss of 60.3 HARC biogeochemical-weighted acres and a temporary loss of 25.7 HARC biogeochemical-weighted acres of waters of the United States.

8.5.4.2 Effects On Physical Characteristics Of The Aquatic Environment

Impacts on physical components of the aquatic environment would generally consist of impacts related to fill of jurisdictional waters, impacts related to losses of stream and wetland functions and services, and impacts related to the geomorphic stability of the site's waters in the long term. Under Alternative 5, these impacts would generally be slightly less than those of the proposed Project, as described below.

8.5.4.2.1 Permanent And Temporary Fill Of Waters Of The United States

Alternative 5 would result in the placement of fill within waters of the United States. In total, this alternative would permanently fill 72.4 acres of waters of the United States (22 percent reduction in acreage compared to the proposed Project), and would temporarily disturb an additional 41.6 acres (25 percent increase compared to the proposed Project). Temporary impacts would be associated with temporary construction zones adjacent to proposed Project facilities. Waters temporarily affected by the Project would be restored and revegetated after completion of construction in the area. In some instances temporary impacts would also result from restoration activities, *i.e.*, when such activities require earthwork to be conducted in jurisdictional areas (correction of existing incised channel banks, for example).The increase in temporarily impacts to waters is due the implementation of modified channels (temporary impacts) in areas where the proposed Project would feature storm drains (permanent impacts).

Avoidance. Alternative 5 would avoid 546.1 acres of waters of the United States within the RMDP site (two percent more acreage than the proposed Project). Of the total 660.1 acres of waters of the United States that occur on the site, Alternative 5 would avoid 83 percent, compared to 81 percent avoidance for the proposed Project. Key avoided areas under this alternative would include the majority of the Santa Clara River mainstem, the Middle Canyon spring complex (a high-quality wetland), and the entire Salt Creek sub-watershed. In addition, a cismontane alkali marsh in lower Potrero Canyon, which would be impacted under the proposed Project, would be avoided under this alternative.

Fill in the Santa Clara River. Of the 471.2 acres of waters of the United States within the Santa Clara River mainstem on site, Alternative 5 would permanently impact 11.3 acres (25 percent decrease in acreage compared to the proposed Project), and would temporarily disturb an additional 19.8 acres (a five percent increase in acreage compared to the proposed Project). The permanent impact would be associated with the construction of three proposed bridges across the river, and would represent only two percent of the total jurisdictional acreage in the river. The increase in impact compared to the proposed Project would be attributable to the proposed bridge crossing the river at Potrero Canyon Road, which would feature a southern abutment constructed partly within waters of the United States.

Fill in On-Site Tributary Drainages. Of the total 188.9 acres of waters of the United States within tributary drainages on site, Alternative 5 would permanently disturb 61.2 acres (22 percent reduction in acreage compared to the proposed Project), and would temporarily disturb an additional 21.8 acres (50 percent increase in acreage compared to the proposed Project). The permanent impact results from converting natural drainages to buried storm drains, eliminating existing drainages for realignment, and grading to accommodate site development. This impact would represent 32 percent of the total jurisdictional acreage in the on-site tributaries. Impacts to tributaries under this alternative would generally affect all classes of tributaries on site (small and large tributaries), and no type of aquatic resource would be disproportionately affected.

Fill in Special Aquatic Sites. Implementation of Alternative 5 would permanently disturb 14.6 acres of wetlands (29 percent reduction in impact acreage compared to the proposed Project), and would temporarily disturb an additional 13.5 acres (21 percent increase in impact acreage compared to the proposed Project). These impacts would occur primarily due to bridge construction along the Santa Clara River mainstem, but this alternative would also affect a cismontane alkali marsh wetland in middle Potrero Canyon. The entire Salt Creek watershed and the Middle Canyon spring complex would be preserved under this alternative, and no impacts to wetlands in those areas would occur. Additionally, the cismontane alkali marsh wetland in lower Potrero Canyon, which would be disturbed under the proposed Project, would be avoided under this alternative. Alternative 5 would avoid 90 percent of all wetlands on site, a 2 percent increase compared to the proposed Project.

8.5.4.2.2 Effects On Substrate And Sediment Dynamics

Like all alternatives, Alternative 5 would have the potential to result in geomorphic impacts on waters of the United States caused by disruptions of the sediment equilibrium in the Santa Clara River mainstem and/or tributaries. In addition, the conversion of existing undeveloped lands to a non-erodible, urban condition would slightly reduce the available sand supply reaching the beaches in Ventura County. These effects would be substantially similar to those of the proposed RMDP, and would generally be minor.

Santa Clara River. Similar to the proposed Project, Alternative 5 would involve the installation of facilities along the Santa Clara River that could increase sediment flows downstream during storm events, and could result in substantial erosion and deposition impacts downstream. Under this alternative, the total floodplain area subject to potentially erosive velocities would be decreased for all modeled storms (2-, 5-, 10-, 20-, 50-, and 100-year return interval storms, and the Capital Flood as defined by the County). Downstream deposition characteristics and potential erosion of the soils covering the proposed buried soil cement bank stabilization would be approximately the same as under the proposed Project. Overall, Alternative 5 would have geomorphic impacts on the Santa Clara River mainstem substantially similar to those of the proposed Project. For more information, please refer to **Section 4.2** of the Draft EIS/EIR for the Project.

Tributaries. Under the proposed Project, tributary drainages with modified or reconstructed channels would be designed to ensure that the channels remain geomorphically stable in the post-development condition. These criteria would apply to Alternative 5 as well, and geomorphic impacts in the tributaries would, therefore, not differ significantly from those of the proposed Project. For more information, please refer to **Section 4.2** of the Draft EIS/EIR for the Project.

Beach Replenishment. Similar to the proposed Project, implementation of Alternative 5 and subsequent build-out of urban development would result in the conversion of currently undeveloped lands to a non-erodible, urban condition. Under this alternative, the total acreage converted would be 4,939 acres. Effectively, this conversion would translate to an average loss of approximately 9,028 tons of sediment per year, or 0.22 percent of the river's total annual yield. The magnitude of this impact represents an 8.3 percent reduction compared to the proposed RMDP, which already would have a very slight impact on beach replenishment. Thus, Alternative 5 would not substantially affect recruitment of sand onto Ventura County beaches. For more information, please refer to **Section 4.2** of the Draft EIS/EIR for the Project.

8.5.4.2.3 Loss Of Hydrologic Function

Alternative 5 would have the potential to result in a loss of hydrologic function of waters of the United States on the Project site. This attribute is affected by the source of water, the duration and magnitude of flows (hydroperiod), whether or not flows reach the floodplain, the presence of flow restrictions, the duration of water flows or ponding within the creek or on the floodplain, and the width of the floodplain, and the HARC hydrology score indicates the relative extent to which the assessment reaches on site perform this function. Lost hydrologic function due to the proposed fill was calculated by applying the HARC hydrology score as a weighting factor to the acreages filled. The fill from implementation of Alternative 5 would result in the permanent loss of 51.3 HARC hydrology-weighted acres (22 percent decrease in acreage compared to the proposed Project), and the temporary loss of 34.7 HARC hydrology-weighted acres (25 percent increase in acreage compared to the proposed Project) of waters of the United States.

8.5.4.3 Effects On Biological Characteristics Of The Aquatic Ecosystem

Compared to Alternative 2, Alternative 5 would have fewer permanent impacts on biological resources. In some areas, however, RMDP facilities are sited differently under Alternatives 5 to avoid impacts to jurisdictional areas in the Santa Clara River and its tributaries. In those areas, Alternative 5 would have somewhat higher temporary impacts to some upland biological resources. Impacts to wildlife habitat connectivity and movement would be similar under all of the alternatives.

8.5.4.3.1 Effects On Sensitive Aquatic And Riparian Plants And Wildlife

Potential impacts to individuals of wildlife species would be similar under each of the alternatives, but the level of risk would be proportionately smaller for alternatives with smaller impacts to suitable habitat for the species. Therefore, Alternative 5 would generally have less impact than Alternative 2 on habitat for sensitive aquatic, semi-aquatic, and riparian plants and wildlife, because Alternative 5 involves a slightly smaller development footprint. One species that will experience substantially less impacts is the southwestern pond turtle. The Draft EIS/EIR determined that Alternative 2 would have significant, unavoidable effects on the pond turtle because it would render lower Potrero Canyon permanently unavailable for nesting, hatchling and juvenile use, and upland refugia during 100-year storm events due to construction of RMDP facilities in the area. Lower Potrero Canyon would remain available to the pond turtle for these uses under Alternative 5. Impacts of Alternative 5 on special-status aquatic species are summarized in **Appendix 8.0** (Impacts of Alternative 5 on Sensitive Aquatic Species). For further information and species-specific discussions, please refer to **Section 4.5** of the Draft EIS/EIR for the Project.

8.5.4.3.2 Loss Of Habitat Function

Alternative 5 could result in a loss of habitat function of waters of the United States on the Project site. This attribute takes into account such factors as plant species diversity, percentage of native plant species, biological structure, evidence of vegetation recruitment (*i.e.*, the presence of seedlings and/or saplings), and the width of the floodplain. The HARC habitat score indicates the relative extent to which the reaches on site perform this function. Lost habitat function due to the proposed fill was calculated by applying the HARC habitat score as a weighting factor to the acreages filled. The fill from implementation of Alternative 5 would result in the permanent loss of 44.2 HARC habitat-weighted acres (23 percent less compared to the proposed Project) and the temporary loss of 29.7 HARC habitat-weighted acres (23 percent more compared to the proposed Project) of waters of the United States.

8.5.4.3.3 Fish, Crustaceans, Mollusks, And Other Aquatic Organisms In The Food Web

Implementation of Alternative 5 could result in permanent physical changes to the Santa Clara River Corridor and surrounding watershed that could affect suitable fish habitat, as discussed in the stickleback analysis section (8.5.4.3.1), including hydrology and fluvial processes. However, these impacts would be minor, as under Alternative 2, the proposed RMDP.

Impacts to crustaceans, mollusks, and other aquatic organisms in the food web also would be minor, as the diversity of invertebrates is generally low due to the substrate being dominated by sand and gravel. As such, the impacts are similar to those under Alternative 2, and would be caused by the changes in water quality, substrate and sediment dynamics, and hydrologic function as discussed in **Sections 8.5.4.1.1**, **8.5.4.2.2**, and **8.5.4.2.3**, respectively. Therefore, Alternative 5 would not result in large-scale changes in the distribution or abundance of aquatic organisms.

8.5.4.3.4 Other Wildlife

The impact upon other, non-sensitive species, that could potentially occur within the aquatic ecosystem will be generally similar to those under Alternative 2 effects, as discussed in **Section 8.5.4.3.1**.

8.5.4.3.5 Effects On Riparian Vegetation

Out of the 324.0 acres of riparian vegetation communities within Corps jurisdiction on the Project site, Alternative 5 permanently impacts 35.2 acres and temporarily impacts 19.2 acres of riparian vegetation (compared to Alternative 2, which has 49.7 acres of permanent and 14.2 acres of temporary impacts). **Table 4.5-27** of the RMDP/SCP EIS/EIR provides a detailed summary of overall impacts to riparian vegetation by floristic alliance (*i.e.*, columns for RMDP Direct Impacts and Specific Plan Indirect Impacts).

8.5.4.4 Cumulative Effects On The Aquatic Ecosystem

Alternative 5 would not result in a cumulative contribution to any significant aquatic ecosystem impact. In addition, many of the mitigation measures identified for the proposed Project, if adopted for other projects in the watershed, would further ensure that cumulative impacts on the aquatic ecosystem impacts remain less than significant. For more information, please refer to **Section 6.0** of the EIS/EIR for the Project.

8.5.4.5 Human Use Characteristics

As required by the section 404(b)(1) Guidelines (40 C.F.R. §§ 230.50 through 230.54), this section evaluates the potential loss of jurisdictional values resulting from human use characteristics, including municipal and private water supplies, recreational and commercial fisheries, water-related recreation, aesthetics, and preserve areas.

8.5.4.5.1 Municipal And Private Water Supplies

Alternative 5 would not render municipal or public water supplies unfit for consumption. The WRP associated with the Specific Plan would be designed to comply with applicable NPDES requirements, ensuring that downstream water quality would not be impaired. The quantity of water passing through the RMDP site within the Santa Clara River and tributaries would not be affected by this alternative.

8.5.4.5.2 Recreational And Commercial Fisheries

Alternative 5 would not have an impact upon recreational or commercial fisheries, as the site is located on private land, where such use is not authorized. Project impacts on water quality would be mitigated to comply with applicable standards and, therefore, would not affect recreational or commercial fishing downstream of the Project area.

8.5.4.5.3 Water-Related Recreation

As stated above, the site is on private land, where recreational use of the site is not authorized. Further, Alternative 5 would not result in off-site impacts to water quality or hydrologic function such that water-related recreation upstream and downstream of the Project area would not be affected.

8.5.4.5.4 Aesthetics

Similar to the proposed RMDP, Alternative 5 would construct three bridges across the Santa Clara River, and would modify the on-site tributary drainages through realignment, stabilization, and in some cases, removal and replacement with development pads and buried storm drain systems. Despite the slight reduction in Specific Plan development and larger spineflower preserves under this alternative, Alternative 5 would nevertheless establish new urban community, in a highly visible, currently undeveloped area, and would result in aesthetic impacts substantially similar to those of the proposed Project (Alternative 2). (See **Section 4.15** of the Draft EIS/EIR.) However, visual impacts of the activities proposed within Corps jurisdiction would largely be confined to bridges, grade control structures, storm drain outlets, and similar facilities. These facilities would contrast with existing natural stream banks, but are not expected to result in significant adverse impacts to the aesthetic values of the jurisdictional areas overall. Proposed bank stabilization activities would cause a substantial change in the appearance of jurisdictional areas during construction, but because the stabilization would be buried and revegetated, these impacts would be temporary. In addition, Alternative 5 contemplates substantial on-site creation and restoration, which will largely replace lost values and the activities take place in the context of a master-planned community which will integrate the resources with the community. Therefore, Alternative 5 would not cause significant adverse impacts to aesthetic values of waters of the United States.

8.5.4.5.5 Parks, National And Historical Monuments, National Seashores, Wilderness Areas, Research Sites, And Similar Preserves

Alternative 5 would not affect parks, national and historical monuments, national seashores, wilderness areas, research sites, or similar preserves, as the RMDP site is privately owned and does not contain any such designated features.

8.5.5 Other Significant Environmental Consequences

As noted in **Section 8.1**, the purpose of this subsection is to determine whether an alternative may have other (non-aquatic) significant adverse environmental consequences that would exclude it from consideration as the potential LEDPA, even if it would have less impact on aquatic resources and was otherwise practicable.

8.5.5.1 Non-Aquatic Biological Resources

Impacts on non-aquatic biological resources would generally be limited to indirect effects associated with build-out of the Specific Plan. The impacts of Alternative 5 on non-aquatic biological resources would generally be less severe than those of Alternative 2 due to the moderate reductions in development under this alternative.

8.5.5.1.1 Effects On Sensitive Upland Vegetation Communities

Under Alternative 5, impacts to oak woodlands within Corps jurisdiction would be the same as for Alternative 2 (0.75 acres of permanent impact). California walnut woodland, and native grasslands do not occur within Corps jurisdiction within the Project site.

8.5.5.1.2 Effects On Special-Status Terrestrial/Upland Plants And Wildlife

The impacts of Alternative 5 on special-status terrestrial species would be slightly less than those of the proposed Project, due to reduced upland development. These impacts are summarized in **Appendix 8.0** (Impacts of Alternative 5 on Sensitive Non-Aquatic Species). For detailed analyses of the effects of Alternative 5 on special-status species, please refer to **Section 4.5** of the Draft EIS/EIR.

8.5.5.1.3 Effects On Wildlife Movement

Both Alternative 5 and Alternative 2 contemplate significant urban development and would negatively affect long-tem habitat connectivity in the RMDP. Compared to Alternative 2, however, Alternative 5 would result in less overall development and would install more bridge crossings instead of culverts. These factors tend to make Alternative 5 more conducive to wildlife movement.

8.5.5.2 Hazards, Hazardous Materials, And Public Safety

Under Alternative 5, construction activities, such as the temporary transport, storage, and use of potentially hazardous materials, would be reduced by approximately 10 percent when compared to the proposed Project, because Alternative 5 would facilitate approximately 10 percent less development.

The demand on emergency response services would be proportional to the post-development population served. Under Alternative 5, the population at risk would be approximately 65,365 residents (a 6.4 percent reduction when compared to the proposed Project). Development under this alternative would be designed to handle emergency evacuations, with five points of access to the north and east. Hazards/hazardous materials impacts under this alternative would be slightly less than those under the proposed Project. For more information, please refer to **Section 4.17** of the Draft EIS/EIR for the Project.

8.5.5.3 Conclusion

Alternative 5 would not result in any significant environmental impact that would exclude it from consideration as the potential LEDPA.

8.5.6 Overall

Alternative 5 would achieve the overall purpose of the RMDP Project and would be practicable in terms of costs and logistics, but it would entail costs that would not be reasonable for a project of this type. Thus, even though the alternative would be less damaging to the aquatic ecosystem than the proposed Project and would not have other significant environmental consequences, it is not practicable and cannot be the LEDPA.

8.6 ANALYSIS OF ALTERNATIVE 6: ELIMINATION OF PLANNED COMMERCE CENTER DRIVE BRIDGE

Under this alternative, the proposed RMDP would be modified in key respects. Two bridges across the Santa Clara River and associated bank stabilization would be constructed. The Potrero Canyon Road Bridge (extended span similar to Alternative 5) and the Long Canyon Road Bridge. The previously-approved Commerce Center Drive bridge would not be constructed under this alternative. Major tributary drainages would be regraded and realigned under this alternative, but the channels would be wider than under the proposed Project (Alternative 2), and the majority of proposed road crossings along the channels would be bridges as opposed to culverts.

This alternative would facilitate urban development within the Specific Plan site, including 19,787 residential units and 5.33 msf of commercial and industrial/business park floor area. The proposed configuration of infrastructure facilities and land uses that would occur under Alternative 6 is presented graphically on **Figure 8-5**. For a complete description of Alternative 6, please refer to **Section 3.0** of the EIS/EIR for the Project.

8.6.1 Project Purpose

Under Alternative 6, urban development within the RMDP site would be substantially reduced compared to the Specific Plan as approved by Los Angeles County. As a result, Alternative 6 would not meet aspects of the overall project purpose related to net developable acreage and Villages.

8.6.1.1 Size

Implementation of Alternative 6 would facilitate a master-planned urban development within the RMDP site, comprising 2,310.7 net developable acres of residential, commercial, and industrial uses and public facilities. Compared to the proposed Project, development under this alternative would be reduced by 22 percent.

8.6.1.2 Residential Uses

Alternative 6 would facilitate the development of 1,976.4 acres of residential uses, a reduction of 23 percent compared to the proposed Project. However, practicable modifications in density would allow the construction of up to 19,787 dwelling units under this alternative, a reduction of five percent compared to the proposed Project. Because the number of dwelling units available under Alternative 6 would be within ten percent of the number approved in the Specific Plan, Alternative 6 could achieve the Specific Plan Basic Objectives for residential uses.

8.6.1.3 Commercial Uses

Alternative 6 would facilitate the development of 197.3 acres of commercial uses, a reduction of 24 percent compared to the proposed Project. However, practicable modifications in density, such as vertical construction, would allow this alternative to support up to 5.33 msf of commercial floor space, a reduction of only four percent compared to the proposed Project. Because the commercial floor space available under Alternative 6 would be within ten percent of the floor space contemplated in the approved Specific Plan, Alternative 6 could achieve the Specific Plan Basic Objectives for commercial uses.

8.6.1.4 Public Facilities

Alternative 6 contemplates the development of 137.0 acres of public facilities representing an eight percent decrease compared to the proposed Project. Because this acreage is within ten percent of the public service acreage contemplated in the approved Specific Plan, Alternative 6 could achieve the Specific Plan Basic Objectives for public facilities.

8.6.1.5 Open Space

Under Alternative 6, 10,883.7 acres of undeveloped lands currently under private ownership would be dedicated to land management entities for permanent preservation. This acreage represents a seven percent increase when compared to the proposed Project. Because the acreage of open space dedicated under this alternative would exceed that called for in the Specific Plan, Alternative 6 could achieve the Specific Plan Basic Objectives for open space.

8.6.1.6 Village Viability

Alternative 6 would facilitate urban development within the RMDP site, but less than the proposed Project. However, because this alternative would not include the bridge across the Santa Clara River at Commerce Center Drive, a substantial portion of the development reduction would occur in the easternmost portion of the RMDP site. The configuration of developable space under Alternative 6 would preclude the construction of a coherent Village in this location. Therefore, Alternative 6 would impede construction of a development composed of four to five interrelated Villages. Please refer to **Figure 8-5** for a graphic illustration of this condition. For this reason, Alternative 6 would fail to meet the Specific Plan Basic Objectives with regard to Villages.

8.6.1.7 Project Purpose Conclusion

Alternative 6 would not facilitate the development of interrelated villages that provide a balance of land uses similar in size and proportion to those approved in the Specific Plan. Therefore, it would not achieve the Basic Objectives of the Specific Plan and the overall project purpose.

8.6.2 Costs

This section compares the costs associated with Alternative 6, including both land acquisition and site development costs, with those of the proposed RMDP. As stated in **Section 8.1**, above, an alternative would be considered economically impractical if its total development costs per net developable acre exceeded those of the proposed Project by more than five percent.

8.6.2.1 Site Development Costs

Alternative 6 would yield a total of 2,310.7 net developable acres at a total development cost of $2,757,365,000. This yields an average development cost of $1,193,303 per net developable acre (15.0 percent increase compared to the proposed Project).

8.6.2.2 Conclusion

Costs for Alternative 6 would be much greater than the normal costs for a project of this type and would, therefore, not be reasonable overall. Alternative 6 is, therefore, not practical with regard to costs.

8.6.3 Logistics

8.6.3.1 Site Circulation

Under Alternative 6, development facilitated on the RMDP site would be served by an internal network of new roads, which would connect to the existing regional transportation network via two proposed bridges across the Santa Clara River (Potrero Canyon Road and Long Canyon Road), and by westward extension of two existing roadways (Magic Mountain Parkway and Pico Canyon Road) onto the site. Alternative 6 would be adequately designed to handle emergency evacuations, with four points of access to the north and east. Under this alternative, the internal circulation network would nearly comply with applicable County standards, and all but one on-site roadway segment would operate at acceptable levels of service (LOS D or better).

8.6.3.2 Flood Protection

Alternative 6 would authorize the construction of flood control features, such as bank stabilization, grade control structures, storm drains, and debris and detention basins, throughout the RMDP site to protect Specific Plan development from flooding. All facilities would be constructed to County standards, which require that facilities be sized to convey flows from the Capital Flood. Because the Capital Flood substantially exceeds the 100-year flood in magnitude in all modeled watersheds within the RMDP site, the proposed facilities would be adequate to protect site development from 100-year storm events.

8.6.3.3 Water Treatment And Reclamation

Under Alternative 6, urban development within the RMDP would be accompanied by a WRP intended to serve the new community. The WRP would not differ from that approved by the County as a component of the Specific Plan approval in May 2003. Because the WRP was sized to accommodate the development approved in the Specific Plan, which would have greater demands on wastewater treatment services than the development facilitated under Alternative 6, the WRP would have adequate capacity to serve this alternative.

8.6.3.4 Grading Balance

When it approved the Newhall Ranch Specific Plan, the County required the proposed development to balance quantities of cut and fill material on site. Alternative 6 was designed to be consistent with this requirement and would not require import or export of soils to or from the RMDP site. Alternative 6, therefore, would not have other adverse environmental consequences associated with the transport of grading spoils.

8.6.4 Impacts To The Aquatic Ecosystem

Like the proposed Project, Alternative 6 would affect the aquatic ecosystem by filling jurisdictional waters, reducing stream and wetland functions and services, and reducing the geomorphic stability of the site's waters in the long term. Under Alternative 6, these impacts would be substantially less severe than those of the proposed Project, due to elimination of the bridge across the Santa Clara River at Commerce Center Drive, increased open space acreage, and wider tributary drainage channels.

8.6.4.1 Effects On Chemical Characteristics Of The Aquatic Environment

Under the proposed Project and all alternatives, including Alternative 6, surface water quality would be directly impacted by construction activities, which would include removal of vegetation, grading, and trenching. However, the proposed Project and alternatives would be subject to regulatory requirements, which would ensure that water quality standards are met and that water quality would not be significantly degraded. Thus, the impacts of all alternatives on chemical components of the aquatic environment would be approximately equal. For more information, please refer to **Section 4.4** of the Draft EIS/EIR for the Project.

8.6.4.1.1 Effects On Water Quality

The proposed Project and all alternatives, including Alternative 6, would have the potential to result in direct water quality impacts on waters of the United States caused by construction activities, which would include removal of vegetation, grading, and trenching, as well as the potential to result in indirect effects on water quality associated with build-out of the approved Specific Plan. However, the proposed Project and alternatives would be subject to regulatory requirements that are intended to protect water quality. Thus, the impacts of all alternatives on chemical components of the aquatic ecosystem would be approximately equal. For more information, please refer to **Section 4.4** of the EIS/EIR for the Project.

***Construction Activities*.** Similar to the proposed Project, Alternative 6's construction-related impacts on water quality during the would consist primarily of sediment (TSS and turbidity) and non-sediment related pollutants, such as nutrients, heavy metals, and certain pesticides, including legacy pesticides.

Under the proposed Project, implementation of erosion and sedimentation source control BMPs during construction would prevent significant erosion and sediment transport impacts and transport of other potential pollutants from the Project site. BMPs will be implemented in compliance with the Construction General Permit and the general waste discharge requirements in the Dewatering General WDRs or an individual WDR/NPDES permit specific to the Project dewatering activities. These erosion and sedimentation source control BMPs would be implemented for Alternative 6 as well, and water quality impacts would, therefore, not differ significantly from those of the proposed Project. For more information, please refer to **Section 4.4** of the Draft EIS/EIR for the Project.

***Long-Term Effects Associated with Project Build-Out*.** Development on the Specific Plan site would be reduced under Alternative 6, as the net acreage/pad for residential, non-residential, and public facilities uses would be reduced by 647 acres (approximately 22.4 percent). The smaller development area in Alternative 6 would reduce the predicted increase in pollutants of concern that would result from the proposed Project. The site design/low impact development, source control, and treatment control BMPs specified in the Newhall Ranch Specific Plan Sub-Regional Stormwater Mitigation Plan would be implemented for Alternative 6 as well, and water quality impacts would, therefore, not differ significantly from those of the proposed Project. For more information, please refer to **Section 4.4** of the Draft EIS/EIR for the Project.

8.6.4.1.2 Loss Of Biogeochemical Function

Alternative 6 would have the potential to result in a loss of biogeochemical function of waters of the United States on the Project site. This attribute measures the ability of wetland and riparian areas to perform specific processes such as maintenance of water quality, cycling of nutrients, retention of particulates, and export of organic carbon, and the HARC biogeochemical score indicates the relative extent to which the assessment reaches on site perform this function. Lost biogeochemical function due to the proposed fill was calculated by applying the HARC biogeochemical score as a weighting factor to the acreages filled. The fill from implementation of Alternative 6 would result in the permanent loss of 39.3 HARC biogeochemical-weighted acres (35 percent reduction in acreage compared to the proposed Project) and a temporary loss of 25.7 HARC biogeochemical-weighted acres (no reduction in acreage compared to the proposed Project) of waters of the United States.

8.6.4.2 Effects On Physical Characteristics Of The Aquatic Environment

Impacts on physical components of the aquatic environment would generally consist of impacts related to fill of jurisdictional waters, impacts related to losses of stream and wetland functions and services, and impacts related to the geomorphic stability of the site's waters in the long term. Under Alternative 6, these impacts would be substantially less than those of the proposed Project, as described below.

8.6.4.2.1 Permanent And Temporary Fill Of Waters Of The United States

Implementation of Alternative 6 would facilitate urban development in the RMDP site, and would result in the placement of fill within waters of the United States. In total, this alternative would permanently fill 60.7 acres of waters of the United States (35 percent reduction in acreage compared to the proposed Project), and would temporarily disturb an additional 33.9 acres (two percent increase in acreage compared to the proposed Project). Temporary impacts would be associated with temporary construction zones adjacent to proposed Project facilities. Waters temporarily affected by the Project would be restored and revegetated after completion of construction in the area. In some instances temporary impacts would also result from restoration activities, *i.e.*, when such activities require earthwork to be conducted in jurisdictional areas (correction of existing incised channel banks, for example).

Avoidance. Alternative 6 would avoid 565.5 acres of waters of the United States within the RMDP site. Of the total 660.1 acres of waters of the United States that occur on the site, Alternative 6 would avoid 86 percent (five percent increase in acreage compared to the proposed Project). Key avoided areas would include the majority of the Santa Clara River mainstem, the Middle Canyon spring complex (a high-quality wetland), and the entire Salt Creek sub-watershed. In addition, a cismontane alkali marsh in lower Potrero Canyon, which would be disturbed under the proposed Project, would be avoided under this alternative.

Fill in the Santa Clara River. Of the 471.2 acres of waters of the United States within the Santa Clara River mainstem on site, Alternative 6 would permanently disturb 5.5 acres (64 percent reduction compared to the proposed Project), and would temporarily disturb an additional 17.0 acres (10 percent reduction compared to the proposed Project). The permanent impact would be associated with the construction of two proposed bridges across the river, and would represent only one percent of the total jurisdictional acreage in the river.

Fill in On-Site Tributary Drainages. Of the total 188.9 acres of waters of the United States within tributary drainages on site, Alternative 6 would permanently disturb 55.2 acres (29 percent reduction in acreage compared to the proposed Project), and would temporarily disturb an additional 16.93 acres (16 percent increase in acreage compared to the proposed Project). The permanent impact results from converting natural drainages to buried storm drains, eliminating existing drainages for realignment, and grading to accommodate site development. This impact would represent 29 percent of the total jurisdictional acreage in the on-site tributaries. While both small and large tributaries would be affected under this alternative, the widened channels proposed in the Chiquito Canyon and San Martinez Grande Canyon tributaries would reduce impacts in these larger drainages. Impacts to the site's smallest tributaries would not differ substantially from those of the proposed Project, as most of these drainages would be converted to buried storm drains.

Fill in Special Aquatic Sites. Implementation of Alternative 6 would permanently disturb 9.5 acres of wetlands (54 percent reduction in impact acreage compared to the proposed Project), and would temporarily disturb an additional 12.0 acres (seven percent increase in impact acreage compared to the proposed Project). These impacts would result primarily from bridge construction along the Santa Clara River mainstem, but this alternative would also affect the cismontane alkali marsh wetland in middle Potrero Canyon. Elimination of the planned bridge across the river at Commerce Center Drive would reduce impacts to adjacent wetlands along the river under this alternative. The entire Salt Creek watershed and the Middle Canyon spring complex would be preserved and no impacts to wetlands in those areas would occur. Additionally, the cismontane alkali marsh wetland in lower Potrero Canyon, which would be disturbed under the proposed Project, would be avoided under this alternative. In total, Alternative 6 would avoid 92 percent of all wetlands on site, a four percent increase in avoidance compared to the proposed Project.

8.6.4.2.2 Effects On Substrate And Sediment Dynamics

Like all alternatives, Alternative 6 could result in geomorphic impacts on waters of the United States caused by disruptions of the sediment equilibrium in the Santa Clara River mainstem and/or tributaries. In addition, the conversion of existing undeveloped lands to a non-erodible, urban condition would slightly reduce the available sand supply reaching the beaches in Ventura County. These effects would be substantially similar to those of the proposed Project, and would generally be minor.

Santa Clara River. Similar to the proposed Project, Alternative 6 could increase sediment flows downstream during storm events, and could result in substantial erosion and deposition impacts downstream. Under this alternative, the total floodplain area subject to potentially erosive velocities would be decreased for all modeled storms (2-, 5-, 10-, 20-, 50-, and 100-year return interval storms, and the Capital Flood as defined by the County). Downstream deposition characteristics and potential erosion of the soils covering the proposed buried soil cement bank stabilization would be approximately the same as under the proposed Project. In some areas, velocities greater than four fps would occur in association with outlet structures, access ramps, or bridge abutments. Overall, Alternative 6 would have geomorphic impacts on the Santa Clara River mainstem substantially similar to those of the proposed Project. For more information, please refer to **Section 4.2** of the Draft EIS/EIR for the Project.

Tributaries. Under the proposed Project, tributary drainages with modified or reconstructed channels would be subject to requirements ensuring that the channels remain geomorphically stable in the post-development condition. These criteria would apply to Alternative 6 as well, and geomorphic impacts in the tributaries would, therefore, not differ from those of the proposed Project. For more information, please refer to **Section 4.2** of the Draft EIS/EIR for the Project.

Beach Replenishment. Similar to the proposed Project, implementation of Alternative 6 and subsequent build-out of urban development would result in the conversion of currently undeveloped lands to a non-erodible, urban condition. Under this alternative, the total acreage converted would be 4,653 acres. his conversion would translate to an average loss of approximately 8,508 tons of sediment per year, or 0.21 percent of the river's total annual yield. The magnitude of this impact represents a 12.5 percent reduction compared to the proposed RMDP. Because the proposed Project's impact on beach replenishment would be very slight, and because the impact of this alternative would be even less, Alternative 6 would not substantially affect recruitment of sand onto Ventura County beaches. For more information, please refer to **Section 4.2** of the Draft EIS/EIR for the Project.

8.6.4.2.3 Loss Of Hydrologic Function

Alternative 6 could result in a loss of hydrologic function of waters of the United States on the Project site. This attribute is affected by the source of water, the duration and magnitude of flows (hydroperiod), whether or not flows reach the floodplain, the presence of flow restrictions, the duration of water flows or ponding within the creek or on the floodplain, and the width of the floodplain, and the HARC hydrology score indicates the relative extent to which the assessment reaches on site perform this function. Lost hydrologic function due to the proposed fill was calculated by applying the HARC hydrology score as a weighting factor to the acreages filled. The fill from implementation of Alternative 6 would result in the permanent loss of 43.3 HARC hydrology-weighted acres (34 percent reduction compared to the proposed Project), and the temporary loss of 28.2 HARC hydrology-weighted acres (two percent increase compared to the proposed Project of waters of the United States.

8.6.4.3 Effects On Biological Characteristics Of The Aquatic Ecosystem

Compared to Alternative 2, Alternative 6 would have fewer permanent impacts on biological resources. In some areas, however, RMDP facilities are sited differently under Alternatives 6 to avoid impacts to jurisdictional areas in the Santa Clara River and its tributaries. In those areas, Alternative 6 would have somewhat higher temporary impacts to some upland biological resources. Impacts to wildlife habitat connectivity and movement would be similar to those of the proposed Project.

8.6.4.3.1 Effects On Sensitive Aquatic And Riparian Plants And Wildlife

Potential impacts to individuals of wildlife species would be similar under each of the alternatives, but the level of risk would be proportionately smaller for alternatives with smaller impacts to suitable habitat for the species. Therefore, Alternative 6 would generally have less impact than Alternative 2 on habitat for sensitive aquatic, semi-aquatic, and riparian plants and wildlife, because Alternative 6 involves a smaller development footprint. One species that would experience substantially less impact is the southwestern pond turtle. The EIS/EIR determined that impacts to habitat for this species would be significant and unavoidable under Alternative 2 because lower Potrero Canyon would become permanently unavailable for nesting, hatchling and juvenile use, and upland refugia during 100-year storm events due to construction of RMDP facilities in the area. Lower Potrero Canyon would remain available to the pond turtle for these uses under Alternatives 6. Impacts of Alternative 6 on special-status aquatic species are summarized in **Appendix 8.0** (Impacts of Alternative 6 on Sensitive Aquatic Species). For further information and species-specific discussions, please refer to **Section 4.5** of the Draft EIS/EIR for the Project.

8.6.4.3.2 Loss Of Habitat Function

Alternative 6 would have the potential to result in a loss of habitat function of waters of the United States on the Project site. This attribute takes into account such factors as plant species diversity, percentage of native plant species, biological structure, and evidence of vegetation recruitment (*i.e.*, the presence of seedlings and/or saplings), and the width of the floodplain, and the HARC habitat score indicates the relative extent to which the assessment reaches on site perform this function. Lost habitat function due to the proposed fill was calculated by applying the HARC habitat score as a weighting factor to the acreages filled. The fill from implementation of Alternative 6 would result in the permanent loss of 36.3 HARC habitat-weighted acres (37 percent reduction compared to the proposed Project) and the temporary loss of 24.3 HARC habitat-weighted acres (one percent increase compared to the proposed Project) of waters of the United States.

8.6.4.3.3 Fish, Crustaceans, Mollusks, And Other Aquatic Organisms In The Food Web

Implementation of Alternative 6 could result in permanent physical changes to the Santa Clara River Corridor and surrounding watershed, including changes in hydrology and fluvial processes, that could affect suitable fish habitat, as discussed in the stickleback analysis section (**8.6.4.3.1**). However, these impacts are expected to be minor under both Alternative 2 and Alternative 6.

Impacts to crustaceans, mollusks, and other aquatic organisms in the food web would be minor as the diversity of invertebrates in the substrate is generally low due to the substrate being dominated by sand and gravel. Impacts to these organisms under Alternative 6 would be similarly minor as under Alternative 2, caused by the changes in water quality, substrate and sediment dynamics, and hydrologic function as discussed in **Sections 8.6.4.1.1**, **8.6.4.2.2**, and **8.6.4.2.3**, respectively. Therefore, there would not be large-scale changes in the distribution or abundance of aquatic organisms as a result of construction of the Project under Alternative 6.

8.6.4.3.4 Other Wildlife

The impact upon other, non-sensitive species, that could potentially occur within the aquatic ecosystem will be generally similar to effects on sensitive species of the same type (fishes, birds, *etc.*), as discussed in **Section 8.6.4.3.1**.

8.6.4.3.5 Effects On Riparian Vegetation

Out of the 324.0 acres of riparian vegetation communities within Corps jurisdiction on the Project site, Alternative 6 permanently impacts 25.9 acres and temporarily impacts 14.3 acres of riparian vegetation (compared to Alternative 2, which has 49.7 acres of permanent and 14.2 acres of temporary impacts). **Table 4.5-27** of the RMDP/SCP EIS/EIR provides a detailed summary of overall impacts to riparian vegetation by floristic alliance (*i.e.*, columns for RMDP Direct Impacts and Specific Plan Indirect Impacts).

8.6.4.4 Cumulative Effects On The Aquatic Ecosystem

Following incorporation of project-specific mitigation set forth in **Section 4.5** and **Section 4.6** of the Draft EIS/EIR, Alternative 6 would not result in a cumulative contribution to any significant impact on aquatic ecosystems. In addition, many of the mitigation measures proposed for the proposed Project, if adopted for other projects in the watershed, would further ensure that cumulative impacts on the aquatic ecosystem impacts remain less than significant. For more information, please refer to **Section 6.0** of the Draft EIS/EIR for the Project.

8.6.4.5 Human Use Characteristics

As required by the section 404(b)(1) Guidelines (40 C.F.R. §§230.50 through 230.54), this section evaluates the potential loss of values that would result relative to human use characteristics including municipal and private water supplies, recreational and commercial fisheries, water-related recreation, aesthetics, and preserve areas.

8.6.4.5.1 Municipal And Private Water Supplies

Alternative 6 would not involve any activities that would render municipal or public water supplies unfit for consumption. The WRP associated with the Specific Plan would be designed to comply with applicable NPDES requirements, ensuring that downstream water quality would not be impaired. The quantity of water passing through the RMDP site within the Santa Clara River and tributaries would not be affected by this alternative.

8.6.4.5.2 Recreational And Commercial Fisheries

Alternative 6 would not have an impact upon recreational or commercial fisheries on the site as it is private land, where such use of the site is not authorized. Potential effects upon water quality would be mitigated to comply with applicable standards such that build-out of the Project would not affect recreational or commercial fishing downstream of the Project area.

8.6.4.5.3 Water-Related Recreation

As stated in the previous section, the site is on private land, where recreational use of the site is not authorized. Further, Alternative 6 would not result in off-site impacts to water quality or hydrologic function such that water-related recreation upstream and downstream of the Project area would not be affected.

8.6.4.5.4 Aesthetics

While Alternative 6 would result in a substantial reduction in Specific Plan development and much larger spineflower preserves compared to the proposed RMDP, this alternative would nevertheless establish new urban community, in a highly visible, currently undeveloped area. (See **Section 4.15** of the Draft EIS/EIR.) However, visual impacts of the activities proposed within Corps jurisdiction would largely be confined to bridges, grade control structures, storm drain outlets, and similar facilities. These facilities would contrast with existing natural stream banks, but are not expected to result in significant adverse impacts to the aesthetic values of the jurisdictional areas overall. Proposed bank stabilization activities would cause a substantial change in the appearance of jurisdictional areas during construction, but because the stabilization would be buried and revegetated, these impacts would be temporary. In addition, Alternative 6 contemplates substantial on-site creation and restoration, which will largely replace lost values and the activities take place in the context of a master-planned community, which will integrate the resources with the community. Therefore, Alternative 6 would not cause significant adverse impacts to aesthetic values of waters of the United States

8.6.4.5.5 Parks, National And Historical Monuments, National Seashores, Wilderness Areas, Research Sites, And Similar Preserves

Alternative 6 would not impact parks, national and historical monuments, national seashores, wilderness areas, research sites, or similar preserves, as the RMDP site is privately owned and does not contain any such designated features.

8.6.5 Other Significant Environmental Consequences

8.6.5.1 Non-Aquatic Biological Resources

Because these species do not typically occur within waters of the United States, impacts on non-aquatic biological resources would generally be limited to indirect effects associated with build-out of the Specific Plan. The impacts of Alternative 6 on non-aquatic biological resources would generally be less severe than those of Alternative 2, due to the reduced extent of urban development facilitated.

8.6.5.1.1 Effects On Sensitive Upland Vegetation Communities

Under Alternative 6, impacts to oak woodlands within Corps jurisdiction would be the same as for Alternative 2 (0.75 acres of permanent impact). California walnut woodland, and native grasslands do not occur within Corps jurisdiction within the Project site.

8.6.5.1.2 Effects On Special-Status Terrestrial/Upland Plants And Wildlife

The impacts of Alternative 6 on special-status terrestrial species would generally be slightly less than those of the proposed Project, due to the reduced extent of upland development facilitated. These impacts are summarized in **Appendix 8.0** (Impacts of Alternative 6 on Sensitive Non-Aquatic Species). For detailed analyses of the effects of Alternative 6 on special-status species, please refer to **Section 4.5** of the Draft EIS/EIR.

8.6.5.1.3 Effects on Wildlife Movement

Both Alternative 6 and Alternative 2 contemplate significant urban development and would negatively affect long-term habitat connectivity in the RMDP. Compared to Alternative 2, however, Alternative 6 would result in less overall development and would install more bridge crossings instead of culverts. Alternative 6 includes five bridge crossings in Potrero Canyon, which Alternative 2 does not. These factors tend to make Alternative 6 more conducive to wildlife movement.

8.6.5.2 Hazards, Hazardous Materials, And Public Safety

Under Alternative 6, construction activities, including the temporary transport, storage and use of potentially hazardous materials, would be reduced by approximately 22 percent when compared to the proposed Project, because Alternative 6 would facilitate approximately 22 percent less development.

The demand on emergency response services would be proportional to the post-development population served. Under Alternative 6, the population at risk would be approximately 62,450 residents (a 10.6 percent reduction when compared to the proposed Project). Development under this alternative would be adequately designed to handle emergency evacuations, with four major points of access to the north and east. This alternative's hazards/hazardous materials impacts would be less than those of the proposed Project. For more information, please refer to **Section 4.17** of the EIS/EIR for the Project.

8.6.6 Overall

Alternative 6 would not be a practicable alternative, as the costs associated with this alternative would not be reasonable for a project of this nature. Due to disproportionate effects on certain villages, Alternative 6 would also fail to achieve the overall purpose of the RMDP Project. This alternative would be less damaging to the aquatic ecosystem compared to the proposed Project. Other significant environmental consequences of this alternative would be generally less severe than those of the proposed Project, due to its reduced development footprint and the post-Project population it would serve. However, some of impacts of Alternative 6 would exceed those of the proposed Project, such as impacts on traffic and land use. Because it is not practicable, Alternative 6 is not the Initial LEDPA.

8.7 ANALYSIS OF ALTERNATIVE 7: AVOIDANCE OF 100-YEAR FLOODPLAIN AND ELIMINATION OF TWO PLANNED BRIDGES

Under this alternative, the proposed Project would be modified in key respects. Only one bridge across the Santa Clara River, with associated bank stabilization, would be constructed, located at Long Canyon Road. The Potrero Canyon Road Bridge and the previously approved Commerce Center Drive Bridge would not be constructed. Under this alternative, major tributary drainages would not be regraded or realigned. In addition, the Middle Canyon and Magic Mountain Canyon drainages, which are proposed for conversion to buried storm drains under the proposed Project (Alternative 2), would be preserved.

This alternative would facilitate urban development within the Specific Plan site, including 16,471 residential units and 3.76 msf of commercial/industrial/business park floor area. The proposed configuration of infrastructure facilities and land uses that would occur under Alternative 7 is presented graphically on **Figure 8-6**. For a complete description of Alternative 7, including infrastructure proposed and urban development facilitated, please refer to **Section 3.0** of the Draft EIS/EIR for the Project.

8.7.1 Project Purpose

Under Alternative 7, urban development within the RMDP site would be incrementally reduced compared to the Specific Plan as approved by Los Angeles County. These reductions in development under this alternative would be substantial. As a result, Alternative 7 would not meet aspects of the overall project purpose related to net developable acreage, residential uses, commercial uses, public facilities, and Villages.

8.7.1.1 Size

Implementation of Alternative 7 would facilitate a master-planned urban development within the RMDP site, comprising 1,596 net developable acres of residential, commercial, and industrial uses and public facilities. Compared to the proposed Project, the development facilitated under this alternative would be reduced by 46 percent.

8.7.1.2 Residential Uses

Alternative 7 would facilitate the development of 1,352.4 acres of residential uses, a reduction of 47 percent compared to the proposed Project. Even after incorporating feasible increases in density, Alternative 7 would allow the construction of only 16,471 dwelling units, a reduction of 21 percent compared to the proposed Project. Because the number of dwelling units available under Alternative 7 would be reduced by more than ten percent compared to the number approved in the Specific Plan, Alternative 7 would fail to achieve the Specific Plan Basic Objectives for residential uses.

8.7.1.3 Commercial Uses

Alternative 7 would facilitate the development of 125.4 acres of commercial uses, a reduction of 51 percent compared to the proposed Project. Despite feasible increases in density, such as vertical construction, this acreage would support only 3.76 msf of commercial floor space, a reduction of 32 percent compared to the proposed Project. Because the commercial floor space available under Alternative 7 would reduced by more than ten percent compared to the floor space that would result from build out of the Specific Plan as approved by the County, Alternative 7 would fail to achieve the Specific Plan Basic Objectives for commercial uses.

8.7.1.4 Public Facilities

Under Alternative 7, the development of 118.2 acres of public facilities would be facilitated, representing a 21 percent reduction compared to the proposed Project. Because this acreage is not within ten percent of the acreage of public services called for in the Specific Plan as approved by the County, Alternative 7 would fail to achieve the Specific Plan Basic Objectives for public facilities.

8.7.1.5 Open Space

Under this alternative, 11,659.6 acres of undeveloped lands currently under private ownership would be dedicated to land management entities for preservation in perpetuity. This acreage represents a 15 percent increase when compared to the proposed RMDP. Because the acreage of open space dedicated under this alternative would exceed that called for in the Specific Plan as approved by the County, Alternative 7 would achieve the Specific Plan Basic Objectives for open space.

8.7.1.6 Village Viability

Alternative 7 would facilitate urban development within the RMDP site, but less than the proposed Project (21 percent reduction in dwelling units as compared to the proposed Project). Because this alternative would not include the bridge across the Santa Clara River at Commerce Center Drive, a substantial portion of the development reduction would occur in the easternmost portion of the RMDP site. The configuration of developable space under Alternative 7 would preclude the construction of a coherent Village in this location. Please refer to **Figure 8-6** for a graphic illustration of this condition. Therefore, Alternative 7 would fail to achieve the Specific Plan Basic Objectives for Villages.

8.7.1.7 Project Purpose Conclusion

Alternative 7 would facilitate an urban development much smaller than that approved in the Specific Plan, featuring an overall reduction in developable land uses of 46 percent. In addition, the proposed configuration of bridges, drainage facilities, and preserved areas would not allow for creation of a Village in the easternmost portion of the RMDP site. Alternative 7 would, therefore, not achieve the Basic Objectives of the Specific Plan and the overall project purpose.

8.7.2 Costs

This section compares the costs associated with Alternative 7, including both site development costs and costs of land, with those of the proposed Project (Alternative 2). As stated in **Section 8.1**, above, an alternative would be unreasonably costly if the total site development costs per net developable acre exceeded those of the proposed Project by more than five percent.

8.7.2.1 Site Development Costs

Alternative 7 would yield 1,596 net developable acres at a development cost of $2,538,137,000. This yields an average development cost of $1,590,311 per net developable acre (53 percent increase compared to the proposed Project). Development costs of this alternative are substantially greater than those of the proposed Project, and would not be reasonable for a Project of this type.

8.7.2.2 Costs Conclusion

Costs for Alternative 7 would be much greater than the costs of the proposed Project and would not be reasonable for a project of this type. Alternative 7 would, therefore, not be practicable with regard to costs.

8.7.3 Logistics

8.7.3.1 Site Circulation

Under Alternative 7, development facilitated on the RMDP site would be served by an internal network of new roads, which would connect to the existing regional transportation network via a proposed bridge across the Santa Clara River at Long Canyon Road, and by westward extension of two existing roadways (Magic Mountain Parkway and Pico Canyon Road) onto the site. Because this alternative would allow only a single point of access to the site from the north, the development facilitated by Alternative 7 would not be sufficiently accessible to handle emergency evacuations. The internal circulation network proposed under Alternative 7 would comply with applicable County standards, and all on-site roadway segments would operate at acceptable levels of service (LOS D or better). Because the lack of a secondary site access to SR-126 is a deficiency that cannot feasibly be mitigated, Alternative 7 would be logistically impracticable with regard to site circulation.

8.7.3.2 Flood Protection

Alternative 7 would authorize the construction of flood control features, such as bank stabilization, grade control structures, storm drains, and debris and detention basins, throughout the RMDP site to protect Specific Plan development from flooding. All facilities would be constructed to County standards, which require that facilities be sized to convey flows from the Capital Flood. Because the Capital Flood substantially exceeds the 100-year flood in magnitude in all modeled watersheds within the RMDP site, the proposed facilities would be adequate to protect site development from 100-year storm events.

8.7.3.3 Water Treatment And Reclamation

Under Alternative 7, urban development within the RMDP site would be accompanied by a WRP intended to serve the new community. The WRP would not differ from that approved by the County as a component of the Specific Plan approval in May 2003. Because the WRP was sized to accommodate the development approved in the Specific Plan, which would have greater demands on wastewater treatment services than the development facilitated under Alternative 7, the WRP would have adequate capacity to serve this alternative.

8.7.3.4 Grading Balance

When it approved the Newhall Ranch Specific Plan, the County required the proposed development to balance quantities of cut and fill material on site. Alternative 7 was designed to comply with this requirement and would not require import or export of soils to or from the

RMDP site. Alternative 7, therefore, would not have other adverse environmental consequences associated with the transport of grading spoils.

8.7.4 Impacts To The Aquatic Ecosystem

Like the proposed Project, Alternative 7 would affect the aquatic ecosystem by filling jurisdictional waters, reducing stream and wetland functions and services, and constructing bridges across the Santa Clara River. Under Alternative 7, however, these impacts would be reduced substantially as compared to the proposed Project, as this alternative would avoid all mapped 100-year floodplains within the RMDP site.

8.7.4.1 Effects On Chemical Characteristics Of The Aquatic Environment

Under the proposed RMDP and all alternatives, including Alternative 7, surface water quality would be directly impacted by construction activities, which would include removal of vegetation, grading, and trenching. However, the proposed Project and alternatives would be subject to regulatory requirements, which would ensure that water quality standards are met and that water quality would not be significantly degraded. Thus, the impacts of all alternatives on chemical components of the aquatic environment would be approximately equal. For more information, please refer to **Section 4.4** of the Draft EIS/EIR for the Project.

8.7.4.1.1 Effects On Water Quality

The proposed Project and all alternatives, including Alternative 7, would have the potential to result in direct water quality impacts on waters of the United States caused by construction activities, which would include removal of vegetation, grading, and trenching, as well as the potential to result in indirect effects on water quality associated with build-out of the approved Specific Plan. However, the proposed Project and alternatives would be subject to regulatory requirements that are intended to protect water quality. Thus, the impacts of all alternatives on chemical components of the aquatic ecosystem would be approximately equal. For more information, please refer to **Section 4.4** of the Draft EIS/EIR for the Project.

***Construction Activities*.** Similar to the proposed Project, Alternative 7's construction-related impacts on water quality during the consist primarily of sediment (TSS and turbidity) and non-sediment related pollutants, such as nutrients, heavy metals, and certain pesticides, including legacy pesticides.

Under the proposed Project, implementation of erosion and sedimentation source control BMPs during construction would prevent significant erosion and sediment transport impacts and transport of other potential pollutants from the Project site. BMPs will be implemented in compliance with the Construction General Permit and the general waste discharge requirements in the Dewatering General WDRs or an individual WDR/NPDES permit specific to the Project dewatering activities. These erosion and sedimentation source control BMPs would be implemented for Alternative 7 as well, and water quality impacts would, therefore, not differ significantly from those of the proposed Project. For more information, please refer to **Section 4.4** of the Draft EIS/EIR for the Project.

Long-term Effects Associated with Project Build-out. Subsequent development on the Specific Plan site, and VCC and Entrada planning areas would be reduced under Alternative 7, as the net acreage/pad for residential, non-residential, and public facilities uses would be reduced by 1,497 acres (approximately 39 percent). The smaller development area in Alternative 7 would reduce the predicted increase in pollutants of concern that would result from the proposed Project. The site design/low impact development, source control, and treatment control BMPs specified in the Newhall Ranch Specific Plan Sub-Regional Stormwater Mitigation Plan would be implemented for Alternative 7 as well, and water quality impacts would, therefore, not differ significantly from those of the proposed Project. For more information, please refer to **Section 4.4** of the Draft EIS/EIR for the Project.

8.7.4.1.2 Loss Of Biogeochemical Function

Alternative 7 would have the potential to result in a loss of biogeochemical function of waters of the United States on the Project site. This attribute measures the ability of wetland and riparian areas to perform specific processes such as maintenance of water quality, cycling of nutrients, retention of particulates, and export of organic carbon, and the HARC biogeochemical score indicates the relative extent to which the assessment reaches on site perform this function. Lost biogeochemical function due to the proposed fill was calculated by applying the HARC biogeochemical score as a weighting factor to the acreages filled. The fill from implementation of Alternative 7 would result in the permanent loss of 7.8 HARC biogeochemical-weighted acres (87 percent reduction compared to the proposed Project) and a temporary loss of 14.9 HARC biogeochemical-weighted acres (42 percent reduction compared to the proposed Project) of waters of the United States.

8.7.4.2 Effects On Physical Characteristics Of The Aquatic Environment

Impacts on physical components of the aquatic environment would generally consist of impacts related to fill of jurisdictional waters, impacts related to losses of stream and wetland functions and services, and impacts related to the geomorphic stability of the site's waters in the long term. Under Alternative 7, these impacts would generally be substantially less severe than those of the proposed Project, as described below.

8.7.4.2.1 Permanent And Temporary Fill Of Waters Of The United States

Implementation of Alternative 7 would facilitate urban development in the RMDP site, and would result in the placement of fill within waters of the United States. In total, this alternative would permanently fill 13.1 acres of waters of the United States (86 percent reduction in acreage compared to the proposed Project), and would temporarily disturb an additional 20.3 acres (39.0 percent reduction in acreage compared to the proposed RMDP). Temporary impacts would be associated with construction zones adjacent to proposed Project facilities. Fill under this alternative would be greatly reduced compared to the proposed Project, because Alternative 7 would avoid all mapped 100-year floodplains (Santa Clara River and several major tributaries) within the RMDP site. Waters temporarily disturbed would be restored and revegetated after completion of construction in the area. In some instances temporary impacts would also result from restoration activities, *i.e.*, when such activities require earthwork to be conducted in jurisdictional areas (correction of existing incised channel banks, for example).

Avoidance. Of the total 660.1 acres of waters of the United States that occur on the site, Alternative 7 would avoid 626.7 acres (14 percent increase in acreage avoided compared to the proposed Project). Key avoided areas under this alternative would include the majority of the Santa Clara River mainstem, the Middle Canyon spring complex (a high-quality wetland), and the entire Salt Creek sub-watershed. In addition, under Alternative 7, the Potrero Canyon and Long Canyon tributaries, which would be filled and reconstructed under the proposed Project, would be avoided except for bridge impacts. Further, the Middle Canyon and Magic Mountain Canyon tributaries, which would sustain substantial impacts under all other alternatives, would be avoided under Alternative 7. This alternative would also reduce impacts to the Santa Clara River mainstem by eliminating the planned bridges at Potrero Canyon Road and Commerce Center Drive.

Fill in the Santa Clara River. Of the 471.2 acres of waters of the United States within the Santa Clara River mainstem on site, Alternative 7 would permanently impact 3.5 acres (77 percent reduction in acreage compared to the proposed Project), and would temporarily disturb an additional 10.3 acres (45 percent reduction in acreage compared to the proposed Project). The permanent impact would be associated with the construction of a proposed bridge across the river at Long Canyon Road, and would represent only one percent of the total jurisdictional acreage in the river.

Fill in On-Site Tributary Drainages. Of the total 188.9 acres of waters of the United States within tributary drainages on site, Alternative 7 would permanently disturb 9.7 acres (88 percent reduction in acreage compared to the proposed Project), and would temporarily disturb an additional 10.1 acres (31 percent reduction in acreage compared to the proposed Project). The permanent impact results from converting natural drainages to buried storm drains, eliminating existing drainages for realignment, and grading to accommodate site development. This impact would represent five percent of the total jurisdictional acreage in the on-site tributaries. Because this alternative would avoid all mapped 100-year floodplains within the RMDP site, impacts to the largest tributaries on site (Potrero, Long, Chiquito, San Martinez Grande, and Middle Canyons) would be greatly reduced. Alternative 7's impacts on smaller tributaries would be diminished by avoiding Magic Mountain Canyon, but would remain substantial.

Fill in Special Aquatic Sites. Implementation of Alternative 7 would avoid all mapped 100-year floodplains within the RMDP site, except where facilities would intercept floodplains out of necessity (bridges, grade control structures). This alternative would permanently disturb 3.2 acres of wetlands (84 percent reduction in acreage compared to the proposed Project), and would temporarily disturb an additional 8.9 acres (20 percent reduction in acreage compared to the proposed Project). These impacts would occur primarily due to construction of one bridge across the Santa Clara River mainstem, at Long Canyon Road. Impacts to wetlands under this alternative would be reduced through the elimination of the two planned bridges across the river at Commerce Center Drive and Potrero Canyon Road, and through avoidance of nearly all wetlands in Potrero Canyon. In addition, the entire Salt Creek watershed and the Middle

Canyon spring complex would be preserved under this alternative, and no impacts to wetlands in those areas would occur. In total, Alternative 7 would avoid 96 percent of all wetlands on site, a seven percent increase compared to the proposed Project.

8.7.4.2.2 Effects On Substrate And Sediment Dynamics

Like all alternatives, Alternative 7 would have the potential to result in geomorphic impacts on waters of the United States caused by disruptions of the sediment equilibrium in the Santa Clara River mainstem or tributaries. In addition, the conversion of existing undeveloped lands to a non-erodible, urban condition would slightly reduce the available sand supply reaching the beaches in Ventura County. These effects would be substantially similar to those of the proposed RMDP, and would generally be minor.

Santa Clara River. Similar to the proposed Project, Alternative 7 would involve the installation of facilities along the Santa Clara River that could increase sediment flows downstream during storm events, and could result in substantial erosion and deposition impacts downstream. Under this alternative, the total floodplain area subject to potentially erosive velocities would be decreased under the 2-, 5-, 10-, 50-, and 100-year storms, as well as under the Capital Flood, but would increase by 0.4 acres under the 20-year return interval storm. However, this minor increase is not significant when viewed in light of the substantial decrease in area subjected to erosive velocities during the other return interval storms. Downstream deposition characteristics and potential erosion of the soils covering the proposed buried soil cement bank stabilization would be approximately the same as under the proposed Project. In some areas, velocities greater than four fps would occur in association with outlet structures, access ramps, or bridge abutments. Overall, Alternative 7 would have geomorphic impacts on the Santa Clara River mainstem substantially similar to those of the proposed Project. For more information, please refer to **Section 4.2** of the Draft EIS/EIR for the Project.

Tributaries. Under the proposed Project, tributary drainages with modified or reconstructed channels would be designed to ensure that the channels remain geomorphically stable in the post-development condition. These design criteria would apply to Alternative 7 as well, and geomorphic impacts in the tributaries would, therefore, not differ significantly from those of the proposed Project. For more information, please refer to **Section 4.2** of the Draft EIS/EIR for the Project.

Beach Replenishment. Similar to the proposed Project, implementation of Alternative 7 and subsequent build-out of urban development would result in the conversion of currently undeveloped lands to a non-erodible, urban condition. Under this alternative, the total acreage converted would be 3,735 acres. Effectively, this conversion would translate to an average loss of approximately 6,795 tons of sediment per year, or 0.17 percent of the river's total annual yield. The magnitude of this impact represents a 29.9 percent reduction compared to the proposed RMDP, which already would have a very slight impact on beach replenishment. Thus, Alternative 7 would not significantly affect recruitment of sand onto Ventura County beaches. For more information, please refer to **Section 4.2** of the Draft EIS/EIR for the Project.

8.7.4.2.3 Loss Of Hydrologic Function

Alternative 7 would have the potential to result in a loss of hydrologic function of waters of the United States on the Project site. This attribute is affected by the source of water, the duration and magnitude of flows (hydroperiod), whether or not flows reach the floodplain, the presence of flow restrictions, the duration of water flows or ponding within the creek or on the floodplain, and the width of the floodplain, and the HARC hydrology score indicates the relative extent to which the assessment reaches on site perform this function. Lost hydrologic function due to the proposed fill was calculated by applying the HARC hydrology score as a weighting factor to the acreages filled. The fill from implementation of Alternative 7 would result in the permanent loss of 8.1 HARC hydrology-weighted acres (88 percent reduction compared to the proposed Project), and the temporary loss of 15.9 HARC hydrology-weighted acres (43 percent reduction compared to the proposed Project) of waters of the United States.

8.7.4.3 Effects On Biological Characteristics Of The Aquatic Ecosystem

Compared to Alternative 2, Alternative 7 would have fewer permanent impacts on biological resources. In some areas, however, RMDP facilities are sited differently under Alternatives 7 to avoid impacts to jurisdictional areas in the Santa Clara River and its tributaries. In those areas, Alternative 7 would have somewhat higher temporary impacts to some upland biological resources. Impacts to wildlife habitat connectivity and movement would be reduced under this alternative, due to substantial avoidance of the Santa Clara River floodplain.

8.7.4.3.1 Effects On Sensitive Aquatic And Riparian Plants And Wildlife

Potential impacts to individuals of wildlife species would be similar under each of the alternatives, but the level of risk would be proportionately smaller for alternatives with smaller impacts to suitable habitat for the species. Therefore, Alternative 7 would generally have less impact than Alternative 2 on habitat for sensitive aquatic, semi-aquatic, and riparian plants and wildlife, because Alternative 7 involves a smaller development footprint. One species that would experience substantially less impact is the southwestern pond turtle. The EIS/EIR determined that impacts to habitat for this species would be significant and unavoidable under Alternative 2 because lower Potrero Canyon would become permanently unavailable for nesting, hatchling and juvenile use, and upland refugia during 100-year storm events due to construction of RMDP facilities in the area. Lower Potrero Canyon would remain available to the pond turtle for these uses under Alternative 7. Impacts of Alternative 7 on special-status aquatic species are summarized in **Appendix 8.0** (Impacts of Alternative 7 on Sensitive Aquatic Species). For further information and species-specific discussions, please refer to **Section 4.5** of the Draft EIS/EIR for the Project.

8.7.4.3.2 Loss Of Habitat Function

Alternative 7 would have the potential to result in a loss of habitat function of waters of the United States on the Project site. This attribute takes into account such factors as plant species diversity, percentage of native plant species, biological structure, and evidence of vegetation recruitment (*i.e.*, the presence of seedlings and/or saplings), and the width of the floodplain, and the HARC habitat score indicates the relative extent to which the assessment reaches on site perform this function. Lost habitat function due to the proposed fill was calculated by applying the HARC habitat score as a weighting factor to the acreages filled. The fill from implementation of Alternative 7 would result in the permanent loss of 7.2 HARC habitat-weighted acres (88 percent reduction compared to the proposed Project) and the temporary loss of 14.4 HARC habitat-weighted acres (40 percent reduction compared to the proposed Project) of waters of the United States.

8.7.4.3.3 Fish, Crustaceans, Mollusks, And Other Aquatic Organisms In The Food Web

Implementation of Alternative 7 could result in permanent physical changes to the Santa Clara River Corridor and surrounding watershed, including changes in hydrology and fluvial processes, that could affect suitable fish habitat, as discussed in the stickleback analysis section (8.7.4.3.1). However, these impacts are expected to be minor under both Alternative 2 and Alternative 7.

Impacts to crustaceans, mollusks, and other aquatic organisms in the food web would be minor as the diversity of invertebrates in the substrate is generally low due to the substrate being dominated by sand and gravel. Impacts to these organisms under Alternative 7 would be similarly minor as under Alternative 2, caused by the changes in water quality, substrate and sediment dynamics, and hydrologic function as discussed in **Sections 8.7.4.1.1, 8.7.4.2.2**, and **8.7.4.2.3**, respectively. Therefore, there would not be large-scale changes in the distribution or abundance of aquatic organisms as a result of construction of the Project under Alternative 7.

8.7.4.3.4 Other Wildlife

The impact upon other, non-sensitive species, that could potentially occur within the aquatic ecosystem will be generally similar to effects on sensitive species of the same type (fishes, birds, etc.), as discussed in **Section 8.7.4.3.1**.

8.7.4.3.5 Effects On Riparian Vegetation

Out of the 324.0 acres of riparian vegetation communities within Corps jurisdiction on the Project site, Alternative 7 permanently impacts 2.2 acres and temporarily impacts 6.1 acres of riparian vegetation (compared to Alternative 2, which has 49.7 acres of permanent and 14.2 acres of temporary impacts). **Table 4.5-27** of the RMDP-SCP EIS/EIR provides a detailed summary of overall impacts to riparian vegetation by floristic alliance (*i.e.*, columns for RMDP Direct Impacts and Specific Plan Indirect Impacts).

8.7.4.4 Cumulative Effects On The Aquatic Ecosystem

Alternative 7 would not result in a considerable contribution to any significant cumulative impacts on aquatic ecosystems. In addition, many of the mitigation measures proposed for the proposed Project, if adopted for other projects in the watershed, would further ensure that cumulative impacts on the aquatic ecosystem impacts remain less than significant. For more information, please refer to **Section 6.0** of the Draft EIS/EIR for the Project.

8.7.4.5 Human Use Characteristics

As required by the section 404(b)(1) Guidelines (40 C.F.R. §§ 230.50 through 230.54), this section evaluates the potential loss of values that would result relative to human use characteristics including municipal and private water supplies, recreational and commercial fisheries, water-related recreation, aesthetics, and preserve areas.

8.7.4.5.1 Municipal And Private Water Supplies

Alternative 7 would not involve any activities that would render municipal or public water supplies unfit for consumption. The WRP associated with the Specific Plan would be designed to comply with applicable NPDES requirements, ensuring that downstream water quality would not be impaired. The quantity of water passing through the RMDP site within the Santa Clara River and tributaries would not be affected by this alternative.

8.7.4.5.2 Recreational And Commercial Fisheries

Alternative 7 would not have an impact upon recreational or commercial fisheries on the site as it is private land, where such use of the site is not authorized. Potential effects upon water quality would be mitigated to comply with applicable standards such that build-out of the Project would not affect recreational or commercial fishing downstream of the Project area.

8.7.4.5.3 Water-Related Recreation

As stated in the previous section, the site is on private land, where recreational use of the site is not authorized. Further, Alternative 7 would not result in off-site impacts to water quality or hydrologic function such that water-related recreation upstream and downstream of the Project area would not be affected.

8.7.4.5.4 Aesthetics

While Alternative 7 would result in a substantial reduction in Specific Plan development and much larger spineflower preserves, this alternative would nevertheless establish a new urban community, in a highly visible, currently undeveloped area. (See **Section 4.15** of the Draft EIS/EIR.) However, visual impacts of the activities proposed within Corps jurisdiction would largely be confined to bridges, grade control structures, storm drain outlets, and similar facilities. These facilities would contrast with existing natural stream banks, but are not expected to result in significant adverse impacts to the aesthetic values of the jurisdictional areas overall. Proposed bank stabilization activities would cause a substantial change in the appearance of jurisdictional areas during construction, but because the stabilization would be buried and revegetated, these impacts would be temporary. In addition, Alternative 7 contemplates substantial on-site creation and restoration, which will largely replace lost values and the activities take place in the context of a master-planned community which will integrate the resources with the community. Therefore, Alternative 7 would not cause significant adverse impacts to aesthetic values of waters of the United States.

8.7.4.5.5 Parks, National And Historical Monuments, National Seashores, Wilderness Areas, Research Sites, And Similar Preserves

Alternative 7 would not impact parks, national and historical monuments, national seashores, wilderness areas, research sites, or similar preserves, as the RMDP site is privately owned and does not contain any such designated features.

8.7.5 Other Significant Environmental Consequences

As noted in **Section 8.1**, the purpose of this subsection is to identify areas where an alternative may have other (non-aquatic) significant adverse environmental consequences that would exclude it from consideration as the potential LEDPA, even if it had less impact on aquatic resources and was otherwise practicable.

8.7.5.1 Non-Aquatic Biological Resources

Because these species do not typically occur within waters of the United States, impacts on non-aquatic biological resources would generally be limited to indirect effects associated with build-out of the Specific Plan. Alternative 7's impacts on non-aquatic biological resources would generally be less severe than those of Alternative 2, due to avoidance of mapped floodplains, elimination of two planned bridges across the river, and a substantial overall reduction in development facilitated.

8.7.5.1.1 Effects On Sensitive Upland Vegetation Communities

Under Alternative 7, no impacts to oak woodlands would occur within Corps jurisdiction due to the avoidance of development within the FEMA 100-year floodplain. California walnut woodland, and native grasslands do not occur within Corps jurisdiction within the Project site.

8.7.5.1.2 Effects On Special-Status Terrestrial/Upland Plants And Wildlife

The impacts of Alternative 7 on special-status terrestrial species would generally be slightly less than those of the proposed Project, due to the reduced extent of upland development facilitated. These impacts are summarized in **Appendix 8.0** (Impacts of Alternative 7 on Sensitive Non-Aquatic Species. For detailed analyses of the effects of Alternative 7 on special-status species, please refer to **Section 4.5** of the Draft EIS/EIR.

8.7.5.1.3 Effects On Wildlife Movement

Both Alternative 7 and Alternative 2 contemplate significant urban development and would negatively affect long-term habitat connectivity in the RMDP. Compared to Alternative 2, however, Alternative 7 would result in less overall development and would install more bridge crossings instead of culverts. The 100-year floodplain, the dominant east-west habitat linkage in the Project area, would be avoided with the exception of bridge crossings. These factors tend to make Alternative 7 more conducive to wildlife movement.

8.7.5.2 Hazards, Hazardous Materials, And Public Safety

Under Alternative 7, construction activities, such as the temporary transport, storage and use of potentially hazardous materials, would be reduced by approximately 35.4 percent when compared to the proposed Project, because Alternative 7 would facilitate approximately 35.4 percent less development.

The demand on emergency response services would be proportional to the post-development population served. Under Alternative 7, the population at risk would be approximately 53,530 residents (a 23.4 percent reduction when compared to the proposed Project). However, development under this alternative would not be adequately designed to handle emergency evacuations, as the alternative features only a single bridge across the Santa Clara River. This alternative would, therefore, result in hazards/hazardous materials impacts greater than those of the proposed Project. For more information, please refer to **Section 4.17** of the Draft EIS/EIR for the Project.

8.7.5.3 Conclusion

As discussed above, Alternative 7 would result in significant adverse impacts related to traffic, and emergency access that would exceed the impacts of the proposed Project.

8.7.6 Overall

Alternative 7 would not be a practicable alternative. Due to insufficient total developable acreage and limited ability to develop the site with interrelated villages, this alternative fails to achieve the overall purpose of the RMDP Project. The costs of this alternative would substantially exceed the costs of the proposed Project and would be unreasonable for a project of this type. Because it contemplates a reduced development footprint and would serve a smaller post-Project population, Alternative 7's impacts on the environment would generally be fewer in number and less severe than those of the proposed Project. Specifically, Alternative 7 would have substantially less impact on the aquatic ecosystem compared to the proposed Project. However, some of impacts of Alternative 7 would exceed those of the proposed RMDP, such as impacts related to traffic and hazards. Because it is not practicable, Alternative 7 is not the initial LEDPA.

8.8 ANALYSIS OF THE NO FILL ALTERNATIVE

Under the No Fill Alternative, all bridges, bank stabilization, and other RMDP infrastructure would be sited to avoid any deposition of fill into waters of the United States. Flood protection would be accomplished by constructing buried bank stabilization between on-site drainages and adjacent development, but beyond the lateral limits of the Corps' jurisdiction. The proposed configuration of infrastructure facilities and land uses that would occur under the No Fill Alternative is presented graphically on **Figure 8-7**.

The Draft EIS/EIR for the Project discussed the No Fill Alternative at **Subsection 3.3.3**, but did not subject the no-fill alternative to detailed analysis because it was considered infeasible. Under NEPA and CEQA, it is not necessary to perform detailed analysis of alternatives that are considered infeasible. However, this Alternatives Analysis provides additional analysis of this alternative to evaluate the practicability of complete avoidance of waters of the United States per the section 404(b)(1) Guidelines.

8.8.1 Project Purpose

Under the No Fill Alternative, urban development within the RMDP site would be substantially reduced compared to the Specific Plan as approved by Los Angeles County. In addition, two of the proposed villages would be disproportionately impacted. Please refer to **Figure 8-7** for a graphic illustration of this condition. As a result, the No Fill Alternative would not meet aspects of the overall project purpose related to development potential and village viability.

8.8.1.1 Size

Implementation of the No Fill Alternative would facilitate a master-planned urban development within the RMDP site, comprising 2,144.9 net developable acres of residential, commercial, and industrial uses and public facilities. Compared to the proposed RMDP, the development facilitated under this alternative would be reduced by 28.5 percent. Due to this substantial reduction, the No Fill Alternative would not meet the overall project purpose with regard to net developable acreage.

8.8.1.2 Residential Uses

The No Fill Alternative would facilitate the development of 1,831.7 acres of residential uses, a reduction of 28 percent compared to the proposed Project. Even after incorporating feasible increases in density, the No Fill Alternative would allow the construction of only 18,339 dwelling units, a reduction of 12 percent compared to the proposed Project. Because the number of dwelling units available under the No Fill Alternative would be reduced by more than ten percent compared to the number approved in the Specific Plan, the No Fill Alternative would fail to achieve the Specific Plan Basic Objectives for residential uses.

8.8.1.3 Commercial Uses

The No Fill Alternative would facilitate the development of 176.2 acres of commercial uses, a reduction of 32 percent compared to the proposed Project. Despite practicable increases in density, such as vertical construction, this acreage would support only 4.76 msf of commercial floor space, a reduction of 14 percent compared to the proposed Project. Because the commercial floor space available under the No Fill Alternative would be reduced by more than ten percent compared to the floor space that would result from build-out of the Specific Plan as approved by the County, the No Fill Alternative would fail to achieve the Specific Plan Basic Objectives for commercial uses.

8.8.1.4 Public Facilities

Under the No Fill Alternative, the development of 137.0 acres of public facilities would be facilitated, representing an eight percent reduction compared to the proposed Project. Because this acreage is within ten percent of the acreage of public services called for in the Specific Plan as approved by the County, the No Fill Alternative would be capable of achieving the Specific Plan Basic Objectives for public facilities.

8.8.1.5 Open Space

Under this alternative, 11,086.9 acres of undeveloped lands currently under private ownership would be dedicated to land management entities for preservation in perpetuity. This acreage represents an nine percent increase when compared to the proposed RMDP. Because the acreage of open space dedicated under this alternative would exceed that called for in the Specific Plan as approved by the County, the No Fill Alternative would achieve the Specific Plan Basic Objectives for open space.

8.8.1.6 Villages Viability

The No Fill Alternative would facilitate urban development within the RMDP site, but less than the proposed Project (12 percent reduction in dwelling units as compared to the proposed Project). This alternative would include two bridges across the Santa Clara River, but would not include the bridges at Potrero Canyon Road. As a result, a substantial portion of the development reduction would occur in the easternmost portion of the RMDP site. The configuration of developable space under the No Fill Alternative would preclude the construction of a coherent village in this location. For this reason, the No Fill Alternative would fail to achieve the Specific Plan Basic Objectives for Villages.

8.8.1.7 Project Purpose Conclusion

The No Fill Alternative would facilitate an urban development much smaller than that approved in the Specific Plan, featuring an overall reduction in developable land uses of 29 percent. In addition, the proposed configuration of bridges, drainage facilities, and preserved areas would not allow for creation of a village in the easternmost portion of the RMDP site. The No Fill Alternative would, therefore, not achieve the Basic Objectives of the Specific Plan and the overall project purpose.

8.8.2 Costs

This section compares the costs associated with the No Fill Alternative, including both site development costs and costs of land, with those of the proposed RMDP. As stated in **Section 8.1**, above, an alternative was deemed to be unreasonably costly if the total site development costs per net developable acre exceeded those of the proposed Project by more than five percent.

8.8.2.1 Site Development Costs

The No Fill Alternative would yield a total of 2,144.9 net developable acres at a total development cost of $2,890,933,000. This yields an average development cost of $1,347,817 per net developable acre (29.9 percent increase compared to the proposed Project). These costs are substantially greater than those of the proposed Project, would not be reasonable for a project of this type, and thus render the No Fill Alternative impracticable.

8.8.2.2 Costs Conclusion

The construction and site development costs associated with the No Fill Alternative are substantially greater than those of the proposed Project and would not be reasonable for a project of this type. The No Fill Alternative is, therefore, not a practicable alternative with respect to costs.

8.8.3 Logistics

8.8.3.1 Site Circulation

Under the No Fill Alternative, development facilitated on the RMDP site would be served by an internal network of new roads, which would connect to the existing regional transportation network via two proposed bridges across the Santa Clara River, one at Long Canyon Road and one at Commerce Center Drive, and by westward extension of two existing roadways (Magic Mountain Parkway and Pico Canyon Road) onto the site. The No Fill Alternative would be adequately designed to handle emergency evacuations, with four points of access to the north and east. The internal circulation network proposed under the No Fill Alternative would comply with applicable County standards, and all on-site roadway segments would operate at acceptable levels of service (LOS D or better). Because the lack of a secondary site access to SR-126 is a deficiency that cannot feasibly be mitigated, the No Fill Alternative would be logistically impracticable with regard to site circulation.

8.8.3.2 Flood Protection

Under the No Fill Alternative, the required flood control and drainage facilities would be installed, but would be located beyond the lateral limits of Corps jurisdiction. Surrounding land uses under this alternative have been configured such that the level of flood protection afforded by the facilities proposed would be adequate to meet applicable County requirements. The No Fill Alternative would, therefore, be logistically practicable with regard to flood protection.

8.8.3.3 Water Treatment And Reclamation

Like the proposed Project, the No Fill Alternative would include a WRP intended to serve the new community. The WRP would not differ from that approved by the County as a component of the Specific Plan approval in May 2003. Because the WRP was sized to accommodate the Specific Plan development, which would have greater demands on wastewater treatment services than the development facilitated under the No Fill Alternative, the WRP would have adequate capacity to serve this alternative. Therefore, the No Fill Alternative would be logistically practicable with regard to water treatment and reclamation.

8.8.3.4 Grading Balance

When it approved the Newhall Ranch Specific Plan, the County required the proposed development to balance quantities of cut and fill material on site. This requirement would apply to any alternative, regardless of modifications to the site plans dictated by the terms and conditions of the section 404 Permit. Accordingly, the No Fill Alternative was designed to comply with this requirement, and the development facilitated would not require import or export of soils to or from the RMDP site. Therefore, the No Fill Alternative would be logistically practicable with regard to grading balance.

8.8.4 Impacts To The Aquatic Ecosystem

Unlike the proposed Project, the No Fill Alternative would not directly affect the aquatic ecosystem. Development within the RMDP site, including constructing bridges across the Santa Clara River, would be accomplished without impact to jurisdictional waters of the United States. Because the No Fill Alternative would avoid fill of jurisdictional waters, these impacts would be much reduced compared to the proposed Project.

8.8.4.1 Effects On Chemical Characteristics Of The Aquatic Environment

Implementation of the No Fill Alternative would potentially result in impacts to water quality and loss of biogeochemical function.

8.8.4.1.1 Effects On Water Quality

The Draft EIS/EIR for the Project determined that the long-term water quality impacts of the proposed Project (Alternative 2) and Alternatives 3 through 7 would be less-than-significant after the implementation of proposed project design features, source control and treatment strategies, compliance with the MS4 permit, compliance with the Los Angeles County Standard Urban Stormwater Mitigation Plan (SUSMP) requirements, and the implementation of mitigation measures provided by the EIS/EIR. Development of the Specific Plan site under the No Fill Alternative would also be required to implement the identified design criteria and regulatory requirements.

The Draft EIS/EIR analysis indicates that with the implementation of Alternative 2, the concentrations of modeled runoff water constituents (except dissolved zinc) would decrease when compared to existing conditions. Since the No Fill Alternative would result in less residential, commercial and public facility development than would be provided by the proposed Project, it is expected that the concentrations of modeled runoff water constituents would also decrease when compared to existing conditions. The concentrations of runoff constituents that would occur after the implementation of the proposed Project and the No Fill Alternative would be below all benchmark water quality objectives and criteria, and TMDL wasteload allocations for the Santa Clara River.

The Draft EIS/EIR also provided qualitative assessments of water quality impacts from constituents such as hydrocarbons pathogens, pesticides, and trash and debris. The analysis concluded that under Alternative 2 the concentration of these constituents may increase when compared to existing conditions. However, with the implementation of regulatory requirements, Draft EIS/EIR mitigation measures, and site design, source control, and treatment control strategies in compliance with the MS4 permit and SUSMP requirements, none of these constituents are expected to significantly impact receiving waters. Since the No Fill Alternative would result in less urban development than the proposed Project, the water quality impacts of the No Fill Alternative for these constituents would be substantially similar to the impacts of proposed Project and could be feasibly reduced to a less-than-significant level.

8.8.4.1.2 Loss Of Biogeochemical Function

Because this alternative would not result in any fill of waters of the United States, this alternative would not lead to lost biogeochemical function. Applying the HARC biogeochemical score to zero acres of fill would yield zero HARC biogeochemical-weighted impact.

8.8.4.2 Effects On Physical Characteristics Of The Aquatic Environment

Impacts on physical components of the aquatic environment generally consist of impacts related to fill of jurisdictional waters, impacts related to losses of stream and wetland functions and services, and impacts related to the geomorphic stability of the site's waters in the long term. Under the No Fill Alternative, because fill of jurisdictional waters would be avoided, these impacts would generally be much less than those of the proposed Project, as described below.

8.8.4.2.1 Permanent And Temporary Fill Of Waters Of The United States

Implementation of the No Fill Alternative would facilitate urban development in the RMDP site, but would do so in a manner that would avoid the need to place permanent or temporary fill within waters of the United States. Fill of waters would, therefore, be reduced by 100 percent compared to the proposed Project. All 660.1 acres of waters of the United States within the RMDP site, including all 276.9 acres of jurisdictional wetlands, would be avoided under this alternative.

8.8.4.2.2 Effects On Substrate And Sediment Dynamics

The No Fill Alternative would have the potential to result in geomorphic impacts on waters of the United States caused by disruptions of the sediment equilibrium in the Santa Clara River mainstem and/or tributaries. In addition, the conversion of existing undeveloped lands to a non-erodible, urban condition would slightly reduce the available sand supply reaching the beaches in Ventura County. These effects would be less severe than those of the proposed Project, and would generally be minor.

***Santa Clara River*.** **The No Fill** Alternative would involve the installation of facilities along the Santa Clara River in a configuration similar to that proposed under Alternative 5. However, the facilities would be constructed to avoid the placement of fill material into waters of the United States, and would, therefore, not affect the river's flow characteristics under normal circumstances. The No Fill Alternative would, therefore, have geomorphic impacts on the Santa Clara River mainstem much reduced compared to those of the proposed Project.

***Tributaries*.** Because all tributary drainages would be avoided under this alternative, sediment dynamics within these drainages would not be directly affected by Project activities. However, as this alternative would facilitate urban development and creation of impervious surfaces on site, potential changes to the hydrograph and sediment budgets could lead to altered sediment dynamics in the streams unless mitigated. Also, existing geomorphic instabilities within the drainages would not be remedied under this alternative. For more information, please refer to **Section 4.2** of the Draft EIS/EIR for the Project.

***Beach Replenishment*.** Similar to the proposed Project, implementation of the No Fill Alternative and subsequent build-out of urban development would result in the conversion of currently undeveloped lands to a non-erodible, urban condition. Under this alternative, the total acreage converted would be lessened by approximately 28 percent compared to the proposed Project. Because the proposed Project's effects on beach replenishment would already be very slight, the No Fill Alternative would not significantly affect recruitment of sand onto Ventura County beaches. For more information, please refer to **Section 4.2** of the Draft EIS/EIR for the Project.

8.8.4.2.3 Loss Of Hydrologic Function

Because this alternative would not result in any fill of waters of the United States, this alternative would not lead to lost hydrologic function. Applying the HARC hydrology score to zero acres of fill would yield zero HARC-weighted hydrology impacts.

8.8.4.3 Effects On Biological Characteristics Of The Aquatic Ecosystem

Compared to Alternative 2, the No Fill Alternative has fewer permanent impacts on biological resources. In some areas, however, where RMDP facilities are sited differently under Alternatives 8 to avoid impacts to jurisdictional areas in the Santa Clara River and its tributaries, these other alternatives may have somewhat higher temporary impacts to upland biological resources. Impacts to wildlife habitat connectivity and movement would be similar under all of the alternatives.

8.8.4.3.1 Effects On Sensitive Aquatic And Riparian Plants And Wildlife

Potential impacts to individuals of wildlife species would be similar under each of the alternatives, but the level of risk would be proportionately smaller for alternatives with smaller impacts to suitable habitat for the species. Therefore, the No Fill Alternative would generally have less impact than Alternative 2 on habitat for sensitive aquatic, semi-aquatic, and riparian plants and wildlife, because the No Fill Alternative involves a smaller development footprint. One species that would experience substantially less impact is the pond turtle. The EIS/EIR that impacts to habitat for this species would be significant and unavoidable under Alternative 2 because lower Potrero Canyon would become permanently unavailable for nesting, hatchling and juvenile use, and upland refugia during 100-year storm events due to construction of RMDP facilities in the area. Lower Potrero Canyon would remain available to the pond turtle for these uses under the No Fill Alternative 8. Impacts of the No Fill Alternative on special-status aquatic species are summarized in **Appendix 8.0** (Impacts of the No Fill Alternative on Sensitive Aquatic Species). For further information and species-specific discussions, please refer to **Section 4.5** of the Draft EIS/EIR for the project.

8.8.4.3.2 Loss Of Habitat Function

Because this alternative would not result in any fill of waters of the United States, this alternative would not lead to lost habitat function. Applying the HARC habitat score to zero acres of fill would yield zero HARC-weighted habitat impacts.

8.8.4.3.3 Fish, Crustaceans, Mollusks, And Other Aquatic Organisms In The Food Web

Implementation of the No Fill Alternative could result in permanent physical changes to the Santa Clara River Corridor and surrounding watershed, including changes in hydrology and fluvial processes, that could affect suitable fish habitat, as discussed in the stickleback analysis section (**8.8.4.3.1**) However, these impacts are expected to be minor under both Alternative 2 and the No Fill Alternative.

Impacts to crustaceans, mollusks, and other aquatic organisms in the food web would be minor as the diversity of invertebrates in the substrate is generally low due to the substrate being dominated by sand and gravel. Impacts to these organisms under the No Fill Alternative would be similarly minor as under Alternative 2, caused by the changes in water quality, substrate and sediment dynamics, and hydrologic function as discussed in **Sections 8.8.4.1.1**, **8.8.4.2.2**, and **8.8.4.2.3**, respectively. Therefore, there would not be large-scale changes in the distribution or abundance of aquatic organisms as a result of construction of the Project under the No Fill Alternative.

8.8.4.3.4 Other Wildlife

The impact upon other, non-sensitive species, that could potentially occur within the aquatic ecosystem will be generally similar to effects on sensitive species of the same type (fishes, birds, etc.), as discussed in **Section 8.8.4.3.1**.

8.8.4.3.5 Effects On Riparian Vegetation

Because the No Fill Alternative avoids impacts to the river and major drainages, 100 percent of the 324.0 acres of riparian vegetation communities within Corps jurisdiction on the Project site would be preserved. There would be no permanent or temporary impacts within Corps jurisdiction (compared to Alternative 2, which has 49.7 acres of permanent and 14.2 acres of temporary impacts).

8.8.4.4 Cumulative Effects On The Aquatic Ecosystem

Following incorporation of project-specific mitigation set forth in **Section 4.5** and **Section 4.6** of the Draft EIS/EIR, the No Fill Alternative would not result in a cumulative contribution to any significant impact on aquatic ecosystems. In addition, many of the mitigation measures proposed for the proposed Project, if adopted for other projects in the watershed, would further ensure that cumulative impacts on the aquatic ecosystem impacts remain less than significant. For more information, please refer to **Section 6.0** of the Draft EIS/EIR for the Project.

8.8.4.5 Human Use Characteristics

As required by the section 404(b)(1) Guidelines (40 C.F.R. §§ 230.50 through 230.54), this section evaluates the potential loss of values that would result relative to human use characteristics including municipal and private water supplies, recreational and commercial fisheries, water-related recreation, aesthetics, and preserve areas.

8.8.4.5.1 Municipal And Private Water Supplies

The No Fill Alternative would not involve any activities that would render municipal or public water supplies unfit for consumption. The WRP associated with the Specific Plan would be designed to comply with applicable NPDES requirements, ensuring that downstream water quality would not be impaired. The quantity of water passing through the RMDP site within the Santa Clara River and tributaries would not be affected by this alternative.

8.8.4.5.2 Recreational And Commercial Fisheries

The No Fill Alternative would not have an impact upon recreational or commercial fisheries on the site as it is private land, where such use of the site is not authorized. Potential effects upon water quality would be mitigated to comply with applicable standards such that build-out of the Project would not affect recreational or commercial fishing downstream of the Project area.

8.8.4.5.3 Water-Related Recreation

As stated in the previous section, the site is on private land, where recreational use of the site is not authorized. Further, the No Fill Alternative would not result in off-site impacts to water quality or hydrologic function such that water-related recreation upstream and downstream of the Project area would not be affected.

8.8.4.5.4 Aesthetics

Similar to the proposed Project and Alternatives 3 through 7, the No Fill Alternative would alter the existing visual environment of the RMDP area. However, visual impacts of the activities proposed within Corps jurisdiction would largely be confined to bridges, grade control structures, storm drain outlets, and similar facilities. These facilities would contrast with existing natural stream banks, but are not expected to result in significant adverse impacts to the aesthetic values of the jurisdictional areas overall. Proposed bank stabilization activities would cause a substantial change in the appearance of jurisdictional areas during construction, but because the stabilization would be buried and revegetated, these impacts would be temporary. In addition, the No Fill Alternative contemplates substantial on-site creation and restoration, which will largely replace lost values and the activities take place in the context of a master-planned community, which will integrate the resources with the community. Therefore, the No Fill Alternative, like the other alternatives, would not cause significant adverse impacts to aesthetic values of waters of the United States.

8.8.4.5.5 Parks, National And Historical Monuments, National Seashores, Wilderness Areas, Research Sites, And Similar Preserves

The No Fill Alternative would not impact parks, national and historical monuments, national seashores, wilderness areas, research sites, or similar preserves, as the RMDP site is privately owned and does not contain any such designated features.

8.8.5 Other Significant Environmental Consequences

In addition to the effects on the aquatic ecosystem discussed above, implementation of the No Fill Alternative would also have the potential to result in other adverse environmental consequences.

8.8.5.1 Non-Aquatic Biological Resources

Because these species do not typically occur within waters of the United States, impacts on non-aquatic biological resources would generally be limited to indirect effects associated with build out of the Specific Plan. The No Fill Alternative's impacts on non-aquatic biological resources would generally be less severe than those of Alternative 2, due to the reduced amount of development facilitated.

8.8.5.1.1 Effects On Sensitive Upland Vegetation Communities

Under the No Fill Alternative, no impacts to oak woodlands would occur within Corps jurisdiction. California walnut woodland, and native grasslands do not occur within Corps jurisdiction within the Project site.

8.8.5.1.2 Effects On Special-Status Terrestrial/Upland Plants And Wildlife

A summary of the effects of the No Fill Alternative on sensitive non-aquatic plants and wildlife species is presented in **Appendix 8.0** (Impacts of the No Fill Alternative on Sensitive Non-Aquatic Species). For a more complete analysis of the Project's effects on these species, please refer to **Section 4.5** of the Draft EIS/EIR.

8.8.5.1.3 Effects On Wildlife Movement

Because the No Fill Alternative would feature a configuration of proposed bridges and drainage facilities along the Santa Clara River mainstem that is very similar to that proposed under Alternative 5, impacts of these two alternatives would be similar with regard to east-west wildlife movement along the river corridor. In upland portions of the Project site, the avoidance of jurisdictional waters under this alternative would result in a configuration somewhat similar to that proposed under Alternative 7. Impacts to wildlife movement from the No Fill Alternative would be fairly similar to those of Alternative 7 with respect to north-south linkages. In all respects, impacts of this alternative on wildlife movement would be slightly less than those of the proposed Project.

8.8.5.2 Hazards, Hazardous Materials, And Public Safety

Development that would occur on the Specific Plan site under the proposed Project and Alternatives 3 through 7 would have the potential to result in short-term, construction-related releases of hazardous materials. Urban uses developed on the Specific Plan site would also have the potential to be long-term sources of hazardous materials that could be released to the environment. New development on the Project site would also have the potential to be adversely effected by contamination that resulted from historic oil production activities and by wildfires. The effects of each of these impacts would be reduced to a less-than-significant level with the implementation of existing waste management regulations, building requirements, fire code requirements, and mitigation measures identified by the Draft EIS/EIR.

The No Fill Alternative would provide 923 fewer acres of net developable area than the proposed Project, resulting in a corresponding reduction in urban development and population on the Specific Plan site. This decrease in development and population would incrementally decrease the potential for exposure to identified hazards. Despite this reduction in urban development, the impacts of the No Fill Alternative would be substantially similar to the mitigable impacts of proposed Project and could be feasibly reduced to less-than-significant levels with the implementation of the mitigation measures identified by the Draft EIS/EIR.

8.8.5.3 Conclusion

The No Fill Alternative would not result in any other significant adverse environmental consequences that the proposed Project would not have and which would exclude it from consideration as the potential LEDPA.

8.8.6 Overall

While the No Fill Alternative would be less damaging to the aquatic ecosystem than the proposed Project, this alternative would fail to achieve the overall project purpose and would be unreasonably costly. The No Fill Alternative is, therefore, not a practicable alternative, and will not be considered the potential LEDPA.

8.9 IDENTIFICATION OF INITIAL LEDPA

Based on the foregoing analysis, and the summary comparison found in **Table 8-1,** Summary Comparison of On-Site Alternatives and Determination of Initial LEDPA, below, Alternative 3 is the least environmentally damaging practicable alternative when compared to Alternatives 2-7 and the No Fill Alternative. Alternatives 4 and 5, while practicable, actually have greater impacts to waters of the United States as compared to Alternative 3. Alternatives 6, 7, and 8 would have resulted in fewer and/or less severe impacts to the aquatic environment than Alternative 3, but these alternatives would fail to meet the overall project purpose, be unreasonably costly, and pose other significant environmental impacts, such as inadequate emergency access to the site. Alternative 3, therefore, is the Initial LEDPA, and has been carried forward for further analysis, as presented in **Sections 9.0, 10.0, 11.0,** and **12.0** of this report.

Table 8-1
Summary Comparison of On-Site Alternatives and Determination of Initial LEDPA

Alternative	Alt. 2	Alt. 3	Alt. 4	Alt. 5	Alt. 6	Alt. 7	No Fill
Project Purpose (*See Appendix 8.0, Comparison of On-Site Alternatives: Project Purpose Detail*)							
Does the alternative meet the Basic Objectives of the Specific Plan?	Yes	Yes	Yes	Yes	No	No	No
Logistics (*See Appendix 8.0, Comparison of On-Site Alternatives: Logistics*)							
Is the alternative available and capable of being done, taking into consideration logistical constraints?	Yes	Yes	Yes	Yes	Yes	No	Yes
Technology							
Is the alternative available and capable of being done, taking into consideration existing technology?	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Cost (*See Appendix 8.0, Comparison of On-Site Alternatives: Cost*)							
Would the costs associated with the alternative be reasonable for a project of this type?	Yes	Yes	Yes	Yes	No	No	No
Practicability							
Is the alternative practicable, taking into account the project purpose, logistics, available technology and cost?	Yes	Yes	Yes	Yes	No	No	No
Impacts to the Aquatic Ecosystem (*See Appendix 8, Comparison of On-Site Alternatives: Impacts to the Aquatic Ecosystem*)							
Does the alternative have significantly less overall adverse impacts to the aquatic ecosystem than the proposed Project?	N/A	Yes	Yes	Yes	Yes	Yes	Yes
Other Adverse Environmental Consequences (*See Appendix 8, Comparison of On-Site Alternatives: Other Adverse Environmental Consequences*)							
Does the alternative avoid other significant, adverse environmental effects that the Proposed Project does not have?	N/A	Yes	Yes	Yes	Yes	Yes	Yes
Impacts Overall							
Among the practicable alternatives, which has the least impact to the aquatic ecosystem without other significant adverse environmental consequences?	No (greater impacts)	Yes	No (greater impacts)	No (greater impacts)	N/A (not practicable)	N/A (not practicable)	N/A (not practicable)
Initial Least Environmentally Damaging Practicable Alternative	**No**	**Yes**	**No**	**No**	**No**	**No**	**No**

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9.0 MODIFICATIONS TO ADDRESS REGULATORY REQUIREMENTS

The RMDP is subject to the requirements of regulatory programs other than the section 404 program. For example, the RMDP must comply with the CESA requirement to fully mitigate impacts to state-listed species, including the San Fernando Valley spineflower; and CDFG requirements associated with the Project's section 1602/1605 Master Streambed Alteration Agreement. Such requirements are considered "other significant adverse environmental consequences" under 40 C.F.R. section 230.1, and must be analyzed by the Corps prior to identifying the Draft LEDPA. In considering such consequences, the Corps solicited input from CDFG, which has jurisdiction over portions of the Project under Fish & Game Code sections 1602 and 1605 (long-term, master streambed alteration agreement) and Fish & Game Code section 2081 (CESA incidental take permits for four CESA-listed species, including San Fernando Valley spineflower).

In its response to the Corps, CDFG suggested that the Corps consider: (1) expanding spineflower preserves; (2) further avoiding and minimizing impacts to riparian resources along the Santa Clara River; and (3) modifying tributary designs to incorporate additional riparian mitigation area to ensure compliance with CESA and CDFG's streambed alteration program. CDFG also supported changes to the Commerce Center Bridge design and road alignment that would reduce secondary impacts to the Middle Canyon Spring complex. In addition, CDFG confirmed that eliminating the Potrero Canyon Road bridge over the Santa Clara River under the Initial LEDPA (Draft EIS/EIR Alternative 3) is consistent with reducing riparian habitat and wildlife impacts in the vicinity of lower Potrero Canyon and the river.

In response, the Applicant modified the Initial LEDPA as described below. The Corps also considered the potential need to address compliance with the federal ESA. However, upon review, the Corps determined that no specific additional changes were necessary to comply with the federal ESA, although the modifications requested by CDFG for the benefit of CESA-listed species would also benefit ESA-listed species, further reducing potential impacts to these species.

9.1 CHANGES INCORPORATED INTO REVISED INITIAL LEDPA

The Revised Initial LEDPA incorporates the following changes, compared to the Initial LEDPA (see **Figure 9-1**):

- **Chiquito Canyon:** Additional channel avoidance, resulting in 0.3 fewer acres of permanent impacts to jurisdictional waters and 1.3 fewer acres of temporary impacts versus the Initial LEDPA. The changes incorporated into the Revised Initial LEDPA for Chiquito Canyon were predominantly focused on minimizing encroachment of permanent impacts to the existing channel, integration of grade stabilization structures, and providing sufficient area for riparian enhancement and mitigation within that modified alignment. The changes did not reduce developable acreage compared to the Initial LEDPA. However, developable acreage was reduced by 3.0 acres compared to the proposed Project (Alternative 2).

- **San Martinez Grande Canyon:** The acreage of permanent fill was minimized substantially under the Initial LEDPA (91 percent reduction compared to the proposed Project), and would not be further reduced by 0.1 acres under the Revised Initial LEDPA. The changes incorporated into the Revised Initial LEDPA for San Martinez Grande Canyon were predominantly focused on grade stabilization structures, and providing sufficient area for riparian enhancement and mitigation within that modified alignment. The changes did not reduce developable acreage compared to the Initial LEDPA. However, developable acreage was reduced by 3.4 acres compared to the proposed Project.
- **Long Canyon:** The design changes incorporated into the Revised Initial LEDPA for Long Canyon incorporates a reconstructed channel area with the increased capacity for flood conveyance and riparian enhancement over the entire length of Long Canyon. The changes reduced developable acreage by 10.2 acres compared to the Initial LEDPA. Compared to the proposed Project, developable acreage was reduced by 18.1 acres.
- **Potrero Canyon**: The Initial LEDPA incorporated a major wetland avoidance component in lower Potrero Canyon associated with the elimination of the Potrero Canyon Road bridge, resulting in 2.1 fewer acres of permanent impacts to the adjacent mesic meadow wetland feature (special aquatic site) versus the proposed Project (Alternative 2). Under the Revised Initial LEDPA, avoidance and minimization of impacts to the lowermost portion of Potrero Canyon, and adjacent mesic meadow wetland feature (cismontane alkali marsh), result in 10.0 acre fewer permanent impacts and 1.5 acre more temporary impacts to jurisdictional waters, including wetlands over that of the Proposed Project and result in 0.3 acre fewer permanent impacts and 0.2 acre fewer temporary impacts to jurisdictional waters, including wetlands over that of the Initial LEDPA. The Revised Initial LEDPA identified a 19-acre wetland mitigation site immediately upstream from the mesic meadow, creating one, nearly contiguous cismontane alkali marsh wetland area in lower Potrero Canyon. The modified design of the Revised Initial LEDPA incorporates a broader channel area with the capacity for flood conveyance and riparian enhancement over most of the length of Potrero Canyon. The reduction in impacts also further minimizes direct, indirect and secondary impacts to special status invertebrate, avian, amphibian, and reptile species that utilize those wetland and riparian areas for various important life history stages. The changes reduced developable acreage by 3.4 acres compared to the Initial LEDPA. Compared to the proposed Project, developable acreage was reduced by 94.3 acres.
- **Santa Clara River:** Additional avoidance of riparian habitat adjacent to the Santa Clara River and lower Castaic Creek (CDFG jurisdiction) along its northern and southern banks was designed into the Revised Initial LEDPA, reducing permanent Corps jurisdiction impacts by 1.1 acre and temporary impacts by 8.7 acre versus the Initial LEDPA. The reduction in impacts also further minimizes direct, indirect and secondary impacts to special status avian, amphibian and reptile species that utilize those adjacent riparian areas for various important life history stages. The changes reduced

developable acreage by 73.0 acres compared to the Initial LEDPA. Overall, developable acreage was reduced by 328.3 acres compared to the proposed Project.

- **Middle Canyon Spring:** The Revised Initial LEDPA avoids permanent and temporary impacts to Middle Canyon Spring through a minor realignment (to the north) of the Commerce Center Driver bridge, road and associated abutment. The revision does not avoid additional acreage of impacts, although a larger buffer is provided between development and the special aquatic site. The revision to the bridge design results in additional costs to the bridge construction that are substantially higher than the proposed Project design.
- **Spineflower Preserves:** Expansion of the four proposed spineflower preserves within the RMDP (San Martinez Grande, Potrero, Grapevine Mesa, and Airport Mesa) was provided by CDFG for consideration in the Revised Initial LEDPA to create improved conditions for habitat connectivity, spineflower expansion, and buffering of urban edge effects, The proposed expansion of those preserves increases the overall preserve acreage from 140.5 acres under the proposed Project (Alternative 2) and 148.8 acres under the Initial LEDPA (Alternative 3), to 219.9 acres under the Revised Initial LEDPA.

Overall, the modifications set forth in the Revised Initial LEDPA reduced permanent impacts to jurisdictional waters by a total of 1.0 acres and reduced temporary impacts by 4.7 acres when compared to the Initial LEDPA. The changes also increased the total area set aside for spineflower conservation by 71.1 acres and preserved additional habitat for special-status species, particularly in sensitive riparian areas. These changes are in addition to significant avoidance measures already incorporated into the Initial LEDPA, which eliminated the Potrero Canyon Road Bridge and related impacts to riparian resources in the Santa Clara River and wetlands within lower Potrero Canyon. The resulting Revised Initial LEDPA would permanently impact a total of 69.0 acres of jurisdictional waters and will temporarily affect 32.9 acres, while avoiding 558.2 acres of jurisdictional waters site-wide. The Revised Initial LEDPA is depicted graphically on **Figure 9-1**. The changes reduced developable acreage by 73.0 acres compared to the Initial LEDPA. Overall, developable acreage was reduced by 328.3 acres compared to the proposed Project.

9.2 COMPLIANCE WITH STATE AND FEDERAL LAW

Based on the input from CDFG, and the Project modifications incorporated into the Revised Initial LEDPA, the Applicant believes that CDFG will be able to issue a master streambed alteration agreement and CESA incidental take permits for the Project. The Master Streambed Alteration Agreement would be a long-term agreement (*i.e.*, greater than five years) authorized and governed by Fish and Game Code section 1605, subdivision (g). Consistent with California Fish and Game Code sections 1600 *et seq.*, the Agreement would include avoidance, minimization and mitigation measures, all or some of which the Applicant must implement for a specific covered activity, and maintenance procedures that the Applicant must follow to complete a specific covered activity. The Applicant expects that these measures will be generally consistent with the Project as represented by the Revised Initial LEDPA.

Likewise, the Applicant believes that issuance of a multi-species incidental take permit for the Revised Initial LEDPA under section 2081 of CESA would not jeopardize the continued existence of a state-listed species, because the impacts of Alternative 3 to spineflower and other state-listed species would be minimized and fully mitigated. Thus, the Project would comply fully with CESA.

The Applicant also expects that the USFWS will issue a Biological Opinion concluding that the Project is not likely to jeopardize the continued existence of any endangered or threatened species or result in the "destruction or adverse modification" of critical habitat (16 U.S.C. § 1536). The Biological Opinion may incorporate "reasonable and prudent measures" to minimize impacts to listed species and habitat, but these measures, by law, cannot include major changes to the Project and, therefore, are not expected to require revision of the analysis in this alternatives analysis.

9.3 PRACTICABILITY AND IMPACTS OF REVISED INITIAL LEDPA

9.3.1 Project Purpose

The Revised Initial LEDPA reduces total developable acreage by 11 percent compared to the proposed Project. Specifically, the residential development acreage is reduced by 11 percent (285.4 acres), and its corresponding unit count is reduced by five percent (977 units). Commercial acreage is reduced by 14 percent (37 acres), but commercial square footage is reduced by only six percent (300,000 square feet). Acreage for public facilities acreage is reduced by four percent (6.0 acres), while open space acreage increases by three percent (332.5 acres) compared to the proposed Project. There are no disproportionate impacts that threaten the viability of a Village. Therefore, the Revised Initial LEDPA will still allow for development of the site consistent with the Basic Objectives of the Specific Plan. Additional detail regarding project Purpose is included in **Appendix 9.0**.

9.3.2 Logistics

The changes associated with the Revised Initial LEDPA would not interfere with safe and efficient internal circulation and access to existing adjacent road networks. The Revised Initial LEDPA would provide for adequate flood conveyance and detention, because their design is the same as the Initial LEDPA or larger, to accommodate additional riparian enhancement and mitigation areas integrated into the Revised Initial LEDPA design. Capacity for water treatment and reclamation would be unchanged from the Initial LEDPA and would be adequate. As with the Initial LEDPA, grading for the Revised Initial LEDPA would balance on site, and, therefore, the Revised Initial LEDPA would avoid major exports of grading spoils from the RMDP area that would result in other adverse impacts to the environment. Therefore, the Revised Initial LEDPA would be logistically practicable. Additional detail regarding logistics is included in **Appendix 9.0**.

9.3.3 Cost

Total development costs for the Revised Initial LEDPA would be $2,839,620,057, compared to $3,069,918,000 for the proposed Project, and $2,884,032,000 for the Initial LEDPA. Cost per developable acre would increase by four percent, to $1,079,960 compared to the proposed

Project. These costs are within five percent of the cost for the proposed Project and are reasonable for a project of this type. Additional detail regarding cost is included in **Appendix 9.0.**

9.3.4 Practicability Conclusion

Based on the analysis above, the Revised Initial LEDPA is capable of achieving the project purpose and is practicable. No additional changes to the Revised Initial LEDPA are necessary at this stage of the analysis. The practicability of the Project will be assessed one final time following the Additional Studies of further avoidance contained in **Section 10.0. Table 9-1,** below, provides a practicability and impacts summary for the Revised Initial LEDPA. Additional detail regarding practicability is included in **Appendix 9.0.**

9.3.5 Permanent And Temporary Fill Of Waters Of The United States

Implementation of the Revised Initial LEDPA would result in the placement of fill within waters of the United States. In total, this alternative would permanently fill 69.0 acres of waters of the United States (26 percent reduction in acreage compared to the proposed Project), and would temporarily disturb 32.9 acres (one percent reduction in acreage compared to the proposed RMDP). Temporary impacts would be associated with temporary construction zones adjacent to proposed Project facilities. Waters temporarily disturbed would be restored and revegetated after completion of construction in the area. In some instances temporary impacts would also result from restoration activities, *i.e.*, when such activities require earthwork to be conducted in jurisdictional areas (correction of existing incised channels or unstable banks, for example).

Table 9-1
Determination of the Revised Initial LEDPA

Comparison of Determination Factors	Initial LEDPA	Revised Initial LEDPA
Project Purpose (See Appendix 10 for Detail)		
Does the alternative meet the Basic Objectives of the Specific Plan?	Yes	Yes
Logistics (See Appendix 10 for Detail)		
Is the alternative available and capable of being done, taking into consideration logistical constraints?	Yes	Yes
Technology		
Is the alternative available and capable of being done, taking into consideration existing technology?	Yes	Yes
Cost (See Appendix 10 for Detail)		
Would the costs associated with the alternative be reasonable for a project of this type?	Yes	Yes
Practicability		
Is the alternative practicable, taking into account the project purpose, logistics, available technology and cost?	Yes	Yes
Impacts to the Aquatic Ecosystem (See Appendix 10 for Detail)		
Does the alternative have significantly less overall adverse impacts to the aquatic ecosystem than the proposed Project?	Yes	Yes
Other Adverse Environmental Consequences (See Appendix 10 for Detail)		
Does the alternative avoid causing other significant, adverse environmental effects that the Proposed Project does not have?	Yes	Yes
Impacts Overall		
Among the practicable alternatives, which has the least impact to the aquatic ecosystem without other significant adverse environmental consequences?	Yes	Yes (Less impacts than Initial LEDPA)
DRAFT LEDPA	**NO**	**YES**

10.0 STUDIES OF ADDITIONAL AVOIDANCE AND IDENTIFICATION OF LEDPA

As described in **Section 9.0**, above, the Revised Initial LEDPA would meet the overall project purpose, be practicable, and meet all applicable state and federal regulatory requirements. However, because the analysis leading to the Revised Initial LEDPA was conducted on a site-wide scale, the practicability of reducing impacts through small-scale changes and fine tuning remained unexplored at that stage. To address this possibility, this section identifies key geographic areas within the RMDP site where additional avoidance may be practicable, and evaluates the extent to which further reductions to impacts to the aquatic environment are practicable.

10.1 METHODS

In determining which locations should be reviewed for additional detailed impact avoidance analysis, the Applicant considered several factors, including the amount of the aquatic resource present, any special qualities of the resource, such as the presence of a special aquatic site, and the extent to which the Revised Initial LEDPA would impact the resource. At the outset, small drainages with minimal aquatic values that were either completely avoided or that would sustain impacts of less than one acre area weighted HARC were not considered for further study since avoidance had such minimal impact and the No Fill Alternative shows that avoidance would have significant loss of development acres.

The results of this evaluation are presented in **Table 10-1**, below. All areas where the Revised Initial LEDPA would impact a special aquatic site were included among the areas proposed for additional study. The detailed analysis consists of fully developing alternative avoidance plans, evaluating the amount of land available for development, computing costs and calculating reduced impacts to Corps jurisdiction or provides a geomorphic analysis of why avoidance is not practicable.

A total of six areas warranting additional detailed avoidance analysis were identified, including:

- Adjacent wetlands along the northern bank of the Santa Clara River mainstem, where a utility corridor is proposed;
- The Potrero Canyon drainage, which is proposed to be relocated;
- The Chiquito Canyon drainage, proposed to be stabilized;
- The Long Canyon drainage, proposed to be relocated;
- The San Martinez Grande Canyon drainage, proposed to be stabilized; and
- The Middle Canyon drainage, proposed for replacement by a buried storm drain system.

The remaining drainage areas were considered for further detailed analysis, but rejected as described below and in **Table 10-1**.

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Table 10-1
Summary Of Areas Considered For Additional Avoidance

Aquatic Resource	Relative Size	Relative Quality Based on HARC	Level of Impact Under Revised Initial LEDPA	Candidate for Detailed Additional Avoidance Study?
Santa Clara River Mainstem	Very large	High, and wetlands present	Minimal, except for utility corridor	Yes, utility corridor area only
Salt Creek	Large	High, and wetlands present	Completely avoided	No
Potrero Canyon	Large	High in some reaches, and wetlands present	Drainage would be completely relocated	Yes
Chiquito Canyon	Large	Medium	Most of drainage would be straightened and recontoured	Yes
Long Canyon	Medium	High in some reaches	Drainage would be completely relocated	Yes
San Martinez Grande Canyon	Medium	High in some reaches	Portions of drainage would be impacted by bank stabilization	Yes
Lion Canyon	Medium	Medium	Substantial impacts to achieve grade control	No
Humble Canyon	Medium	High in some reaches	Drainage mostly avoided	No
Middle Canyon	Medium	Medium	Drainage would be completely eliminated	Yes
Off-Haul Canyon	Medium	Mostly moderate, but high in some reaches	Drainage would be completely eliminated	No
Magic Mountain Canyon	Medium	Mostly moderate, but high in some reaches	Drainage would be completely eliminated	No
Ayers Canyon	Small	High	Completely avoided	No
Middle Canyon Spring Complex	Small	High, entire complex is wetland	Completely avoided	No, but included in Middle Canyon study

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Immediately northwest of the RMDP boundary, Magic Mountain Canyon (approximately 5,000 linear feet) drains to a concrete-bottomed V-ditch that ultimately outlets to the Santa Clara River roughly 4,600 linear feet downstream. The Magic Mountain Canyon drainage is an ephemeral stream, and is characterized by disturbed areas and upland vegetation communities (big sagebrush scrub and coastal sage scrub). Of the 6.4 acres of Corps jurisdiction, 2.9 acres are classified as disturbed land, 0.6 acres are river wash, with the remaining 2.9 acres consisting of big sagebrush and coastal sage scrub habitats. The presence of these vegetation types within the active channel indicates a relatively short duration of surface water presence. The drainage does not support riparian vegetation, and special aquatic sites are absent. Because of these upland habitat characteristics, wetland habitat function within the drainage is limited (the HARC assessment ascribed this drainage a Habitat score of 0.57, the seventh-lowest Habitat score assigned within the Project area).

The Magic Mountain Canyon reach within the RMDP site is located within and along the proposed alignments of Westridge Parkway and Commerce Center Drive (Major Highway designation), and adjacent development within the Mission Village portion of the Newhall Ranch Specific Plan. The No Fill Alternative shows major impacts to developable acreage from avoiding this drainage. This would also lead to increased costs as any road way crossing of the drainage would require bridges.

Due to the low level of wetland function provided by this drainage, the minimal benefit of avoidance, the effect on the land plan, and the projected cost increases, an additional avoidance study within Magic Mountain Canyon was not conducted.

In Off-Haul Canyon, roughly 1,500 linear feet of the downstream reaches flow through a soft-bottom agricultural ditch that is seasonally maintained to convey stormwater runoff through the agricultural fields and under SR-126 to the Santa Clara River. The approximately 2,700 linear feet upstream flows through narrow channels that are located within the development grading footprint within the Homestead Village portion of the Specific Plan. It is an ephemeral stream with minimal high-quality habitat (only 1.5 acres of high quality HARC reaches) and no special aquatic sites. In addition, the drainage is located in the area needed to build the necessary road infrastructure and development within Homestead Village. The No Fill Alternative shows major impacts to developable acreage from avoiding this drainage. This would also lead to increased costs. Due to the highly degraded nature of the downstream reach (ditch), the minimal benefit of avoidance, the effect on the land plan and projected increased costs, Off-Canyon Canyon was not considered for further detailed analysis.

The proposed treatment for Lion Canyon already has incorporated an avoid and stabilize design approach. Currently, Lion Canyon operates in a state of geomorphic disequilibrium due to large headcuts and uncontrolled erosive features (Lion Canyon Channel Geomorphic Assessment of Lion Canyon, PWA, 2007). In order to maintain Lion Canyon in a relatively natural state, prescriptive geomorphic controls have been designed to: (1) remedy uncontrolled vertical erosion; and (2) to incorporate a wider channel cross-section to support stormwater runoff that is currently constricted by channel incision. Therefore, the proposed design of Lion Canyon incorporates areas where grade control structure will be constructed within the natural channel. In other reaches, grade controls will be constructed to restore a more natural channel cross-section. In the lower-most portion just above the Santa Clara River confluence, the channel will be stabilized with a series of grouted boulder and soil cement step-pools to ensure a stable outlet of Lion Canyon to the River.

The following design recommendations for the Lion Canyon drainage have been taken from the Draft EIS/EIR:

> To maximize vegetation, aquatic, and wildlife habitat and maintain a natural channel appearance, the design also proposes using a range of types of step-pool structures and armored riffles to accommodate the drops in channel elevation. Construction of these structures would likely include large boulders, soil cement, or concrete, and would mimic natural step-pool function and morphology in appearance and function. The final design will be developed according to the geomorphic basis of design.

A chart entitled, "Lion Canyon Geomorphic Description By Reach With Design Recommendations," found in **Appendix 10.0** of this report, summarizes the recommended treatments along Lion Canyon to meet the design criteria.

This design approach was applied to Alternatives 2, 3, 4, 5, and 6 to remedy existing geomorphic disequilibrium in Lion Canyon. Construction without geomorphic controls in Lion Canyon is not considered to be logistically practicable because uncontrolled erosion in Lion Canyon would result in continued geomorphic dysfunction and place adjacent infrastructure and development at risk to erosion and unstable geologic conditions. Therefore, an independent avoidance analysis of Lion Canyon was not conducted as part of this Special Study analysis.

To establish a geographic boundary and facilitate a meaningful analysis, an area was delineated surrounding each of these features termed a "Special Study Area." The Special Study Area boundaries were drawn to encompass the aquatic resource in question and all proposed land uses that would be affected by changes in the tributary drainage treatments. For example, where avoiding a drainage would render adjacent proposed urban land uses non-constructable due to inadequate flood protection and associated drainage setback requirements, those lands were encompassed within the Special Study Area for the drainage. **Figure 10-1** depicts the Special Study Area Locations within the RMDP Project area.

Within each Special Study Area, the Revised Initial LEDPA was used as the starting point for the examination of whether further avoidance would be practicable. **Figure 10-2** depicts the configurations of the Revised Initial LEDPA within the RMDP Project area. Modifications to the Revised Initial LEDPA were then developed within each area (termed "Sub-alternatives") that would incrementally reduce impacts to the aquatic environment, through increased avoidance, improved geomorphic stability, or other means. Generally, the Sub-alternatives considered included one or more configurations of the Revised Initial LEDPA with additional avoidance incorporated, a Sub-alternative avoiding fill of waters except as required to achieve and maintain long-term geomorphic channel stability, and a Sub-alternative avoiding fill of waters within the Special Study Area altogether.

The objective of each Special Study was to determine a least environmentally damaging practicable Sub-alternative for that area. This was accomplished by comparing the acreage of additional waters avoided and any associated increases in costs among all Sub-alternatives, while also considering the overall project purpose and any other significant environmental consequences of the Sub-alternatives. Costs and overall project purpose criteria were compared against the proposed RMDP (Alternative 2) to determine practicability, as this alternative conforms to the Specific Plan and represents fully meeting the overall project purpose. Likewise, the costs associated with Alternative 2 would be typical for a project of this type, and, therefore, are suitable for a comparative analysis to determine whether costs of a particular Sub-alternative would be reasonable.

The specific aquatic features identified for additional study comprise only a portion of the total RMDP site, and the criteria used to compare the various Sub-alternatives within each Special Study Area were therefore less detailed than those used to determine the Initial LEDPA in **Section 8.0** of this report. Specific screening criteria used to evaluate the practicability of the Sub-alternatives within each Special Study Area included:

- **Project Purpose** -- *Would the Sub-alternative meet the basic objectives of the Specific Plan?*
- **Costs** -- *Would the Sub-alternative create additional costs that are not reasonable -- i.e., exceed 5 percent per net developable acre? In addition, as described below, costs in excess of that amount will be reviewed to determine if they are reasonable given the resulting avoidance and, in some instances, weighed in light of overall costs.*
- **Impacts to the aquatic environment** -- *Would the Sub-alternative result in substantially less impact to the aquatic environment than the Revised Initial LEDPA?*
- **Other Significant Environmental Consequences** -- *Would the Sub-alternative result in other significant adverse environmental consequences that the Revised Initial LEDPA would not have?*

When conducting the Special Studies, one relevant consideration was whether additional minimization of impacts to waters of the United States, beyond the avoidance already contained in the Revised Initial LEDPA, was "appropriate and practicable" within the meaning of the section 404(b)(1) Guidelines. The preamble to the Guidelines provides, "steps which would be unreasonably costly or would be infeasible or which would accomplish only inconsequential reductions in impact need not be taken." Therefore, determining whether additional avoidance was reasonable required comparing the additional avoidance achieved by the Sub-alternatives -- beyond the avoidance already contained in the Revised Initial LEDPA -- to the additional cost or lost development potential necessary to achieve that additional avoidance. This was accomplished by comparing each Sub-alternative to the Revised Initial LEDPA. The additional cost per net developable acre of additional avoidance and the lost development acreage per acre of additional avoidance were calculated for each Sub-alternative and compared with the Revised Initial LEDPA. The use of the sub alternative area for the cost comparison is consistent with standard accounting principles for allocating cost and consistent with the Section 404(b)(1) Guidelines. It properly takes into consideration whether the cost of avoiding a specific area is reasonable under the guidelines by focusing in the incremental cost of the avoidance. Most of the sub-alternatives involve relatively small incremental changes and no further analysis beyond the sub-area is needed. However, the additional avoidance alternative for Potrero Canyon does involve a potential reduction in fill of approximately seven acres. For that alternative, the costs of achieving that avoidance is also examined in light of overall project costs.

After the least environmentally damaging Sub-alternative was identified for each Special Study Area, the Revised Initial LEDPA was revised to incorporate the selected Sub-alternatives and was screened one final time to ensure that the alternative remained practicable. The resulting alternative was determined to be the Draft LEDPA. Each Special Study Area is evaluated below. the Draft LEDPA determinations for each Special Study Area is presented in **Section 10.8** of this report.

10.2 UTILITY CORRIDOR SPECIAL STUDY AREA

The purpose of the Utility Corridor Special Study was to determine whether additional avoidance of waters of the United States within a portion of the Santa Clara River corridor, including an adjacent wetland area along the northern bank near between San Martinez Grande Canyon and Off-Haul Canyon. The Utility Corridor design is currently constrained by SR-126 to the north and the Santa Clara River and adjacent wetlands to the south. The Utility Corridor requires conventional bank protection for its entire length (approximately 3,000 linear feet) to protect it from unacceptable scour and damage that may be generated by Santa Clara River flood conditions results in 1.7 acres of permanent and 4.8 temporary impacts to the adjacent wetlands (special aquatic site) under the Initial and Revised Initial LEDPA. The Special Study Area for this analysis encompassed 77.6 acres, and is depicted graphically on **Figure 10-1**. In total, the Utility Corridor Special Study Area contains 16.5 acres of waters of the United. States., entirely comprised of jurisdictional wetlands.

Under the Revised Initial LEDPA (Special Study UT-1) there is 11.2 acres available for utility corridor development. This meets the overall project purpose to allow for the installation of necessary infrastructure (potable, agricultural, and recycled water pipelines; sewer; oil pipelines; and other utilities) along SR-126. **Figure 10-3** depicts the Revised Initial LEDPA within the Utility Corridor Special Study Area. The total development cost associated with the Utility Corridor is $4,205,808. As described above, the Revised Initial LEDPA permanently impacts 1.7 acres and temporarily impacts 4.8 acres of wetlands adjacent to the Santa Clara River, while avoiding 10.0 acres.

The Revised Initial LEDPA was studied with additional avoidance of impacts to the wetlands within the Utility Corridor Special Study Area (UT-2 Sub-alternative) and is depicted on **Figure 10-4**. The avoidance study evaluated specialized grading and retaining wall installation along the Utility Corridor to further avoid wetland impacts associated with the Revised Initial LEDPA. Under this configuration there are 10.2 acres available for the Utility Corridor development, and meets the overall project purpose. The UT-2 Sub-alternative has 1.0 acre of permanent and 4.0 acres of temporary wetland impacts, a 41 percent reduction in permanent impacts. The total development cost associated with the Utility Corridor additional avoidance is $6,528,808, an increase of $2,323,000 for 0.7 fewer acres of permanent impacts.

10.2.1 Conclusion

Although Sub-alternative UT-2 would represent a decrease in impacts to the aquatic environment compared to the Revised Initial LEDPA, this Sub-alternative is not impracticable due to unreasonable costs and minimal reduction in impacts. Under the 404(b)(1) guidelines an alternative is not practicable unless it has significantly less impacts to the aquatic ecosystem which is not the case here. For a detailed breakdown of the overall project purpose, cost, practicability, impacts, efficiency, and summary conclusion associated with the additional study of Utility Corridor, please refer to "Additional Study: Utility Corridor Special Study Area" chart found in **Appendix 10.0** of this report.

10.3 POTRERO CANYON SPECIAL STUDY AREA

The purpose of the Potrero Canyon Special Study was to determine whether additional avoidance of waters of the United. States., including cismontane alkali marsh wetlands, was practicable within Potrero Canyon, a perennial/intermittent tributary to the south bank of the Santa Clara River within the RMDP site. The Special Study Area for this analysis encompassed 1,762.2 acres, and is depicted graphically on **Figure 10-1**. In total, the Potrero Canyon Special Study Area contains 32.8 acres of waters of the United. States., comprised of 26.3 acres of non-wetland waters and 6.5 acres of jurisdictional wetlands. For a detailed breakdown of the overall project purpose, cost, practicability, impacts, efficiency, and summary conclusion associated with the additional study of Potrero Canyon , please refer to "Additional Study: Potrero Canyon Special Study Area" chart found in **Appendix 10.0** of this report.

10.3.1 Sub-Alternative PC-1: Revised Initial LEDPA

Under the Revised Initial LEDPA, the valley containing the existing channel of Potrero Canyon would be filled and developed, with the exception of approximately the downstream-most 0.5 mile, which would not be impacted. Within the filled portion, a soft-bottom, engineered channel would be constructed atop the fill material approximately following the alignment of the existing stream and connecting with the existing channel at the transition between the impacted and preserved segments. Within the Potrero Canyon Special Study Area, this Sub-alternative would facilitate 799.5 net developable acres of urban land uses (commercial, residential, and public facilities) at a cost of $1,059,687 per net developable acre. This Sub-alternative would result in permanent impacts to 22.7 acres of waters of the United States (18.2 acres of non-wetland waters and 4.5 acres of wetlands, including both permanent and temporary impacts) within Potrero Canyon. The land uses and channel configuration proposed under Sub-alternative PC-1 are depicted graphically on **Figure 10-5**. The Revised Initial LEDPA would be practicable and would meet the overall project purpose, as described in **Section 9.0** of this report.

10.3.2 Sub-Alternative PC-2: Revised Initial LEDPA Plus Additional Avoidance

This Sub-alternative would seek to lessen impacts to waters of the United States within Potrero Canyon by limiting the proposed "valley fill" to the upstream portion of the drainage, avoiding the wetland areas in the canyon. Grade controls would be utilized under this Sub-alternative, and installed at periodic intervals within the unfilled portion of the drainage. Lessening the extent of the valley fill would reduce the amount of buildable space in this Special Study Area under Sub-alternative PC-2, and land uses would be adjusted to accommodate this change. The land uses and channel configuration proposed under Sub-alternative PC-2 are depicted graphically on **Figure 10-6**.

10.3.2.1 Project Purpose

Incorporation of the additional avoidance proposed under Sub-alternative PC-2 would result in 769.1 net developable acres within the Potrero Canyon Special Study Area, a decrease of 124.7 acres (14.0 percent) compared with the proposed Project (Alternative 2). Because of the substantial decrease in net developable acreage associated with this Sub-alternative within the Potrero Canyon Special Study Area (greater than ten percent reduction), Sub-alternative PC-2 would contribute insufficient development to achieve the Specific Plan objectives; and, therefore, fail to meet the overall project purpose. Compared to the Revised Initial LEDPA, Sub-alternative PC-2 would result in 7.7 acres of additional avoidance (including 2.7 acres of additional wetland avoidance) and 30.4 acres of reduction in net developable acreage.

10.3.2.2 Cost

Implementation of Sub-alternative PC-2 would result in a development cost per net developable acre of $1,349,352 per acre, an increase of $322,908, which is a 31.5 percent cost increase compared to the proposed RMDP. As this cost increase substantially exceeds five percent, the costs associated with this Sub-alternative would not be approximately the same as those of the proposed Project. This cost is unreasonable even if it is viewed over the entire project as it would raise the overall cost per net developable acre to $1,117,000 per acre. This would be an increase of 7.2 percent compared to Alternative 2, well in excess of the cost criteria.

Compared to the Revised Initial LEDPA, Sub-alternative PC-2 would result in 7.7 acres of additional avoidance and a cost increase of $289,664 per net developable acre. The added cost attributed to this alternative is 190 million dollars or nearly 24 million dollars per acre. An increased cost of this magnitude is neither typical nor reasonable. This cost/benefit ratio further indicates that Sub-alternative PC-2 would be unreasonably costly and, therefore, not practicable.

10.3.2.3 Impacts To The Aquatic Environment

Sub-alternative PC-2 would result in 18.16 acres of impacts (15.07 acres of permanent impacts and 3.09 acres of temporary impacts) to waters of the United States within the Potrero Canyon Special Study Area. Of this total, 1.0 acres of permanent impacts and 1.2 acres of temporary impacts would occur within wetlands. Overall, this would represent a 54 percent reduction in impacts compared to the proposed RMDP, and a 23 percent reduction compared to the Revised Initial LEDPA. With respect to wetlands only, Sub-alternative PC-2 would constitute a 83 percent reduction in permanent impacts compared to the proposed RMDP, and a 58 percent reduction compared to the Revised Initial LEDPA.

10.3.2.4 Other Significant Environmental Consequences

Sub-alternative PC-2 would not result in any significant environmental consequences exceeding those of the Revised Initial LEDPA.

10.3.2.5 Conclusion

Although Sub-alternative PC-2 would represent a substantial decrease in impacts to the aquatic environment compared to the Revised Initial LEDPA, this Sub-alternative would not contribute sufficient development to meet the overall project purpose, and would be impracticable due to unreasonable costs.

10.3.3 Sub-Alternative PC-3: Avoidance Plus Grade Stabilization

Under this Sub-alternative, placement of fill within the Potrero Canyon drainage would be avoided, with the exception of a series of grade control structures proposed within the existing channel. Portions of the existing channel are geomorphically unstable under existing conditions (refer to **Section 4.2** of the Draft EIS/EIR), and would continue to exhibit excessive channel incision and scour if grade stabilization was not addressed in the post-Project condition. Sub-alternative PC-3 would not include widespread filling of the Potrero Valley during site preparation, as is proposed under the Revised Initial LEDPA, and would instead favor a more surgical approach that would allow substantially greater avoidance. The land uses and channel configuration proposed under Sub-alternative LC-3 are depicted graphically on **Figure 10-7**. For a detailed breakdown of the overall project purpose, cost, practicability, impacts, efficiency, and summary conclusion associated with the additional study of Potrero Canyon Sub-alternatives, please refer to "Additional Study: Potrero Canyon Special Study Area" chart found in **Appendix 10.0** of this report.

10.3.3.1 Project Purpose

If the Project were constructed incorporating the additional avoidance proposed under Sub-alternative PC-3, urban development would be facilitated on 709.7 net developable acres within the Potrero Canyon Special Study Area, a decrease of 184.1 acres (20.6 percent) compared to the proposed Project (Alternative 2). Compared to the Revised Initial LEDPA, Sub-alternative PC-3 would result in 21.1 acres of additional avoidance and 89.8 acres less net developable acreage.

10.3.3.2 Cost

Implementation of Sub-alternative PC-3 would have an associated development cost of $1,481,463 per net developable acre, an 44.3 percent increase compared to the proposed RMDP. As this cost increase substantially exceeds five percent, the costs associated with this Sub-alternative would be impracticable due to unreasonable costs. Compared to the Revised Initial LEDPA, Sub-alternative PC-3 would achieve 21.1 acres of additional avoidance at an increased cost of $421,776 per net developable acre. This cost/benefit ratio further indicates that Sub-alternative PC-3 would be unreasonably costly and, therefore, not practicable.

10.3.3.3 Impacts To The Aquatic Environment

Sub-alternative PC-3 would result in 1.61 acres of permanent impacts and 0.53 acres of temporary impacts to waters of the United States (including 0.6 acres of permanent impacts and 0.2 acres of temporary impacts to wetlands) within the Potrero Canyon Special Study Area. Overall, this would represent a 92.8 percent reduction in impacts compared to the proposed RMDP, and a 91.1 percent reduction compared to the Revised Initial LEDPA. With respect to wetlands only, Sub-alternative PC-3 would constitute a 95 percent reduction in permanent impacts compared to the proposed RMDP, and a 64 percent reduction compared to the Revised Initial LEDPA.

10.3.3.4 Other Significant Environmental Consequences

Sub-alternative PC-3 would not result in any significant environmental consequences exceeding those of the Revised Initial LEDPA.

10.3.3.5 Conclusion

Although Sub-alternative PC-3 would represent a substantial decrease in impacts to the aquatic environment compared to the Revised Initial LEDPA, this Sub-alternative would not contribute sufficient development within the Potrero Canyon Special Study Area to meet the overall project purpose, and would be impracticable due to unreasonable costs.

10.3.4 Sub-Alternative PC-4: No Fill

Under this Sub-alternative, all placement of fill within the Potrero Canyon drainage would be avoided. Rather than filling or stabilizing the channel, Sub-alternative PC-4 would accommodate flood control requirements within the Potrero Canyon Special Study Area by locating proposed developed land uses sufficiently far from the channel banks to preclude the need for structural flood protection. The land uses and channel configuration proposed under Sub-alternative PC-4 are depicted graphically on **Figure 10-8**.

10.3.4.1 Project Purpose

With respect to the extent of urban development facilitated, Sub-alternative PC-4 would be identical to Sub-alternative PC-3, discussed above. If the Project were constructed avoiding the Potrero Canyon drainage channel as proposed under this Sub-alternative, urban development would be facilitated on 709.7 net developable acres within the Potrero Canyon Special Study Area, a decrease of 184.1 acres (20.6 percent) compared to the proposed Project (Alternative 2). Compared to the Revised Initial LEDPA, Sub-alternative PC-4 would result in 22.7 acres of additional avoidance and 89.8 acres less net developable acreage.

10.3.4.2 Cost

Implementation of Sub-alternative PC-4 would result in a development cost per net developable acre of $1,471,184, an 43.3 percent cost increase compared to the proposed RMDP. As this cost increase substantially exceeds five percent, the costs associated with this Sub-alternative would be impracticable due to unreasonable costs. Compared to the Revised Initial LEDPA, Sub-alternative PC-4 would result in 22.7 acres of additional avoidance and a cost increase of

$444,470 per net developable acre. This cost/benefit ratio further indicates that Sub-alternative PC-4 would be unreasonably costly and therefore not practicable.

10.3.4.3 Impacts To The Aquatic Environment

Sub-alternative PC-4 would not result in any permanent or temporary impacts to the Potrero Canyon drainage due to the placement of fill material, representing a 100 percent reduction of fill impacts compared to the proposed RMDP and the Revised Initial LEDPA. However, because portions of the channel are currently in a state of sediment imbalance, and because this Sub-alternative would not rectify the imbalance nor stabilize the drainage to prevent geomorphic changes, it is probable that unstable conditions such as channel incision and bank failures may manifest or become more severe in the future under this Sub-alternative causing long-term degradation of the avoided areas and causing downstream impacts due to increased sediment discharge. For more information, please refer to **Section 4.2** of the Draft EIS/EIR.

10.3.4.4 Other Significant Environmental Consequences

Sub-alternative PC-4 would not result in any significant environmental consequences exceeding those of the Revised Initial LEDPA, aside from those associated with the geomorphic stability of the channel, described above.

10.3.4.5 Conclusion

Although Sub-alternative PC-4 would represent a substantial decrease in impacts to the aquatic environment compared to the Revised Initial LEDPA, this Sub-alternative would not contribute sufficient development within the Potrero Canyon Special Study Area to meet the overall project purpose, and would be impracticable due to unreasonable costs.

10.3.5 Potrero Canyon Special Study Conclusion

Based on the analysis of the four Sub-alternatives considered above, additional avoidance of waters of the United States within the Potrero Canyon Special Study Area, beyond that incorporated in the Revised Initial LEDPA, would not be practicable.

10.4 CHIQUITO CANYON SPECIAL STUDY AREA

The purpose of the Chiquito Canyon Special Study was to determine whether additional avoidance of waters of the United States, was practicable within Chiquito Canyon, a large intermittent/ephemeral wash tributary to the north bank of the Santa Clara River within the RMDP site. The Special Study Area for this analysis encompassed 367.2 acres, and is depicted graphically on **Figure 10-1**. In total, the Chiquito Canyon Special Study Area contains 11.3 acres of non-wetland waters of the United States. No wetlands are present within this Special Study Area. For a detailed breakdown of the overall project purpose, cost, practicability, impacts, efficiency, and summary conclusion associated with the additional study of Chiquito Canyon, please refer to "Additional Study: Chiquito Canyon Special Study Area" chart found in **Appendix 10.0** of this report.

10.4.1 Sub-Alternative CH-1: Revised Initial LEDPA

Under the Revised Initial LEDPA, the existing channel of Chiquito Canyon would be somewhat straightened, and stabilized with buried soil cement bank protection, and would sustain permanent and temporary impacts. These impacts would be most severe in the downstream portion of the drainage, which would be dominated by permanent and temporary impacts, rather than the upstream portion, which would feature mostly temporary impacts and avoidance. Within the Chiquito Canyon Special Study Area, this Sub-alternative would facilitate 124.9 net developable acres of urban land uses (commercial, residential, and public facilities) at a cost of $1,149,978 per net developable acre. This Sub-alternative would result in impacts to 9.8 acres of non-wetland waters of the United States within Chiquito Canyon, including 4.6 acres of permanent impacts and 5.2 acres of temporary impacts. The land uses and channel configuration proposed under Sub-alternative CH-1 are depicted graphically on **Figure 10-9**. The Revised Initial LEDPA would be practicable and meet the overall project purpose, as described in **Section 9.0** of this report.

10.4.2 Sub-Alternative CH-2: Revised Initial LEDPA Plus Additional Avoidance

This Sub-alternative would seek to lessen impacts to waters of the United States within Chiquito Canyon by allowing a wider width for the channel in the post-Project condition, thereby limiting fill of the drainage. This expansion of the drainage corridor would reduce the amount of buildable space in this Special Study Area under Sub-alternative CH-2, and land uses would be adjusted to accommodate this change. The land uses and channel configuration proposed under Sub-alternative CH-2 are depicted graphically on **Figure 10-10**.

10.4.2.1 Project Purpose

Implementation of the Revised Initial LEDPA incorporating the additional avoidance proposed under Sub-alternative CH-2 would result in 126.6 net developable acres within the Chiquito Canyon Special Study Area, a decrease of 1.29 acres (1.01 percent) compared with the proposed Project (Alternative 2). This Sub-alternative would not substantially deviate from the objectives of the Specific Plan, and would allow development consistent with meeting the overall project purpose. Compared to the Revised Initial LEDPA, Sub-alternative CH-2 would result in 0.9 acres of additional avoidance and a 1.66-acre increase in net developable acreage.

10.4.2.2 Cost

Implementation of Sub-alternative CH-2 would result in a development cost per net developable acre of $1,187,693, a 4.1-percent cost increase compared to the proposed RMDP. Because this cost increase does not exceed five percent, costs associated with Sub-alternative CH-2 would be approximately similar to those of the proposed Project and this Sub-alternative would not be unreasonably costly. Compared to the Revised Initial LEDPA, Sub-alternative CH-2 would result in 0.9 acres of additional avoidance and a cost increase of $37,716 per net developable acre.

10.4.2.3 Impacts To The Aquatic Environment

Sub-alternative CH-2 would result in 7.3 acres of impacts (3.71 acres of permanent impacts and 3.56 acres of temporary impacts) to waters of the United States within the Chiquito Canyon Special Study Area. Overall, this would represent a 50 percent reduction in permanent impacts compared to the proposed RMDP, and a 13 percent reduction compared to the Revised Initial LEDPA.

10.4.2.4 Other Significant Environmental Consequences

Sub-alternative CH-2 would not result in any significant environmental consequences exceeding those of the Revised Initial LEDPA.

10.4.2.5 Conclusion

Sub-alternative CH-2 is not a practicable alternative because it would only result in 0.9 acres less impact to the aquatic environment than the Revised Initial LEDPA within the Chiquito Canyon Special Study Area at an additional cost of approximately $7 million, which is not considered "appropriate and practicable" within the meaning of the Guidelines.

10.4.3 Sub-Alternative CH-3: Avoidance Plus Grade Stabilization

Under this Sub-alternative placement of fill within the mainstem of the Chiquito Canyon drainage would be avoided, with the exception of a series of grade control structures proposed within the existing channel. Three small, first-order tributaries to the west bank would also be filled. The required bank stabilization under this Sub-alternative would be set back beyond the lateral limits of the Corps' jurisdiction, such that these facilities would not be constructed within waters of the United States. The land uses and channel configuration proposed under Sub-alternative CH-3 are depicted graphically on **Figure 10-11**.

10.4.3.1 Project Purpose

If the Project were constructed incorporating the additional avoidance proposed under Sub-alternative CH-3, urban development would be facilitated on 117.5 net developable acres within the Chiquito Canyon Special Study Area, a decrease of 10.4 acres (8.1 percent) compared to the proposed Project (Alternative 2). This Sub-alternative would not substantially deviate from the objectives of the Specific Plan, and would allow development consistent with meeting the overall project purpose. Compared to the Revised Initial LEDPA, Sub-alternative CH-3 would result in 4.4 acres of additional avoidance and 7.43 acres less net developable acreage.

10.4.3.2 Cost

Implementation of Sub-alternative CH-3 would have an associated development cost of $1,309,329 per net developable acre, a 14.8 percent increase compared to the proposed RMDP. As this cost increase substantially exceeds five percent, the costs associated with this Sub-alternative would be impracticable due to unreasonable. Compared to the Revised Initial LEDPA, Sub-alternative CH-3 would achieve 4.4 acres of additional avoidance at an increased cost of $159,351 per net developable acre. This cost/benefit ratio further indicates that Sub-alternative CH-3 would be unreasonably costly and, therefore, not practicable.

10.4.3.3 Impacts To The Aquatic Environment

In total, Sub-alternative CH-3 would result of 0.8 acres of impacts to non-wetland waters of the United States within the Chiquito Canyon Special Study Area, including 0.20 acres of permanent impacts and 0.63 acres of temporary impacts. Overall, this would represent a 97 percent reduction in permanent impacts compared to the proposed RMDP, and a 60 percent reduction compared to the Revised Initial LEDPA.

10.4.3.4 Other Significant Environmental Consequences

Sub-alternative CH-3 would not result in any significant environmental consequences exceeding those of the Revised Initial LEDPA.

10.4.3.5 Conclusion

Although Sub-alternative CH-3 would represent a substantial decrease in impacts to the aquatic environment compared to the Revised Initial LEDPA and allow for sufficient development within the Chiquito Canyon Special Study Area to meet the overall project purpose, this Sub-alternative would be impracticable due to unreasonable costs.

10.4.4 Sub-Alternative CH-4: No Fill

Under this Sub-alternative, all placement of fill within the mainstem of the Chiquito Canyon drainage would be avoided. However, the three first-order tributaries to the west bank of the drainage would be filled. Rather than filling or stabilizing the channel, Sub-alternative CH-4 would accommodate flood control requirements within the Chiquito Canyon Special Study Area by locating the required bank protection beyond the limits of waters of the United States. The land uses and channel configuration proposed under Sub-alternative CH-4 are depicted graphically on **Figure 10-12**.

10.4.4.1 Project Purpose

With respect to the extent of urban development facilitated, Sub-alternative CH-4 would be identical to Sub-alternative CH-3, discussed above. If the Project were constructed avoiding the Chiquito Canyon mainstem as is proposed under this Sub-alternative, urban development would be facilitated on 117.5 net developable acres within the Chiquito Canyon Special Study Area, a decrease of 10.4 acres (8.1 percent) compared to the proposed Project (Alternative 2). This Sub-alternative would not substantially deviate from the objectives of the Specific Plan, and allow development within the Chiquito Canyon Special Study Area consistent with meeting the overall project purpose. Compared to the Revised Initial LEDPA, Sub-alternative CH-4 would result in 4.4 acres of additional avoidance and 7.43 acres less net developable acreage.

10.4.4.2 Cost

Implementation of Sub-alternative CH-4 would result in a development cost per net developable acre of $1,303,244, a 14.3 percent cost increase compared to the proposed RMDP. As this cost increase substantially exceeds five percent, the costs associated with this Sub-alternative would be impracticable due to unreasonable costs. Compared to the Revised Initial

LEDPA, Sub-alternative CH-4 would result in 4.4 acres of additional avoidance and a cost increase of $153,266 per net developable acre. This cost/benefit ratio further indicates that Sub-alternative CH-4 would be unreasonably costly and, therefore, not practicable.

10.4.4.3 Impacts To The Aquatic Environment

Sub-alternative CH-4 would not result in any permanent or temporary impacts to the Chiquito Canyon drainage due to the placement of fill material, and would represent a 100 percent reduction of fill impacts compared to the proposed RMDP and the Revised Initial LEDPA. However, because portions of the channel are currently in a state of sediment imbalance, and because this Sub-alternative would not rectify the imbalance nor stabilize the drainage to prevent geomorphic changes, it is probable that unstable conditions such as channel incision and bank failures may manifest or become more sever in the future under this Sub-alternative. For more information, please refer to **Section 4.2** of the Draft EIS/EIR.

10.4.4.4 Other Significant Environmental Consequences

Sub-alternative CH-4 would not result in any significant environmental consequences exceeding those of the Revised Initial LEDPA, aside from those associated with the geomorphic stability of the channel, described above.

10.4.4.5 Conclusion

Although Sub-alternative CH-4 would represent a substantial decrease in impacts to the aquatic environment compared to the Revised Initial LEDPA and would allow for sufficient development within the Chiquito Canyon Special Study Area to meet the overall project purpose, this Sub-alternative would be impracticable due to unreasonable costs.

10.4.5 Chiquito Canyon Special Study Conclusion

Based on the analysis of the four Sub-alternatives considered above, additional avoidance of waters of the United States within the Chiquito Canyon Special Study Area, beyond that incorporated in the Revised Initial LEDPA, would be impracticable due to unreasonable costs.

10.5 LONG CANYON SPECIAL STUDY AREA

The purpose of the Long Canyon Special Study was to determine whether additional avoidance of waters of the United States was practicable within Long Canyon, an intermittent/ephemeral tributary to the south bank of the Santa Clara River within the RMDP site. The Special Study Area for this analysis encompassed 783.3 acres, and is depicted graphically on **Figure 10-1**. In total, the Long Canyon Special Study Area contains 5.7 acres of non-wetland waters of the United States. No wetlands are present within the Special Study Area.

10.5.1 Sub-Alternative LC-1: Revised Initial LEDPA

Under the Revised Initial LEDPA, the valley containing the existing channel of Long Canyon would be filled, and a soft-bottom, engineered channel would be constructed atop the fill material approximately following the alignment of the existing stream. Within the Special Study Area, this Sub-alternative would facilitate 339.5 net developable acres of urban land uses (commercial, residential, and public facilities) at a cost of $1,092,056 per net developable acre.

This Sub-alternative would result in permanent impacts to 5.7 acres of waters of the United States within Long Canyon. The land uses and channel configuration proposed under Sub-alternative LC-1 are depicted graphically on **Figure 10-13**. The Revised Initial LEDPA would be practicable and meet the overall project purpose, as described in **Section 9.0** of this report.

10.5.2 Sub-Alternative LC-2: Revised Initial LEDPA Plus Additional Avoidance

This Sub-alternative would seek to lessen impacts to waters of the United States within Long Canyon by avoiding a quarter-mile segment near the downstream end of the drainage. Surrounding land uses would be adjusted to accommodate this change, including expansion of an open area to the southwest to provide connectivity to the drainage. The land uses and channel configuration proposed under Sub-alternative LC-2 are depicted graphically on **Figure 10-14**. For a detailed breakdown of the overall project purpose, cost, practicability, impacts, efficiency, and summary conclusion associated with the additional study of Long Canyon, please refer to "Additional Study: Long Canyon Special Study Area" chart found in **Appendix 10.0** of this report.

10.5.2.1 Project Purpose

Incorporation of the additional avoidance proposed under Sub-alternative LC-2 would result in 327.3 net developable acres within the Long Canyon Special Study Area, a decrease of 32.2 acres (8.5 percent) compared with the proposed Project. This Sub-alternative would not substantially deviate from the objectives of the Specific Plan, and would allow development consistent with meeting the overall project purpose. Compared to the Revised Initial LEDPA, Sub-alternative LC-2 would result in 0.45 acres of additional avoidance and 12.2 acres of reduction in net developable acreage.

10.5.2.2 Cost

Implementation of Sub-alternative LC-2 would result in a development cost per net developable acre of $1,065,848, a 0.6 percent decrease compared to the proposed RMDP. This Sub-alternative, therefore, would not be unreasonably costly. Compared to the Revised Initial LEDPA, Sub-alternative LC-2 would result in 0.45 acres of additional avoidance and a cost savings of $26,208 per net developable acre. As it would be more cost-effective to implement than the Revised Initial LEDPA, Sub-alternative LC-2 would not be unreasonably costly. For a detailed breakdown of the overall project purpose, cost, practicability, impacts, efficiency, and summary conclusion associated with the additional study of Long Canyon Sub-alternatives, please refer to "Additional Study: Long Canyon Special Study Area" chart found in **Appendix 10.0** of this report.

10.5.2.3 Impacts To The Aquatic Environment

Sub-alternative LC-2 would result in 5.25 acres of impacts (5.24 acres of permanent impacts and 0.01 acres of temporary impacts) to non-wetland waters of the United States within the Long Canyon Special Study Area. This would represent a 8 percent reduction in permanent impacts compared to the proposed RMDP and the Revised Initial LEDPA.

10.5.2.4 Other Significant Environmental Consequences

Sub-alternative LC-2 would not result in any significant environmental consequences exceeding those of the Revised Initial LEDPA.

10.5.2.5 Conclusion

Sub-alternative LC-2 is a practicable alternative that would result in 0.45 acres less impact to the aquatic environment than the Revised Initial LEDPA without resulting in other significant environmental consequences.

10.5.3 Sub-Alternative LC-3: Avoidance Plus Grade Stabilization

Under this Sub-alternative, placement of fill within the Long Canyon drainage would be avoided, with the exception of fill associated with facilities and structures necessary for maintaining a stable channel grade. The channel is geomorphically unstable under existing conditions (refer to **Section 4.2** of the Draft EIS/EIR), and would continue to exhibit excessive channel incision and scour if grade stabilization was not addressed in the post-Project condition. Generally speaking, Sub-alternative LC-3 would represent a departure from the "valley fill" concept proposed under the initial LEDPA, and would instead favor a more surgical approach that would allow substantially greater avoidance. The land uses and channel configuration proposed under Sub-alternative LC-3 are depicted graphically on **Figure 10-15**.

10.5.3.1 Project Purpose

If the Project were constructed incorporating the additional avoidance proposed under Sub-alternative LC-3, urban development would be facilitated on 297.3 net developable acres within the Long Canyon Special Study Area, a decrease of 60.2 acres (16.9 percent) compared to the proposed Project. For a detailed breakdown of the overall project purpose, cost, practicability, impacts, efficiency, and summary conclusion associated with the additional study of Long Canyon Sub-alternatives, please refer to "Additional Study: Long Canyon Special Study Area" chart found in **Appendix 10.0** of this report. Compared to the Revised Initial LEDPA, Sub-alternative LC-3 would result in 4.31 acres of additional avoidance and 42.2 acres less net developable acreage.

10.5.3.2 Cost

Implementation of Sub-alternative LC-3 would result in a development cost per net developable acre of $1,259,261, a 18.8 percent increase compared to the proposed RMDP. As this cost increase substantially exceeds five percent, the costs associated with this Sub-alternative would be impracticable due to unreasonable costs. Compared to the Revised Initial LEDPA, Sub-alternative LC-3 would result in 4.31 acres of additional avoidance and a cost increase of $199,455 per net developable acre. This cost/benefit ratio further indicates that Sub-alternative LC-3 would be unreasonably costly, and, therefore, not practicable.

10.5.3.3 Impacts To The Aquatic Environment

Sub-alternative LC-3 would result in 1.39 acres of permanent impacts and no temporary impacts to non-wetland waters of the United States within the Long Canyon Special Study

Area. This would represent a 75.6 percent reduction in permanent impacts compared to the proposed RMDP and the Revised Initial LEDPA.

10.5.3.4 Other Significant Environmental Consequences

Sub-alternative LC-3 would not result in any significant environmental consequences exceeding those of the Revised Initial LEDPA.

10.5.3.5 Conclusion

Although Sub-alternative LC-3 would represent a substantial decrease in impacts to the aquatic environment compared to the Revised Initial LEDPA, this Sub-alternative would not contribute sufficient development to meet the overall project purpose, and would be impracticable due to unreasonable costs.

10.5.4 Sub-Alternative LC-4: No Fill

Under this Sub-alternative, all placement of fill within the mainstem of the Long Canyon drainage would be avoided. A first-order tributary to the mainstem within the Special Study Area would be filled, however. Rather than filling or stabilizing the channel, Sub-alternative LC-4 would accommodate flood control requirements within the Long Canyon Special Study Area by locating proposed developed land uses sufficiently far from the channel banks to preclude the need for structural flood protection. The land uses and channel configuration proposed under Sub-alternative LC-4 are depicted graphically on **Figure 10-16.**

10.5.4.1 Project Purpose

With respect to the extent of urban development facilitated, Sub-alternative LC-4 would be identical to Sub-alternative LC-3, discussed above. If the Project were constructed avoiding the Long Canyon drainage channel as is proposed under Sub-alternative LC-4, urban development would be facilitated on 297.3 net developable acres within the Long Canyon Special Study Area, a decrease of 60.2 acres (16.9 percent) compared to the proposed Project (Alternative 2). For a detailed breakdown of the overall project purpose, cost, practicability, impacts, efficiency, and summary conclusion associated with the additional study of Long Canyon Sub-alternatives, please refer to "Additional Study: Long Canyon Special Study Area" chart found in **Appendix 10.0** of this report. Compared to the Revised Initial LEDPA, Sub-alternative LC-4 would result in 5.7 acres of additional avoidance and 42.2 acres less net developable acreage.

10.5.4.2 Cost

Implementation of Sub-alternative LC-4 would result in a development cost per net developable acre of $1,246,311, an 17.6 percent cost increase compared to the proposed RMDP. As this cost increase substantially exceeds five percent, the costs associated with this Sub-alternative would be impracticable due to unreasonable costs. Compared to the Revised Initial LEDPA, Sub-alternative LC-4 would result in 5.0 acres of additional avoidance and a cost increase of $186,505 per net developable acre. This cost/benefit ratio further indicates that Sub-alternative LC-4 would be unreasonably costly, and, therefore, not practicable.

10.5.4.3 Impacts To The Aquatic Environment

Sub-alternative LC-4 would no result in any permanent or temporary impacts to the Long Canyon drainage due to the placement of fill material, representing a 100 percent reduction of fill impacts compared to the proposed RMDP and the Revised Initial LEDPA. However, because the channel is currently in a state of sediment imbalance, and because this Sub-alternative would not rectify the imbalance nor stabilize the drainage to prevent geomorphic changes, it is probable that the headcutting and downcutting, channel incision, and bank failures evident within the channel would continue or worsen over time. For more information, please refer to **Section 4.2** of the Draft EIS/EIR.

10.5.4.4 Other Significant Environmental Consequences

Sub-alternative LC-4 would not result in any significant environmental consequences exceeding those of the Revised Initial LEDPA, aside from those associated with the geomorphic stability of the channel, described above.

10.5.4.5 Conclusion

Although Sub-alternative LC-4 would represent a substantial decrease in impacts to the aquatic environment compared to the Revised Initial LEDPA, this Sub-alternative would be impracticable due to unreasonable costs.

10.5.5 Long Canyon Special Study Conclusion

Based on the analysis of the four Sub-alternatives considered above, additional avoidance of waters of the United States within the Long Canyon Special Study Area, beyond that incorporated in the Revised Initial LEDPA, would be practicable, and should be implemented as described in the analysis of Sub-alternative LC-2, above.

10.6 SAN MARTINEZ GRANDE CANYON SPECIAL STUDY AREA

The purpose of the San Martinez Grande Canyon Special Study was to determine whether additional avoidance of waters of the United States, was practicable within San Martinez Grande Canyon, an intermittent/ephemeral tributary to the north bank of the Santa Clara River within the RMDP site. The Special Study Area for this analysis encompassed 130.8 acres, and is depicted graphically on **Figure 10-1**. In total, the San Martinez Grande Canyon Special Study Area contains 2.55 acres of non-wetland waters of the United States. No wetlands are present within this Special Study Area. For a detailed breakdown of the overall project purpose, cost, practicability, impacts, efficiency, and summary conclusion associated with the additional study of San Martinez Grande Canyon, please refer to "Additional Study: San Martinez Grande Canyon Special Study Area" chart found in **Appendix 10.0** of this report.

10.6.1 Sub-Alternative SMG-1: Revised Initial LEDPA

Under the Revised Initial LEDPA, the existing channel of San Martinez Grande Canyon would be straightened and stabilized with buried soil cement bank protection. Because the straightened channel would follow the same general alignment as the existing channel and would have a greater width, the majority of the impacts under this Sub-alternative would be temporary in nature. Permanent impacts to the drainage would be limited to two locations where road crossings are proposed. Within the San Martinez Grande Canyon Special Study Area, this Sub-alternative would facilitate 55.0 net developable acres of urban land uses (commercial, residential, and public facilities) at a cost of $1,202,336 per net developable acre. This Sub-alternative would result in impacts to 2.5 acres of non-wetland waters of the United States within San Martinez Grande Canyon, including 0.09 acres of permanent impacts and 2.4 acres of temporary impacts. The land uses and channel configuration proposed under Sub-alternative SMG-1 are depicted graphically on **Figure 10-17**. The Revised Initial LEDPA would be practicable and meet the overall project purpose, as described in **Section 9.0** of this report.

10.6.2 Sub-Alternative SMG-2: Revised Initial LEDPA Plus Additional Avoidance

This Sub-alternative would be substantially similar to the Revised Initial LEDPA, described above, but would feature greater avoidance and less temporary impacts at one bend near the downstream end of the channel. The acreage of roadways proposed under this Sub-alternative is reduced slightly to accommodate this change. The land uses and channel configuration proposed under Sub-alternative SMG-2 are depicted graphically on **Figure 10-18**.

10.6.2.1 Project Purpose

Implementation of the Revised Initial LEDPA incorporating the additional avoidance proposed under Sub-alternative SMG-2 would result in 55.0 net developable acres within the San Martinez Grande Canyon Special Study Area, a decrease of 3.4 acres (5.8 percent) compared with the proposed Project (Alternative 2). This Sub-alternative would not substantially deviate from the objectives of the Specific Plan, and would allow development within the San Martinez Grande Canyon Special Study Area consistent with meeting the overall project purpose. Compared to the Revised Initial LEDPA, Sub-alternative SMG-2 would result in 0.7 acres of additional avoidance, and not result in any change in net developable acreage, as the additional avoidance did not require land use adjustments.

10.6.2.2 Cost

Implementation of Sub-alternative SMG-2 would result in a development cost per net developable acre of $1,206,345, a 6.1 percent cost increase compared to the proposed RMDP. Because this cost increase exceeds five percent, costs associated with Sub-alternative SMG-2 would be higher than those of the proposed Project and would be impracticable due to unreasonable costs. Compared to the Revised Initial LEDPA, Sub-alternative SMG-2 would result in 0.1 acres less permanent impacts and a cost increase of $4,009 per net developable acre.

10.6.2.3 Impacts To The Aquatic Environment

Sub-alternative SMG-2 would result in 1.8 acres of impacts (0.2 acres of permanent impacts and 1.7 acres of temporary impacts) to waters of the United States within the San Martinez Grande Canyon Special Study Area. Overall, this would represent a 94 percent reduction in impacts compared to the proposed RMDP, and be approximately the same as the Revised Initial LEDPA.

10.6.2.4 Other Significant Environmental Consequences

Sub-alternative SMG-2 would not result in any significant environmental consequences exceeding those of the Revised Initial LEDPA.

10.6.2.5 Conclusion

Sub-alternative SMG-2 is a practicable alternative that would result in 0.02 acres less impact to the aquatic environment than the Revised Initial LEDPA within the San Martinez Grande Canyon Special Study Area without resulting in other significant environmental consequences. However, Sub-alternative SMG-2 is not practicable for the cost reasons discussed above.

10.6.3 Sub-Alternative SMG-3: Avoidance Plus Grade Stabilization

Under this Sub-alternative placement of fill within the San Martinez Grande Canyon drainage would be avoided, with the exception of four grade control structures proposed within the existing channel. The required bank stabilization under this Sub-alternative would be set back beyond the lateral limits of the Corps' jurisdiction, such that these facilities would not be constructed within waters of the United States. The land uses and channel configuration proposed under Sub-alternative SMG-3 are depicted graphically on **Figure 10-19**.

10.6.3.1 Project Purpose

If the Project were constructed incorporating the additional avoidance proposed under Sub-alternative SMG-3, urban development would be facilitated on 52.2 net developable acres within the San Martinez Grande Canyon Special Study Area, a decrease of 6.1 acres (10.6 percent) compared to the proposed Project (Alternative 2). Compared to the Revised Initial LEDPA, Sub-alternative SMG-3 would result in 1.7 acres of additional avoidance and 2.8 acres less net developable acreage.

10.6.3.2 Cost

Implementation of Sub-alternative SMG-3 would have an associated development cost of $1,412,179 per net developable acre, a 24.2 percent cost increase compared to the proposed RMDP. As this cost increase substantially exceeds five percent, the costs associated with this Sub-alternative would be impracticable due to unreasonable costs. Compared to the Revised Initial LEDPA, Sub-alternative SMG-3 would achieve 1.7 acres of additional avoidance at an increased cost of $275,225 per net developable acre. This cost/benefit ratio further indicates that Sub-alternative SMG-3 would be unreasonably costly and therefore not practicable.

10.6.3.3 Impacts To The Aquatic Environment

In total, Sub-alternative SMG-3 would not result in any permanent impacts to waters of the United States within the San Martinez Grande Canyon Special Study Area, and would result in 0.08 acres of temporary impacts to non-wetland waters. Overall, this would represent a 100 percent reduction in permanent impacts compared to the proposed RMDP, and a 5 percent reduction compared to the Revised Initial LEDPA.

10.6.3.4 Other Significant Environmental Consequences

Sub-alternative SMG-3 would not result in any significant environmental consequences exceeding those of the Revised Initial LEDPA.

10.6.3.5 Conclusion

Although Sub-alternative SMG-3 would represent a substantial decrease in impacts to the aquatic environment compared to the Revised Initial LEDPA, this Sub-alternative would be impracticable due to unreasonable costs.

10.6.4 Sub-Alternative SMG-4: No Fill

Under this Sub-alternative, all placement of fill within the San Martinez Grande Canyon drainage would be avoided. Rather than filling or stabilizing the channel, Sub-alternative SMG-4 would accommodate flood control requirements within the San Martinez Grande Canyon Special Study Area by locating the required bank protection beyond the limits of waters of the United States. The land uses and channel configuration proposed under Sub-alternative SMG-4 are depicted graphically on **Figure 10-20**.

10.6.4.1 Project Purpose

With respect to the extent of urban development facilitated, Sub-alternative SMG-4 would be identical to Sub-alternative SMG-3, discussed above. If the Project were constructed avoiding the San Martinez Grande drainage as is proposed under this Sub-alternative, urban development would be facilitated on 52.2 net developable acres within the San Martinez Grande Canyon Special Study Area, a decrease of 6.1 acres (10.6 percent) compared to the proposed Project (Alternative 2). Compared to the Revised Initial LEDPA, Sub-alternative SMG-4 would feature 2.5 acres of additional avoidance and 2.8 acres less net developable acreage.

10.6.4.2 Cost

Implementation of Sub-alternative SMG-4 would result in a development cost per net developable acre of $1,406,910, a 23.7 percent cost increase compared to the proposed RMDP. As this cost increase substantially exceeds five percent, the costs associated with this Sub-alternative would be impracticable due to unreasonable costs. Compared to the Revised Initial LEDPA, Sub-alternative SMG-4 would result in 2.5 acres of additional avoidance and a cost increase of $269,957 per net developable acre. This cost/benefit ratio further indicates that Sub-alternative SMG-4 would be unreasonably costly, and, therefore, not practicable.

10.6.4.3 Impacts To The Aquatic Environment

Sub-alternative SMG-4 would not result in any permanent or temporary impacts to the San Martinez Grande Canyon drainage due to the placement of fill material, and would represent a 100 percent reduction of fill impacts compared to the proposed RMDP and the Revised Initial LEDPA. However, because portions of the channel are currently in a state of sediment imbalance, and because this Sub-alternative would not rectify the imbalance nor stabilize the drainage to prevent geomorphic changes, it is probable that unstable conditions such as channel incision and bank failures may manifest or become more severe in the future under this Sub-alternative. For more information, please refer to **Section 4.2** of the Draft EIS/EIR.

10.6.4.4 Other Significant Environmental Consequences

Sub-alternative SMG-4 would not result in any significant environmental consequences exceeding those of the Revised Initial LEDPA, aside from those associated with the geomorphic stability of the channel, described above.

10.6.4.5 Conclusion

Although Sub-alternative SMG-4 would represent a substantial decrease in impacts to the aquatic environment compared to the Revised Initial LEDPA, this Sub-alternative would be impracticable due to unreasonable costs.

10.6.5 San Martinez Grande Canyon Special Study Conclusion

Based on the analysis of the four Sub-alternatives considered above, additional avoidance of waters of the United. States. within the San Martinez Grande Canyon Special Study Area, beyond that incorporated in the Revised Initial LEDPA, would be impracticable due to unreasonable costs.

10.7 MIDDLE CANYON SPECIAL STUDY AREA

The purpose of the Middle Canyon Special Study was to determine whether additional avoidance of waters of the United States, was practicable within Middle Canyon, a medium-sized, ephemeral tributary to the south bank of the Santa Clara River within the RMDP site. The Special Study Area for this analysis encompassed 556.4 acres, and is depicted graphically on **Figure 10-1**. In total, the Middle Canyon Special Study Area contains 7.4 acres of non-wetland waters of the United States, including 5.3 acres of non-wetland waters within the drainage itself, and an additional 2.1 acres of jurisdictional wetlands in the Middle Canyon Spring Complex, located immediately to the west of the canyon mouth. For a detailed breakdown of the overall project purpose, cost, practicability, impacts, efficiency, and summary conclusion associated with the additional study of Middle Canyon, please refer to "Additional Study: Middle Canyon Special Study Area" chart found in **Appendix 10.0** of this report.

10.7.1 Sub-Alternative MC-1: Revised Initial LEDPA

Under the Revised Initial LEDPA, the existing channel of Middle Canyon would be completely eliminated during the site grading process, and flows from the watershed would be conveyed by a buried storm drain system incorporated into the development. Only a segment of the drainage, approximately 250 feet in length, would be preserved. The Middle Canyon spring complex would be completely avoided, and no permanent or temporary impacts would occur in this area.

Within the Middle Canyon Special Study Area, this Sub-alternative would facilitate 283.9 net developable acres of urban land uses (commercial, residential, and public facilities) at an average cost of $1,145,479 per net developable acre. This Sub-alternative would result in impacts to 5.16 acres of non-wetland waters of the United States within the Middle Canyon drainage (all permanent impacts), and would not result in any impacts to the jurisdictional wetlands in the spring complex. The land uses and channel configuration proposed under Sub-alternative MC-1 are depicted graphically on **Figure 10-21**. The Revised Initial LEDPA would be practicable and would meet the overall project purpose, as described in **Section 9.0** of this report.

A Revised Initial LEDPA with Additional Avoidance Study was conducted for Middle Canyon and is presented in **Appendix 10.0**. However, a detailed description is not provided here because it does not result in additional avoidance of waters and/or wetlands per se. The Additional Avoidance study contemplated a design that further "buffered" the Middle Canyon Spring complex from temporary impacts through changes to the Commerce Center Drive bridge design. The additional cost was approximately $5,117 per net developable acre, but did not result in any additional avoidance of Middle Canyon Spring wetlands (already 100 percent avoided under the Revised Initial LEDPA); therefore, it was not carried forward in the Middle Canyon Special Study Sub-alternative analysis.

10.7.2 Sub-Alternative MC-2: Avoidance Plus Grade Stabilization

Under this Sub-alternative, placement of fill within the Middle Canyon drainage would be avoided, with the exception of road crossings and a series of grade control structures proposed within the existing channel. Bank stabilization would be required for flood protection under this Sub-alternative, but would be constructed beyond the lateral limits of the Corps' jurisdiction, such that these facilities would not be constructed within waters of the United States. The land uses and channel configuration proposed under Sub-alternative MC-2 are depicted graphically on **Figure 10-22**.

10.7.2.1 Project Purpose

If the Project were constructed incorporating the additional avoidance proposed under Sub-alternative MC-2, there would be 240.4 net developable acres within the Middle Canyon Special Study Area, a decrease of 61.5 acres (20.4 percent) compared to the proposed Project (Alternative 2). Because of the substantial decrease in net developable acreage associated with this Sub-alternative within the Middle Canyon Special Study Area (greater than ten percent reduction). Compared to the Revised Initial LEDPA, Sub-alternative MC-2 would result in 3.56 acres of additional avoidance and 43.5 acres less net developable acreage.

10.7.2.2 Cost

Implementation of Sub-alternative MC-2 would have an associated development cost of $1,709,827 per net developable acre, a 54.3 percent cost increase compared to the proposed RMDP. As this cost increase substantially exceeds five percent, the costs associated with this Sub-alternative would be impracticable due to unreasonable costs. Compared to the Revised Initial LEDPA, Sub-alternative MC-2 would achieve 3.56 acres of additional avoidance at an increased cost of $601,474 per net developable acre. This cost/benefit ratio further indicates that Sub-alternative MC-2 would be unreasonably costly, and, therefore, not practicable.

10.7.2.3 Impacts To The Aquatic Environment

In total, Sub-alternative MC-2 would result in 1.60 acres of permanent impacts to non-wetland waters of the United States within the Middle Canyon Special Study Area, and would not result in any temporary impacts. The Middle Canyon spring complex would be avoided, and this Sub-alternative would not result in any wetland impacts. Overall, Sub-alternative MC-2 would represent a 69.2 percent reduction in impacts compared to the proposed RMDP, and a 68 percent reduction compared to the Revised Initial LEDPA.

10.7.2.4 Other Significant Environmental Consequences

Sub-alternative MC-2 would not result in any significant environmental consequences exceeding those of the Revised Initial LEDPA.

10.7.2.5 Conclusion

Although Sub-alternative MC-2 would represent a substantial decrease in impacts to the aquatic environment compared to the Revised Initial LEDPA, this Sub-alternative would be impracticable due to unreasonable costs.

10.7.3 Sub-Alternative MC-3: No Fill

Under this Sub-alternative, all placement of fill within the Middle Canyon drainage would be avoided. Rather than filling or stabilizing the channel, Sub-alternative MC-3 would accommodate flood control requirements within the Middle Canyon Special Study Area by locating the required bank protection beyond the limits of waters of the United States. The land uses and channel configuration proposed under Sub-alternative MC-3 are depicted graphically on **Figure 10-23**.

10.7.3.1 Project Purpose

With respect to the extent of urban development facilitated, Sub-alternative MC-3 would be identical to Sub-alternative MC-2, discussed above. If the Project were constructed avoiding the Middle Canyon drainage as is proposed under this Sub-alternative, urban development would be facilitated on 240.4 net developable acres within the Middle Canyon Special Study Area, a decrease of 61.5 acres (20.4 percent) compared to the proposed Project (Alternative 2). Compared to the Revised Initial LEDPA, Sub-alternative MC-3 would feature 5.16 acres of additional avoidance and 43.5 acres less net developable acreage.

10.7.3.2 Cost

Implementation of Sub-alternative MC-3 would result in a development cost per net developable acre of $1,699,760, a 53.4 percent cost increase compared to the proposed RMDP. As this cost increase substantially exceeds five percent, the costs associated with this Sub-alternative would be impracticable due to unreasonable costs. Compared to the Revised Initial LEDPA, Sub-alternative MC-3 would result in 5.16 acres of additional avoidance and a cost increase of $591,407 per net developable acre. This cost/benefit ratio further indicates that Sub-alternative MC-3 would be unreasonably costly and, therefore, not practicable.

10.7.3.3 Impacts To The Aquatic Environment

Sub-alternative MC-3 would not result in any permanent or temporary impacts to the Middle Canyon drainage due to the placement of fill material, and would represent a 100 percent reduction of fill impacts compared to the proposed RMDP and the Revised Initial LEDPA. However, because portions of the channel are currently in a state of sediment imbalance, and because this Sub-alternative would not rectify the imbalance nor stabilize the drainage to prevent geomorphic changes, it is probable that unstable conditions such as channel incision and bank failures may manifest or become more sever in the future under this Sub-alternative. For more information, please refer to **Section 4.2** of the Draft EIS/EIR.

10.7.3.4 Other Significant Environmental Consequences

Sub-alternative MC-3 would not result in any significant environmental consequences exceeding those of the Revised Initial LEDPA, aside from those associated with the geomorphic stability of the channel, described above.

10.7.3.5 Conclusion

Although Sub-alternative MC-3 would represent a substantial decrease in impacts to the aquatic environment compared to the Revised Initial LEDPA, this Sub-alternative would be impracticable due to unreasonable costs.

10.7.4 Middle Canyon Special Study Conclusion

Based on the analysis of the three Sub-alternatives considered above, additional avoidance of waters of the United States within the Middle Canyon Special Study Area, beyond that incorporated in the Revised Initial LEDPA, would be impracticable.

10.8 IDENTIFICATION OF DRAFT LEDPA

The preamble to the section 404(b)(1) Guidelines helps to reconcile practicability, and cost in particular, with the regulatory requirement to "minimize" impacts to aquatic resources. The preamble states, "[s]ection 320.10(d) uses the term 'minimize' to indicate that all reasonable reductions in impacts be obtained. As indicated by the 'appropriate and practicable' provision, steps which would be unreasonably costly or would be infeasible or which would accomplish only inconsequential reductions in impact need not be taken." Thus, an alternative that reduces impacts to an "inconsequential" degree in relation to its cost would not be "appropriate and practicable" and need not be taken.

Based on the analysis contained in this section, the following additional avoidance of waters of the United States is practicable, over and above that contained in the Revised Initial LEDPA.

- Santa Clara River at Utility Corridor Location - Revised Initial LEDPA only, further avoidance impracticable
- Potrero Canyon - Revised Initial LEDPA only, further avoidance impracticable
- Chiquito Canyon - Revised Initial LEDPA only, further avoidance impracticable

- Long Canyon - Further avoidance practicable, LEDPA is Sub-alternative LC-2 (Revised Initial LEDPA with Additional Avoidance)
- San Martinez Grande Canyon -Revised Initial LEDPA only, further avoidance impracticable
- Middle Canyon - Revised Initial LEDPA only, further avoidance impracticable

The least environmentally damaging Sub-alternatives identified above have been conglomerated to produce a site-wide LEDPA. It is concluded that this alternative, which results from the incorporation of the additional avoidance into the Revised Initial LEDPA, is the alternative that results in the least impact on the aquatic ecosystem and other environmental resources, while remaining capable of being implemented after taking into consideration cost, existing technology, and logistics in light of overall project purposes.

The Draft LEDPA as determined by this analysis (by special study area) is presented below in **Table 10-2**. **Table 10-2** also indicates which drainage-specific alternative configuration from the Draft EIS/EIR onsite alternatives is most comparable to the Draft LEDPA. The resultant RMDP configuration determined by the Draft LEDPA is depicted on **Figure 10-24**.

Although the Corps mitigation rule does not apply to this Project, a Draft Mitigation and Montioring Plan for Impacts to Waters of the United States has been prepared for the Draft LEDPA and identifies the timing, location and enhancement activity details associated with the phasing of compensatory mitigation for impacts to waters of the United States and wetlands under the jurisdiction of the Corps (**Appendix 11.0**).

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Table 10-2
Summary of Draft LEDPA Determinations by Sub-Alternative Study Area

Special Study Area / Aquatic Resource Area	Revised Initial LEDPA	Revised Initial LEDPA + Additional Avoidance	Revised Initial LEDPA + Grade Stabilization Only	Revised Initial LEDPA + No Fill	Comparable Draft EIS/EIR Alternative
	Is the Sub-Alternative the LEDPA for the study area?				
Utility Corridor	**Yes**	No	No	No	Alternatives 3, 4, 6 and 7
Potrero Canyon	**Yes**	No	No	No	Alternative 5
Chiquito Canyon	**Yes**	No	No	No	Alternative 5 / Alternative 7
Long Canyon	No	**Yes**	No	No	Alternative 7 corridor width, but reconstructed
San Martinez Grande Canyon	**Yes**	No	No	No	Alternative 5
Middle Canyon	**Yes**	No	No	No	Alternatives 2-5

11.0 ENVIRONMENTAL ANALYSIS OF LEDPA

11.1 OVERVIEW OF THE DRAFT LEDPA

The Draft LEDPA, shown in **Figure 10-24** is a modified version of Draft EIS/EIR Alternative 3 that includes additional avoidance of waters of the United States, increased spineflower preserve acreage in the Potrero, San Martinez Grande, Grapevine Mesa, and Airport Mesa areas, based on input received from CDFG, and larger riparian corridors within five major tributaries. As in Alternative 3, there would only be two bridges crossing the Santa Clara River (Commerce Center Drive Bridge and the Long Canyon Road Bridge). The Potrero Canyon Road Bridge would not be constructed, reducing impacts to jurisdictional waters and wetlands in the Santa Clara River and lower Potrero Canyon. In addition, a 19-acre wetland mitigation area would be established in lower Potrero Canyon, contiguous with the existing lower mesic meadow (cismontane alkali marsh). In two major tributary drainages, Long and Potrero canyons, most of the existing drainages would be filled and modified so that there would not be a loss of Corps jurisdiction. In the three other major tributary drainages, Lion, San Martinez Grande, and Chiquito canyons, the Draft LEDPA would incorporate limited channel grading to expand the drainage and adjacent riparian areas and realign their banks. The remainder of the jurisdictional areas in Lion, San Martinez Grande and Chiquito Canyon would be avoided. Overall, of the 660.1 acres of waters of the United States on the Project site, implementation of the Draft LEDPA would result in the permanent fill of 66.3 acres of waters of the United States (10 percent of the total site jurisdiction and is a 29 percent reduction versus the proposed Project). The Draft LEDPA would temporarily disturb 32.2 acres, which is 1.1 acres less than the proposed project (three percent less than the proposed Project). The mitigation associated with the Draft LEDPA would ensure a no net loss of acreage and functions and values of waters of the United States. Further, the Draft LEDPA also would comply with all of the mitigation measures required by CDFG under the streambed alteration program under Fish & Game Code sections 1602 and 1605.

11.2 DESCRIPTION OF REGULATED ACTIVITIES

11.2.1 RMDP Component Of The Draft LEDPA

Under the Draft LEDPA, infrastructure would be constructed in and adjacent to the Santa Clara River and tributary drainages within the Project area. A description of the infrastructure and related channel design elements is provided below.

Santa Clara River. **Figure 11-1** depicts the locations of the major RMDP infrastructure along the Santa Clara River relative to jurisdictional areas. **Table 11-1** summarizes the characteristics of this infrastructure.

As shown in **Figure 11-1**, one proposed bridge, Long Canyon Road Bridge, and one previously approved bridge, Commerce Center Drive Bridge, would be located across the main stem of the Santa Clara River. The Potrero Canyon Road Bridge has been eliminated under the Draft

LEDPA.[33] **Table 11-1** documents the length, width, and vertical clearance of the two bridges, as well as the number of piers supporting each bridge.

Buried bank stabilization would be installed in upland and riparian areas along approximately one-half of the north bank (18,811 lf) and one-third of the south bank (7,728 lf) of the Santa Clara River. Twenty-five storm drain outlets would be installed along the north bank and 10 such outlets on the south bank of the River (35 storm drain outlets total). The WRP outfall to the Santa Clara River also would be constructed. Geofabric bank protection is proposed on the north side of the Santa Clara River between San Martinez Grande Canyon and Chiquito Canyon for the utility corridor.

Figure 11-1 also depicts the proposed RMDP riparian/upland revegetation zones in green and the newly created river channel in blue.

Table 11-1
Draft LEDPA Santa Clara River Major RMDP Infrastructure

Santa Clara River Location	Bank Stabilization (lf)	Outlets (No.)	Bridges			
			Length (lf)	Width (lf)	Piers (No.)	Vertical Clearance (ft)
Bridges						
Commerce Center Drive Bridge	-	-	1,200	100	9	22
Long Canyon Road Bridge	-	-	980	100	9	31-40
Banks			-	-	-	-
North River Bank	18,811	25	-	-	-	-
South River Bank	7,728	10	-	-	-	-
Total	**26,539**	**35**	-	-	-	-

Source: RMDP, 2008.

Tributary Drainages. **Figure 11-2** through **Figure 11-7** illustrate the modified, converted, and preserved tributary drainages within the Project area under the Draft LEDPA. **Table 11-2** describes the characteristics of the tributary drainages. Overall, the Draft LEDPA would preserve 131,769 lf of on-site drainages, which is 54 percent of the total 242,049 lf of jurisdictional drainages on the Project site. The Draft LEDPA would modify 54,001 feet of on-site tributaries; convert 56,291 lf of tributary channel to buried storm drain; install 69,913 lf of bank stabilization; and provide three bridges over tributaries and 13 culvert road crossings over tributaries.

33 The Potrero Canyon Bridge was approved by Los Angeles County as part of the Specific Plan on May 27, 2003. Newhall will seek approval to delete this bridge from the Specific Plan and anticipates receiving that approval.

Chiquito Canyon. Under the Draft LEDPA, Chiquito Canyon would require stabilizing treatments to protect the channel and surrounding development from excessive vertical scour and lateral channel migration as shown on **Figure 11-3**. The existing drainage would remain mostly intact but would be permanently altered by construction of stabilization elements, including buried bank stabilization and grade stabilization structures. Approximately 5,722 lf of buried bank stabilization would be installed along the west bank and 7,069 lf of buried bank stabilization would be installed along the east bank of Chiquito Canyon. In addition, approximately 2,624 lf of drainage would be converted to buried storm drain. Three culverted road crossings would be installed along Chiquito Canyon to accommodate traffic circulation, and a culverted road extension would be installed for the Caltrans SR-126 road widening project.[34] **Table 11-2** summarizes the proposed changes.

San Martinez Grande Canyon. The Draft LEDPA proposes to construct a soft-bottom channel to incorporate the existing alignment of San Martinez Grande Canyon Road between SR-126 and the northern Project boundary as shown on **Figure 11-4**. Portions of the existing drainage would be permanently altered by construction of the modified tributary drainage, including buried bank stabilization and grade stabilizing structures. Approximately 3,686 lf of buried bank stabilization would be installed along the west bank and 2,558 lf of buried bank stabilization would be installed along the east bank of San Martinez Grande Canyon. As shown, one bridge and one culverted road crossing would be installed along San Martinez Grande Canyon to accommodate traffic circulation, and a culverted road extension would be installed for the Caltrans SR-126 road widening project. **Table 11-2** summarizes the proposed changes. Please refer to **Figure 11-4** for locations of the San Martinez Grande Canyon proposed RMDP tributary drainage features, including affected drainages/jurisdictional areas, and the development areas along San Martinez Grande Canyon.

Potrero Canyon. In Potrero Canyon, the Draft LEDPA would require bank stabilization along both sides of the Potrero Canyon drainage as shown on **Figure 11-5**. In the southeastern upstream reaches of Potrero Canyon, the existing drainage would be graded and flows would be converted to buried storm drain. At a point approximately four-fifths of the way up the drainage, from the drainage's mouth at the river, the storm drain would convey flows into a soft-bottom channel constructed approximately parallel to the existing drainage. Geotechnically stabilized earthen fill would be constructed in the upper two-thirds of Potrero Valley to support residential and commercial development, as well as a wide, reconstructed channel and riparian corridor. Bank stabilization would be constructed in upland areas, effectively widening the soft-bottom channel in this reach. The fill portion of Potrero Canyon would be discontinued immediately upstream of the mesic meadow, which meadow would remain preserved. Approximately 18,316 lf of Potrero Canyon would consist of reconstructed channel.

[34] In addition, as part of the Caltrans SR-126 road widening project, the existing six-lane bridge allowing SR-126 to cross the Castaic Creek drainage would be expanded to eight lanes.

One new bridge and three road crossing culverts would be constructed at approximately even intervals between the upstream end of the mesic meadow and just downstream of the point where the drainage begins to branch (see **Figure 11-5**). The Via Canyon portion of the upper Potrero Valley would be reconstructed as well. Grade stabilization structures are proposed along the entire length of the reconstructed soft-bottom channel. Approximately 17,202 lf of buried bank stabilization would be installed along the west bank, and 17,130 lf of buried bank stabilization would be installed along the east bank of Potrero Canyon. Approximately 9,389 lf of drainage would be converted to buried storm drain. **Table 11-2** summarizes the proposed changes.

Refer to **Figure 11-5** for locations of newly created drainage, preserved drainage area, permanent drainage impact areas, side drainage bank stabilization areas, and bridge/road crossing culvert locations relative to jurisdictional areas. **Figure 11-5** also shows the relationship of the proposed Potrero Canyon drainage modifications to the proposed Potrero spineflower preserve to the west.

Long Canyon. In Long Canyon, the Draft LEDPA proposes to reconstruct a wide, stabilized channel along the same general alignment as the existing drainage. The reconstructed Long Canyon channel would be graded on top of 10 to 30 feet of fill material within Long Canyon. The reconstructed channel includes numerous grade stabilization structures to ensure vertical stability and a wider channel and valley bottom to accommodate controlled, lateral migration within a revegetated corridor.

Under the Draft LEDPA, approximately 9,618 lf of Long Canyon would consist of reconstructed channel, while roughly 800 lf would be preserved and 961 lf would be converted to buried storm drain. There would be 8,040 lf of buried bank stabilization along the west bank, and 6,665 lf along the east bank of Long Canyon. The Draft LEDPA includes four road crossing culverts in Long Canyon, including a large fill-supported crossing for Magic Mountain Parkway. **Table 11-2** summarizes the proposed changes. Please refer to **Figure 11-6** for locations of the proposed infrastructure features, affected drainages/jurisdictional areas, and development areas along Long Canyon.

Lion Canyon. The main branch of Lion Canyon would be stabilized for its entire length, selectively regraded in some areas, and stabilized with grade control structures in others. Approximately 5,835 lf of the existing drainage would be permanently altered by construction of stabilizing elements. In addition, approximately 6,095 lf of drainage would be converted to buried storm drain.

There would be one major road crossing culvert to support Magic Mountain Parkway in the uppermost reach. An existing agricultural road crossing in the lower reach would remain and be converted for maintenance access to the water quality basin near the confluence with the Santa Clara River. **Table 11-2** summarizes the proposed changes. Please refer to **Figure 11-7** for locations of the proposed features, including affected drainages/jurisdictional areas, and the development areas along Lion Canyon.

Table 11-2
Draft LEDPA Tributary Drainage RMDP Infrastructure

Drainage Location	Drainage Modified (lf)	Drainage Converted to Buried Storm Drain (lf)	Bank Stabilization[1] (lf)		Preserved Drainage (lf)	Road Crossings	
			West Bank	East Bank		Bridges	Culverts
Modified Drainages							
Chiquito Canyon	8,004	2,624	5,722	7,069	1,432	1	2
Lion Canyon	5,835	6,095	-	-	-	-	1
Long Canyon	9,618	961	8,040	6,665	-	-	4
Potrero Canyon	18,316	9,389	17,202	17,130	11,989	1	4
San Martinez Grande Canyon	4,792	-	3,686	2,558	378	1	1
Unmodified/Converted Drainages							
Agricultural Ditch	-	1,479	-	-	329	-	-
Ayers Canyon[2]	147	-	-	-	2,317	0	1
Dead-End Canyon	-	1,931	-	-	-	-	-
Exxon Canyon	-	1,276	-	-	2,265	-	-
Homestead Canyon	-	609	-	-	-	-	-
Humble Canyon	-	421	-	-	5,116	-	-
Middle Canyon	-	7,375	-	-	211	-	-
Mid-Martinez Canyon	-	4,557	-	-	256	-	-
Off-Haul Canyon	-	5,764	-	-	3,014	-	-
Salt Canyon	7,290	-	-	1,841	101,470	-	-
Magic Mountain Canyon	-	6,111	-	-	-	-	-
Unnamed Canyon 1[3]	-	4,647	-	-	-	-	-
Unnamed Canyon 2	-	416	-	-	-	-	-
Unnamed Canyon A	-	-	-	-	1,293	-	-
Unnamed Canyon B	-	1,004	-	-	568	-	-
Unnamed Canyon C	-	402	-	-	869	-	-
Unnamed Canyon D	-	1,230	-	-	262	-	-
Totals	**54,001**	**56,291**	**34,650**	**35,263**	**131,769**	**3**	**13**

Notes:
1 The lf of bank stabilization does not necessarily reflect impacts to jurisdictional areas; it only provides the linear feet of bank protection to be installed along various tributary drainages, some of which is in upland areas.
2 The 147 lf of Drainage Modified is road crossing bridge/culvert-related.
3 Unnamed Canyons 1 and 2 are located within the Entrada planning area and are given a numerical designation to distinguish them from the four other unnamed canyons located within the Specific Plan area (i.e., Unnamed Canyons A-D).
Source: RMDP, 2008.

Other Drainages. One culverted road crossing would be constructed across the mouth of the Ayers Canyon drainage. No other drainage facilities would be constructed in Ayers Canyon. In addition, the existing six-lane bridge allowing SR-126 to cross the Castaic Creek drainage would be expanded to eight lanes.

11.2.2 SCP Component Of The Draft LEDPA

The spineflower preserve design identified in the Revised Initial LEDPA has been carried forward in the Draft LEDPA, as summarized in **Table 11-3** and depicted in **Figure 11-8**. This design would result in a greater level of spineflower protection than the proposed SCP, with increased preservation of occupied habitat and less loss when compared to the proposed Project. Within the preserves, spineflower management and monitoring actions would be the same as those described in the proposed SCP.

Figure 11-8 depicts the Draft LEDPA spineflower preserves relative to the connectivity between the preserves and the approved and proposed open space within the SCP study area. Refer to **Table 11-3**, which summarizes the Draft LEDPA spineflower preserve characteristics, including spineflower acreages proposed to be preserved and taken.

Table 11-3
Draft LEDPA Spineflower Preserve Summary

Preserve Area	Preserve Size (ac)	Spineflower Preserved (ac)	Spineflower Impacted (ac)	Percent Preserved (ac)	Percent Taken (ac)
Airport Mesa	68.52	5.31	3.05	63.5%	36.5%
Grapevine Mesa	65.75	4.02	0.86	82.4%	17.6%
Potrero	16.90	1.32	0.33	80.0%	20.0%
San Martinez Grande	69.20	2.29	-	100%	0.0%
Grand Total	**220.37**	**12.94**	**4.24(1)**	**75.3%**	**24.7%**

The Entrada preserve and Valencia Commerce Center spineflower population areas are outside of both the RMDP and the scope of the Corps' Section 404(b)(1) Alternatives Analysis; and, therefore, are not included in this summary.

Table 11-4 summarizes each of the Draft LEDPA proposed preserve areas and the preserve design elements, including the core or occupied spineflower population areas, the interior areas within the core that allow for expansion of the preserves, and the designated buffer, which represents the area within the preserve between the core perimeter and the outer preserve boundary or urban edge.

Table 11-4
Draft LEDPA Preserve Design

	Preserve Statistics		Preserve Design Elements		
Preserve Area	Proposed Preserve[1] (ac)	Cumulative Area Occupied[2] (ac)	Core[3]	Buffer[4]	Expansion[5]
Airport Mesa	68.52	5.31	26.16	18.82	23.54
Grapevine Mesa	65.75	4.02	9.01	37.33	19.41

Potrero	16.9	1.32	4.37	10.43	2.1
San Martinez Grande	69.2	2.29	8.24	26.17	34.79
Grand Total	**220.37**	**12.94**	**47.78**	**92.75**	**79.84**

Notes:
1 Proposed preserve is the total area within the preserve boundary.
2 Cumulative area occupied is the total area of mapped spineflower within the preserve between 2002 and 2007.
3 Core identifies the occupied/preserved populations interior to buffer area and preserve boundary.
4 Buffer represents the area within the preserve between the core perimeter and the preserve boundary (urban edge.)
5 Expansion area represents the area interior to the core that is not part of the cumulative area occupied.

The Entrada preserve and Valencia Commerce Center spineflower population areas are outside of both the RMDP and the scope of the Corps' Section 404(b)(1) Alternatives Analysis; and, therefore, are not included in this summary.

The spineflower preserve design for the RMDP area that is contained in the Draft LEDPA is subject to change based on further input from CDFG. CDFG is responsible for granting incidental take authorization under CESA for impacts to spineflower.

11.2.3 Summary Description of Development Facilitated by the Draft LEDPA

Figure 11-9 depicts the land uses that would be facilitated within the RMDP Area under the Draft LEDPA. The Draft LEDPA would provide 2,587.0 net developable acres, 19,812 residential units and 5.41 million square feet of commercial uses. **Table 11-5** describes the development facilitated under the Draft LEDPA in relation to the development approved under the Specific Plan.

Table 11-5
Development Facilitated by the Draft LEDPA

Land Use Category[1]	Acres	Res. (DU)[2]	Comm.[3] (MSF)[4]	Percent Res. Reduction (DU)[5]	Percent Comm. Reduction (MSF)[5]	Total Res. Reduction (DU)[5]	Total Comm. Reduction (MSF)[5]
Single-Family Residential	1,247.6	8,228	-	9.40%	-	853	-
Multi-Family Residential	973.6	11,584	-	1.86%	-	220	-
Commercial	224.2	-	5.41	-	2.49%	-	0.14
Public Facilities[6]	143.3	-	-	-	-	-	-
Subtotal - Net Developable Acreage	2,587.0						
Other Public Facilities	71.3	-	-	-	-	-	-
Open Space[7]	10,553.7	-	-	-	-	-	-
Subtotal RMDP Area	**13,212.0**	**19,812**	**5.41**	**5.14%**	**2.49%**	**1,073**	**0.14**

Notes:
1 In some instances, land use categories have been consolidated to simplify presentation of the land use data.
2 "DU" means development units
3 Commercial includes business park, office, retail, *etc.*
4 "MSF" means million square feet.
5 All reductions represent a comparison to the amount of development approved under the Specific Plan and included in the Proposed Project.
6 Public Facilities includes parks, schools, libraries, *etc.*
7 Open Space means natural (preserved) and manufactured open space, and includes the Specific Plan's High Country SMA/SEA 20, River Corridor SMA/SEA 23, Open Areas, spineflower preservations areas, and other specified open areas, primarily located within the Specific Plan's Estate Residential designation. Open Space does not include the Salt Creek area, adjacent to the Specific Plan boundary, comprised of about 1,517 acres. If the Salt Creek area is included, the total Open Space is approximately 10,462.8 acres (8,946 + 1,517 = 10,462.8).

Source: The Newhall Land and Farming Company, 2010.

11.3 ENVIRONMENTAL ANALYSIS OF THE DRAFT LEDPA

11.3.1 Impacts To The Aquatic Ecosystem

As explained above, the Draft LEDPA would affect the aquatic ecosystem by filling some jurisdictional waters, constructing bridges across the Santa Clara River, and installing bank stabilization in various locations. This section describes both the direct impacts of the proposed fill activities, as well as indirect impacts stemming from development that would be facilitated by the Draft LEDPA.

11.3.1.1 Effects On Chemical Characteristics Of The Aquatic Environment -- Overview

Under the Draft LEDPA, surface water quality would be directly impacted by construction activities, which would include removal of vegetation, grading, and trenching. However, the Draft LEDPA would be subject to regulatory requirements that would ensure that water quality standards are met and that water quality would not be significantly degraded.

11.3.1.1.1 Effects On Water Quality

The Draft LEDPA would have the potential to result in direct water quality impacts on waters of the United States caused by construction activities, which would include removal of vegetation, grading, and trenching. It also would have the potential to result in indirect effects on water quality associated with build-out of development.

Construction Activities. The Draft LEDPA's construction-related potential impacts on water quality would consist primarily of sediment (TSS and turbidity) and non-sediment related pollutants, such as nutrients, heavy metals, and certain pesticides, including legacy pesticides.

Implementation of erosion and sedimentation source control BMPs during construction would prevent significant erosion and sediment transport impacts from the Project site. The BMPs would also prevent the transport of other pollutants potentially entrained in the settlement. BMPs would be implemented in compliance with the Construction General Permit and the general waste discharge requirements in the Dewatering General WDRs or an individual WDR/NPDES permit specific to the Project dewatering activities. Water quality impacts would, therefore, not differ significantly from those of Alternative 3, which are described in greater detail in **Section 8** of this Alternatives Analysis and **Section 4.4**, Water Quality, of the EIS/EIR.

Long-term Effects Associated With Project Build-Out. The Draft LEDPA would facilitate development of 19,812 residential units and 5.41 million square feet of commercial uses, along with related public facilities and services, on 2,587.0 net developable acres. As a result of this development, runoff volume and most pollutant loads would be expected to increase, compared to existing conditions, while pollutant concentrations would be expected to decrease, with the exception of copper. All concentrations are predicted to be below benchmark criteria and within the range of observed concentrations in Santa Clara River Reach 5.

Concentrations of qualitatively assessed pollutants of concern would also be expected to increase, including hydrocarbons, MBAS, and possibly also pathogens, pesticides, trash and debris, and cyanide. However, none of the pollutants of concern are expected to significantly impact receiving waters, because they would be effectively reduced by implementation of the comprehensive site design/low impact development, source control, and treatment control BMPs specified in the Newhall Ranch Specific Plan Sub-Regional Stormwater Mitigation Plan.

Wastewater generated by the development would be treated in the Newhall Ranch WRP and used to supply distribution of recycled water throughout the Specific Plan area in the form of irrigation of landscaping and other approved uses. The NPDES Permit and WDRs for the Newhall Ranch WRP include effluent limitations that are protective of surface receiving water quality and designated beneficial uses.

Overall, long-term indirect effects on water quality from development would be substantially similar to the effects of Alternative 3, despite the reduction in development area associated with the Draft LEDPA. Those effects are described in greater detail in **Section 8** of this Alternatives Analysis and in **Section 4.4**, Water Quality, of the EIS/EIR.

11.3.1.1.2 Loss Of Biogeochemical Function

The Draft LEDPA would have the potential to result in a loss of biogeochemical function of waters of the United States on the Project site. This attribute measures the ability of wetland and riparian areas to perform specific processes such as maintenance of water quality, cycling of nutrients, retention of particulates, and export of organic carbon. The HARC biogeochemical score indicates the relative extent to which the on-site assessment reaches perform this function. Lost biogeochemical function due to the proposed fill was calculated by applying the HARC biogeochemical score as a weighting factor to the acreages filled. The fill from implementation of the proposed Draft LEDPA would result in the permanent loss of HARC biogeochemical-weighted acres slightly less than those calculated for the Initial LEDPA (permanent loss of 45.3 and temporary loss of 28.8 HARC biogeochemical-weighted acres versus the Initial LEDPA, which had losses of 46.3 and 29.4, respectively).

11.3.1.2 Effects On Physical Characteristics Of The Aquatic Environment - Overview

Impacts on physical components of the aquatic environment would generally consist of impacts related to fill of jurisdictional waters, impacts related to losses of stream and wetland functions and services, and impacts related to the geomorphic stability of the site's waters in the long term. Under the Draft LEDPA, these impacts generally would be less than those of the proposed RMDP.

11.3.1.2.1 Permanent And Temporary Fill Of Waters Of The United States

Of the 660.1 acres of waters of the United States on the Project site, implementation of the Draft LEDPA would result in the permanent fill of 66.3 acres of waters of the United States (10% of the total site jurisdiction and four percent less than the proposed Project). The Draft LEDPA would temporarily disturb an additional 32.2 acres (three percent less than the proposed Project). These temporary impacts would be associated with construction zones adjacent to proposed Project facilities, which would be restored and revegetated following completion of construction. In some instances temporary impacts would also result from restoration activities, *i.e.*, when such activities require earthwork to be conducted in jurisdictional areas (correction of existing incised channel banks, for example).

Avoidance. The Draft LEDPA would avoid 561.7 acres of waters of the U.S. within the RMDP site, which is 85 percent of the 660.1 acres of waters of the United States that occur on the site. For comparison, the proposed Project would avoid 81 percent of waters of the United States. Key avoided areas under the Draft LEDPA would include the majority of the Santa Clara River mainstem, the Middle Canyon spring complex (a high-quality wetland), and the Salt Creek sub-watershed. In addition, a cismontane alkali marsh in lower Potrero Canyon, which would be impacted under the proposed Project, would be avoided and linked with a 19-acre wetland mitigation site immediately upstream from the mesic meadow, creating one, nearly contiguous cismontane alkali marsh wetland area in lower Potrero Canyon.

Fill in the Santa Clara River. Of the 471.2 acres of waters of the United States within the Santa Clara River mainstem on site, the Draft LEDPA would permanently impact 4.5 acres (a 70 percent reduction compared to the proposed Project), and temporarily disturb an additional

14.6 acres (a 22 percent reduction compared to the proposed Project). The permanent impact would be associated with the construction of two bridges across the river (one of which is already permitted) and would represent one percent of the total jurisdictional acreage in the river.

Fill in On-Site Tributary Drainages. Of the total 188.9 acres of waters of the United States within tributary drainages on site, the Draft LEDPA would permanently disturb 61.8 acres (a 21 percent reduction compared to the proposed Project), and would temporarily disturb an additional 17.6 acres (a 21 percent reduction compared to the proposed Project). This impact results from converting drainages to buried storm drains, eliminating existing drainages for realignment, and grading to accommodate site development. This impact would represent 33 percent of the total jurisdictional acreage in the on-site tributaries. The Draft LEDPA would generally affect all classes of tributaries on site (small and large tributaries), and no type of aquatic resource would be disproportionately affected.

Fill in Special Aquatic Sites. Implementation of the Draft LEDPA would permanently disturb 7.7 acres of wetlands (a 62 percent reduction compared to the proposed Project) and temporarily disturb an additional 11.4 acres (a two percent increase compared to the proposed Project). These impacts would occur primarily due to bridge construction along the Santa Clara River mainstem, but the proposed Project would also impact a cismontane alkali marsh wetland in middle Potrero Canyon. Elimination of the planned bridge across the river at Potrero Canyon Road would reduce impacts to wetlands along the river under the Draft LEDPA. In addition, the entire Salt Creek watershed and the Middle Canyon spring complex would be preserved and no permanent impacts to wetlands in those areas would occur. Additionally, the cismontane alkali marsh wetland in lower Potrero Canyon would be avoided. In total, the Draft LEDPA would avoid 93 percent of all wetlands on site, a five percent increase in wetland avoidance compared to the proposed Project.

11.3.1.2.2 Effects On Substrate And Sediment Dynamics

The Draft LEDPA could result in geomorphic impacts on waters of the United States caused by disruptions of the sediment equilibrium in the Santa Clara River mainstem and/or tributaries. In addition, the conversion of existing undeveloped lands to a non-erodible, urban condition would slightly reduce the available sand supply reaching the beaches in Ventura County. These effects would be substantially similar to those of Alternative 3 and would be minor.

Santa Clara River. The Draft LEDPA would involve the installation of facilities along the Santa Clara River that could increase sediment flows downstream during storm events, and could result in erosion and deposition impacts downstream. Under the Draft LEDPA, the total floodplain area subject to potentially erosive velocities, the downstream deposition characteristics, potential erosion of soils covering the proposed buried soil cement bank stabilization, and other geomorphic impacts to the Santa Clara River mainstem would be approximately the same as Alternative 3. Those impacts are minor and are described in greater detail in **Section 4.2**, Geomorphology and Riparian Resources, of the EIS/EIR under Alternative 3, which is the alternative most similar to the Draft LEDPA. Tables 11-6 and 11-7 summarize the change in Santa Clara River floodplain area (by vegetation type) subject to scour (distribution of flow velocities greater than 4 fps under the 2-year, 5-year,10-year, 20-year, 50-year, and 100-year flood events) for the Draft LEDPA, and provide a comparison to existing conditions and to Alternative 2. Generally, these changes in floodplain are subject to scour are minor, in comparison to Alternative 2. However, due to the additional bank stabilization setbacks designed into the Draft LEDPA, there are some additional floodplain areas of agricultural and disturbed land vegetation types that will be subjected to flows greater than 4 fps. As compared to Alternative 2, the Draft LEDPA would generally subject less native riparian vegetation types (cottonwood-willow riparian forest, herbaceous wetlands, riverwash, and riparian scrub) to potential scour (flood flows greater than 4 fps).

***Tributaries*.** Under the Draft LEDPA, tributary drainages with modified or reconstructed channels would be designed to ensure that the channels remain geomorphically stable in the post-development condition. Geomorphic impacts in the tributaries would not differ significantly from those of Alternative 3, which are minor and are described in greater detail in **Section 4.2**, Geomorphology and Riparian Resources, of the EIS/EIR.

***Beach Replenishment*.** The Draft LEDPA would result in the conversion of currently undeveloped lands to a non-erodible, urban condition. The total acreage converted would be 4,452 acres. Effectively, this conversion would translate to an average loss of approximately 8,150 tons of sediment per year, or 21 percent of the river's total annual yield. Because this change is very small, the Draft LEDPA would not significantly affect recruitment of sand onto Ventura County beaches. For further information, please refer to **Section 4.2,** Geomorphology and Riparian Resources, of the EIS/EIR.

11.3.1.2.3 Loss Of Hydrologic Function

The Draft LEDPA would have the potential to result in a loss of hydrologic function of waters of the United States on the Project site. This attribute is affected by the source of water, the duration and magnitude of flows (hydroperiod), whether or not flows reach the floodplain, the presence of flow restrictions, the duration of water flows or ponding within the creek or on the floodplain, and the width of the floodplain. The HARC hydrology score indicates the relative extent to which the on-site assessment reaches perform this function. Lost hydrologic function due to the proposed fill was calculated by applying the HARC hydrology score as a weighting factor to the acreages filled. The fill from implementation of the proposed RMDP would result in the permanent loss of 46.5 HARC hydrology-weighted acres of waters of the United States (30 percent less than the proposed Project), and the temporary loss of 27.4 HARC hydrology-weighted acres (one percent less than the proposed Project).

In addition, under the Draft LEDPA, the floodplain area for the 100-year return event would be increased by 12.8 acres, resulting in a 100-year floodplain area of 1,296.7 acres within the Project area. Like the Proposed Project, the Draft LEDPA would be designed to comply with DPW and Los Angeles County design requirements for flood control, as well as the mitigation measures recommended in the Draft EIS/EIR for flood-related impacts. Please refer to **Section 4.1**, Surface Water Hydrology and Flood Control, of the EIS/EIR for a complete discussion of hydrology-related impacts under Alternative 3, which is the alternative most similar to the Draft LEDPA.

Table 11-6
Draft LEDPA Change in Floodplain Area by Vegetation Type where Velocity >4fps vs. Existing Conditions

Vegetation Type	Change in Flood Plain Area (Acres)					
	2 Year	5 Year	10 Year	20 Year	50 Year	100 Year
Agriculture	-0.2	3.0	5.6	3.8	-55.5	-89.5
Alluvial Scrub	0.0	0.0	0.0	0.0	0.1	0.2
Arroweed Scrub	0.0	0.0	0.0	0.0	0.0	0.1
Big Sagebrush Scrub	0.0	0.0	0.0	0.0	-0.1	0.0
California Annual Grassland	0.0	0.0	0.0	0.0	0.3	0.0
Undifferentiated Chaparral	0.0	0.0	0.0	0.0	0.0	0.0
California Sagebrush	0.0	0.0	0.0	0.0	0.0	0.0
California Sagebrush-California Buckwheat	0.0	0.0	0.0	0.0	0.0	0.0
California Sagebrush-Undifferentiated	0.0	0.0	0.0	0.0	0.0	0.0
California Sagebrush-Purple Sage	0.0	0.0	0.1	0.1	0.1	0.1
Cottonwood Willow Riparian Forest	-0.5	-1.0	-0.9	-1.3	0.8	-3.1
Burned California Sagebrush	0.0	0.0	0.1	0.1	0.2	0.5
Disturbed Cottonwood Willow Riparian Forest	0.0	0.1	0.1	0.1	0.2	0.1
Developed	0.0	0.0	0.0	0.0	0.0	0.0
Disturbed Land	-0.4	0.3	0.4	0.1	-1.1	-3.8
Disturbed Riparian Scrub	0.0	-0.1	-0.2	-0.1	-0.5	-0.3
Disturbed Southern Willow Scrub	0.0	0.0	0.0	0.0	0.0	0.0
Giant Reed	0.1	0.0	-0.1	-0.1	0.0	0.0
Herbaleous Wetlands	1.3	-0.6	0.7	-9.4	-2.1	-3.6
Live Oak Woodland	0.1	0.1	0.1	0.3	0.3	0.4
Mulefat Scrub	0.0	0.0	0.0	-0.2	-0.1	-1.5
Open Channel	0.0	0.0	0.0	0.0	0.0	0.0
Southern Coast Live Oak Riparian Forest	0.0	0.0	0.0	0.0	0.0	0.0
Ornamental	0.1	0.0	0.0	0.1	0.1	0.4
River Wash	2.0	0.0	1.4	0.3	3.9	0.7
Southern Willow Scrub	0.0	0.1	0.0	0.4	-0.4	-0.1
Tamarisk Scrub	0.0	0.1	0.0	0.0	0.0	0.0
Valley Oak Woodland	0.1	0.0	0.0	0.1	0.0	0.0
TOTAL CHANGE	**2.3**	**2.0**	**7.3**	**-5.6**	**-54.0**	**-99.4**

Source: PACE, 2010.

Table 11-7
Draft LEDPA Change in Floodplain Area by Vegetation Type where Velocity >4fps vs. Alternative 2

Vegetation Type	Change in Flood Plain Area (Acres)					
	2 Year	5 Year	10 Year	20 Year	50 Year	100 Year
Agriculture	-0.2	3.0	5.5	8.5	15.9	21.5
Alluvial Scrub	0.0	0.0	0.0	0.0	0.1	0.1
Arroweed Scrub	0.0	0.0	0.0	0.0	0.0	0.1
Big Sagebrush Scrub	0.0	0.0	0.0	0.0	-0.1	0.0
California Annual Grassland	0.0	0.0	0.0	0.0	0.0	-0.1
Undifferentiated Chaparral	0.0	0.0	0.0	0.0	0.0	0.0
California Sagebrush	0.0	0.0	0.0	0.0	0.0	0.0
California Sagebrush-California Buckwheat	0.0	0.0	0.0	0.0	0.0	0.0
California Sagebrush-Undifferentiated	0.0	0.0	0.0	0.0	0.0	0.0
California Sagebrush-Purple Sage	0.0	0.0	0.1	0.1	0.1	0.1
Cottonwood Willow Riparian Forest	-0.2	-1.1	-1.3	-1.1	0.3	-0.9
Burned California Sagebrush	0.0	0.0	0.1	0.1	0.3	0.5
Disturbed Cottonwood Willow Riparian Forest	0.0	0.1	0.1	0.2	0.2	0.1
Developed	0.0	0.0	0.0	0.0	0.0	0.0
Disturbed Land	-0.3	0.2	0.3	0.4	2.7	4.9
Disturbed Riparian Scrub	-0.1	-0.2	-0.2	-0.1	-0.3	-0.3
Disturbed Southern Willow Scrub	0.0	0.0	0.0	0.0	0.0	0.0
Giant Reed	0.1	0.0	-0.1	-0.1	-0.1	0.0
Herbaleous Wetlands	2.1	-0.7	1.4	-10.9	-1.4	-2.5
Live Oak Woodland	0.0	0.1	0.1	0.3	0.4	0.4
Mulefat Scrub	0.0	0.0	0.0	0.1	0.5	1.0
Open Channel	0.0	0.0	0.0	0.0	0.0	0.0
Southern Coast Live Oak Riparian Forest	0.0	0.0	0.0	0.0	0.0	0.0
Ornamental	0.1	0.0	0.0	0.1	0.1	0.4
River Wash	2.0	-0.3	1.2	-0.2	2.8	1.9
Southern Willow Scrub	0.0	0.1	0.3	0.6	0.9	1.6
Tamarisk Scrub	0.0	0.1	0.0	0.0	0.0	0.0
Valley Oak Woodland	0.0	0.0	-0.1	-0.1	-0.1	0.0
TOTAL CHANGE	**3.5**	**1.3**	**7.4**	**-2.1**	**22.2**	**29.1**

Source: PACE, 2010.

11.3.1.3 Effects On Biological Characteristics Of The Aquatic Ecosystem

The Draft LEDPA would have impacts on biological resources, including sensitive vegetation communities, federally-listed species, and other selected special-status plant and wildlife species. The comparative quantitative and qualitative (where applicable) impacts resulting from the Draft LEDPA are described below.

11.3.1.3.1 Effects On Sensitive Aquatic And Riparian Plants And Wildlife

Potential impacts of the Draft LEDPA to individuals of wildlife species would be similar to those of Alternative 3, which are described in great detail in **Section 8.2** of this Alternatives Analysis and in **Section 4.5**, Biological Resources, of the Draft EIS/EIR. However, impacts to habitat for sensitive aquatic, semi-aquatic, and riparian plants and wildlife would be incrementally reduced in proportion to the reduced development facilitated under the Draft LEDPA. In addition, the Draft LEDPA would substantially reduce impacts to the southwestern pond turtle, which would have sustained significant and unavoidable impacts to habitat under the proposed Project because: (1) lower Potrero Canyon would become permanently unavailable for nesting, hatchling, and juvenile use; and (2) upland refugia during 100-year storm events would be lost due to construction of RMDP facilities in the area. Under the Draft LEDPA, lower Potrero Canyon would remain available to the pond turtle for these uses. For further information and species-specific discussions, please refer to **Section 8** of this Alternatives Analysis and **Section 4.5**, Biological Resources, of the EIS/EIR.

11.3.1.3.2 Loss Of Habitat Function

The Draft LEDPA would have the potential to result in a loss of habitat function of waters of the United States on the Project site. This attribute takes into account such factors as plant species diversity, percentage of native plant species, biological structure, and evidence of vegetation recruitment (*i.e.*, the presence of seedlings and/or saplings), and the width of the floodplain. The HARC habitat score indicates the relative extent to which the on-site assessment reaches perform this function. Lost habitat function due to the proposed fill was calculated by applying the HARC habitat score as a weighting factor to the acreages filled. The fill from implementation of the Draft LEDPA would result in the permanent loss of 33.9 HARC habitat-weighted acres (32 percent less than the proposed RMDP) and the temporary loss of 23.3 HARC habitat-weighted acres of water of the United States (10 percent less than the proposed RMDP).

11.3.1.3.3 Fish, Crustaceans, Mollusks, And Other Aquatic Organisms In The Food Web

Implementation of the Draft LEDPA could result in permanent physical changes to the Santa Clara River Corridor and surrounding watershed, including changes in hydrology and fluvial processes, that could affect suitable fish habitat. However, these changes are generally minor and does not result in a significant gain or loss of fish habitat. Tables 11-8 and 11-9 below provide summary analysis of changes to fish refugia (distribution of flow velocities less than 2 fps under the 2-year, 5-year,10-year, 20-year, 50-year, and 100-year flood events), within the Santa Clara River, in comparison to the existing conditions and those of Alternative 2.

Table 11-8
Summary of Fish Refugia (< 2 fps) by Flood Event
Existing Conditions / Alternative 2 / Draft LEDPA

Flood Event (return interval)	Natural Habitats (<2 fps)			Disturbed Areas (< 2 fps)			Total Fish Refugia Area (< 2 fps)		
	Existing Condition	Alternative 2	Draft LEDPA	Existing Condition	Alternative 2	Draft LEDPA	Existing Condition	Alternative 2	Draft LEDPA
	(Acres)	(Acres)	(Acres)	(Acres)	(Acres)	(Acres)	(Acres)	(Acres)	(Acres)
2	126.3	127.6	**128.1**	2.1	2.0	**4.4**	128.4	129.6	**132.5**
5	115.9	116.7	**120.0**	2.6	2.7	**6.6**	118.5	119.4	**126.6**
10	128.3	138.3	**121.6**	4.7	4.8	**4.5**	133.0	129.3	**126.1**
20	182.0	175.1	**190.4**	27.0	10.3	**15.2**	209.0	185.4	**205.6**
50	199.7	199.3	**185.9**	31.1	21.4	**22.5**	230.8	220.7	**208.4**
100	144.5	164.0	**148.7**	26.8	28.7	**24.6**	171.3	192.7	**173.3**

[1] Data presented herein reflects GIS source data, with very high data resolution. To facilitate the reader, values are rounded to the nearest 1/10th of an acre. Values reported as 0.0 may represent up to 0.04 acres.

Source: PACE (2010)

Table 11-9
Draft LEDPA Analysis of Change in Fish Refugia (<2 fps) by Flood Event

Flood Event (return interval)	Natural Habitats (<2 fps)		Disturbed Areas (<2 fps)		Total Change in Fish Refugia Area (< 2 fps)	
	Draft LEDPA change vs. Existing	Draft LEDPA change vs. Alternative 2	Draft LEDPA change vs. Existing	Draft LEDPA change vs. Alternative 2	Draft LEDPA change vs. Existing	Draft LEDPA change vs. Alternative 2
	(Acres)[1]	(Acres)	(Acres)	(Acres)	(Acres)	(Acres)
2	1.8	0.5	2.3	2.4	4.1	2.9
5	4.1	3.3	4.0	3.9	8.1	7.2
10	-6.7	-2.9	-0.2	-0.3	-6.9	-3.2
20	8.4	15.3	-11.8	4.9	-3.4	20.2
50	-13.8	-13.4	-8.6	1.1	-22.4	-12.3
100	4.2	-15.3	-2.2	-4.1	2.0	-19.4

[1] Data presented herein reflects GIS source data, with very high data resolution. To facilitate the reader, values are rounded to the nearest 1/10th of an acre. Values reported as 0.0 may represent up to 0.04 acres.

Source: PACE (2010)

Impacts to crustaceans, mollusks, and other aquatic organisms in the food web would be minor as the diversity of invertebrates in the substrate is generally low due to the substrate being dominated by sand and gravel. Impacts to these organisms under the Draft LEDPA would be caused by the changes in water quality, substrate and sediment dynamics, and hydrologic function as discussed in **Subsections 8.3.4.1.1, 8.3.4.2.2,** and **8.3.4.2.3** of this Alternatives Analysis. Therefore, there would not be large-scale changes in the distribution or abundance of aquatic organisms as a result of the Draft LEDPA.

11.3.1.3.4 Other Wildlife

The Draft LEDPA's impact upon non-sensitive species that could potentially occur within the aquatic ecosystem will be generally similar to effects on sensitive species of the same type (fishes, birds, *etc.*), as discussed above. More detailed information on these effects is found in **Section 4.5**, Biological Resources, of the EIS/EIR under Alternative 3, which is the alternative most similar to the Draft LEDPA.

11.3.1.3.5 Effects On Riparian Vegetation

Of the 324.0 acres of riparian vegetation communities within Corps jurisdiction on the Project site, the Draft LEDPA would permanently impact 30.3 acres and temporarily impact 15.5 acres of riparian vegetation. For comparison, the Proposed Project would permanently impact 49.7 and temporarily impact 14.2 acres of riparian vegetation. **Table 4.5-27** of the Draft EIS/EIR provides a detailed summary of overall impacts to riparian vegetation by floristic alliance; the impacts of the Draft LEDPA would be similar to the impacts of Alternative 3 as shown in that table.

11.3.1.4 Cumulative Effects On The Aquatic Ecosystem

Following incorporation of project-specific mitigation set forth in **Section 4.5**, Biological Resources, and **Section 4.6**, Jurisdictional Waters and Streams, of the Draft EIS/EIR, the Draft LEDPA would not result in a cumulative contribution to any significant aquatic ecosystem impacts. In addition, many of the mitigation measures proposed for the proposed Project, if adopted for other projects in the watershed, would further ensure that cumulative impacts on the aquatic ecosystem impacts remain less than significant. For further information, please refer to **Section 6.0**, Cumulative Impacts, of the EIS/EIR under Alternative 3, which is the alternative most similar to the Draft LEDPA.

11.3.1.5 Human Use Characteristics

As required by the section 404(b)(1) Guidelines (40 C.F.R. §§ 230.50 through 230.54), this section evaluates the potential loss of values that would result relative to human use characteristics including municipal and private water supplies, recreational and commercial fisheries, water-related recreation, aesthetics, and preserve areas.

11.3.1.5.1 Municipal And Private Water Supplies

The Draft LEDPA would not involve any activities that would render municipal or public water supplies unfit for consumption. The WRP associated with the Project would be designed to comply with applicable NPDES requirements, ensuring that downstream water quality would not be impaired. The Draft LEDPA would not affect the quantity of water passing through the site within the Santa Clara River and tributaries.

11.3.1.5.2 Recreational And Commercial Fisheries

The Draft LEDPA would not have an impact upon recreational or commercial fisheries on the site as it is private land, and such use of the site is not authorized. Potential effects upon water quality would be mitigated to comply with applicable standards such that the Draft LEDPA, if implemented, would not affect recreational or commercial fishing downstream of the Project area.

11.3.1.5.3 Water-Related Recreation

As stated in the previous section, the site is on private land, where water-related recreation use of the site is not authorized. Further, the Draft LEDPA would not result in off-site impacts to water quality or hydrologic function, and, therefore, water-related recreation upstream and downstream of the Project area would not be affected.

11.3.1.5.4 Aesthetics

The Draft LEDPA would establish a new urban community in a currently undeveloped area. (See **Section 4.15**, Visual Resources, of the Draft EIS/EIR.) However, visual impacts of the activities proposed within Corps jurisdiction would be largely confined to bridges, grade control structures, storm drain outlets, and similar facilities. These facilities would contrast with existing natural stream banks, but are not expected to result in significant adverse impacts to the aesthetic values of the jurisdictional areas overall. Proposed bank stabilization activities would cause a substantial change in the appearance of jurisdictional areas during construction, but because the stabilization would be buried and revegetated, these impacts are considered temporary. In addition, the Draft LEDPA contemplates substantial on-site creation and restoration, which would largely replace lost habitat values. Furthermore, the proposed activities take place in the context of a master-planned community, which would integrate the resources with the community. Therefore, the Draft LEDPA would not cause significant adverse impacts to aesthetic values of waters of the United States.

11.3.1.5.5 Parks, National And Historical Monuments, National Seashores, Wilderness Areas, Research Sites, And Similar Preserves

The Draft LEDPA would not impact parks, national and historical monuments, national seashores, wilderness areas, research sites, or similar preserves, as the Project site is privately owned and does not contain any such designated features.

11.3.2 Other Significant Adverse Environmental Consequences

The purpose of this subsection is to identify areas where an alternative may have other (non-aquatic) significant adverse environmental consequences that would exclude it from consideration as the potential LEDPA, even if it had less impact on aquatic resources and was otherwise practicable.

11.3.2.1 Non-Aquatic Biological Resources

Because non-aquatic species do not typically occur within waters of the United States, impacts to these resources generally would be limited to indirect effects associated with build-out of the Specific Plan. The effects of the Draft LEDPA on non-aquatic biological resources would be similar to those of Alternative 3, but would be incrementally reduced, due to the reduction in development associated with the Draft LEDPA.

11.3.2.1.1 Effects On Sensitive Upland Vegetation Communities

Under the Draft LEDPA, impacts to oak woodlands within Corps jurisdiction would be the same as Alternative 3: 0.75 acres of permanent impacts. California walnut woodland, and native grasslands do not occur within Corps jurisdiction within the Project site.

11.3.2.1.2 Effects On Special-Status Terrestrial/Upland Plants And Wildlife

The impacts of the Draft LEDPA on special-status terrestrial species would be similar to, but slightly less than, Alternative 3, due to the reduced extent of upland development facilitated. Those impacts are discussed in **Section 8.2.5.1.2** and summarized in **Appendix 8.0** (Impacts on Sensitive Non-Aquatic Species) of this Alternatives Analysis. One exception is impacts to the San Emigdio blue butterfly. Under the Draft LEDPA, impacts to the colony in Potrero Canyon would be reduced by design changes that would not cause the colony to be permanently fragmented as it would be under the proposed Project. For more detailed analyses of effects on special-status species, please refer to **Section 4.5**, Biological Resources, of the EIS/EIR.

11.3.2.1.3 Effects On Wildlife Movement

The Draft LEDPA contemplates urban development in the RMDP area. Compared to the proposed Project, the Draft LEDPA would result in less overall development and install more bridge crossings instead of culverts. Although bridges within wildlife corridors present less of an obstacle than culverts, the suitability of the affected corridors is still constrained by adjacent development.

Under the Draft LEDPA, the Salt Creek corridor would accommodate north-south wildlife movement for all species guilds, and the east-west Santa Clara River corridor would remain viable for aquatic and low-mobility avian wildlife guilds since the two proposed bridges would not present a barrier to wildlife movement through the corridor. Wildlife movement constraints would be reduced with implementation of the proposed mitigation measures. For more information regarding effects on wildlife movement, please refer to **Section 4.5**, Biological Resources, of the EIS/EIR. Within that section, **Tables 4.5-23** and **4.5-74** summarize the impacts related to wildlife habitat linkages, movement corridors, and crossings.

11.3.2.2 Hazards, Hazardous Materials, And Public Safety

Under the Draft LEDPA, construction activities, including the temporary transport, storage, and use of potentially hazardous materials, would occur in the Project area, and potential impacts would be roughly proportional to the development area and intensity. The new urban population of approximately 54,879 residents would also place additional demand on emergency response services in the Project area. The Draft LEDPA would be adequately designed to respond to emergency evacuations, with four points of access to the north and east, thus allowing for safe access even without the Potrero Bridge. For further information, please refer to **Section 4.17**, Hazards, Hazardous Materials, and Public Safety, of the EIS/EIR.

11.3.2.3 Conclusion Regarding Significant Adverse Environmental Consequences

The Draft LEDPA would not result in any other significant adverse environmental consequences, which would exclude it from consideration as the LEDPA.

11.3.3 Mitigation

Although mitigation is not properly taken into account under the 404(b)(1) Guidelines in determining whether a project is the LEDPA, it is nonetheless a necessary and appropriate consideration for the Corps in assessing the net effects of a proposed project. The Draft LEDPA would incorporate extensive mitigation both on-site and off-site as provided for in both the Final EIS/EIR and as discussed in the Draft Mitigation and Monitoring Plan for Impacts to Waters of the United States (Appendix 11.0).

11.4 PRACTICABILITY AND IMPACTS OF THE DRAFT LEDPA

11.4.1 Project Purpose

The Draft LEDPA reduces total developable acreage by 13 percent compared to the proposed Project. Specifically, the residential development acreage is reduced by 13 percent (329.1 acres), and its corresponding unit count is reduced by five percent (1,073 units). Commercial acreage is reduced by 14 percent (37 acres), but commercial square footage is reduced by only three percent (140,000 square feet). Acreage for public facilities acreage is reduced by four percent (6.0 acres), while open space acreage increases by four percent (372.2 acres) compared to the proposed Project. There are no disproportionate impacts that threaten the viability of a Village. Therefore, the Draft LEDPA will still allow for development of the site consistent with the Basic Objectives of the Specific Plan. Additional detail regarding project Purpose is included in **Appendix 11.0**.

11.3.2 Logistics

The changes associated with the Draft LEDPA would not interfere with safe and efficient internal circulation and access to existing adjacent road networks. The Draft LEDPA would provide for adequate flood conveyance and detention, because their design is the same as the Revised Initial LEDPA or larger, to accommodate additional riparian enhancement and mitigation areas integrated into the Draft LEDPA design. Capacity for water treatment and reclamation would be unchanged from the Initial LEDPA and would be adequate. As with the Initial LEDPA, grading for the Draft LEDPA would balance on site, and, therefore, the Draft LEDPA would avoid major exports of grading spoils from the RMDP area that would result in other adverse impacts to the environment. Therefore, the Draft LEDPA would be logistically practicable. Additional detail regarding logistics is included in **Appendix 11.0**.

11.3.3 Cost

Total development costs for the Draft LEDPA would be $2,813,955,840, compared to $3,069,918,000 for the proposed Project. Cost per developable acre would increase by 4.9 percent, to $1,091,402 compared to the proposed Project. These costs are within five percent of the cost for the proposed Project and are reasonable for a project of this type. Additional detail regarding cost is included in **Appendix 11.0**.

11.3.4 Practicability Conclusion

Based on the analysis above, the Draft LEDPA is capable of achieving the project purpose and is practicable. No additional changes to the Draft LEDPA are necessary at this stage of the analysis. **Table 11-1**, below, provides a practicability and impacts summary for the Draft LEDPA. Additional detail regarding practicability is included in **Appendix 11.0**.

11.3.5 Permanent And Temporary Fill Of Waters Of The United States

Implementation of the Draft LEDPA would result in the placement of fill within waters of the United States. In total, this alternative would permanently fill 66.3 acres of waters of the United States (29 percent reduction in acreage compared to the proposed Project), and would temporarily disturb 32.2 acres (less than one percent reduction in acreage compared to the proposed RMDP). Temporary impacts would be associated with temporary construction zones adjacent to proposed Project facilities. Waters temporarily disturbed would be restored and revegetated after completion of construction in the area. In some instances temporary impacts would also result from restoration activities, *i.e.*, when such activities require earthwork to be conducted in jurisdictional areas (correction of existing incised channels or unstable banks, for example).

Table 11-1
Determination of the Draft LEDPA

Comparison of Determination Factors	Draft LEDPA
Does the alternative meet the Basic Objectives of the Specific Plan?	Yes
Is the alternative available and capable of being done, taking into consideration logistical constraints?	Yes
Is the alternative available and capable of being done, taking into consideration existing technology?	Yes
Would the costs associated with the alternative be reasonable for a project of this type?	Yes
Is the alternative practicable, taking into account the project purpose, logistics, available technology and cost?	Yes
Does the alternative have significantly less overall adverse impacts to the aquatic ecosystem than the proposed Project?	Yes
Does the alternative avoid causing other significant, adverse environmental effects that the Proposed Project does not have?	Yes
Among the practicable alternatives, which has the least impact to the aquatic ecosystem without other significant adverse environmental consequences?	Yes (Less impacts than Revised Initial LEDPA)
DRAFT LEDPA	**YES**

12.0 DETERMINATION OF COMPLIANCE WITH REQUIREMENTS ON DISCHARGE

In addition to ensuring that a project is the LEDPA, the Guidelines require the Corps to ensure that a project complies with the other discharge restrictions found at 40 C.F.R. § 230.10. This section analyzes the Project's compliance with these requirements of the Guidelines.

12.1 RESTRICTIONS ON DISCHARGE

First, the project must be the LEDPA. (40 C.F.R. § 230.10, subd. (a).) The remaining restrictions on discharge state that a project also must not:

- Cause or contribute to violations of any applicable State water quality standard;
- Violate any applicable toxic effluent standard or prohibition under CWA section 307;
- Jeopardize the continued existence of any species listed under the ESA or result in destruction or adverse modification of critical habitat; or
- Violate requirements imposed to protect any marine sanctuary.

(40 C.F.R. § 230.10, subd. (b).) In addition, the project must not cause or contribute to significant degradation of the waters of the United States, including causing significant adverse effects on:

- Life stages of aquatic life and other wildlife dependent on aquatic ecosystems;
- Aquatic ecosystem diversity, productivity, and stability; or
- Recreational, aesthetic, and economic values.

(40 C.F.R. § 230.10, subd. (c).) Finally, a project must include all appropriate and practicable steps that will minimize potential adverse impacts on the aquatic ecosystem. (40 C.F.R. § 230.10, subd. (d).)

Based on the Guidelines, the Corps must find that the proposed Project either would: (1) comply with the discharge restrictions; (2) comply with the restrictions, provided it incorporates "appropriate and practicable discharge conditions;" or (3) not comply. Non-compliance exists where: (i) there is a practicable alternative to the discharge that would have less adverse effect on the aquatic ecosystem; (ii) the proposed discharge would result in significant degradation of the aquatic ecosystem; (iii) the proposed discharge does not include all appropriate and practicable measures to minimize potential harm to the aquatic ecosystem; or (iv) the Corps has insufficient information to make a reasonable judgment as to whether the proposed discharge will comply with these Guidelines. (40 C.F.R. § 230.12, subd. (a).) The Corps' findings must reflect "factual determinations," required under the Guidelines, regarding the "potential short-term or long-term effects of a proposed discharge ... on the physical, chemical (*i.e.*, water quality), and biological components of the aquatic environment." (40 C.F.R. § 230.11.) The effects considered must include cumulative and indirect/secondary effects. (40 C.F.R. § 230.11, subds. (g)-(h).)

12.2 ANALYSIS OF PROJECT COMPLIANCE

As established by: (1) the information included in this Alternatives Analysis; (2) the EIS/EIR and other documents incorporated herein by reference; and (3) other studies and documents provided to the Corps, the LEDPA identified above would comply with the restrictions on discharge, based on the short-term and long-term effects on the physical, chemical, and biological components of the aquatic environment.

The analysis provided **Section 4.4**, Water Quality, of the EIS/EIR determined that with implementation of applicable regulatory requirements and proposed PDFs, the proposed Project and alternatives would not result in any significant surface water or groundwater quality impacts. In addition, the EIS/EIR, **Section 4.1**, evaluated impacts to surface water, hydrology, and flood control. **Section 4.2**, Geomorphology and Riparian Resources, provided an overview of the existing site conditions, and evaluated the potential hydraulic and hydromodification impacts on sensitive aquatic/riparian resources in the Santa Clara River Corridor and tributary drainages. Species-specific impacts in riparian and aquatic habitats also were analyzed in **Section 4.5**, Biological Resources. Impacts to jurisdictional waters through direct removal, filling, hydrological interruption, or other means were assessed in **Section 4.6**, Jurisdictional Waters and Streams. Based on the analysis in the EIS/EIR and this alternatives analysis, the Applicant expects that the RWQCB will certify that the LEDPA described in **Section 11.0** of this document would not cause or contribute to violations of any applicable water quality standards. This analysis also demonstrates that the LEDPA would not violate any applicable toxic effluent standard or prohibition under CWA section 307.

The EIS/EIR and this alternatives analysis thoroughly analyzed potential impacts to species listed as threatened or endangered under the federal ESA, as well as designated critical habitat. The potential impacts of the LEDPA are summarized in **Section 11.0**, above. Based on that analysis, the Applicant expects the USFWS to issue a biological opinion finding that the LEDPA would not jeopardize the continued existence of any federally-listed species or cause destruction or adverse modification of critical habitat. Further, the LEDPA would not affect any marine sanctuary, as none is located in or adjacent to the RMDP area and the Project would not significantly affect water quality or quantity upstream or downstream of the RMDP area.

Based on the analysis of impacts to the aquatic ecosystem summarized in **Section 11.0** of this report, as well as the analysis of the proposed Project and alternatives found in the EIS/EIR, the Applicant submits that the LEDPA would not cause or contribute to significant degradation of the waters of the United States, including causing significant adverse effects on life stages of aquatic life or other wildlife; aquatic ecosystem diversity, productivity and stability; or recreational, aesthetic, and economic values.

Finally, the LEDPA includes all appropriate and practicable steps to minimize potential adverse impacts on the aquatic ecosystem, as demonstrated by the evaluation of on-site alternatives in **Section 8.0** and the additional studies in **Section 10.0** of this report, which considered measures to provide additional avoidance of special aquatic sites, the Santa Clara River and each major tributary drainage. **Section 11.0** summarizes the avoidance and minimization measures incorporated into the LEDPA.

Based on the foregoing, the Applicant submits that the LEDPA complies with the 404(b)(1) Guidelines and with the restrictions on discharge found in 40 C.F.R. § 230.10.

FIGURES

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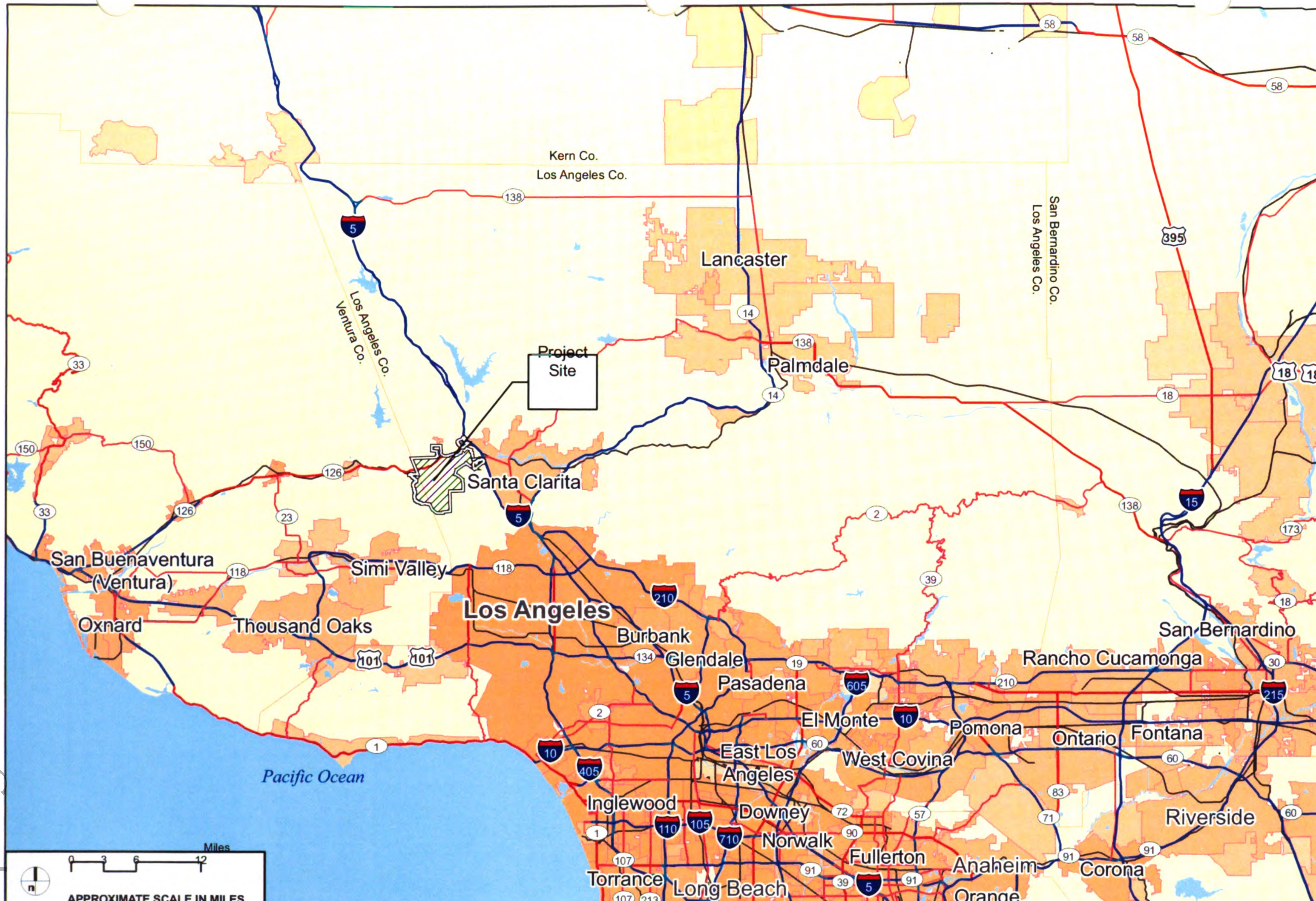

FIGURE 1-1

PROJECT VICINITY MAP